CANADA

DEPARTMENT OF MINES

MINES BRANCH

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ANNUAL REPORT

OF THE

DIVISION OF MINERAL RESOURCES AND STATISTICS

ON THE

MINERAL PRODUCTION OF CANADA

During the Calendar Years

1907 AND 1908

JOHN McLEISH, B.A.
Chief of the Division of Mineral Resources and Statistics

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To Dr. EUGENE HAANEL,
Director of Mines Branch,
Department of Mines, Ottawa.

SIR,—I beg to hand you herewith a report giving complete and revised statistical information descriptive of the mining and metallurgical production in Canada during the calendar years 1907 and 1908, the reports for the two years having been combined in one volume owing to the delay in the completion of the material for the 1907 report.

Preliminary reports on the mineral production during these years were sent to press February 27, 1908, and February 25, 1909, respectively, and issued within the following week in each case; while special articles on the subjects of iron and steel, coal, coke and peat, asbestos, chromite, petroleum, natural gas and cement, included as parts of the present report, have previously been issued as separate bulletins.

The preparation of the statistics and reviews has been altogether the work of the Division of Mineral Resources and Statistics, with the exception of the reviews on coal, coke and peat, natural gas, petroleum, mineral water, mineral pigments, mica, pyrites, phosphate and salt, for the careful preparation of which we are indebted to Mr. T. C. Denis of the Mines Branch staff.

Free use has been made of the reports published by the provincial Bureaus of Mines in the preparation of the material for this report, due acknowledgment being given in each case to the proper authority, and we are particularly indebted to the Provincial Mineralogist for the Province of British Columbia for advance details of the mineral production in that Province.

Grateful acknowledgment is made of the hearty co-operation of the mine and smelter owners, who have, with few exceptions, cheerfully complied with our demands and furnished us with statistics and information regarding their operations.

I have the honour to be, Sir,
Your obedient servant,

(Signed) JOHN McLEISH.

DIVISION OF MINERAL RESOURCES AND STATISTICS,
December 13, 1909.

10,084—1½

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EXPLANATORY NOTES.

The term ton, used throughout this report, signifies a ton = 2,000 pounds; while the year referred to means the calendar year unless otherwise stated. The Government fiscal year formerly ended on the 30th of June; but now terminates on the 31st of March. This change took place in 1907, hence the fiscal period ending March 31, 1907, covers only nine months.

Statistics of exports and imports given throughout this report are compiled from the reports of Trade and Navigation published by the Customs Department.

The term "production" used throughout this report may in general be interpreted as meaning the quantity sold or shipped. Mineral products mined or manufactured, but not sold or shipped at the end of the year, are not included as "production." An exception to this usage will be found in reference to pig iron, in which case the statistics of production represent the quantities made.

The values of the metallic minerals produced, whether refined in Canada or not, are calculated on the basis of the average market price of the metal for the current year in New York; the value of non-metallic products being given as at the mine or point of shipment. This differs from the practice of the Ontario and Quebec Bureaus of Mines. The value adopted by these Bureaus for metallic products is the value of these products at the point of production, as given by the producers. In the case of nickel the value given by the Ontario Bureau of Mines in 1908 is equivalent to 44·1 per cent of the final value of the metal; the value given to copper is 53·6 per cent of the final value; while the value given to the silver is 86·7 per cent of the final value. The silver is all shipped from the mine as ore or concentrates; while the nickel and copper are reduced at the mine by the operating companies to a high grade Bessemer matte. In British Columbia the custom of the Provincial Bureau of Mines is to value the lead at 90 per cent, the silver at 95 per cent, and the copper at 100 per cent of the average prices for the year in the New York metal market. The Provincial Bureau of Mines of Nova Scotia does not place a value upon the production, being content with publishing quantities only.

The calculation of the quantities of metal production is, however, another important example of lack of uniformity of method. This subject is referred to in the article on smelter production, and in the articles on copper and lead, etc., and need not be further discussed here.

It will be seen, therefore, that in comparing the statistics of mineral production published by different authorities it is very important to take into account the basis on which the figures are compiled, whether relating to quantity, or value, and to know whether or not, and to what extent, the statistics include the production of matte or metals from imported ores. The Province of Nova Scotia has a large iron and steel industry based to a large extent on imported iron ores; Quebec has an industry in the manufacture of aluminium based almost altogether on imported ores; while the iron smelting industry of Ontario is to a considerable extent based on both imported ores and fuels.

THE

MINERAL PRODUCTION OF CANADA

During the Calendar Years

1907 AND 1908.

INTRODUCTION.

A tabulated statement of the mineral production of Canada in 1907 and 1908 will be found on a subsequent page.

The revised statistics show the total value of the production in 1908 to be $85,927,802, as compared with a value of $86,865,202 in 1907; indicating a decrease in 1908 of $937,400, or a little over one per cent. A further analysis of the table will show a decrease in the value of the metallic production of over $650,000; a decrease in the value of the production of structural materials and clay products, chiefly in brick and lime, of over $1,150,000; and an increase in the value of *other non-metallic* products of over $860,000.

The growth of the annual mineral production since 1886, the first year for which complete statistics for the whole of Canada are available, is shown herewith. During the first ten years between 1886 and 1895 the production a little more than doubled; while during the next ten year period, the production was increased more than threefold. During the last three years the increase has been a little over 20 per cent.

Annual Mineral Production in Canada since 1886.

Year.	Value of Production.	Value per Capita.	Year.	Value of Production.	Value per Capita.
	$	$ cts.		$	$ cts.
1886	10,221,255	2 23	1898	38,412,431	7 32
1887	10,321,331	2 23	1899	49,234,005	9 27
1888	12,518,894	2 67	1900	64,420,983	11 98
1889	14,013,113	2 96	1901	65,804,611	12 25
1890	16,765,353	3 50	1902	63,211,634	11 55
1891	18,976,616	3 92	1903	61,740,513	11 03
1892	16,623,415	3 39	1904	60,073,897	10 36
1893	20,035,082	4 04	1905	69,525,170	11 42
1894	19,931,158	3 98	1906	79,057,308	12 51
1895	20,505,917	4 05	1907	86,865,202	13 35
1896	22,474,256	4 38	1908	85,927,802	12 37
1897	28,485,023	5 49			

Despite the decrease in total value in 1908, the mining industry was undoubtedly more actively prosecuted during that year. It is true that the general business depression of the year is particularly reflected in the decreased production of the structural materials, as well as in the general fall in the prices of metals; nevertheless the actual production of metals, from the point of view of tonnage, was much greater in 1908. In fact, had the metals copper, silver, lead, and nickel, maintained as high average prices in 1908 as in 1907, the total production in Canada in 1908 would have been worth over $8,000,000 more to the producers than was actually the case.

Comparative Statement of Mineral

	PRODUCT.		1907.	
			Quantity.	Value. (*d*)
	METALLIC.			$
1	Antimony, ore	Tons.*	2,016	65,000
2	Antimony, refined	Lbs.	63,850	5,108
3	Cobalt (*c*)	"	.....	72,133
4	Copper	"	57,979,205	11,398,120
5	Gold	Ozs.	405,517	8,382,780
6	Pig iron from Canadian ore (*b*)	Tons.	107,599	1,982,307
7	Iron ore (*a*)	"	25,901	45,907
8	Lead	Lbs.	47,738,703	2,542,086
9	Nickel	"	21,189,793	9,535,407
10	Silver	Ozs.	12,779,799	8,348,659
11	Zinc ore	Tons.	1,573	49,100
	Total value of metallic		.....	42,426,607
	NON-METALLIC.			
12	Arsenic	Tons.	.....	47,303
13	Asbestos	"	62,130	2,484,767
14	Asbestic	"	28,296	20,275
15	Calcium carbide	"	.....	.....
16	Chromite	"	7,196	72,901
17	Coal	"	10,511,426	24,381,842
18	Corundum	"	1,892	177,922
19	Feldspar	"	12,584	29,819
20	Graphite	"	579	16,000
21	Graphite, artificial	"	204	.....
22	Grindstones	"	5,414	60,376
23	Gypsum	"	485,921	646,914
24	Limestone used as flux	"	395,503	298,097
25	Magnesite	"	.....	.....
26	Manganese ore	"	1	22
27	Mica	"	774	312,599
	Mineral pigments :—			
28	Barytes	"	1,344	3,000
29	Ochres	"	5,828	35,570
30	Mineral water		.....	126,020
31	Natural gas		.....	815,032
32	Peat	Tons.	50	200
33	Petroleum	Bls.	778,872	1,057,088
34	Phosphate	Tons.	824	6,018
35	Pyrites	"	46,243	212,491
36	Quartz	"	56,585	124,148
37	Salt	"	72,697	342,315
38	Talc	"	1,534	4,602
39	Tripolite	"	30	225
	Total		.....	31,275,546

Production for Years 1907 and 1908.

1908.		Increase (+) or Decrease (−)		Increase (+) or Decrease (−)		
Quantity.	Value. (*d*)	Quantity.	%	Value.	%	
	$			$		
148*a*	5,443*a*	− 1,868	92·66	− 59,557	91·63	1
....	.....	....	.....	.....	.....	2
.....	113,423	....	.....	+ 41,290	57·24	3
63,702,873	8,413,876	+ 6,723,668	11·80	− 2,984,244	26·18	4
476,112	9,842,105	+ 70,595	17·41	+ 1,459,325	17·41	5
99,420	1,664,302	− 8,179	7·78	− 318,005	16·04	6
....	.....	....	.....	.....	.....	7
43,195,733	1,814,221	− 4,542,970	9·52	− 727,865	28·63	8
19,143,111	8,231,538	− 2,046,682	10·35	− 1,303,869	13·67	9
22,106,233	11,686,239	+ 9,326,434	72·98	+ 3,337,580	39·98	10
452	3,215	− 1,121	71·27	− 45,885	93·45	11
.....	41,774,362	.....	....	− 652,245	1·54	
....	58,566	.....	....	+ 11,263	23·81	12
66,548	2,555,361	+ 4,418	7·11	+ 70,594	3·52	13
24,225	17,974	− 4,071	14·39	− 2,301	8·81	14
6,864	417,150	.....	.....	....	... .	15
7,225	82,008	+ 29	0·29	+ 9,107	12·49	16
10,886,311	25,194,573	+ 354,885	3·38	+ 812,731	7·47	17
1,089	100,398	− 803	42·44	− 77,523	22·95	18
7,877	21,099	− 4,707	37·40	− 8,720	34·20	19
251	5,565	− 328	56·65	− 10,435	65·22	20
214	.....	+ 10	4·17	.....	.....	21
3,843	48,128	− 1,571	29·02	− 12,248	20·29	22
340,964	575,701	− 144,957	29·83	− 71,213	11·01	23
418,661	289,705	+ 23,158	5·86	− 8,392	2·82	24
120	840	.....	.....	.. ..	. ...	25
. .....	....	....	.....	.....	.....	26
436	139,871	− 338	43·67	− 172,728	55·26	27
4,312	19,021	+ 2,968	220·83	+ 16,021	534·03	28
4,746	30,440	− 1,082	18·57	− 5,130	14·42	29
.....	151,953	.. ..	.....	+ 25,933	20·58	30
.....	1,012,660	.....	....	+ 197,628	24·25	31
60	180	+ 10	20·00	− 20	10·00	32
527,987	747,102	− 260,885	33·07	− 309,986	29·33	33
1,596	14,794	+ 772	93·69	+ 8,776	145·83	34
47,336	224,824	+ 1,093	2·37	+ 12,333	5·80	35
44,741	52,830	− 11,844	20·93	− 71,318	57·45	36
79,975	378,798	+ 7,278	10·01	+ 36,483	10·66	37
1,016	3,048	− 518	33·77	− 1,554	33·77	38
30	195	.....	.....	− 30	13·33	39
....	32,142,784	....	.....	+ 867,238	2·77	

Comparative Statement of Mineral Production

	PRODUCT.		1907.	
			Quantity.	Value.
	Structural Material and Clay Products.			$
40	Cement, natural	Bls.	5,775	4,043
41	Cement, Portland	"	2,436,093	3,777,328
	Clay products :—			
42	Bricks, common	No.	439,015,556	3,455,524
43	" pressed	"	78,922,092	794,722
44	" paving	"	3,617,720	72,354
45	" moulded and ornamental	"	.....	47,288
46	Fireclay, and fireclay products	.....	.....	131,322
47	Fireproofing and architectural terra-cotta, etc.	.....	.....	89,389
48	Pottery	.....	.....	253,809
49	Sewer pipe	.....	.....	667,100
50	Tiles, drain	.....	.....	260,609
51	Lime	Bus.	4,755,316	974,595
52	Sand-lime brick	No.	16,492,971	167,795
53	Sand and gravels (*a*)	Tons.	298,095	119,853
54	Slate	Squares.	4,335	20,056
	Stone :—			
55	Building stone	.....	.....	1,830,000
56	Flagstones	Sq. yds.	3,000	2,550
57	Granite	Tons.	151,136	194,712
	Total Structural Material and Clay Products		.....	12,863,049
	Estimated for mineral products not reported		.....	300,000
	Grand Total		.....	86,865,202

(*a*) Exports.

* Short tons throughout. (*a*) Exports. (*b*) Only the quantity and value of pig iron in 1907 was 651,962 tons, valued at $9,125,226, and in 1908, 630,835 tons, valued at $8,111,194. nickel, and silver are valued at the final average value of those metals in the New York metal 65·327 cents per ounce For 1908 the average values were : copper 13·208 cents, lead 4·200 cents, metallic products are valued at their shipping values.

for Years 1907 and 1908—*Continued.*

1908.		Increase (+) or Decrease (−)		Increase (+) or Decrease (−)		
Quantity.	Value.	Quantity.	%	Value.	%	
	$			$		
1,044	815	− 4,731	81·92	− 3,228	79·84	40
2,665,289	3,709,139	+ 229,196	9·41	− 68,189	1·84	41
408,305,768	2,982,255	− 30,709,788	7·00	− 473,269	13·70	42
53,480,764	517,180	− 25,441,328	32·24	− 277,542	34·92	43
3,719,961	59,456	+ 102,241	2·83	− 12,898	17·83	44
.....	18,535	.....	.....	− 28,753	60·80	45
.....	110,302	.....	.....	− 21,020	16·01	46
.....	170,211	.....	.....	+ 80,822	90·42	47
.....	200,541	.....	.....	− 53,268	20·99	48
.....	514,362	.....	.....	− 152,738	22·90	49
20,100,261	298,561	.....	.....	+ 37,952	14·56	50
3,601,468	712,947	− 1,153,848	24·26	− 261,648	26·85	51
17,288,260	152,856	+ 795,289	4·82	− 14,939	8·90	52
298,954	161,387	+ 859	0·29	+ 41,534	3·47	53
2,950	13,496	− 1,385	31·95	− 6,560	32·71	54
.....	1,800,000	.....	.....	− 30,000	1·64	55
6,800	6,293	+ 58,200	.....	+ 3,743	44·99	56
.....	282,320	.....	.....	+ 87,608	32·71	57
.....	11,710,656	.....	.....	− 1,152,393	8·96	
.....	300,000	.....	.....	.....	.....	
.....	85,927,802	.....	.....	− 937,400	1·079	

attributed to Canadian ore are here given. The total production of pig iron in Canadian furnaces (c) Value received by shippers of silver-cobalt ores for cobalt contents. (d) The metals copper, lead, market, namely, for 1907 : copper 20·004 cents, lead 5·325 cents, nickel 45 cents per pound ; silver nickel 43 cents per pound ; and silver 52·864 cents per ounce. The other metallic, and the non-

A comparison of average monthly prices of metals in 1907 and 1908, as quoted by the Engineering and Mining Journal of New York, showing the decreases in 1908 both in price and percentage, is given hereunder.—

Comparison of Prices of Metals, 1907 and 1908.

——	1907.	1908.	Decrease in 1908.	Percentage of Decrease.
	Cts.	Cts.	Cts.	%
Copper	20·004	13·208	6·796	33·97
Lead	5·325	4·200	1·125	21·12
Nickel	45·000	43·000	2·000	4·44
Silver	65·327	52·864	12·463	19·07
Spelter	5·962	4·726	1·236	20·73
Tin	38·166	29·465	8·701	22·79

The outstanding feature of the mining industry during 1908 was undoubtedly the silver production, a total increase of over 72 per cent being shown in the number of ounces produced. The metals copper and gold also show important increases in quantity produced; while iron, lead, and nickel were produced in slightly smaller quantity than in 1907.

In the non-metallic class decreases in gypsum and petroleum are more than counterbalanced by increases in coal, asbestos, natural gas, salt, etc. The Portland cement industry shows a small increase in sales and a large increase in quantity of cement made, with large stocks on hand at the close of the year.

Of the total production in 1908, $41,774,362, or 48·62 per cent, is credited to the metallic ores; $11,710,656, or about 13·63 per cent, to structural materials and clay products; and $32,142,784, or 37·41 per cent, to the other non-metallic products; $300,000, or 0·34 per cent, being credited to mineral products not reported.

The chief items contributing to the total are the metals gold, copper, nickel, silver, lead, and iron; coal, petroleum and natural gas, asbestos, cement, stone, the clay products and lime. These account for from 95 per cent to 97 per cent of the total production.

The relative importance in value of output of the different products contributing to the total mineral production in 1907 and 1908 is shown in the following table:—

Proportionate Value of Different Mineral Products, 1907 and 1908.

1907. Products.	Per cent of total.	1908. Products.	Per cent of total.
1 Coal	28·07	1 Coal	29·32
2 Copper	13·12	2 Silver	13·60
3 Nickel	10·98	3 Gold	11·45
4 Gold	9·65	4 Copper	9·79
5 Silver	9·61	5 Nickel	9·58
6 Clay products	6·56	6 Clay products	5·67
7 Portland cement	4·35	7 Portland cement	4·32
8 Lead	2·93	8 Asbestos and asbestic	2·99
9 Asbestos and asbestic	2·88	9 Building stone	2·42
10 Building stone	2·33	10 Lead	2·11
11 Pig iron	2·28	11 Pig iron	1·94
12 Petroleum	1·22	12 Natural gas	1·18
13 Lime	1·12	13 Petroleum	0·87
14 Natural gas	0·94	14 Lime	0·83
15 Gypsum	0·74	15 Gypsum	0·67
16 Salt	0·39	16 Calcium carbide	0·49
17 Mica	0·35	17 Salt	0·44
18 Limestone (as flux)	0·34	18 Limestone (as flux)	0·34
19 Pyrites	0·24	19 Pyrites	0·26
20 Sundries under 1 per cent	1·90	20 Sundries under 1 per cent	1·73

The relative importance of the various items is clearly set forth in the table, and does not require special reference, except as regards pig iron, From a metallurgical point of view the production of pig iron and steel is a much more important industry than is here set forth, ranking probably in second place; but as a large proportion of the iron is made from imported ore, only the quantity that may be attributed to Canadian ore has been included in these general tables. Complete details of the production of iron and steel will be found in the chapter on that subject.

EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for refining and manufacturing to the United States, and other countries; manufactured mine products being re-imported for our consumption.

The following tables of exports and imports have been compiled from the Trade and Navigation Reports of the Customs Department. The exports of the various products of the mine during the calendar years 1907 and 1908 are shown in the first table, the total value being close to $40,000,000 in each year. The second table shows the exports during the fiscal years, classified according to destinations. It will be seen that in the fiscal year 1907-8 the United States took 90 per cent of the whole, and Great Britain about 4 per cent, the balance being distributed among about 27 other countries:—

Exports of the Products of the Mine—Calendar Years 1907 and 1908.

	1907		1908	
	Quantity.	Value.	Quantity.	Value.
		$		$
Arsenic.....Lbs.	613,504	10,850	1,913,732	43,493
Asbestos.....Tons	56,753	1,669,299	61,210	1,842,763
Barytes.....Cwt.	550	2,750	3,509	13,690
Chromite.....Tons	892	19,800	4,571	56,864
Coal..... "	1,894,074	4,879,564	1,729,833	4,661,377
Feldspar..... "	12,068	37,932	9,524	34,045
Gold.....	.....	8,029,603	.....	7,740,918
Gypsum.....Tons	375,026	424,794	280,091	324,574
Copper, fine, in ore, etc.....Lbs.	54,651,452	8,742,133	51,136,371	5,934,559
" black or coarse in pig..... "	36,998	7,476	.....	.....
Lead in ore, etc..... "	21,978,177	865,941	4,511,931	153,394
" in pig, etc..... "	3,613,706	163,957	13,942,663	469,060
Nickel in ore, etc..... "	19,376,335	2,280,374	19,419,893	1,866,624
Silver in ore, etc.....Ozs.	14,813,735	9,941,849	20,884,451	12,403,482
Platinum in ore concentrates, etc..... "	242	4,864	43	937
Mica .....Lbs.	1,117,010	422,172	580,195	198,839
Mineral pigments ..... "	382,624	10,043	249,635	4,850
Mineral water.....Gals.	2,877	1,913	8,953	3,659
Oil—				
Crude..... "	1,125	102	.....	.....
Refined..... "	3,132	575	296	71
Ores—				
Antimony .....Tons	1,327	37,807	148	5,443
Iron..... "	25,901	45,907	4,334	72,260
Manganese..... "	1	22	.....	.....
Other ores..... "	11,232	428,250	13,910	509,779
Phosphate..... "	.....	.....	1	30
Plumbago .....Cwt.	2,415	3,036	7,706	10,158
Pyrites.....Tons	25,056	80,139	17,283	96,600
Salt.....Lbs.	2,222,542	7,709	529,229	3,840
Sand and gravel.....Tons	298,095	119,353	298,954	161,387
Slate..... "	.....	.....	10,709	2,539
Stone, ornamental..... "	153	1,262	1,314	28,777
" building..... "	225	1,825	4,009	14,034
" for mfg. of grindstones..... "	460	5,154	661	5,991
Other products of the mine.....	.....	190,720	.....	176,007
Manufactures—				
Bricks.....M.	802	6,193	2,344	9,047
Aluminium in bars, etc.....Lbs.	5,478,203	1,109,353	1,713,800	399,785
" manufactured.....	.....	1,499	.....	1,727
Cement.....	.....	9,618	.....	34,591
Clay, manufactures of.....	.....	369	.....	92
Coke .....Tons	70,617	320,357	58,708	248,759
Grindstones manufactured.....	.....	32,534	.....	13,730
Gypsum, ground.....	.....	557	.....	9,765
Iron and steel—				
Stoves.....No.	698	8,077	651	8,258
Castings, N.E.S	.....	33,595	.....	28,062
Pig iron.....Tons	439	13,504	290	10,614
Machinery (Linotype).....	.....	33,926	.....	126,590
" N.E.S.....	.....	436,793	.....	285,257
Sewing machines ....No.	4,193	77,232	9,697	109,002
Typewriters..... "	5,430	163,719	3,720	169,939
Hardware, tools, etc	.....	48,909	.....	57,631
" N.E.S.....	.....	128,417	.....	59,304
Scrap iron and steel .....Cwt.	229,229	185,430	92,566	73,807
Steel and mfg. of	.....	477,766	.....	1,169,674
Lime.....	.....	55,903	.....	43,316
Metals, N.O.P.....	.....	63,700	.....	65,360
Plumbago, mfg. of.....	.....	2,847	.....	876
Stone, ornamental.....	.....	3,576	.....	13,748
" building.....	.....	657	.....	1,446
		41,652,206		39,780,784

Exports Showing Destination of Mine Products During the Fiscal Years 1906-7 and 1907-8.

Destination.	1906. (9 months). Value.	1907. Value.	Destination.	1906. (9 months). Value.	1907. Value.
	$	$		$	$
United States	24,067,112	35,219,840	New Zealand	2,951	22,793
Great Britain	1,127,267	1,560,842	Argentina	2,882	8,445
Belgium	332,389	627,506	Austria-Hungary	600	1,500
Newfoundland	267,044	421,995	Hong Kong	350	183,017
China	112,181	419,576	Holland	262	5,253
Bermuda	50,381	72,686	Spain	186	393
France	45,003	60,886	Cape Verde islands	....	12,792
Mexico	35,478	70,941	Philippines	.....	7,550
Germany	34,756	33,748	Egypt	.....	6,717
Japan	28,048	207,872	Russia	.....	3,985
Cuba	21,465	61,304	Chili	.....	1,250
British Africa	20,217	28,039	Switzerland	.....	385
St. Pierre	17,549	28,321	British Possessions(all other)	.....	25
West Indies	15,529	28,857			
Australia	5,807	58,560			
Italy	4,498	22,055	Total	26,191,955	39,148,813

It will be observed also in the first table, that the metals and metal products form about 80 per cent, and coal alone about 15 per cent of the total exports.

There is only one metal refinery in Canada, viz., at Trail, B.C., at which fine gold, fine silver, and refined pig lead are being produced (the erection of a refinery at the Ottawa Branch of the Royal Mint now provided for will perhaps create a market for some of Ontario's silver production), but at present, the great bulk of the products of the metallurgical furnaces of this Province, as well as of Ontario, is shipped to the United States for refining.

Similar conditions prevail with respect to many of our non-metallic mineral products: asbestos, gypsum, mica, corundum, feldspar, etc., which are largely exported either for refining, or for consumption abroad.

Statistics of imports of minerals and mineral products during the fiscal period of nine months ending March 31, 1907, and the 12 months ending March 31, 1908, are shown in the next two tables.

Since we export nearly all of our metallic products, it naturally follows, that we are compelled to import a large value in metals and their manufactures. The total value of the imports in 1908 was over $124,000,000, and of this about 50 per cent is made up of iron and steel products; 15 per cent of other metallic products, and about 25 per cent of coal and coke.

IMPORTS.

Minerals and Mineral Products for Fiscal Period of nine Months 1906-7.

Products.	Value.	Products.	Value.
Alumina	$206,181	Litharge	$49,183
Alum	26,905	Lithographic stone	8,698
Aluminium	239,103	Manganese, oxide of	11,087
Antimony	51,881	Magnesia	9,494
" salts	19,612	Marble and Mfs. of	176,450
Arsenic	6,116	Mercury	45,662
Asbestos and Mfs. of	127,509	Metallic alloys—	
Asphaltum	239,811	Babbit metal	46,937
Bells and gongs	74,729	Brass and Mfs. of	1,834,014
Bismuth	5,926	Britannia metal	25,331
Blast furnace slag	1,870	German silver	67,658
Borax	73,820	Type metal	1,987
Bricks and tiles	421,501	Mineral and bituminous substances N. E. S	50,773
" fire	349,185	Mineralogical specimens	562
Burrstones	245	Mineral and metallic pigments, paints and colours	942,524
Cement	540,006	Mineral water	143,416
Chalk, feldspar, etc	24,822	Nickel	68,141
Clays	178,240	Ores of metals, N. E. S	1,869,268
Coal	17,543,574	Paraffin wax	5,922
Coal tar and coal pitch	114,071	" candles	5,088
Coke	1,132,680	Petroleum and products of	1,318,139
Copper and Mfs. of	3,066,571	Phosphate (fertilizer)	30,950
Cryolite	35,360	Phosphorus	1,415
Crucibles, clay or plumbago	27,271	Platinum and Mfs of	113,485
Chloride of lime	52,113	Precious stones	1,218,338
Earthenware	1,422,880	Pumice	5,745
Electric carbons	105,558	Salt	299,394
Emery	61,584	Saltpetre	60,948
Flint, quartz, etc	50,636	Sand and gravels	177,412
Fullers earth	4,483	Slate and Mfs. of	95,520
Gold and silver and Mfs. of	1,461,721	Stone and Mfs. of	432,771
Graphite and Mfs. of	33,562	Sulphate of copper	118,800
Gypsum, plaster of Paris, etc	83,393	" iron	2,061
Iron and steel—		Sulphur	277,439
Pigs, scraps, blooms, etc	3,366,638	Sulphuric acid	6,901
Rolled bars, plates, etc	13,037,043	Tin and Mfs. of	2,719,813
Ferro silicon and Ferro-manganese etc	610,875	Whiting	33,153
Manufactures of machinery, hardware, etc	24,320,291	Zinc and Mfs. of	411,529
Kainite	5,647	Total	82,294,090
Lead and Mfs. of	416,793		
Lime	67,573		

IMPORTS.

Minerals and Mineral Products for Fiscal Year 1907--8.

Products.	Value.	Products.	Value.
Alumina	$221,130	Litharge	$90,785
Alum	40,818	Lithographic stone	3,723
Aluminium	168,969	Manganese, oxide of	17,863
Antimony	49,648	Magnesia	8,300
" salts	16,836	Marble and Mfs. of	287,587
Arsenic	7,531	Mercury	76,549
Asbestos	190,980	Metallic alloys—	
Asphaltum	327,407	Babbit metal	38,965
Bells and gongs	101,210	Brass and Mfs. of	2,173,349
Bismuth	6,416	Britannia metal	38,263
Blanc fixe and satin white	10,707	German silver, nickel and nickel silver	146,632
Blast furnace slag	33,367	Type metal	6,454
Borax	114,880	Mineral and bituminous substances	80,102
Bricks and tiles	440,209	Minerals and metallic pigments, paints and colours	1,254,679
" fire	639,347	Mineral water, including aerated waters	206,408
Burrstones	3,396	Nickel anodes	36,870
Cement	871,169	Ores of metals, N. E. S.	2,832,548
Chalk, feldspar, etc	96,589	Paraffin wax	8,041
Clays	267,720	" candles	20,035
Coal	29,043,398	Petroleum and products of	2,006,019
Coal tar and coal pitch	272,531	Phosphate (fertilizer)	27,955
Coke	2,166,036	Platinum and Mfs. of	60,390
Copper and Mfs. of	3,363,657	Precious stones	1,716,010
Cryolite	34,617	Pumice	8,917
Crucibles, clay or plumbago	40,092	Salt	430,219
Chloride of lime	82,760	Saltpetre	97,725
Earthenware	2,190,784	Sand and gravels	223,043
Electric carbons	173,365	Slate and Mfs. of	131,083
Emery	33,919	Stone and Mfs. of	511,780
Flint and quartz, etc	59,248	Sulphate of copper	146,028
Fullers earth	6,834	" iron	1,664
Fossils	478	Sulphur and phosphorus	521,675
Gold and silver Mfs. of	2,728,792	Sulphuric acid	7,582
Graphite and Mfs. of	34,458	Tin and Mfs. of	4,061,898
Gypsum, plaster of Paris, etc	89,619	Whiting	63,499
Iron and steel—		Zinc and Mfs. of	534,903
Pig iron	3,493,600		
Ferro-silicon, etc	612,062		
All other iron and steel	57,714,036		
Kainite	8,624		
Lead and Mfs. of	603,716	Total	124,388,109
Lime	99,611		

PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1908 is shown in the accompanying tables; in the first of which the total production in the several provinces and the percentage of each is given for both 1907 and 1908.

It will be observed that the largest production during each of the past two years has been from the Province of Ontario: British Columbia occupying second place. These two provinces together, contributed about 63 per cent of the total in 1908.

Mineral Production by Provinces, 1907 and 1908.

Province.	1907.		1908.	
	Value of Production.	Per cent of total.	Value of Production.	Per cent of total.
	$	%	$	%
Nova Scotia	14,532,040	16·73	14,487,108	16·86
New Brunswick	664,467	0·77	579,816	0·68
Quebec	6,205,553	7·14	6,743,650	7·85
Ontario	30,381,638	34·98	30,623,812	35·64
Manitoba	898,775	1·03	584,374	0·68
Saskatchewan	533,251	0·61	413,212	0·48
Alberta	4,657,524	5·36	5,122,505	5·96
British Columbia	25,656,056	29·54	23,704,035	27·58
North West Territories	3,335,898	3·84	3,669,290	4·27
Dominion	86,865,202	100·00	85,927,802	100·00

Mineral Production of Nova Scotia, 1908.

Product.		Quantity.	Value.
			$
Gold	Ozs.	11,842	244,799
Pig iron from Canadian ore (b)	Tons.	3,280	60,923
Coal	"	6,652,539	13,364,476
Grindstones	"	473	4,803
Gypsum	"	234,455	230,433
Limestone (used as flux)	"	301,180	212,362
Barytes	"	4,312	19,021
Tripolite	"	30	195
Clay products			117,833
Lime	Bus.	51,068	16,102
Other products (a)			216,161
Total			14,487,108

(a) Includes antimony, copper, arsenic, cement and stone.
(b) The total production of pig iron in Nova Scotia in 1908 was 352,642 tons valued at $3,554,540.

Mineral Production of New Brunswick, 1908.

Product.		Quantity.	Value.
			$
Coal	Tons.	60,000	135,000
Grindstones	"	3,370	43,325
Gypsum	"	81,620	191,312
Mineral water			14,894
Clay products			75,513
Lime	Bus.		34,262
Other products (a)			85,510
Total			579,816

(a) Includes graphite, stone, etc.

Mineral Production of Quebec, 1908.

Product.		Quantity.	Value.
			$
Copper	Lbs.	1,282,024	169,330
Pig iron from Canadian ore (b)	Tons.	5,229	133,492
Silver	Ozs.	13,299	7,030
Asbestos and asbestic	Tons.	90,773	2,573,335
Chromite	"	7,225	82,008
Magnesite	"	120	840
Mica	"	148	82,613
Ochres	"	4,746	30,440
Mineral water	"		75,533
Phosphate	"	598	5,900
Pyrites	"	26,598	159,588
Cement	Bls.	704,492	984,350
Clay products			1,264,418
Lime	Bus.	857,700	201,357
Flagstones	Sq. yds.		6,293
Granite			167,085
Slate	Squares.		13,496
Other products (a)			786,542
Total			6,743,650

(a) Includes graphite, limestone (flux), building stone and calcium carbide.
(b) The total production of pig iron in Quebec in 1908 was 6,709 tons valued at $171,383.
There was also in this Province an important production of aluminium from imported ores.

Mineral Production of Ontario, 1908.

Product.		Quantity.	Value.
			$
Copper	Lbs.	15,005,171	1,981,883
Gold	Ozs.	3,212	66,389
Pig iron from Canadian ore (b)	Tons.	90,911	1,469,887
Nickel	Lbs.	19,143,111	8,231,538
Cobalt			113,423
Silver	Ozs.	19,398,545	10,254,847
Zinc ore	Tons.	452	3,215
Arsenic, white (716 tons) and arsenical ore	"		42,566
Calcium carbide	"	2,364	147,150
Corundum	"	1,089	100,398
Feldspar	"	7,877	21,099
Graphite	"	210	5,040
Gypsum	"	10,380	42,456
Limestone (as flux)	"	114,837	75,966
Mica	"	288	57,258
Mineral water			61,526
Natural gas			949,297
Petroleum	Bls.	527,987	747,102
Phosphate	Tons.	998	8,894
Pyrites	"	20,738	65,236
Quartz	"	44,741	52,830
Salt	"	79,975	378,798
Talc	"	1,016	3,048
Cement	Bls.	1,519,930	1,910,630
Clay products			2,461,416
Lime	Bus.	2,087,731	358,507
Building stone and granite			693,850
Other products (a)			319,563
Total			30,623,812

(a) Includes sand-lime brick, sand and gravel (exports), peat, etc. (b) The total production of pig iron in Ontario in 1908 was 271,484 tons valued at $4,385,271.

Mineral Production in Manitoba, 1908.

Product.		Quantity.	Value.
			$
Gypsum	Tons.	14,500	111,500
Clay products			265,091
Lime	Bus.	138,786	24,192
Cement	Bls.	11,234	16,851
Sand-lime brick	No.	2,645,000	21,740
Other products (e)			145,000
Total			584,374

(e) Includes building stone, etc.

Mineral Production in Saskatchewan, 1908.

Product.	Quantity.	Value.
		$
Coal..... Tons.	150,566	253,790
Brick..... No.	8,262,996	87,566
Other products (a).....	.....	71,856
Total.....	.....	413,212

(a) Includes building stone, sand-lime brick, etc.

Mineral Production in Alberta, 1908.

Product.	Quantity.	Value.
		$
Gold..... Ozs.	50	1,037
Coal..... Tons.	1,685,661	4,127,311
Natural gas.....	.....	63,363
Clay products.....	.....	240,384
Other products (a).....	.....	690,410
Total.....	.....	5,122,505

(a) Includes cement, lime, stone, etc.

Mineral Production in British Columbia, 1908.

Product.	Quantity.	Value.
		$
Copper..... Lbs.	47,274,614	6,244,031
Gold..... Ozs.	286,858	5,929,880
Lead..... Lbs.	43,195,733	1,814,221
Silver..... Ozs.	2,631,389	1,391,058
Coal..... Tons.	2,333,708	7,292,838
Clay products.....	.....	344,446
Lime..... Bus.	176,435	44,027
Other products (a).....	.....	643,534
Total.....	.....	23,704,035

(a) Includes cement, stone, sand-lime brick, etc.

Mineral Production in Yukon, 1908.

Product.		Quantity.	Value.
			$
Copper	Lbs.	112,264	14,828
Gold	Ozs.	174,150	3,600,000
Silver	"	63,000	33,304
Coal	Tons.	3,847	21,158
Total			3,669,290

METALLIC PRODUCTS.

SMELTER PRODUCTION.

Until comparatively recent years a considerable percentage of metalliferous ores mined in Canada has been shipped outside of the country, to be smelted and refined; and although the smelting industry has shown steady growth there is as yet but one refinery in Canada producing fine gold, silver, and lead; besides three metallurgical works in Ontario producing silver of varying degrees of fineness. Practically all of our production of matte and blister is still exported for refining.

Hitherto in compiling statistics of mineral production the practice has been, in the case of ores exported, to calculate the metal contents on the basis of custom analysis, without making any deduction for smelter losses. In the case of ores smelted in eastern Canada—such as the nickel-copper ores at Sudbury—the practice has been to calculate the metal contents of the mattes produced and shipped. For British Columbia the statistics collected and published by the provincial Bureau of Mines have been used in these reports. These statistics, according to the returns requested from the operators, are based on the assay values of each shipment and represent the "total gross contents (of shipment) without smelter deductions."

As the metalliferous production of British Columbia constitutes a considerable proportion of that of the whole of Canada, it will thus be seen that the statistics of metalliferous production hitherto published include important quantities of metals not finally recoverable.

In dealing with such low grade copper ores as those of the Boundary district of British Columbia (copper contents averaging about 1½ per cent or less) and ores so low in copper as those of Rossland, the difference between statistics of production based on assays, and statistics based on copper recovered by the smelters, will be greatly accentuated. In fact, in cases such as these, the difference as respects copper may approximate as much as 25 per cent or more of the original copper contents of the ore.

In the treatment of smelting ores, particularly ores carrying copper, gold, and silver values, there are three main operations, viz., mining, smelting, and refining, and these afford several possible view points or bases [1] for the compilation of statistics of production.

[1] A discussion of the methods of compiling mining statistics will be found in the Mineral Resources of the United States for 1906, gold and silver, pp. 113-116; copper, pp. 373-377; lead, p. 439; zinc, p. 459.

From the point of view of mine production the statistics may be made to show either: (1) the total quantity of metal contained in the ore shipped as determined by assay, which would include all metal subsequently lost in smelting and refining operations; or (2) the quantity of metal which the mining operator is paid for by the purchasing smelter, or, in the case of companies operating both mines and smelters, the quantity of metal actually recovered in the smelter products.

Statistics of smelter production should show the quantities of metals contained in the various products matte, blister, etc., produced by the smelters, and would include a small quantity of metal subsequently lost in the refining process.

Statistics based on smelter production should, if all ores shipped are included, agree fairly closely with statistics of mine production based on the quantity of metal paid for, due regard being had for the time required in transporting and smelting the ore.

No matter what basis may be adopted it will not be found possible to obtain uniform results, since different companies keep their accounts in different ways and will report accordingly.

Through the courtesy of the companies operating smelters in Canada the Mines Branch is enabled to present complete statistics of smelter and refinery production in Canada during 1908.

Returns have been received from the following companies:—

The Mond Nickel Co.,	Victoria Mines, Ont.
The Canadian Copper Co.,	Copper Cliff, Ont.
The Coniagas Reduction Co,	Thorold, Ont.
The Deloro Mining & Reduction Co.,	Deloro, Ont.
The Consolidated Mining & Smelting Co. of Canada,	Trail, B.C.
The Sullivan Group Mining Co.,	Marysville, B.C.
[1] The Northport Smelting & Refining Co.	Northport, Wash., U.S.A.
The Granby Consolidated Mining, Smelting & Power Co.,	Grand Forks, B.C.
The British Columbia Copper Co., Ltd.	Greenwood, B.C.
The Dominion Copper Co.,	Boundary Falls, B.C.
The Tyee Copper Co., Ltd.,	Ladysmith, B.C.

Refined products obtained include refined lead; fine gold, fine silver and copper sulphate produced from the residues of the lead refinery; fine silver, white arsenic, nickel and cobalt oxides produced from the Cobalt District ores of Ontario. Smelter products exported for refining include in 1908 copper matte, 7,649 tons, and blister copper, 15,418 tons, carrying gold and silver values; Bessemer nickel-copper matte 21,210 tons, carrying small gold and silver values as well as metals of the platinum group; speiss resulting from the treatment of the Cobalt District ores 1,326 tons, carrying silver, cobalt, nickel and arsenic values.

[1] The Northport Smelter treats Canadian ore almost exclusively, and for statistical purposes is considered as if located in Canada.

The aggregate results of refining and smelting may be summarized as follows: The figures unfortunately cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ore are still shipped to other smelters outside of Canada for smelting. It should also be explained that these figures include the results of the treatment of a small quantity of imported ores.

Refinery and Smelter Production, 1908.

		Refined Products.	Metals contained in matte, blister, base bullion and speiss, exported for refining.
Gold	Ozs.	15,436	203,300
Silver	"	(a) 11,168,689	3,271,899
Lead	Lbs.	36,549,274	1,116,792
Copper	"	.....	51,965,289
Copper sulphate	"	203,379	.....
Nickel	"	(b)	19,506,251
Cobalt	"	(b)	692,170
White arsenic	"	1,431,052	.....
Arsenic	"	.....	436,787

(a) There is here included 9,212,650 fine ounces of silver contained in silver bullion, of which the fineness varies from 850 to 998.
(b) Small quantities of nickel oxide and cobalt oxide were also produced.

The quantities of ores and concentrates treated during 1908 aggregated 2,218,395 tons, comprising the following :—

	Tons.
Nickel-copper ores	360,180
Silver-cobalt-nickel-arsenic ores	7,182
Lead and other ores treated in lead furnaces	53,545
Copper-gold-silver ores	1,797,488
Total	2,218,395

Nickel-Copper Ores: The smelters of the Canadian Copper Company at Copper Cliff and the Mond Nickel Co. at Victoria Mines treat the nickel-copper ores of the district. These ores consist of pyrrhotite and chalcopyrite, the nickel being chiefly contained in the mineral pentlandite disseminated through the ore. The greater part of the ore is roasted in open heaps. In 1908 [1] the total quantity of ore mined was 409,551 tons, while the quantity smelted was 360,180 tons. The quantity of Bessemer matte shipped was 21,210 tons, containing 7,503 tons of copper and 9,572 tons of nickel.

Statistics of the smelter production of these ores are available practically since the commencement of the industry, and are shown in the following table :—

[1] See also the statistics given in the chapter on nickel.

Smelter Production of the Nickel Copper Ores of the Sudbury District.

Calendar Year.	Ore Mined.	Ore Smelted.	Matte Shipped.	Value of Matte.	Nickel contents of Matte.	Copper contents of Matte.
	Tons.	Tons.	Tons.	$	Tons.	Tons.
1886	3,307					
1887	567	30,000?			900?	1,500?
1888						
1889	44,990	40,146	3,274		432	733
1890					718	651
1891	83,300	72,558	10,336		2,018	2,064
1892	74,381	57,022			1,207	1,102
1893			9,425		1,991	1,821
1894	103,223	96,038	11,681	766,422	2,454	2,604
1895	74,135	68,618	10,188	890,834	1,944	2,288
1896	94,966	71,027	10,759	416,594	1,699	1,584
1897	93,154	96,370	13,968		1,999	2,750
1898	123,820	121,924			2,759	4,187
1899	159,957	172,761		702,341	2,872	2,834
1900	196,420		23,336	1,076,306	3,540	3,364
1901	315,692	255,958		1,661,839	4,594	4,318
1902	269,538	211,847	25,311	1,327,448	5,347	3,553
1903	136,033	207,030	13,832	2,686,469	6,253	3,576
1904	203,388	118,470	10,154	2,193,198	5,274	2,455
1905	277,766	251,421	17,405	4,019,814	9,438	4,386
1906	343,814	340,059	20,310	4,628,011	10,745	5,264
1907	351,916	359,076	22,025	3,289,382	10,595	6,996
1908	409,551	360,180	21,210	2,930,989	9,572	7,503

Silver-Cobalt-Nickel-Arsenic ores: The rich silver ores of the Cobalt district, the first shipments of which were made in 1904, are still for the most part shipped out of Canada even for first treatment.

The Canadian Copper Co. established works for the treatment of these ores at Copper Cliff in 1906, at which silver bullion and white arsenic are recovered. The Coniagas Reduction Company has built a plant at Thorold, Ont., for the treatment of the ores of the Coniagas mine and also custom ore, and it is equipped to recover silver bullion and white arsenic; nickel oxide and cobalt oxide have also been recovered at this plant, and the Company expects to make this an important feature of its operations. The Deloro Mining and Reduction Company has established works at Deloro, Ont., for the recovery of gold and silver bullion and white arsenic, with the object of treating not only the Cobalt District silver ores but also the auriferous arsenical pyrites of Hastings county.

The treatment of these ores in Ontario in 1908 gave the following results:—

Ore treated	7,182 tons.
Products recovered;[1]	
Silver produced	9,212,650 ozs.[2]
White arsenic	1,431,052 lbs.
Speiss or residues	1,326 tons.
Metallic contents of speiss:	
Silver	2,612,344 ozs.
Nickel	363,140 lbs.
Cobalt	692,170 "
Arsenic	436,787 "

[1] Nickel oxide and cobalt oxide were also produced in small quantities by one firm only.
[2] Fine ounces contained in silver bullion, fineness ranging from 850 to 998.

Lead Ores : There were in 1908 only two lead smelting plants equipped for operation, viz., at Marysville and Trail, B.C. The smelter at Marysville was in operation for only two months during the year. The Trail smelter[1], operated by the Consolidated Mining & Smelting Co. of Canada, is supplemented by a lead refinery employing the Betts Electrolytic Process and having a capacity of 75 tons per day. The main ore supply comes from the St. Eugene mine owned by the same Company, though practically all the lead ore produced in the Slocan district, is smelted as custom ore. Supplementing the lead ores is a small tonnage of gold and silver ores with some gold concentrates from stamp mills.

In the refinery the bullion from the smelter is cast into anodes and redeposited electrolytically upon cathode starting sheets of refined lead. The refined lead is cast into pigs of 100 pounds and 180 pounds weight, the latter being a special form for the Chinese trade.

The slimes from the tank room carry gold, silver, antimony, arsenic and copper. The first two are recovered as fine metals and the copper as copper sulphate.

Antimony was recovered for a time, but owing to a falling off of the percentage of antimony in the bullion, and a fall in the price of the metal, its recovery became unprofitable and was discontinued.

The annual production of refined lead, fine gold and silver, and of copper sulphate has been as follows :—

Calendar Year.	Refined Lead.	Fine Gold.	Fine Silver.	Copper Sulphate.
	Lbs.	Ozs.	Lbs.	Lbs.
1904	7,519,440	4,336	551,450	56,000
1905	15,804,509	8,602	1,088,328	77,175
1906	20,471,314	9,992·6	1,263,809	143,135
1907	26,607,461	10,394·9	1,631,422	97,751
1908	36,549,274·	15,346·1	1,956,039	203,379

Gold Silver-Copper Ores of British Columbia : There are six copper smelters in British Columbia in addition to the smelter at Northport, Wash., U.S.A., treating these complex ores.

The ores of the Rossland camp, of which gold is the chief constitutent value, are smelted in the Trail copper furnace of the Consolidated Mining & Smelting Co., and at the Northport smelter. The low grade copper ores of the Boundary district are smelted locally at Grand Forks, Greenwood, and Boundary Falls, some also going to Trail. On the coast the ores of this class are smelted at Ladysmith and Crofton, but a considerable tonnage is also shipped to United States smelters

[1] For a complete description of this smelter see Journal of Canadian Mining Institute, Vol. XII. "Lead smelting and refining practice at Trail, B.C.", by A. J. McNab.

for treatment, while the local smelters are receiving some foreign ores. The Crofton smelter, which was not in operation during 1908, is owned by the Britannia Copper Syndicate, Ltd.

The aggregate production of these smelters in 1908, including the foreign ores treated, was as follows :—

Ore smelted	1,797,488	tons.
Smelter products :		
Matte	7,649	"
Blister	15,418	"
Metallic contents of matte and blister :		
Gold	202,959	ozs.
Silver	631,484	"
Copper	36,960,118	lbs.

Trail Smelter : Statistics of the production of the Trail smelter including both the copper and lead smelters, have been published in the annual reports of the Company, the figures since 1906 having been as follows :—

Production of Trail Smelter.

Year Ending June 30.	Ore Smelted.	Metals Contained in Matte and Bullion Produced.			
		Gold.	Silver.	Lead.	Copper.
	Tons.	Ozs.	Ozs.	Lbs.	Lbs.
1906 (6 mos. only)	157,640	64,590	1,074,255	15,133,683	2,399,161
1907	222,573	69,168	1,100,271	20,383,083	3,443,310
1908	305,956	121,380	2,224,888	32,157,139	4,004,468
1909	347,417	114,920	2,443,475	43,675,077	4,637,631
Production from 1894 to June, 1909.	1,971,559	814,442	14,837,467	178,503,739	37,478,855

Granby Smelter : The smelting plants of the Boundary district are of particular interest on account of the low grade ore treated. These ores vary from 1 to 3 per cent. in copper and from $1 to $3 in gold and silver, and over 1,000,000 tons are now annually smelted. There are three smelters in the district, the largest being that at Grand Forks operated by the Granby Consolidated Mining, Smelting & Power Co. The first furnace of 300 tons capacity was completed in 1890, and since that date the capacity of the plant has from time to time been increased, until at present there are eight furnaces with a capacity of about 4,500 tons per day. The converter plant which was first installed in 1902 has now a capacity of 40,000,000 pounds per year.

The quantities of ores smelted and the average extraction of metal per ton during the past four years, as published in the manager's reports to the Directors of this Company, are as follows:—

Year ending June 30.	Dry Ore Smelted.	Extraction per ton.			Average cost* of Copper per lb.
		Copper.	Silver.	Gold.	
	Tons.	Lbs.	Ozs.	Ozs.	Cts.
1906		24·30	0·3107	0.0513	8·35
1907	665,915	24·43	0·3088	0.0503	10·14
1908	882,611	23·42	0·2865	0.0454	10·24
1909	984,733	21·81	0·2724	0.0434	10·00

* Cost after deducting value of gold and silver.

These reports also give the total sales of copper in the 12 months ending June, 1907, as 16,403,497 pounds. In the 12 months ending June, 1908, the sales are stated as: copper, 21,126,926 pounds; silver, 300,593 ounces, and gold 40,139 ounces; and in the 12 months ending June, 1909, the sales were: copper, 21,901,528 pounds; silver, 335,521 ounces; and gold, 45,761 ounces.

At the British Columbia Copper Co.'s furnace at Greenwood, B.C., there are three large furnaces, each having a smelting capacity of from 650 to 750 tons per day.

The manager in his report to the Directors covering the year ending November 30, 1908, states that the "Material handled through the three blast furnaces in six month's operations, exclusive of coke, was:—

	Tons.
British Columbia Copper Co.'s ores	312,471
Custom ore	4,829
Converter slag	3,846
Custom matte	281
	321,427

"Included in the item of converter slag is 1,390 tons of custom ore and clay used in converter linings.

"The converter production from the above smelter consisted of 5,802,638 pounds blister copper containing 5,767,355 lbs. of fine copper, 13,597 ozs. of gold, and 58,204 ozs. of silver."

The cost of producing, refining and marketing per pound of fine copper, after crediting expenditure with gold and silver values, is stated as 9·996 cents, which is practically the same as the cost recorded at Granby.

The Ladysmith smelter, owned by the Tyee Copper Co., was the only one in operation on the coast during 1908.

In the report of the Smelter Manager covering the year ending April 30, 1908, he gives the total ore smelted as 42,807 tons. During the year 3,975·5 tons of copper matte were shipped containing 3,173,431 pounds of fine copper, 74,432 ounces of fine silver, and 3,657 ounces of fine gold.

COPPER.

The total production of copper in Canada for 1908, estimated, with the exception of the Province of Ontario, on the basis of the copper content of the ores shipped to the smelters, was 63,702,873 pounds valued at $8,413,876, or 13·208 cents per pound, the average price for fine copper for the year in New York.

Similarly estimated the production in 1907 was 56,979,205 pounds valued at $11,398,120, or 20·004 cents per pound, the average price for fine copper for that year. Compared with 1907 the production in 1908 shows an increase of 6,723,668 pounds, or 11·8 per cent in quantity; but a decrease in total value of $2,984,244, or 26·2 per cent, owing to the lower average price of the metal during the past year.

Details of the production by provinces are given in Table 1.

COPPER.—TABLE 1.

Production by Provinces 1907 and 1908.

Province.	1907.		1908.		Increase or Decrease. (i) (d)	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		$		$		$
Quebec.....	1,517,990	303,659	1,282,024	169,330	(d) 235,966	(d) 134,329
Ontario.....	14,104,337	2,821,432	15,005,171	1,981,883	(i) 900,834	(d) 839,549
British Columbia...	40,832,720	8,168,177	47,274,614	6,244,031	(i) 6,441,894	(d)1,924,146
Other Districts *...	524,158	104,852	141,064	18,632	(d) 383,094	(d) 86,220
Total.....	56,979,205	11,398,120	63,702,873	8,413,876	(i) 6,723,668	(d)2,984,244

* Includes Nova Scotia and Yukon.

For the Province of Ontario, the exception above noted, the production given in the above table is almost altogether derived from the nickel-copper ores of the Sudbury district, and the figures represent the quantity of copper contained in the nickel-copper matte shipped from Copper Cliff and Victoria Mines smelters. This figure will undoubtedly show a smaller quantity of copper than is contained in the ore charged to smelters. According to analyses published by Barlow,[1] the

[1] Nickel and copper deposits, Ontario, Geological Survey, Canada.

standard slags discarded in the smelting operations at Copper Cliff contain from 0·13 per cent to as high as 0·44 per cent of copper, and the slags in weight are equivalent to 85 per cent or more of the original ore charged. Applying these data to the statistics of nickel-copper ore charged to smelters in 1908 we find that the quantity of copper contained in the ore charged would probably be anywhere from 5 per cent to 18 per cent higher than the quantity of copper given in the table as contained in the matte produced. The relative importance of Ontario's position is, therefore, slightly underestimated.

The distinction between mine production, smelter production, and refinery production has already been discussed in some detail in the article on smelter production.

It has to be admitted that the method of stating copper production, or the production of any other metal for that matter, in terms of the quantity of metal contained in the ore, without making any allowance for smelting losses, is open to some criticism, particularly when a large portion of the ores is smelted within the country. In earlier years, when our metalliferous ores were largely shipped out of the country for first treatment, it may have been somewhat difficult perhaps to obtain actual smelter results. It seems more reasonable, however, to regard as production that quantity of metal which is actually recovered or probably recoverable, and with the object of presenting statistics of production on this basis the Mines Branch has, through the courtesy of the smelter operators, obtained fairly complete statistics of the results of their operations during 1908. These have already been given in detail under "Smelter Production," and with respect to copper show the total quantity of copper contained in blister and matte produced in Canadian smelters [1] from Canadian ores to have been approximately 50,628,386 pounds. Complete data were not obtained as to the total quantities of ore shipped out of Canada for smelting (excluding the ore shipped to Northport, Wash.) but a rough estimate would place the copper recoverable from these at about 2,300,000 pounds, making the total copper production of Canada in 1908, based on smelter results, as 52,928,386 pounds.

The exports of copper in ore, matte, regulus, etc., from Canada during the calendar year 1908, is reported by the Customs Department as 51,136,371 pounds.

W. R. Ingalls, in *Mineral Industry*, through independent inquiry, reports the copper production of Canada in 1908 as 53,725,213 pounds.

Prices: The average monthly prices, in cents per pound, of electrolytic copper in New York during the past five years is shown in the following table:—

[1] The Northport Smelter in the State of Washington, operating on British Columbia ores, is for the purposes of these statistics considered as a Canadian smelter.

Monthly average prices of Electrolytic Copper in New York.

Months.	1904.	1905.	1906.	1907.	1908.
	Cts.	Cts.	Cts.	Cts.	Cts.
January	12·410	15·008	18·310	24·404	13·726
February	12·063	15·011	17·869	24·869	12·905
March	12·299	15·125	18·361	25·065	12·704
April	12·923	14·920	18·375	24·224	12·743
May	12·758	14·627	18·475	24·048	12·598
June	12·269	14·673	18·442	22·665	12 675
July	12·380	14·888	18·190	21·130	12·702
August	12·343	15·664	18·380	18·356	13·462
September	12·495	15·965	19·033	15·565	13·388
October	12 993	16·279	21·203	13·169	13·354
November	14·284	16·599	21 833	13·391	14·130
December	14·661	18·328	22·885	13·163	14·111
Yearly Average	12·823	15 590	19·278	20·004	13·208

In London the monthly average prices of standard copper were as shown hereunder, in £ per ton of 2,240 pounds.

Monthly average Prices of Standard Copper in London.

Months.	1904.	1905.	1906.	1907.	1908.
	£	£	£	£	£
January	57·500	68·262	78·869	106·739	62·386
February	56·500	67·963	78·147	107·356	58·786
March	57·321	68·174	81·111	106·594	58·761
April	58·247	67·017	84·793	98·625	58·331
May	57·321	64·875	84·867	102·375	57·387
June	56·398	65·881	83·994	97·272	57·842
July	57·256	66·887	81·167	95·010	57 989
August	56·952	69·830	83·864	79·679	60·500
September	57·645	69·667	87·831	68·375	60·338
October	60·012	71·406	97·269	60·717	60·139
November	65·085	74·727	100·270	61·226	63·417
December	66·384	78·993	105·226	60·113	62·943
Yearly Average	58·857	69·465	87·282	87·007	59 902

In 1908 the price of copper varied only slightly, the lowest being 12 cents in February and the highest 14¼ cents in December, the average for the year being 13·208 cents per pound. During 1907, the panic year, there was wide fluctation. The price of copper had risen by successive steps during the preceding three years until a maximum of 25 cents was reached in March of 1907. During the next four months the prices fluctuated between 24 and 21 cents, but then fell rapidly to 13 cents in October.

Statistics showing the annual copper production in Canada since 1886, on the basis explained in the introduction to this subject, are given in Table 2.

The table shows the yearly increase or decrease as the case may be, and also the average yearly price per pound in New York.

COPPER.—TABLE 2.

Annual Production.

Calendar Year.	Lbs.	Increase or Decrease.		Value.	Increase or Decrease.		Average Price per Pound.
		Lbs.	%		$	%	
				$			Cts.
1886	3,505,000	.....	.....	385,550	.....	.....	11·00
1887	3,260,424	(*d*) 244,576	6·99	366,798	(*d*) 18,752	4·86	11·25
1888	5,562,864	2,302,440	70·60	927,107	560,309	152·70	16·66
1889	6,809,752	1,246,888	22·40	936,341	9,234	0·99	13·75
1890	6,013,671	(*d*) 796,081	11·69	947,153	10,812	1·15	15·75
1891	9,529,401	3,515,730	58·46	1,226,703	279,550	29·51	12·87
1892	7,087,275	2,442,126	25·63	818,580	(*d*) 408,123	33·27	11·55
1893	8,109,356	1,022,381	14·40	871,809	53,229	6·50	10·75
1894	7,708,789	(*d*) 401,067	4·94	736,960	(*d*) 134,849	15·46	9·56
1895	7,771,639	62,850	0·81	836,228	99,268	13·47	10·76
1896	9,393,012	1,621,373	20·86	1,021,960	185,732	22·21	10·88
1897	13,300,802	3,907,790	41·60	1,501,660	479,700	46·94	11·29
1898	17,747,136	4,446,334	33·43	2,134,980	633,320	42·17	12·03
1899	15,078,475	(*d*)2,668,661	15·04	2,655,319	520,339	24·37	17·61
1900	18,937,138	3,858,663	25·59	3,065,922	410,603	15·46	16·19
1901	37,827,019	18,889,881	99·75	6,096,581	3,030,659	98·84	16·117
1902	38,804,259	977,240	2·58	4,511,383	(*d*)1,585,198	26·00	11·626
1903	42,684,454	3,880,195	10·00	5,649,487	1,138,104	25·23	13·235
1904	41,383,722	(*d*) 1,300,732	3·05	5,306,635	(*d*) 342,852	6·07	12·823
1905	48,092,753	6,709,031	16·21	7,497,660	2,191,025	41·29	15·590
1906	55,609,888	7,517,135	15·63	10,720,474	3,222,814	42·98	19·278
1907	56,979,205	1,369,317	2·46	11,398,120	677,654	6·32	20·004
1908	63,702,873	6,723,668	11·80	8,413,876	2,984,244	26·18	13·208

Statistics of exports of copper, as collected by the Customs Department, are shown in Table 3, and statistics of imports in Tables 4 and 5. The total imports of copper in so far as weights are given amounted in 1908 to 15,675,923 pounds, a quantity far exceeded by the production.

COPPER.—TABLE 3.

Exports of Copper in Ore, Matte, etc.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		$			$
1885		262,600	1897	14,022,610	850,336
1886		249,259	1898	11,572,381	840,243
1887		137,966	1899	11,371,766	1,199,908
1888		257,260	1900	23,631,523	1,741,885
1889		168,457	1901	32,488,872	3,404,908
1890		398,497	1902	26,094,498	2,476,516
1891		348,104	1903	38,364,676	3,873,827
1892		277,632	1904	38,553,282	4,216,214
1893	4,792,201	269,160	1905	40,740,861	5,443,873
1894	1,625,389	91,917	1906	42,398,538	7,303,366
1895	3,742,352	236,965	1907	54,688,450	8,749,609
1896	5,462,052	281,070	1908	51,136,371	5,934,559

COPPER.—TABLE 4.

Imports of Pigs, Old, Scrap, etc.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1880	31,900	2,130	1895	72,062	6,770
1881	9,800	1,157	1896	86,905	9,226
1882	20,200	1,984	1897	49,000	5,449
1883	124,500	20,273	1898	1,050,000	80,000
1884	40,200	3,180	1899	1,655,000	246,740
1885	28,600	2,016	1900	1,144,000	180,990
1886	82,000	6,969	1901	951,500	152,274
1887	40,100	2,507	1902	1,767,200	225,832
1888	32,300	2,322	1903	2,038,400	252,594
1889	32,300	3,288	1904	2,115,300	270,315
1890	112,200	11,521	1905	1,944,400	266,548
1891	107,800	10,452	1906	2,627,700	441,854
1892	343,600	14,894	1907 (9 mos.)	2,616,600	520,971
1893	168,300	16,331	1908	3,612,400	650,597
1894	101,200	7,397			
1908 { Copper, old and scrap or in blocks			Duty free.	193,700	36,016
1908 { Copper in pigs or ingots			"	3,418,700	614,581
			Total 1908	3,612,400	650,597

COPPER.—TABLE 5.

Imports of Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1880	123,061	1890	472,668	1900	1,090,280
1881	159,163	1891	563,522	1901	951,045
1882	220,235	1892	422,870	1902	1,281,522
1883	247,141	1893	458,715	1903	1,291,635
1884	134,534	1894	175,404	1904	1,191,610
1885	181,469	1895	251,615	1905	1,775,881
1886	219,420	1896	285,220	1906	2,660,303
1887	325,365	1897	264,587	1907 (9 mos.)	2,545,600
1888	303,459	1898	786,529	1908	2,713,060
1889	402,216	1899	551,586		

		Duty.	Lbs.	Value.
				$
1908.	Copper in bars and rods, in coils, or otherwise, in lengths not less than 6 feet, unmanufactured	Free.	8,388,300	1,749,458
	Copper, in strips, sheets or plates, not planished or coated, etc	"	2,955,400	688,539
	Copper tubing in lengths not less than 6 feet, and not polished, bent or otherwise manufactured	"	509,227	143,140
	Copper rollers, for use in calico printing	"	.....	2,831
	Copper and manufactures of :—			
	Nails, tacks, rivets and burrs or washers	30 %	.....	2,693
	Wire, plain, tinned or plated	15 "	210,596	39,055
	Wire cloth, etc	25 "	.....	3,816
	All other manufactures of, N.O.P	30 "	.....	83,528
	Total	....	12,063,523	2,713,060

Nova Scotia.

The Sterling Mining Company, operating at Waughs River, shipped 240 tons of ore to the United States during the year ending Sept. 30, 1908, which yielded 28,800 pounds of copper.

Quebec.

As usual the copper production in Quebec was derived chiefly from the pyrite ores of the Eastern Townships, which are mined primarily for the manufacture of sulphuric acid. In 1908 the Capelton mines of the Nichols Chemical Co., now known as the Albert Copper Co., were not operated, the total production being obtained from the Eustis mines. The sulphuric acid plant of the Nichols Chemical Co. was continued in operation, using ores from the Eustis mines as well as iron pyrites from Ontario. Mr. Obalski in his report on mining operations in the Province of Quebec gives the total shipments of ore in 1908 as 26,598 tons.

Statistics of copper contained in the ore shipped since 1886 are shown in Table 6.

COPPER.—TABLE 6.

Quebec :—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		$			$
1886	3,340,000	367,400	1898	2,100,235	252,658
1887	2,937,900	330,514	1899	1,632,560	287,494
1888	5,562,864	927,107	1900	2,220,000	359,418
1889	5,315,000	730,813	1901	1,527,442	246,178
1890	4,710,606	741,920	1902	1,640,000	190,666
1891	5,401,704	695,469	1903	1,152,000	152,467
1892	4,833,480	564,042	1904	1,760,000	97,455
1893	4,468,352	480,348	1905	621,243	252,752
1894	2,176,430	208,067	1906	1,981,169	381,930
1895	2,242,462	241,288	1907	1,517,990	303,659
1896	2,407,200	261,903	1908	1,282,024	169,330
1897	2,474,970	279,424			

Ontario.

There is comparatively little copper production in this Province outside that obtained from the nickel-copper ores of the Sudbury district. There are many copper deposits, however, some of which have been worked quite extensively in former years, such as the old Bruce mines on the north shore of Lake Huron. More or less work is being done each year on deposits of this class, but very little ore has been shipped in recent years. In 1907 active operations were carried on at the Hermina mine in Salter township, the Bruce mines in Plummer township, the mine of the Cobden Copper Co. in Cobden township, the Spencer mine north of Sault Ste. Marie, and the Tip Top Copper mine west of Port Arthur, The Ontario Bureau of Mines reports the ore raised as 9,575 tons, containing about 3 per cent copper, but comparatively little was shipped. In 1908 most of these mines were closed down, the Hermina alone being kept in active operation but shipping very little ore.

Nickel-copper ores have been mined as usual by the Canadian Copper Co. at the Copper Cliff, Creighton, and Crean Hill mines, and by the Mond Nickel Co. at the Victoria mines. The total ore production in 1908 was 409,551 tons, while the ore charged to the smelter, consisting in part of roasted ore, was 360,180 tons. There was shipped during the year 21,210 tons of Bessemer matte containing 7,503 tons of copper and 9,572 tons of nickel, the value of the matte being reported as $2,930,265. In 1907, 359,076 tons of ore were smelted, and 22,025 tons of matte shipped containing 6,996 tons of copper and 10,595 tons of nickel, the matte being valued at $3,289,382.

These details are given somewhat more completely and in tabular form in the article on nickel, and also under "Smelter Production," page 28, to which reference may be made.

Statistics of the copper production in Ontario are given in Table 7, and the fact may be again mentioned that these figures represent mainly the copper contents of matte shipped and not the copper contents of the ore shipped.

COPPER.—TABLE 7.

Ontario :—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		$			$
1886	165,000	18,150	1898	8,375,223	1,007,539
1887	322,524	36,284	1899	5,723,324	1,007,877
1888	Nil.	Nil.	1900	6,740,058	1,091,215
1889	1,466,752	201,678	1901	8,695,831	1,401,507
1890	1,303,065	205,233	1902	7,408,202	861,278
1891	4,127,697	531,234	1903	7,172,533	949,285
1892	2,203,795	254,538	1904	4,913,594	630,070
1893	3,641,504	391,461	1905	8,779,259	1,368,686
1894	5,207,679	497,854	1906	10,638,231	2,050,838
1895	4,576,337	492,414	1907	14,104,337	2,821,432
1896	3,167,256	344,598	1908	15,005,171	1,981,883
1897	5,500,652	621,023			

British Columbia.

The production of copper in this Province, according to statistics collected and published by the Provincial Bureau of Mines, reached a total in 1908 of 47,274,614 pounds, as compared with 40,832,720 pounds in 1907, an increase of 6,441,894 pounds or 15·8 per cent. The production in 1906 was 42,990,488 pounds, in comparison with which 1907 shows a decrease of 2,157,768 pounds or 5 per cent.

These figures represent the total quantity of metal contained in the ores sent to the smelters for which returns were received during the year, being based on "assay values per 2,000 lbs." or "total gross contents per lot without smelter deductions."

According to returns received by the Mines Branch from British Columbia smelters the total quantity of copper contained in matte, blister, and copper sulphate produced in British Columbia smelters during 1908, including the Northport smelter in Washington State, was 37,041,115 pounds. This includes a quantity of copper that should be credited to United States ores treated in these furnaces, which would, however, to a large extent be offset by British Columbia ores treated in United States smelters other than Northport.

Returns of smelter production in this Province were not collected by this Department previous to 1908, and a record of statistics of production on this basis is not available.

Statistics of the annual production since 1894, as ascertained by the Provincial Bureau of Mines, are shown in Table 8, and by districts, since 1905, in Table 9. It

will be seen that in 1908 the ores of the Boundary district produced about 85 per cent of the total, the Rossland mines about 11 per cent, and the Coast district 3 per cent.

COPPER.—TABLE 8.

British Columbia:—Production.

Calendar Year.	Copper contained in ores, shipped	Increase.		Value.
	Lbs.	Lbs.	%	
1894	324,680	.....	.....	$ 31,039
1895	952,840	628,160	193	102,526
1896	3,818,556	2,865,716	301	415,459
1897	5,325,180	1,506,624	39	601,213
1898	7,271,678	1,946,498	36	874,783
1899	7,722,591	450,913	6	1,359,948
1900	9,977,080	2,254,489	29	1,615,289
1901	27,603,746	17,626,666	177	4,448,896
1902	29,636,057	2,032,311	7	3,445,488
1903	34,359,921	4,723,864	16	4,547,735
1904	35,710,128	1,350,207	3·7	4,579,110
1905	37,692,251	1,982,123	5·6	5,876,222
1906	42,990,488	5,298,237	14·1	8,287,706
1907	40,832,720	*2,157,768	*5·02	8,168,177
1908	47,274,614	6,441,894	15·8	6,244,031

* Decrease.

COPPER.—TABLE 9.

British Columbia:—Production by Districts.

——	1905.	1906.	1907.	1908.
	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar	.....	293,269	674,887	490,873
East Kootenay	10,606	6,910	.....	.....
West Kootenay—				
Nelson	92,663	216,034	434,222	53,243
Slocan	.....	2,861	.....	.....
Trail Creek	5,800,294	4,750,110	5,080,275	5,042,244
All other	.....	1,145	.....	.....
Yale—				
Boundary	27,670,644	32,226,782	31,521,550	40,178,521
Ashcroft, Kamloops	680,808	355,377	38,706	3,269
Coast Districts	3,437,236	5,138,000	3,083,080	1,506,464
	37,692,251	42,990,488	40,832,720	47,274,614

The low grade ores of the Boundary district in addition to being self fluxing are remarkably uniform in character, ranging from one to two per cent in copper and from $1 to $2 in gold and silver.

In this district the production has been derived from four principal groups of properties operated by The Granby Consolidated Mining, Smelting & Power Co., Ltd., The British Columbia Copper Co., The Dominion Copper Co., and the Consolidated Mining and Smelting Co. of Canada, Ltd.

Each of these Companies operates its own smelter, the first two converting the copper matte to blister copper.

The approximate ore shipments during 1908, and the total shipments from the opening of the mines to the end of 1908 were as follows :—

——	1908.	Total to end of 1908.
	Tons.	Tons.
Granby Con. Mining, Smelting and Power Co.	1,028,748	4,642,000
B. C. Copper Co.	348,610	1,655,000
Dominion Copper Co.	22,239	595,000
Consolidated Mining & Smelting Co., (Snowshoe)	49,036	278,000
Other mines		70,000
Totals	1,448,733	7,240,000

The Granby Co.'s mines at Phœnix are equipped for a daily output of about 5,000 tons. At the Company's smelter at Grand Forks about 1,037,089 tons of ore were treated during 1908, producing 23,535,000 pounds of copper in the form of blister.

The British Columbia Copper Co., during the 12 months ending November 30, 1908, shipped 319,527 tons of ore. The smelter at Greenwood was operated for six months of the year only, in which time 321,427 tons of ore, including 281 tons of matte from the Dominion Copper Co.'s smelter, were put through. The converter production was 5,802,638 pounds of blister copper containing 5,767,355 pounds of fine copper; 13,597 ounces of gold, and 58,204 ounces of silver.

The cost per ton of ore handled, including all charges from ore in place to sale of the contained metals, was estimated by the Company at $2.62 or about 10 cents per pound of fine copper after crediting expenditure with gold and silver values.

The mines of the Dominion Copper Co. were operated for a few weeks only in July and August, and the smelter at Boundary Falls treated only about 20,000 tons of ore. The financial affairs of this Company had become somewhat involved and when a temporary fuel shortage forced a shut down operations were not resumed.

The output of the Consolidated Mining & Smelting Co.'s Snowshoe mine was smelted chiefly at the Company's smelter at Trail.

Next to the Boundary camp, Rossland is the most important copper producing district. Gold is the chief element of value in this camp, although copper is of considerable importance. The total shipments of ore in 1908 are reported as 302,419 tons from the Trail Creek Mining division, containing 5,042,244 pounds of copper or an average percentage of only 0·833.

The principal operating companies were :—

The Consolidated Mining & Smelting Company of Canada, Ltd.

The Le Roi Mining Co., Ltd.

The Le Roi No. 2, Limited.

The Giant California Mining Company.

The Consolidated Mining & Smelting Company operated the Centre Star, War Eagle, Idaho, and Iron Mask mines, from which the shipments were respectively: Centre Star 104,913 tons; War Eagle 46,969 tons; Idaho 11,806 tons, and Iron Mask 23,295 tons, or a total of 186,983 tons. The ore is all smelted in the Company's smelter at Trail.

The Le Roi Mining Company, Ltd., shipped from the Le Roi and Black Bear mines 73,127 tons of ore to their own smelter at Northport in the State of Washington.

The shipments by Le Roi No. 2, Limited, were 29,732 tons of ore and 1,100 tons of concentrates derived from 14,604 tons of ore milled. In the annual statement published by the Company the shipments for the year ending September 30, 1908, are stated to have been 29,648 tons containing 28,452·9 ounces gold, 20,408·9 ounces silver; and 910,354 pounds of copper or an average per ton of 0·9597 ounces gold; 0·691 ounces silver and 30,705 pounds or 1·535 per cent copper. The total smelting charges are reported as $5.55 per ton.

The Giant-California shipped 300 tons of ore, and nine other mines about 1,200 tons.

In the "Coast Districts" 27,831 tons of ore shipped are credited with a copper content of 1,506,464 pounds, or an average of 2·7 per cent. This ore was derived chiefly from the Indian Chief group on Sidney inlet operated by the Tyee Copper Co., Ltd., the Marble Bay mines operated by the Tacoma Steel Co., and the Northern Texada mines, both on Texada island, and the Britannia mines on Howe sound operated by the Britannia Mining & Smelting Co.

On Queen Charlotte islands the Ikeda mines, owned and operated by Awaya, Ikeda & Co., were practically the only mines from which shipments were made.

According to the Mining Recorder about 6,000 tons of ore were shipped during 1908 to the Tyee Smelter at Ladysmith; of which 2,000 tons would average 14 per cent copper, $6 in gold, and $2.50 in silver; and 4,000 tons would average 6 per cent copper, $4 in gold, and $2 in silver. According to the returns made to the Provincial Mineralogist, however, the shipments were 6,928 tons averaging 3·5 per cent copper; $2.06 in gold and $1.02 in silver.

Yukon District.

According to returns kindly furnished by the management of the "Whitehorse and Yukon Route," 3,530 tons of ore were shipped from the Whitehorse mines in 1907, and 408 tons in 1908. Direct returns were not received from all the mines, but an estimate of the copper contents of the ores shipped based on reported assays would credit the 1907 shipments with 511,838 pounds of copper, and the 1908 shipments with 112,264 pounds.

"The Whitehorse copper belt is situated in the southern part of the Yukon Territory, about forty-five miles north of the British Columbia boundary, and extends along the valley of the Lewes river, the principal feeder of the Yukon, for a distance of about twelve miles. The town of Whitehorse, in addition to being the terminus of the railway from the coast, is also the head of navigation on the Yukon.

"The history of the Whitehorse copper belt dates back to the early Klondike rush. Discoveries of copper croppings are reported to have been made by miners on their way to Dawson in the summer of 1897.

"The first claim to be staked, the Copper King, was located July 6, 1898. Later in the same year the Anaconda and Big and Little Chief claims were staked. In the following year the district was pretty thoroughly prospected on the surface, and most of the important claims, including the Pueblo, Best Chance, Arctic Chief, Grafton, War Eagle, and numerous others were discovered and staked."

During the next few years exploratory and development work was undertaken and a few occasional shipments of ore were made.

"The total amount of development work so far done in the district, including that of the past season (1907), does not exceed 3,500 feet, and the total shipments to various coast smelters aggregate about 4,000 tons. This slow progress in a camp containing so many favourable showings is remarkable, and is attributed mainly to delay in providing proper transportation facilities. Most of the important mines are situated at distances of from four to seven miles from the present terminus of the White Pass railway at Whitehorse, and are connected with it by wagon roads constructed by the territorial government. The transportation charges to Whitehorse by wagon amount to from $3 to $4 per ton, and from Whitehorse by rail and steamer to the various coast smelters to $6 per ton. The large iron ore bodies on which the camp principally depends, are all comparatively low grade, averaging about 4 per cent in copper, and the margin of profit on the ores under present conditions is small.

"A spur from the main line of the White Pass railway has now been located along a portion of the copper belt, connecting closely with the principal mines, and cheaper transportation in the immediate future is assured. A large tonnage, probably half a million tons, is in sight at the various mines, as a result of recent development work, and extensive shipments are contemplated when the spur is completed."

The total ore shipments from the camp to the end of 1908 have exceeded 4,700 tons. The shipments during 1907 and 1908 reported as railway shipments are shown hereunder, the shipments up to the end of 1906 being those mentioned by Mr. R. G. McConnell in his recent report.

Shipments of Copper Ore from Whitehorse, Yukon.

——	Total Shipments to 1906.	1907.	1908.
	Tons.	Tons.	Tons.
Arctic Chief	140	570·6	32·3
Copper King	500	275·2	360·7
Claude Irvine			14·7
Grafter		1,914·4	
Pueblo	100	530·5	
Valerie	40		
War Eagle		239·4	
	780	3,530·1	407·7

GOLD.

Refined Metal.—There is but one refinery in Canada producing fine gold bars, viz., at Trail, B. C., where the output is about 10,000 ounces per annum.

The greater part of our gold production finds its way to refineries in the United States or to the United States Mint.

A branch of the British Mint has been established in Ottawa, but a refinery is not yet in operation in connexion therewith.

At the Assay Office in Vancouver, operated in connexion with this Department, gold bullion is received, assayed, and purchased, the bullion being resold to the United States Mint. The total quantity of gold bullion received at this office during nine months ending December 31, 1908, was 89,117·76 troy ounces (weight after melting), valued at $1,478,894, after deducting assay charges, the average fineness of the resulting bullion being 0·801½ gold and 0·191 silver. The refinery at Trail established in 1904 is operated by the Consolidated Mining & Smelting Company of Canada, Ltd., and the annual production of fine gold for the years 1904-8 is shown below. This gold is recovered from the ores treated in the lead furnaces.

Production of Refined gold at Trail, B. C.

Year.	Ozs.
1904	4,336
1905	3,602
1906	9,992·631
1907	10,394·88
1908	15,346·117

Mine Production.—The production of gold in Canada, made up of gold derived from alluvial workings, gold obtained from the crushing of free-milling quartz ores, and the gold contained in other metalliferous ores sent to copper and lead smelters, etc., reached a total in 1908 of 476,112 fine ounces valued at $9,842,105, as compared with 405,517 fine ounces valued at $8,382,780 in 1907, an increase of 70,595 ounces in quantity and $1,459,325 in value, or 17·4 per cent. This is the first time in eight years that an increase has been shown over the previous year's output.

The production in 1907 was less than the production in 1906 by 150,898 fine ounces, or $3,119,340, a decrease of 27·1 per cent.

The production by provinces in 1907 and 1908 is shown in Table 1 as follows:—

GOLD.—TABLE 1.

Production by Provinces 1907 and 1908.

	1907.		1908.	
	Ozs. (fine ‡)	Value.	Ozs. (fine ‡)	Value.
		$		$
Nova Scotia	(b) 13,675	282,686	11,842	244,799
Ontario	(b) 3,212	66,399	3,212	66,389
Alberta	(a) 33	675	50	1,037
British Columbia	(c) 236,216	4,883,020	286,858	5,929,880
Yukon	(a) 152,381	3,150,000	174,150	3,600,000
Totals	405,517	8,382,780	476,112	9,842,105

‡Calculated from the value: one dollar=0·048375 ozs.

(a) Placer gold.

(b) Gold from vein mining.

(c) As follows:

	1907.	1908.
Gold from placer mining	$828,000	$647,000
" vein "	4,055,020	5,282,880
	$4,883,020	$5,929,880

The exact value of fine gold is $\frac{20.67}{837}$ dollars per ounce equivalent to $20.671834. (United States Standard).

In most cases, statistics of gold production are stated as crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by $\frac{837}{17280}$ or 0·048375.

Of the total production in 1908 about $4,248,037 or 43·2 per cent is to be attributed to alluvial workings, $977,584 or 9·9 per cent derived from stamping and milling ores, and $4,622,520 or 46·9 per cent contained in ores sent to smelters. The increased output in 1908 is due to two main causes: (1) the larger output from the Yukon placers resulting from the extensive development work undertaken by the Yukon Gold Company in that district, and (2) to an important increase in the assay value of some of the ores mined in the Rossland camp.

Statistics of the annual gold production in Canada since 1858 are shown in Table 2.

GOLD.—TABLE 2.

Annual Production in Canada, 1858–1908.

Calendar Year.	Ozs. (fine.‡)	Value.	Calendar Year.	Ozs. (fine.‡)	Value.
		$			$
1858	34,104	705,000	1885	55,575	1,148,829
1859	78,129	1,615,072	1886	70,782	1,463,196
1860	107,806	2,228,543	1887	57,460	1,187,804
1861	128,973	2,666,118	1888	53,145	1,098,610
1862	135,391	2,798,774	1889	62,653	1,295,159
1863	202,498	4,186,011	1890	55,620	1,149,776
1864	199,605	4,126,199	1891	45,018	930,614
1865	192,898	3,987,562	1892	43,905	907,601
1866	152,555	3,153,597	1893	47,243	976,603
1867	145,775	3,013,431	1894	54,600	1,128,688
1868	134,169	2,773,527	1895	100,798	2,083,674
1869	102,720	2,123,405	1896	133,262	2,754,774
1870	83,415	1,724,348	1897	291,557	6,027,016
1871	105,187	2,174,412	1898	666,386	13,775,420
1872	90,283	1,866,321	1899	1,028,529	21,261,584
1873	74,346	1,536,871	1900	1,350,057	27,908,153
1874	97,856	2,022,862	1901	1,167,216	24,128,503
1875	130,300	2,693,533	1902	1,032,161	21,336,667
1876	97,729	2,020,233	1903	911,559	18,843,590
1877	94,304	1,949,441	1904	796,374	16,462,517
1878	74,420	1,538,394	1905	684,951	14,159,195
1879	76,547	1,582,358	1906	556,415	11,502,120
1880	63,121	1,304,824	1907	405,517	8,382,780
1881	63,524	1,313,153	1908	476,112	9,842,105
1882	60,288	1,246,268			
1883	53,853	1,113,246		12,977,893	268,276,923
1884	51,202	1,058,439			

‡ Calculated from the value: one dollar = 0·048375 ounces.

It will be observed that previous to 1897 the production only twice exceeded $4,000,000, the maximum output during the period being in 1863 when the production reached $4,186,011. The discovery in 1896 of the rich placer deposits of the Yukon, however, caused a rapid increase in the production during the next four years, a second maximum being reached in 1900 when the output was only a little less than $28,000,000. The following year showed a falling off in the Yukon output, as has each succeeding year until 1908, when the tide has apparently once more turned.

The total gold production to date represents an output of 12,977,893 ounces, or $268,276,923.

Nova Scotia.

The gold production in this Province, which is derived almost entirely from quartz ores, was 13,895 crude ounces, in 1908, valued at $244,799, which is equivalent to 11,842 fine ounces. The gold was derived from 61,536 tons of rock crushed, and represents an average return of a little less than $4 per ton. With the exception of the year 1904 this is the smallest output recorded since 1881.

In 1907 the production was 14,878 crude ounces valued at $282,686, derived from 58,550 tons of ore.

Over 90 per cent of the production in 1908 was obtained from five mines, the principal operators being as follows :—

Operator.	Location of Mine.
Boston Richardson Mining Co.,	Goldboro, Guysborough county.
Beaver Hat Mining Co., -	" " "
McDonald & Copeland, -	Isaac Harbour, Guysborough county.
California Gold Mining Co.,	Cochrane Hill, " "
Wine Harbour Gold Mining Co.,	Wine Harbour, " "
Harrigan Cove Gold Mining Co.,	Harrigan cove, Halifax county.
Dominion Mining Co., - -	Tangier, Halifax county.
Jno. H. Anderson, - -	Lake Catcha, Halifax county.
Geo. E. Franklyn, - -	Montague, " "
Consolidated Mines Co. of Canada, Ltd., - -	Moose River, Halifax county.
Touquoy Gold Mining Co., -	" "
Oldham Sterling Gold Co.,	Oldham, Halifax county.
Chester Basin Gold Syndicate,	Gold River, Lunenburg county.
Uniacke Mines & Power Co.,	" "
Mic-Mac Gold Mining Co.,	" "
Dominion Antimony Co., -	West Gore, Hants county.
Eagle Mining Co., - -	Renfrew, "
The Great Bras D'Or Gold Mining Co., - - -	Middle River, Victoria county.
The Caribou Gold Mines, -	" Halifax county.
Ponhook Mining Co., Ltd.,	Malaga Barrens, Queens county.

Statistics of the total annual production since 1862 are shown in Table 3, and of the tons of ore treated and the yield of gold per ton in Table 4. The production of gold by districts during the calendar year 1907, is shown in Table 5. The production by districts for the 12 months ending Sept. 31, 1908, as collected and published by the Provincial Mines Department, is shown in Table 6 ; while the total production from 1862 to 1908 by districts, according to the same authority, is shown in Table 7.

GOLD.—TABLE 3.

Nova Scotia:—Annual Production.

Calendar Year.	Ozs. (fine).	Value.	Calendar Year.	Ozs. (fine).	Value.
		$			$
1862	6,863	141,871	1887	20,009	413,631
1863	13,180	272,448	1888	21,137	436,939
1864	18,883	390,349	1889	24,673	510,029
1865	24,011	496,357	1890	22,978	474,990
1866	23,776	491,491	1891	21,841	451,503
1867	25,763	532,563	1892	18,865	389,965
1868	19,377	400,555	1893	18,436	381,095
1869	16,855	348,427	1894	18,834	389,338
1870	18,740	387,392	1895	21,919	453,119
1871	18,139	374,972	1896	23,876	493,568
1872	12,352	255,349	1897	27,195	562,165
1873	11,180	231,122	1898	26,054	538,590
1874	8,623	178,244	1899	29,876	617,604
1875	10,576	218,629	1900	28,955	598,553
1876	11,300	233,585	1901	26,459	546,963
1877	15,925	329,205	1902	30,348	627,357
1878	11,864	245,253	1903	25,533	527,806
1879	12,980	268,328	1904	10,362	214,209
1880	12,472	257,823	1905	13,707	283,353
1881	10,147	209,755	1906	12,223	252,676
1882	13,307	275,090	1907	13,675	282,686
1883	14,571	301,207	1908	11,842	244,799
1884	15,168	313,554			
1885	20,945	432,971		857,832	17,733,042
1886	22,038	455,564			

GOLD.—TABLE 4.

Nova Scotia:—Ore Treated, and Yield of Gold Per Ton.

Calendar Year.	Tons Treated.	Yield of Gold per ton.	Calendar Year.	Tons Treated.	Yield of Gold per ton.
1862	6,473	$21.91	1886	29,010	$15.70
1863	17,000	16.02	1887	32,280	12.81
1864	21,431	18.21	1888	36,178	12.08
1865	24,421	20.32	1889	39,160	13 02
1866	32,157	15.28	1890	42,749	11.11
1867	31,384	16.96	1891	36,351	12.42
1868	32,259	12.41	1892	32,552	11.98
1869	35,144	19.91	1893	42,354	8.99
1870	30,824	12.56	1894	55,357	7.04
1871	30,787	12.17	1895	60,600	7.47
1872	17,089	14.94	1896	69,169	7.13
1873	17,708	13.05	1897	73,192	7.68
1874	13,844	12.87	1898	82,747	6.50
1875	14,810	14.76	1899	112,226	5.50
1876	15,490	15.08	1900	87,390	6.85
1877	17,369	18.95	1901	91,948	5.32
1878	17,989	13.63	1902	93,842	6.68
1879	15,936	16.83	1903	103,856	5.08
1880	13,997	18.42	1904	45,436	4.71
1881	16,556	12.66	1905	57,774	4.90
1882	21,081	13.04	1906	66,059	3.82
1883	25,954	11.60	1907	58,550	4.82
1884	25,186	12.44	1908	61,536	3.97
1885	28,890	14.98			

GOLD.—TABLE 5.

Nova Scotia:—District Details—Calendar Year, 1907.

Districts.	Mines.	Mills.	Tons of Ore.	Total Yield of Gold.			Average Yield of Gold per ton.		
			Crushed.	Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.
Caribou	1	1	2,348	316	7	3	..	2	16·67
Ecum Secum	1	1	576	400	14	..	..	13	21·91
Gold River	1	1	1,065	1,379	0	3	1	5	21·52
Harrigan Cove	1	1	.....	....	..	..	..	..	....
Lake Catcha	1	2	89	146	2	17	1	12	20·14
Leipsigate	1	1	1,121	321	..	..	..	5	17·44
McKay	1	1	20	3	..	..	..	3	....
Millers Lake	1	1	166	52	7	15	..	6	7·46
Montague	2	2	92	15	14	15	..	3	10·07
Oldham	1	1	665	807	18	..	1	4	7·14
Renfrew	1	1	409	47	15	..	..	2	8·04
Upper Stewiacke	1	1	182	24	18	..	..	2	12·17
Stormont	3	3	45,683	9,201	7	..	..	4	0·67
Tangier	1	1	647	201	15	..	..	6	5·67
Uniacke	1	1	3	4	10	..	1	10	....
Wagamatkook	1	1	77	24	14	21	..	6	10·24
Whiteburn	1	1	76	42	6	..	..	11	3·16
Wine Harbour	1	1	3,928	569	14	..	..	2	21·61
Gold recovered from stibnite ore	..	..	1,403	1,319	..	..	..	18	19·26
			58,550	14,878	4	2	..	5	1·97

GOLD.—TABLE 6.

Nova Scotia: District Details—Year ended Sept. 30, 1908.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold per ton.		
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.
Stormont	41,793	5,835	15	0	.....	2	19
Wagamatkook	2,800	590	9	19	.....	4	5
Caribou	1,240	132	0	0	.....	2	3
Caribou (Moose River)	8,952	890	10	0	.....	2	0
Tangier	567	256	0	0	.....	9	1
Oldham	754	2,458	3	0	3	5	5
Leipsigate	2,692	868	5	19	.....	6	11
Gold River	712	474	16	11	.....	13	8
Brookfield	15	2	5	0	.....	3	0
McKay Settlement	11	1	8	4	.....	2	13
Uniacke	22	21	19	4	.....	19	23
Lake Catcha	106	219	1	14	2	1	8
Montagu Mortared	.....	1	15	0	.....	.....	.....
Uniacke	.....	53	8	15	.....	.....	.....
Lake Catcha	.....	5	17	10	.....	.....	.....
* Total	59,664	11,811	15	0	.....	3	23

*This total does not include the stibnite ore mined at West Gore, Hants co. Returns for fiscal year show that 132 tons and 1,209 lbs. of ore contained 179 ozs., 5 dwts. of gold.

10,084—4½

GOLD.—TABLE 7.

Nova Scotia :—Production of Gold from 1862 to 1908.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold.			Value at $19 per oz.
		Ozs.	Dwts.	Grs.	Ozs.	Dwt.	Grs.	$
*Caribou and Moose River	203,008	55,915	16	22	.....	5	12	1,062,401
Montague	29,178	41,985	19	14	1	8	19	797,734
Oldham	55,037	60,982	18	21	1	2	4	1,158,676
Renfrew	52,904	45,129	7	19	.....	17	1	857,459
Sherbrooke	299,931	152,973	15	2	.....	10	5	2,906,501
Stormont	435,646	106,867	5	17	.....	4	22	2,030,479
Tangier	51,765	24,384	11	19	.....	9	10	463,307
†Uniacke	63,179	43,904	3	18	.....	13	21	834,180
Waverley	155,520	69,980	10	16	.....	9	0	1,329,630
‖Brookfield	92,282	38,661	18	22	.....	8	7	734,676
‡Salmon River	118,440	41,699	10	20	.....	7	1	792,291
‖Whiteburn	6,907	9,800	0	2	1	8	9	186,200
§Lake Catcha	27,202	26,986	5	23	.....	19	20	512,739
¶Rawdon	12,189	9,606	5	10	.....	15	18	182,519
Wine Harbour	77,396	34,992	15	11	.....	9	1	664,863
‖‖Fifteenmile Stream	36,456	17,058	15	5	.....	9	8	324,117
Malaga	20,896	19,293	11	7	.....	18	11	366,578
Other districts	138,529	73,025	16	2	.....	10	13	1,387,490
	1,877,465	873,249	9	10	.....	9	7	16,591,740
Not included in above; gold extracted from or contained in stibnite ore shipped from West Gore, as per returns: 1905	527	1,232	16	23	2	6	19	23,424
1906	783	1,031	13	11	1	6	8	19,602
1907	1,403	1,319	18	12	.....	18	19	25,078
1908	133	179	5	0	1	6	23	3,406
Total	1,880,311	877,013	3	8	.....	.....	.....	16,663,250

*From 1869. †From 1866. ‡From 1883. ‖From 1887. §From 1882. ¶From 1887 ‖‖From 1883.

The following notes with respect to operations at the principal mines are taken from the Report of the Provincial Department of Mines :—

Boston Richardson Mining Company, operating at Goldboro, Guysborough county.

During the year ending Sept. 30, 1908, 38,000 tons of ore were crushed, yielding 4,092 ounces of gold by stamp, amalgamation, and cyanide processes, making a total average recovery of 89 per cent; 76 per cent by amalgamation, and 13 per cent by cyanide. This is a decrease of 4,850 tons crushed, and 2,412 ounces of gold as compared with last year.

Consolidated Mines Company of Canada, Ltd., at Moose River, Halifax county.

This Company employed an average of 55 men, and from 8,326 tons of quartz and slate crushed recovered 844 ounces of gold, being an increase of 629 ounces of gold recovered, and 5,431 tons crushed compared with the previous year.

Oldham Sterling Gold Company, at Oldham, Halifax county.

An average of 40 men were employed by this firm throughout the year. From 526 tons of quartz crushed 2,384 ounces of gold were recovered, representing

an average recovery of 4·53 ounces to the ton. The production for 1907 was 853 ounces from 362 tons of quartz, being a yield of 2·36 ounces to the ton. The production for 1908 was thus 1,531 ounces greater than in 1907, and the yield to the ton almost twice as great as in 1907.

Mic-Mac Gold Mining Co., Mic-Mac Mines, Lunenburg county.

At this mine there was crushed between December, 1907, and May, 1908, about 2,692 tons of quartz, yielding 868 ounces of gold and 194 ounces of silver.

The Great Bras d'Or Gold Mining Co., Middle River, Victoria county.

The operations of this Company are of special interest, and the past year shows the first gold recovered in this district, or in fact in the island of Cape Breton, by stamp-milling.

An average of 31 men were employed, and from 2,800 tons of quartz crushed, 590 ounces of gold were recovered, being an average return of 4·21 dwts. per ton.

Quebec.

There has been no production of gold reported in this Province during the past two years. The production during the four years from 1903 to 1906 practically represents the gold contained in the pyritous ores mined at Capelton and Eustis in the Eastern townships. These ores are still being mined, but no returns have been received as to the gold contents. Very little gold has been obtained from the alluvial deposits of the St. Francis, Chaudiere, and Gilbert rivers since 1894, when the output was returned as $29,196. A considerable amount of prospecting, however, is being done each year with the hope of re-establishing a gold mining industry in this district. There has also been some prospecting of gold-bearing quartz in Marston township, as well as in the northern portion of Pontiac county adjacent to the Larder Lake district of Ontario.

GOLD.—TABLE 8.

Quebec:—Annual Production.

Calendar Year.	Ozs. (fine*)	Value.	Calendar Year.	Ozs. (fine*)	Value.
		$			$
1877	583	12,057	1893	759	15,696
1878	868	17,937	1894	1,412	29,106
1879	1,160	23,972	1895	62	1,281
1880	1,605	33,174	1896	145	3,000
1881	2,741	56,661	1897	44	900
1882	827	17,093	1898	295	6,089
1883	860	17,787	1899	238	4,916
1884	422	8,720	1900	Nil	Nil
1885	103	2,120	1901	145	3,000
1886	193	3,981	1902	391	8,073
1887	78	1,604	1903	180	3,712
1888	181	3,740	1904	140	2,900
1889	58	1,207	1905	191	3,940
1890	65	1,350	1906	165	3,412
1891	87	1,800	1907	Nil	Nil
1892	628	12,987	1908	Nil	Nil
				14,626	302,305

*Calculated from the value: one dollar = 0·048375 ozs.

Ontario.

Four companies in 1908 showed a total production of 3,787 crude ounces valued at $66,389. This is practically the same production as was recorded for 1907. The producing mines were :—

The Deloro Mining & Reduction Company, Deloro, Ont.

The Lepage Gold Mining Co., Ltd., operating the Grace mine at Michipicoten river.

The St. Anthony Gold Mine at Ignace, Ont., leased to and operated by J. S. Steele.

The Imperial Gold Mines, Ltd., operating the Laurentian mine near Gold Rock, Ont.

A considerable amount of development and exploratory work was done on a number of other properties.

The production is practically all from quartz milling ores, of which 10,607 tons were treated in 1908, averaging about $6.26 per ton.

The Larder Lake district in the north, which has attracted a good deal of attention, has not as yet become a regular producer of bullion.

Statistics of the production of gold in Ontario since 1887 are shown in Table 9 below.

GOLD.—TABLE 9.

Ontario :—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		$			$
1887	327	6,760	1899	20,394	421,591
1888	Nil.	Nil.	1900	14,391	297,495
1889	"	"	1901	11,844	244,837
1890	"	"	1902	11,118	229,828
1891	97	2,000	1903	9,076	188,036
1892	344	7,118	1904	1,935	40,000
1893	708	14,637	1905	4,402	91,000
1894	1,917	39,624	1906	3,202	66,193
1895	3,015	62,320	1907	3,212	66,399
1896	5,563	115,000	1908	3,212	66,389
1897	9,157	189,294			
1898	12,863	265,889		116,797	2,414,410

* Calculated from the value : one dollar=0·048375 ozs.

Alberta.

The value of the gold derived from the placer deposits of the Saskatchewan river and purchased by banks at Edmonton was, in 1907, about $675, and in 1908 about $1,037. This is the only record of production from that district during these years.

Statistics of the production of gold from the Saskatchewan river since 1887 are shown in Table 10.

GOLD.—TABLE 10.

Alberta :—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		$			$
1887	102	2,100	1899	726	15,000
1888	58	1,200	1900	242	5,000
1889	967	20,000	1901	726	15,000
1890	193	4,000	1902	484	10,000
1891	266	5,500	1903	48	1,000
1892	508	10,506	1904	24	500
1893	466	9,640	1905	121	2,500
1894	726	15,000	1906	39	800
1895	2,419	50,000	1907	33	675
1896	2,661	55,000	1908	50	1,037
1897	2,419	50,000			
1898	1,209	25,000		14,487	299,458

* Calculated from the value: one dollar = 0·048375 ozs.

British Columbia.[1]

The gold production in British Columbia in 1908—including the alluvial gold recovered, the gold recovered in stamp mills, and the gold contained in ores sent to the smelters—reached a total value of $5,929,880, being the largest production yet recorded. Compared with 1907, when the production was $4,883,020, an increase of $1,046,860, or 21·4 per cent is shown. The production in 1907, however, had been the lowest in seven years, and was less than the production in 1906 by $696,019 or 12·5 per cent. During the past ten years the average yearly production has been $5,408,698.

In 1907, gold to the value of $828,000 or 16·9 per cent was derived from placer workings, and $4,055,020 or 83·1 per cent was from lode ores. Of the latter about 95 per cent was contained in ores sent to smelters, the balance being recovered by stamp milling.

In 1908 the production of placer gold was only $647,000, a decrease as compared with 1907 of $181,000 or 21·9 per cent, while the production of lode gold was $5,282,880, an increase of $1,227,860 or over 30 per cent as compared with 1907. This remarkable increase was due principally to the Rossland camp, which produced in 1908 some $986,806 or 50 per cent more gold than in 1907, derived partly from an increased tonnage, but chiefly through an increased average assay value of the ores of the camp.

Statistics of production by districts in 1907 and 1908 are shown in Tables 11 and 12, while the total annual production since 1858 is shown in Table 13.

[1] The statistics of gold production for this Province are as published by the provincial mineralogist at Victoria.

GOLD.—TABLE 11.

British Columbia :—Production by Districts, ‡ 1907.

Districts.	Gold : Placer.		Gold : Lode.	
	Ozs.	Value.	Ozs.	Value.
		$		$
Cariboo :—				
Cariboo	15,325	306,500		
Quesnel	2,200	44,000		
Omineca	500	10,000		
Cassiar :—				
Atlin :—	20,400	408,000		
All other				
East Kootenay :—	1,250	25,000	165	3,410
Fort Steele				
Others	500	10,000	6	124
West Kootenay :—				
Ainsworth			118	2,439
Nelson	50	1,000	13,383	276,627
Slocan			14	289
Trail Creek			94,573	1,954,824
Others	250	5,000	1,168	24,143
Lillooet	600	12,000	180	3,721
Yale :—				
Grand Forks	75	1,500	81,218	1,678,776
Similkameen	50	1,000		
Yale	150	3,000	20	413
Coast, and all others	50	1,000	5,334	110,254
	41,400	828,000	196,179	4,055,020

‡ From Annual Report of the Minister of Mines for British Columbia.

GOLD.—TABLE 12.

British Columbia:—Products by Districts, ‡ 1908.

Districts.	Gold: Placer.		Gold: Lode.	
	Ozs.	Value.	Ozs.	Value.
		$		$
Cariboo:—				
Cariboo	17,750	355,000		
Quesnel	1,500	30,000		
Omineca	1,000	20,000		
Cassiar:—				
Atlin	10,150	203,000		
All other divisions	450	9,000	693	14,324
East Kootenay:—				
Fort Steele	170	3,400		
Other divisions	20	400		
West Kootenay:—				
Ainsworth			162	3,349
Nelson	50	1,000	17,376	359,162
Slocan and Slocan City			96	1,984
Trail Creek			142,314	2,941,630
All other divisions	250	5,000	870	17,982
Lillooet	660	13,200	28	579
Yale:—				
Grand Forks	100	2,000	91,551	1,892,359
Similkameen, etc	50	1,000		
Yale, etc	150	3,000		
Coast and other divisions	50	1,000	2,492	51,510
Totals	32,350	647,000	255,582	5,282,880

‡ From the Annual Report of the Minister of Mines, British Columbia.

GOLD.—TABLE 13.

British Columbia :—Annual Production.

Calendar Year.	Ozs. (fine‡).	Value.	Calendar Year.	Ozs. (fine‡).	Value.
		$			$
1858	34,104	705,000	1885	34,527	713,738
1859	78,129	1,615,072	1886	43,714	903,651
1860	107,806	2,228,543	1887	33,558	693,709
1861	128,973	2,666,118	1888	29,834	616,731
1862	128,528	2,656,903	1889	28,489	588,923
1863	189,318	3,913,563	1890	23,918	494,436
1864	180,722	3,735,350	1891	20,792	429,811
1865	168,887	3,491,205	1892	19,327	399,525
1866	128,779	2,662,106	1893	18,360	379,535
1867	120,012	2,480,868	1894	25,664	530,530
1868	114,792	2,372,972	1895	61,289	1,266,954
1869	85,865	1,774,978	1896	86,504	1,788,206
1870	64,675	1,336,956	1897	131,805	2,724,657
1871	87,048	1,799,440	1898	142,215	2,939,852
1872	77,931	1,610,972	1899	203,295	4,202,473
1873	63,166	1,305,749	1900	228,916	4,732,105
1874	89,233	1,844,618	1901	257,292	5,318,703
1875	119,724	2,474,904	1902	288,383	5,961,409
1876	86,429	1,786,648	1903	284,108	5,873,036
1877	77,796	1,608,182	1904	275,975	5,704,908
1878	61,688	1,275,204	1905	285,529	5,902,402
1879	62,407	1,290,058	1906	269,886	5,579,039
1880	49,044	1,013,827	1907	236,216	4,883,020
1881	50,636	1,046,737	1908	286,858	5,929,880
1882	46,154	954,085			
1883	38,422	794,252		5,792,334	119,738,208
1884	35,612	736,165			

‡Calculated from the value : one dollar=0·048375 ozs.

That placer gold mining is subject to the greatest fluctuations, even after it passes out of the range of individual methods into the hands of large companies is evidenced by the results in Atlin district, where the production was $408,000 in 1907, but only $203,000 in 1908. In this camp, as in many others, the ground has passed into the possession of a few large companies, and the temporary stopping of one of these companies causes a large percentage of decrease in the output. In this case it was the Atlin Consolidated Mining Company, owning the "Guggenheim Steam Shovel," that failed to operate; while another large company, the Pine Creek Power Company, was enlarging its ditch and was, therefore, prevented from getting through it the necessary water for gravel washing.

In the Dease Lake section of Stikine division, the Berry Creek Co., the largest company there, failed to operate this year, so reducing the output of the camp by two-thirds.

The Cariboo district, including Barkerville and Quesnel sections, held its own and produced over half the placer output of the Province.

Dredging for gold has not been successful; the inland dredges at Atlin have been abandoned, and although a little dredging was done at Lillooet and Yale on the lower Fraser river, the amount of gold recovered was small.

Of the lode gold production 55·7 per cent was derived from the Rossland camp in 1908, as compared with 48·2 per cent in 1907.

The principal companies carrying on active mining operations during 1908 were as follows:—

The Consolidated Mining and Smelting Company of Canada, Ltd., with total shipments of 186,983 tons.

The Le Roi Mining Company, Ltd., shipping 73,127 tons.

The Le Roi No. 2, Ltd., shipping 29,732 tons, in addition to which 14,604 tons were milled at the mine, producing 1,000 tons of concentrates.

The Giant California Mining Co., Ltd., shipping about 300 tons of ore.

Smaller shipments were made from a number of other properties working under lease.

The following table shows the production of the Rossland mines since 1894, and illustrates the average results attained during each of the past fifteen years.

Ore Shipments, total metallic contents, and average metallic contents per ton from Rossland mines, as determined from smelter returns.

Year.	Ore, tons, 2,000 lbs.	Gold.		Silver.		Copper.		Total.	Value Per ton.
		Ozs.	Ozs. Per ton.	Ozs.	Ozs. Per ton.	Lbs.	Per cent	$	$ c.
1894.....	1,856	3,723	2·000	5,357	2·890	106,229	2·850	75,510	40.69
1895.....	19,693	31,497	1·600	46,702	2·410	840,420	2·100	702,459	35.67
1896.....	38,075	55,275	1·450	89,285	2·340	1,580,635	2·080	1,243,360	32.65
1897.....	68,804	97,024	1·420	110,068	1·600	1,819,586	1·320	2,097,280	30.48
1898.....	111,282	87,343	0·780	170,804	1·540	5,232,011	2·350	2,470,811	22.10
1899.....	172,665	102,976	0·596	185,818	1·070	5,693,889	1·650	3,229,086	18.70
1900.....	217,636	111,625	0·513	167,378	0·769	2,071,865	0·476	2,739,300	12.58
1901.....	283,360	132,333	0·467	970,460	3·424	8,333,446	1·470	4,621,299	16.31
1902.....	329,534	162,146	0·492	373,101	1·132	11,667,807	1·770	4,893,395	14.85
1903.....	360,786	145,353	0·403	209,537	0·581	8,652,127	1·199	4,255,958	11.80
1904.....	312,991	133,095	0·425	181,830	0·581	7,119,876	1·137	3,760,866	12.01
1905.....	330,618	129,843	0·393	147,753	0·447	5,800,294	0·877	3,672,828	11.11
1906.....	279,527	105,356	0·377	126,174	0·451	4,750,110	0·850	3,173,587	11.35
1907.....	285,923	94,573	0·331	126,661	0·443	5,080,275	0·888	3,049,485	10.67
1908.....	302,419	142,314	0·471	129.558	0·428	5,042,244	0·834	3,672.270	12.14

The Boundary is the next district of importance as a gold producer, being credited with $1,892,359 in 1908, an increase of nearly 13 per cent over the production in 1907. This output is in large part due to a small gold content of the large tonnage of low grade copper ore mined in this district. These ores will average in gold only from 0·04 to 0·05 ounces to the ton, but nearly one and a half million tons were mined in 1908. Included in this district also is the output of

the Hedley camp in the Osoyoos Mining division. The principal producer in this camp was the Nickel Plate group operated by the Daly Reduction Company. The ore is chiefly an auriferous arsenopyrite, which is crushed in a 40 stamp mill and the gold recovered by amalgamation and cyanidation. The efficiency of the stamp mill and cyanide plant has been greatly increased, the recovery of values for 1908 having been reported as follows: extraction on plates 21 per cent, on vanners 41·5 per cent, and in cyanide 29 per cent, making a total extraction of 91·5 per cent. The daily average tonnage of ore treated has been brought up to about 130 to 135 tons, and during the past year about 42,000 tons of ore were treated, producing 20,000 ounces of gold.

From the Nelson Mining division gold to the value of $359,162 was obtained in 1908, chiefly from properties in Sheep Creek camp. The ores of this camp are treated in stamp mills and values saved on tables as concentrates after the free gold is extracted on amalgamated plates.

Tungsten has been found associated with some of these ores.

The principal shipping mines of the camp were the Nugget, operated by the Nugget Gold Mines, Ltd., the Mother Lode and Kootenay Belle, operated by J. L. Warner, and the Queen mine, sold during the year to a Minneapolis syndicate and operated under the management of Chas. Lewiston. These four properties shipped or milled about 11,600 tons of ore valued at upwards of $195,000.

Mr. Brock, Director of the Geological Survey, visited this camp during 1908 and his descriptions of the mines will be found on pages 18 to 20 of the Summary Report of the Geological Survey for 1908. Writing of the future prospects of the camp he states that:—

"The gold veins of Sheep creek are of considerable promise. They are clean-cut fissure veins of fair size; they appear to be persistent in a horizontal sense and are likely to be so in a vertical sense also; they appear to carry good values and to have high grade pay-streaks; and the ore mills freely. They are oxidized to a depth unusual in British Columbia. While no doubt they will be found to change from oxidized to sulphide ore if followed to any deeper levels, the experience with the unoxidized ore of the Queen mine below the zone of weathering justifies the hope that they will remain to a large extent free milling, that the sulphides will be profitably concentrated, and that the ore, while perhaps becoming poorer, may still remain of pay grade.

The conditions for mining are favourable. The properties can usually be developed by tunnels along the leads. Wood and water are generally conveniently available. A first-class wagon road, with easy grades, extends from the railway at Salmo to the Yellowstone and Kootenay Belle mills, a distance of about 10 miles. Short aërial trams would ordinarily place the ore at a point where it may be milled by water-power. If too great a demand should be made upon the local power, electrical energy might be brought in from the outside.

While the outlook is distinctly encouraging for profitable, small mines, it is to be understood that none of the veins as yet show signs of becoming large and heavy producers. Heavy capitalization would be as unwise as it is unnecessary.

So far it has the appearance of being a good poor man's camp. There are a large number of quartz veins about the head of Sheep and Lost creeks which afford a good field for the prospector."

At the Granite Poorman, six miles west of Nelson, about 8,000 tons of ore were treated in the 20 stamp-mill, yielding about $60,000 gross value.

From the Arlington mine on the north fork of Salmon river, operated by the Hastings (B.C.) Exploration Co., about 1,190 tons were shipped, yielding about $65,000 in gold and silver. This ore was shipped to the Trail smelter.

The coast districts reported a production of only $51,510 in gold, a decrease of $58,744 as compared with 1907. The chief mines shipping during 1908 were the Marble Bay mine on Texada island, operated by the Tacoma Steel Co., and shipping about 1,000 tons, and the Indian Chief mines at Sidney inlet on the west coast of Vancouver island, worked by the Tyee Copper Co. and shipping about 3,300 tons.

Yukon.

For the first time in eight years the gold production of the Yukon shows an increase over the previous year's output.

In round numbers the production in 1908 was $3,600,000, as compared with $3,150,000 in 1907, an increase of $450,000 or 7 per cent. The production in 1907 was less than in 1906 by $2,450,000 or a decrease of nearly 44 per cent.

The statistics of the production of gold in the Yukon district during the years between 1898 and 1906, as given in Table 14, are based primarily on the receipts of gold at the United States mints and receiving offices and credited to the Canadian Yukon. Although a royalty was exacted on the gold output, it seems certain that, particularly during the years of high production, considerable amounts of gold were produced which escaped the royalty payment.

During the past three years, however, the gold production of the Yukon as ascertained by the Interior Department, and on which a royalty of 2½ per cent is imposed, has agreed fairly closely with the quantities reported at the United States receiving offices as having been derived from the Canadian Yukon. For the purposes of collecting the royalty a fixed value of $15 per ounce is placed upon the crude gold. The actual value of the gold will average somewhat higher than this, however. The average value of the deposits for a number of years, as shown by the experience of United States assay offices, has been about $16.50 per ounce.

At the Canadian Assay Office in Vancouver, B.C., there was deposited during the 9 months ending Dec. 31, 1908, 60,132 ounces from the Yukon, valued, after all charges had been deducted, at $1,000,296, showing an average value of $16.63 per ounce.

The production of crude gold in the Yukon during the past three years, as ascertained by the Department of the Interior, and upon which royalty of 2½ per cent has been collected, is shown in the accompanying table.

Production of Crude Gold in the Yukon District.

Month.	1906.	1907.	1908.
	Ozs.	Ozs.	Ozs.
January	3,732·94	7,308·95	2,464·00
February	11,693·99	213·00	47·30
March	10·30	66·80	16·65
April	784·77	202·80	947·00
May	64,060·66	35,736·62	6,851·96
June	57,578·27	31,402·14	51,530·90
July	49,012·36	26,793·50	35,291·11
August	54,947·07	22,392·10	37,930·99
September	53,487·08	33,119·51	39,654·27
October	51,799·53	35,589·70	37,028·98
November	131·81	200·30	1,989·39
December	3,352·83	52·80	5,491·76
	350,391·61	193,078·22	219,244·31

In 1908 the production is estimated at $3,600,000 in gold representing 174,150 fine ounces of metal, and 41,000 fine ounces of silver valued at $21,674, being at the average price of fine silver for the year; making a total valuation of the Yukon output of $3,621,674.

In 1907 the production is estimated at $3,150,000 in gold representing 152,381 fine ounces of metal, and 35,988 fine ounces of silver valued at $23,510, the silver being the quantity reported as received at United States receiving offices. The total value in gold and silver for the year was thus $3,173,510.

Statistics of the total annual gold production in the district since 1885 are shown in Table 14.

GOLD.--TABLE 14.

Annual Production in Yukon.

Calendar Year.	Ozs. (fine‡).	Value.	Calendar Year.	Ozs. (fine‡).	Value.
		$			$
1885 } 1886 }	4,387	100,000	1898	483,750	10,000,000
			1899	774,000	16,000,000
1887	3,386	70,000	1900	1,077,553	22,275,000
1888	1,935	40,000	1901	870,750	18,000,000
1889	8,466	175,000	1902	701,437	14,500,000
1890	8,466	175,000	1903	592,594	12,250,000
1891	1,935	40,000	1904	407,938	10,500,000
1892	4,233	87,500	1905	381,001	7,876,000
1893	8,514	176,000	1906	270,900	5,600,000
1894	6,047	125,000	1907	152,381	3,150,000
1895	12,094	250,000	1908	174,150	3,600,000
1896	14,513	300,000			
1897	120,937	2,500,000		6,181,817	127,789,500

‡ Calculated from the value: one dollar=0·048375 ozs.

Since 1898 a royalty to the extent of $3,615,381 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 Interior Department, are shown in the accompanying table. The difference between these figures and those shown in Table 14, which are based on the Mint receipts of Yukon gold, has already been mentioned and is probably due to two main factors: (1) the fixing of the value of the gold for royalty purposes at $15 per ounce, a figure from $1 to $2 less than the actual value of the gold, and (2) the probability that in the earlier years of royalty collection considerable quantities of gold dust left the camp unrecorded and escaped royalty payment.

Gold Production in the Yukon, and Royalty Collected.‡

Fiscal Year.	Total Gold Production.	Total Exemption.	Royalty Collected on.	Royalty Paid.
	$	$	$	$
1898	3,072,773	339,845	2,732,928	273,292
1899	7,582,283	1,699,657	5,882,626	588,262
1900	9,809,464	2,501,744	7,307,720	730,771
1901	9,162,082	1,927,666	7,236,522	592,660
1902	9,566,340	1,199,114	8,367,225	331,436
1903	12,113,015	.....	12,113,015	302,893
1904	10,790,663	.....	10,790,663	272,217
1905	8,222,054	.....	8.222,054	206,760
1906	6,540,007	.....	6,540,007	163,963
1907 (9 months)	3,304,791	.....	3,304,791	82,622
1908	2,820,162	.....	2,820,162	70,505

‡From the Report of the Mines Branch of the Department of the Interior, 1908.

IRON AND STEEL.

INTRODUCTION.

The accompanying statistical review of the iron industry in Canada is divided into two sections; the first dealing with the production of iron ores, and the second with the production of pig iron and steel.

Although iron ores are of wide occurrence throughout Canada, being found in practically every province, and in many cases in undoubted quality and quantity, nevertheless, the development of our iron ore deposits has not kept pace with the growth of our iron metallurgical industries.

The total production of iron ore in Canada up to date, has probably not exceeded 5,000,000 tons, while our present rate of production varies from 300,000 to 400,000 tons per annum.

Newfoundland, where we obtain from 650,000 to 700,000 tons per annum for use at Sydney—is producing close to 1,000,000 tons per year. Since 1896, or during the past thirteen years, we have imported nearly 3,000,000 tons of ore, chiefly from Newfoundland and the south shore of Lake Superior, for use in our Canadian smelters. The reasons for this large importation of ores, when we have apparently such important and extensive deposits of our own, are, probably, chiefly economic.

In Nova Scotia the Newfoundland ores can be laid down at Sydney more cheaply and more certainly than the local ores, while in Ontario, although numerous iron ranges are known across the northern portion of the Province north of Lakes Superior and Huron, questions of transportation have undoubtedly delayed their development in some cases, while in others the ores are of too low grade to compete with the other sources of supply.

At the present time there are in Canada about seven or eight producing mines, and of these, only one, the Helen mine, is producing over 100,000 tons per annum.

During the past few years the Mines Branch has been carrying on special investigations into the iron ore resources of Canada, and the following reports have already been published:—

The Iron Ore Deposits of Nova Scotia, by Dr. J. E. Woodman.

The Iron Ore Deposits of Thunder Bay and Rainy River District, Ontario, by F. Hille, M.E.

The Tungsten Ores of Canada, by Dr. T. L. Walker.

Chrome Iron Ore Deposits of the Eastern Townships, Quebec, by Fritz Cirkel, M.E.

Iron Ore Deposits along the Ottawa (Quebec side) and Gatineau Rivers, Quebec, by Fritz Cirkel, M.E.

Iron Ore Deposits of Vancouver and Texada Islands, by Einar Lindeman, M.E.

The production of pig iron and steel in Canada has become an important industry, though dependent to a very large extent on imported supplies of ore and fuel. The growth of the industry has no doubt been greatly stimulated by the payment of bounties on the part of the Dominion government. Production is as yet confined to the eastern half of Canada, chiefly in the Provinces of Ontario and Nova Scotia. There are sixteen completed blast furnaces, with a total daily capacity of about 2,665 tons.

The general business depression of 1908 resulted in only a slightly decreased production of pig iron in that year, while a rapid recovery is indicated by the greatly increased rate of production being maintained during the early months of 1909. The rapid growth of population, the extensive railway construction being undertaken, the replacement of wooden bridges by steel on old railways, and the increasing use of steel in building construction, all mean a great increase in our consumption of iron and steel goods, so that in 1908, although our own furnaces turned out 630,835 tons of pig iron, we imported in addition over a million tons of iron and steel.

A summary of the chief statistics of the production of iron ore, pig iron, and steel is given hereunder, while many details will be found in subsequent pages.

Statistical Summary of Iron Ore, and Iron and Steel Production, 1907-8.

Material.	1907.	1908.
	Short Tons.	Short Tons.
Iron ore shipped	312,856	238,082
Canadian iron ore charged to furnaces	244,104	209,266
Imported " "	1,117,260	1,051,445
Pig iron made	651,962	630,835
Steel ingots and castings made	706,982	588,763
Finished rolled iron and steel products made (a)	672,200	566,099
Canadian coke charged to iron furnaces	521,068	492,076
Imported " "	327,082	325,670
Pig iron imported	(b) 150,157	(c) 212,290
Iron and steel goods imported	(b) 632,868	(c) 851,843

(a) Statistics collected and published by American Iron and Steel Association.
(b) Nine months ending March, 1907.
(c) Twelve months ending March, 1908.
The figures given do not show the total quantities of iron and steel goods imported, as in many cases the quantities are not given in the trade returns.

IRON ORE.

The total production (shipments) of iron ore from mines in Canada in 1908 was 238,082 tons valued at $568,189 at shipping point, as compared with 312,856 tons valued at $666,941 in 1907, and 248,831 tons valued at $522,242 in 1906. By provinces the production during the past three years was as follows:—

IRON.—TABLE 1.

Production of Iron Ore by Provinces, 1906-7-8.

Provinces.	1906.		1907.		1908.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
Nova Scotia	97,820	151,386	89,839	137,161	11,802	17,620
Quebec	9,933	32,938	12,748	34,956	10,103	22,094
Ontario	141,078	337,918	207,769	488,324	216,177	528,475
British Columbia	.....	.....	2,500	6,500	.....	.....
	248,831	522,242	312,856	666,941	238,082	568,189

The production during 1907 and 1908, classified as magnetites, hematites (including brown ores), carbonates, and bog ores, was as follows:—

IRON.—TABLE 2.

Classified Production of Iron Ore, 1907-8.

Character of Ore.	1907.			1908.		
	Short Tons.	Value.	Per Ton.	Short Tons.	Value.	Per Ton.
		$	$ cts.		$	$ cts.
Magnetite	50,073	106,252	2 12	49,946	124,534	2 49
Hematite	205,795	473,532	2 30	173,164	416,127	2 40
Carbonate	42,740	47,701	1 11	4,869	5,434	1 12
Bog	14,248	39,456	2 77	10,103	22,094	2 19
	312,856	666,941	2 13	238,082	568,189	2 39

The decreased ore production in 1908, as compared with 1907, was chiefly in hematite and carbonate ores. The latter are used extensively as a flux at the Londonderry furnace, which was in operation for thirty-eight days only, in 1908. The shipments from the Helen mine at Michipicoten were also somewhat less than in 1907.

The magnetites represent shipments mainly from eastern Ontario, but include in 1907 shipments from Atikokan, as well as small shipments from the Barachois mine, Cape Breton, and Texada island, B.C.; while in 1908 a small shipment of magnetite was made from the deposit being developed at Moose mountain, Ontario.

The hematites include the ores mined at Torbrook and Acadia mines, Nova Scotia (from the latter of which the carbonate ores are also obtained), and the Helen mine, Michipicoten. The bog ores are obtained and used in the Province of Quebec, but include, in 1907, a small shipment from Quatsino sound in Vancouver island, B.C.

A record of the production of iron ore in past years is shown in Tables 3 and 4 following:—

IRON.—TABLE 3.

Production of Iron Ore by Provinces, 1886-1908.

Calendar Year.	Nova Scotia.	Quebec.	Ontario.	British Columbia.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
1886	44,388	.....	16,032	3,941	64,361
1887	43,532	13,404	16,598	2,796	76,330
1888	42,611	10,710	16,894	8,372	78,587
1889	54,161	14,533	.....	15,487	84,181
1890	49,206	22,305	.....	.....	76,511
1891	53,649	14,380	.....	950	68,979
1892	78,258	22,690	.....	2,300	103,248
1893	102,201	22,076	.....	1,325	125,602
1894	89,379	19,492	.....	1,120	109,991
1895	83,792	17,783	.....	1,222	102,797
1896	58,810	17,630	15,270	196	91,906
1897	23,400	22,436	2,770	2,099	50,705
1898	19,079	17,873	21,111	280	58,343
1899	28,000	19,420	25,126	2,071	74,617
1900	18,940	19,000	82,950	1,110	122,000
1901	18,619	15,489	272,538	7,000	313,646
1902	16,172	18,524	359,288	10,019	404,003
1903	40,335	12,035	209,634	2,290	264,294
1904	61,293	16,152	141,601	.....	219,046
1905	84,952	12,681	193,464	.....	291,097
1906	97,820	9,933	141,078	.....	248,831
1907	89,839	12,748	207,769	2,500	312,856
1908	11,802	10,103	216,177	.....	238,082

IRON.—TABLE 4.

Production of Iron Ore in Nova Scotia, 1876-1885.

Calendar Year.	Tons.	Calendar Year.	Tons.
1876	15,274	1881	39,843
1877	16,879	1882	42,135
1878	36,600	1883	52,410
1879	29,989	1884	54,885
1880	51,193	1885	48,129

Nova Scotia.—Although there are two important iron smelting centres in this Province, Sydney and Sydney Mines on the one hand, and Londonderry on the other, the latter is the only furnace at which Nova Scotia ores are now used. The Sydney furnaces employ Newfoundland ores almost exclusively. The local ore production is obtained mainly from the Acadia mines at Londonderry, and the Torbrook mines in Annapolis county, both operated by the Londonderry Iron & Mining Co., Ltd. The total shipments in 1908 were only 11,802 tons, as compared with 89,839 tons in 1907, the Londonderry furnace having been shut down the greater part of the year. In 1907 shipments were made from the Brookfield mine and from Barachois, Cape Breton, in addition to the mines already mentioned.

A comprehensive report on the iron ores of Nova Scotia, by Dr. J. E. Woodman, has recently been published by the Mines Branch.

Quebec.—In this Province bog ores are mined in the counties of Champlain, Joliette, Drummond, Nicolet, St. Maurice, and Vaudreuil, and smelted in small charcoal furnaces at Radnor Forges and Drummondville. In 1908, there were 10,103 tons of these bog ores shipped to the above-mentioned furnaces, as compared with 12,748 tons in 1907. Magnetite ores from Ontario are used with these ores in the Radnor furnaces.

Ontario.—In this Province the production was obtained from four mines in 1908, and five in 1907. The largest output is secured from the Helen mine at Michipicoten. This ore, which is mainly a red hematite, is shipped to the blast furnaces at Sault Ste. Marie, Midland, and Hamilton, and to the United States market. About 1,400,000 tons have been shipped during the past nine years.

In the western part of the Province the Atikokan mine was operated during 1907; the ore, a magnetite, being shipped to the new blast furnace at Port Arthur. Neither mine nor furnace, however, was worked during 1908.

The Moose Mountain mine, thirty miles north of Sudbury, which has been undergoing development for several years, made a small shipment in 1908. The ore, a magnetite, is shipped via the Canadian Northern railway to Key Harbour, a port on Georgian bay, whence shipments can be made to any of the lake

ports. This mine will probably supply a considerable tonnage of ore during the next few years.

In eastern Ontario, shipments of magnetite were made in 1907 from the Wilbur and Radnor mines on the Kingston and Pembroke railway, and from the Mineral Range mine on the Central Ontario railway, to the blast furnaces at Sault Ste. Marie, Midland, and Deseronto, Ont., and Radnor Forges, Que., small quantities being also shipped to the Ontario Iron & Steel Co., at Welland, Ont., and to the Electric Reduction Co., at Buckingham, Que. In 1908 the Radnor mine was not operated; the Mineral Range mine was worked under lease by the Canada Iron Furnace Co., shipments being made to their furnaces at Midland and Radnor Forges, Que.; while the output from the Wilbur mine was shipped to Sault Ste. Marie.

British Columbia.—This Province is not as yet an important producer of iron ore. Small shipments have been made from time to time, chiefly from Texada island. This ore is a magnetite, and about 1,000 tons are reported as having been shipped in 1907; in addition, about 1,500 tons of bog ore were shipped from Quatsino sound according to the provincial mineralogist. No shipments were made in 1908.

Following is a list of the principal producers of iron ore:—

Name of Owner.	Address.	Name of Mine.	Location of Mine.
Nova Scotia Steel & Coal Co., Ltd...	New Glasgow, N.S..	Barachois.....	Barachois, C.B.
Londonderry Iron & Mining Co....	Montreal, Que	Acadia.	Colchester co., N.S.
		Brookfield	Colchester co., N.S.
		Torbrook.	Annapolis, N.S.
*J. McDougall & Co.....	Montreal, Que..	Bog ores	Drummond, Nicolet and other counties.
*Canada Iron Furnace Co.....	Montreal, Que....	Bog ores.....	
*Canada Iron Furnace Co.....	Montreal, Que.....	Radnor.....	Gratton tp., Renfrew county, Ont.
Wilbur Iron Ore Co., Ltd.....	Toronto, Ont.....	Wilbur mine...	Levant tp., Lanark county, Ont.
Mineral Range Iron Mining Co., Ltd.	Bessemer, Ont.....	Mineral range...	Mayo tp., Hastings county, Ont.
The Lake Superior Corporation.....	Sault Ste. Marie, Ont.	Helen mine.....	Michipicoten, Ont.
Moose Mountain, Ltd.....	Selwood, Ont.	Moose mountain	Hutton tp., Nipissing dist., Ont.
Atikokan Iron Co., Ltd.....	Port Arthur, Ont...	Atikokan.....	Rainy River dist., Ont.
Puget Sound Iron Co.	Van Anda, B.C.....	....	Texada island, B.C.
....	....	Bog ore.....	Quatsino sound, B.C.

* Consolidated under the Canada Iron Corporation, Limited.

IMPORTS AND EXPORTS.

During the past thirteen years the iron smelting industry in Canada has had to draw more and more upon imported supplies of iron ore, a large portion of these supplies being, however, derived from Newfoundland, which can hardly be looked upon as a foreign source. Still for purposes of commerce it has to be so considered.

The total consumption of iron ore in Canadian furnaces in 1908 was 1,246,144 short tons, made up of 194,699 tons of Canadian ore and 1,051,445 tons of imported ore. The Canadian production was, therefore, only about 19 per cent of our requirements. Previous to 1896 the furnaces were supplied altogether by Canadian ores. The quantities of Canadian and imported ores annually charged to blast furnaces since 1887 are shown in Table 10. The Department of Customs does not separately publish statistics of iron ore imports.

Since the opening of the Helen mine at Michipicoten considerable quantities of iron ore have been exported to the United States. The statistics of exports for both calendar and fiscal years are shown in the two tables following, the statistics for the fiscal year having been added, to compare with the record of imports of iron ore into the United States from Canada, as published in the 'Foreign Commerce and Navigation of the United States,' Washington, D.C., and shown in Table 6a. It so happened that from 1901 to 1906 the figures in the Canadian reports were inaccurate, owing to reasons explained in foot-notes to the tables.

IRON.—TABLE 5.

Exports of Iron Ore. Calendar Years, 1893-1908.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1893	2,419	7,590	1901*	306,199	762,283
1894	.....	21,294	1902*	428,901	1,065,019
1895	1,571	3,909	1903*	368,233	922,571
1896	1,033	1,911	1904*	168,828	401,738
1897	403	811	1905*	168,289	407,681
1898	182	278	1906	74,778	149,177
1899	4,145	9,538	1907	25,901	45,907
1900	5,527	13,511	1908	*(a)*	.....

* The export figures for the five years indicated are incorrect owing to a duplication of entries.
(a) The figures of the Trade Report for this year include ferro-products, and are, therefore, omitted.

IRON.—TABLE 6.

Exports of Iron Ore. Fiscal Years, 1879-1908.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		$			$
1879	3,562	7,530	1894	1,859	9,026
1880	30,524	76,474	1895	2,315	5,743
1881	44,677	114,850	1896	14	35
1882	43,835	135,463	1897	1,320	2,492
1883	44,914	138,775	1898	360	402
1884	25,308	66,549	1899	1,849	4,968
1885	54,367	132,074	1900	4,327	7,089
1886	7,542	23,039	1901*	58,401	150,657
1887	23,345	71,934	1902*	525,983	1,303,901
1888	13,544	39,945	1903*	293,510	733,230
1889	24,752	60,289	1904*	233,850	579,883
1890	13,811	31,376	1905*	224,908	540,909
1891	14,648	32,582	1906*	148,040	345,540
1892	7,707	36,935	1907†	34,191	65,367
1893	7,811	26,114	1908	26,310	46,686

* See foot-note to Table 5. † Nine months ending March 31, 1907.

IRON.—TABLE 6a.

Imports of Iron Ore into the United States from Canada, 1893-1908.*

Year ending June 30.	Short Tons.	Value.	Year ending June 30.	Short Tons.	Value.
		$			$
1893	7,706	17,186	1901	34,453	76,159
1894	301	756	1902	309,527	685,540
1895	2,681	10,114	1903	144,725	320,263
1896	39	142	1904	126,995	283,765
1897	2,535	5,243	1905	120,241	245,623
1898	1,313	2,904	1906	113,309	220,112
1899	2,585	5,120	1907	34,731	52,765
1900	4,477	5,550	1908	32,124	55,617

* Compiled from the 'Foreign Commerce and Navigation of the United States.'

PIG IRON AND STEEL.

The total production of pig iron in Canadian furnaces in 1908 was 630,835 short tons (563,246 long tons) valued at the furnace at $8,111,194, as compared with a production of 651,962 short tons (582,109 long tons) valued at $9,125,226 in 1907, and 598,411 short tons (534,296 long tons) valued at $7,955,136 in 1906. The year 1907 was a year of maximum output in the Canadian iron industry. The business depression of 1908, following the financial panic of that year in the United States, resulted in a falling off of only 21,127 tons, or 3·2 per cent in the output of pig iron in Canada in 1908. This decrease is insignificant compared to that which took place in the United States, where the pig iron production in 1908 was over 38 per cent less than the production in 1907.

These figures of production do not include the output from two electric furnace plants making ferro-products, situated at Welland, Ontario, and Buckingham, Que., of which returns were not received.

Of the total output of pig iron during 1908 about 6,709 tons valued at $171,383 were made with charcoal as fuel, and 624,126 tons valued at $7,939,811 with coke. In 1907 the quantity made with charcoal was 10,047 tons valued at $232,004, and with coke 641,915 tons valued at $8,893,222.

According to the American Iron and Steel Association, which has collected and published statistics of iron and steel production in Canada, the production of basic pig iron in 1908 amounted to 375,659 short tons, as against 382,208 short tons in 1907; and the production of Bessemer pig iron was 126,348 short tons in 1908, as against 173,499 tons in 1907.

The total production of pig iron in 1907 and 1908 is shown by provinces in the following table, the average values per ton being also indicated. In the case of Nova Scotia a large proportion of the pig iron is directly converted to steel, and in large part the value is estimated and does not necessarily represent a market value. The Quebec production is entirely charcoal iron of a high grade.

IRON.—TABLE 7.

Production of Pig Iron by Provinces, 1907-8.

Province.	1907.			1908.			Percentage increase or decrease in quantity.
	Tons.	Value.	Value per ton.	Tons.	Value.	Value per ton.	
		$	$		$	$	%
Nova Scotia	366,456	4,211,913	11 49	352,642	3,554,540	10 08	(d) 3·7
Quebec	10,047	232,004	23 09	6,709	171,383	25 55	(d) 33·2
Ontario	275,459	4,681,309	16 99	271,484	4,385,271	16 15	(d) 1·4
Total	651,962	9,125,226	13 99	630,835	8,111,194	12 86	(d) 3·2

The proportions of the whole contributed by the several provinces were, in 1908: Nova Scotia, 56 per cent; Ontario, 43 per cent; and Quebec about 1 per cent. The provinces have maintained this relative order of importance in pig iron production during the past eight years. During the past four years the production has exceeded 500,000 tons annually; while from 1898 to 1894 the production ranged from 100,000 tons to 300,000 tons per annum.

Statistics of the total production of pig iron since 1887 by provinces are given in Table 8.

IRON.—TABLE 8.

Annual Production of Pig Iron by Provinces, 1887-1908.

Year.	Nova Scotia.		Ontario.		Quebec.		Total.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$		$
1887	19,320	250,000	.....	.....	5,507	116,192	24,827	366,192
1888	17,556	211,403	.....	.....	4,243	101,832	21,799	313,235
1889	21,289	383,202	.....	.....	4,632	116,670	25,921	499,872
1890	18,382	262,608	.....	.....	3,390	69,080	21,772	331,688
1891	21,353	309,527	.....	.....	2,538	59,374	23,891	368,901
1892	40,049	583,556	.....	.....	2,394	53,865	42,443	637,421
1893	46,472	553,408	.....	.....	9,475	236,875	55,947	790,283
1894	41,344	449,533	.....	.....	8,623	196,914	49,967	646,447
1895	35,192	417,083	.....	.....	7,262	169,653	42,454	586,736
1896	32,351	400,829	28,302	368,942	6,615	154,358	67,268	924,129
1897	22,500	230,000	26,115	291,466	9,392	217,235	58,007	738,701
1898	21,627	221,677	48,253	530,789	7,135	159,929	77,015	912,395
1899	31,100	404,300	64,749	808,157	7,094	164,849	102,943	1,377,306
1900	28,133	421,995	62,387	938,725	6,055	140,978	96,575	1,501,698
1901	151,130	1,764,017	116,371	1,599,413	6,875	149,493	274,376	3,512,923
1902	237,244	2,477,767	112,688	1,584,273	7,970	181,501	357,902	4,243,541
1903	201,246	2,186,273	87,004	1,345,464	9,635	210,973	297,885	3,742,710
1904	164,488	1,700,130	127,845	1,746,126	11,121	241,729	303,454	3,687,985
1905	261,014	2,440,722	256,704	3,868,197	7,588	166,267	525,306	6,475,186
1906	315,008	3,439,217	275,558	4,338,275	7,845	177,644	598,411	7,955,136
1907	366,156	4,211,913	275,459	4,581,309	10,047	232,004	651,962	9,125,226
1908	352,642	3,554,540	271,484	4,385,271	6,709	171,383	630,835	8,111,194

The quantities of iron ore, coke, charcoal, limestone, etc., consumed in blast furnaces in 1907 and 1908 are shown as follows:—

IRON.—TABLE 9.

Ore, Fuel, and Flux charged to Blast Furnaces, in years 1907-8.

	1907.			1908.		
	Quantity.	Value.	Canadian and Imported.	Quantity.	Value.	Canadian and Imported.
		$	%		$	%
Canadian iron ore and mill cinder..... Tons.	244,104	726,633	18	209,266	741,491	17
Imported iron ore..... "	1,117,260	2,493,921	82	1,051,445	2,432,484	83
Canadian coke..... "	521,068	1,654,079	61	492,076	1,604,411	60
*Imported coke..... "	327,082	1,731,098	39	325,670	1,525,711	40
Charcoal..... Bus.	1,682,085	128,495	.....	1,121,990	85,738	.....
Canadian limestone..... Tons.	395,503	298,097	81	418,661	289,705	87
Imported " ..... "	92,959	77,738	19	64,404	53,436	13

*Including coke made from imported coal.

Previous to 1896 the pig iron made was entirely from Canadian ore. Since that date, however, increasing quantities of imported ore have been used, as well as imported fuels and fluxes, until in 1908 about 83 per cent of the ore charged, 40 per cent of the coke, and 13 per cent of the limestone were imported. This condition is, of course, due not to non-existence of the raw materials in the country; but rather to questions of costs and transportation affecting each furnace.

Thus at Sydney, N.S., the ore used is practically all imported from Newfoundland, while the fuel and flux are of Canadian origin. At Londonderry the industry is based entirely on Canadian materials, as is also the case in Quebec province. In Ontario a portion of the ore is imported—65 per cent of the charge in 1908—the coke fuel is all imported, and in the cases of the furnaces at Sault Ste. Marie and Port Arthur the flux is imported.

Statistics showing the quantities of ore, fuel, and flux, charged to Canadian blast furnaces since 1887, are shown in the following table:—

IRON.—TABLE 10.

Iron Ore, Fuel, and Flux charged to Furnaces since 1887.

Calendar Year.	Iron Ore Charged.		Fuel Charged.			Limestone
	Canadian. (a)	Imported.	Charcoal.	*Coke from Canadian Coal.	Imported Coke.	
	Tons.	Tons.	Bus.	Tons.	Tons.	Tons.
1887	60,434	.....	940,400	33,581	.....	17,171
1888	54,956	.....	804,286	30,228	.....	16,857
1889	65,670	.....	755,800	36,333	.....	22,122
1890	57,304	.....	589,860	34,073	.....	18,478
1891	60,933	.....	441,812	32,796	.....	11,377
1892	96,948	.....	1,121,365	52,622	.....	22,967
1893	124,053	.....	1,302,720	65,332	.....	27,797
1894	108,871	.....	1,173,970	60,026	.....	35,101
1895	93,208	.....	789,561	51,629	.....	31,585
1896	96,560	46,300	756,600	50,067	33,990	37,462
1897	53,658	55,722	1,031,800	35,800	27,810	31,273
1898	57,881	77,107	836,400	31,952	50,407	33,913
1899	66,384	120,650	1,928,025	44,844	64,648	51,826
1900	71,341	112,042	1,799,737	45,021	59,345	52,966
1901	156,613	261,010	1,835,736	207,835	115,367	169,399
1902	125,664	559,381	2,146,623	362,208	112,314	293,594
1903	82,035	485,911	2,322,030	350,190	96,540	277,452
1904	180,932	454,671	3,477,470	257,182	130,210	211,278
1905	116,974	861,847	4,404,394	365,897	243,882	369,715
1906	221,733	982,740	2,168,476	462,672	304,676	456,036
1907	244,104	1,117,260	1,682,085	521,068	327,082	488,462
1908	209,266	1,051,445	1,121,990	492,076	325,670	483,065

(a) Includes mill cinder.

*Includes for the first ten years small quantity of coal.

In the tabulated statement showing the total mineral production of Canada, the production of pig iron from Canadian ore only is given. This has been arrived at by separating the total production at each furnace into two classes, viz., pig iron from Canadian ore and pig iron from imported ore, the separation being made on the basis of the Canadian and imported ores entering into the production of pig iron at each respective furnace.

The production during the past thirteen years separated in this way has been as follows:—

Calendar Year.	Pig iron from Canadian ore.	Pig iron from Imported ore.	Calendar Year.	Pig iron from Canadian ore.	Pig iron from Imported ore.
	Tons.	Tons.		Tons.	Tons.
1896	40,720	26,548	1903	42,052	255,833
1897	26,200	31,807	1904	68,297	235,157
1898	30,553	46,162	1905	68,170	457,136
1899	34,244	68,699	1906	104,660	493,751
1900	35,387	61,188	1907	107,599	544,363
1901	83,100	191,276	1908	99,420	531,415
1902	71,664	286,238			

Of sixteen completed furnaces fifteen were in blast in 1908, for varying periods of time. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron and Steel Co., Sydney, C.B.: four completed furnaces of 275 tons capacity each per day; operated throughout 1907 and 1908, with the exception of one furnace which was idle during nine and a half months of 1908.

Nova Scotia Steel and Coal Company, Limited, New Glasgow, N.S.: one furnace at Sydney Mines, C.B., of 200 tons capacity; operated throughout 1907, and eleven months of 1908.

Londonderry Iron and Mining Co., Limited, Londonderry, N.S.: one furnace of 100 tons capacity; operated about nine months in 1907, and thirty-eight days in 1908.

John McDougall & Co., Montreal, Que.: two small furnaces of seven and eight tons capacity at Drummondville, Que.; one furnace operated throughout 1907, and both for about half of 1908.

Canada Iron Furnace Company, Limited, Montreal, Que.: one furnace of fifty tons daily capacity at Radnor Forges, Que.; operated throughout 1907, and six months of 1908.

One furnace of 150 tons at Midland, Ont.: operated nine and a half months in 1907, and eleven months in 1908.

Deseronto Iron Company, Limited, Deseronto, Ont.: one furnace with a daily capacity of 50 tons; operated three and a half months in 1907, and two months in 1908.

Hamilton Steel and Iron Company, Hamilton, Ont.: two furnaces, one of 200 tons capacity; operated throughout 1907, and forty-nine days in 1908; a second furnace of 300 tons capacity, operated fifty-two days in 1907, and throughout 1908.

Algoma Steel Company, Limited, Sault Ste. Marie, Ont.: two furnaces at Steelton near Sault Ste. Marie, of 250 tons capacity each; operated ten and a half months in 1907, and seven and a half months in 1908.

The Atikokan Iron Company, Limited, Port Arthur, Ont.: one furnace of 100 tons capacity; operated for about five months in 1907, but idle throughout 1908.

The total daily capacity of the sixteen furnaces is about 2,665 tons.

The number of men employed in 1908 was reported as 1,380, and wages paid, $750,224.

Of the sixteen completed furnaces ten were in blast and six idle on December 31, 1908.

The furnace plants operated by the Canada Iron Furnace Co., and John McDougall & Co., have been consolidated under one general management, known as the Canada Iron Corporation, Ltd.

Very little pig iron is exported from Canada. Considerable quantities are, however, imported. During the twelve months ending March, 1908, the imports of ordinary pig iron were 210,053 tons, valued at $3,448,125, and of charcoal pig, 2,237 tons valued at $45,475. The imports during the fiscal year 1907 (nine months ending March) were 150,127 tons of ordinary pig, valued at $2,280,860, and 30 tons of charcoal pig, valued at $675.

The annual imports of these two classes of pig iron since 1880 are shown in the following table. The duty on pig iron is $2.50 per ton.

IRON.—TABLE 11.

Annual Imports of Pig Iron since 1880.

Fiscal Year.	Pig Iron.		Charcoal Pig Iron.		Total.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
1880	(a) 23,159	371,956	.....	.....	23,159	371,956
1881	(a) 43,630	715,997	.....	.....	43,630	715,997
1882	56,594	811,221	6,837	211,791	63,431	1,023,012
1883	75,295	1,085,755	2,198	58,994	77,493	1,144,749
1884	49,291	653,708	2,893	66,602	52,184	720,310
1885	42,279	545,426	1,119	27,333	43,398	572,759
1886	42,463	528,483	3,185	60,086	45,648	588,569
1887	46,295	554,388	3,919	77,420	50,214	631,808
1888	(b) 48,973	648,012	.....	.....	48,973	648,012
1889	(b) 72,115	864,752	.....	.....	72,115	864,752
1890	(b) 87,613	1,148,078	.....	.....	87,613	1,148,078
1891	(b) 81,317	1,085,929	.....	.....	81,317	1,085,929
1892	(b) 68,918	886,485	.....	.....	68,918	886,485
1893	56,849	682,209	5,944	84,358	62,793	766,567
1894	42,376	483,787	2,906	34,968	45,282	518,755
1895	31,637	341,259	2,780	31,171	34,417	372,430
1896	36,131	394,591	917	11,726	37,048	406,317
1897	25,766	291,788	2,936	35,373	28,702	327,161
1898	37,186	382,103	2,250	23,533	39,436	405,636
1899	44,261	452,911	1,955	19,123	46,216	472,034
1900	49,767	811,490	1,816	38,736	51,583	850,226
1901	35,293	548,033	490	7,121	35,783	555,154
1902	39,978	585,077	38	726	40,016	585,803
1903	91,730	1,338,574	882	16,352	92,612	1,354,926
1904	62,515	894,728	.....	.....	62,515	894,728
1905	71,005	857,879	.....	.....	71,005	857,879
1906	96,797	1,401,047	.....	.....	96,797	1,401,047
1907*	150,127	2,280,860	30	675	150,157	2,281,535
1908	210,053	3,448,125	2,237	45,475	212,290	3,493,600

* Nine months ending March.
(a) Comprises pig iron of all kinds.
(b) These figures appear in Customs reports under heading 'iron in pigs, iron kentledge and cast-iron.'

World's production.—The production of pig iron in other countries is given hereunder for the past four years, in order to show the relative position occupied by Canada in the production of this metal.

IRON.—TABLE 12.

Production of Pig Iron in Principal Countries of the World from 1905 to 1908: metric tons 2,204·62 lbs.

——	1905.	1906.	1907.	1908.
	Metric Tons.	Metric Tons.	Metric Tons.	Metric Tons.
United States	23,340,258	25,706,882	26,193,863	16,190,994
Germany	10,987,623	12,478,067	13,045,760	11,813,511
United Kingdom	9,746,221	10,311,778	10,082,638	9,438,477
France	3,077,000	3,319,032	3,588,949	3,391,150
Russia	2,125,000	2,350,000	2,768,220	2,748,000
Austria Hungary	1,372,300	1,403,500	1,405,000	1,390,000
Belgium	1,310,290	1,431,160	1,427,940	1,206,440
Sweden	531,200	552,250	603,100	563,300
Canada	476,549	542,869	591,449	572,283
Spain	383,100	387,500	385,000	375,000
Italy	31,300	30,450	32,000	32,500
Other countries	655,000	650,000	556,900	550,000
Totals	54,035,841	59,163,488	60,680,819	48,271,655

* With the exception of those for Canada these figures are taken from the Mineral Industry, New York, 1908.

FERRO-PRODUCTS.

These are made in small quantities in electric furnaces at Buckingham, Que., and Welland, and Sault Ste. Marie, Ont. The operating companies, however, have not furnished the Department with any returns of production.

At Buckingham the Electric Reduction Company, Ltd., has for a number of years been making ferro-chrome, ferro-silicon, ferro-phosphorus, and other products. At Welland, Ont., the Electro Metals Company, Ltd., has four furnaces of from 1,000 to 1,500 horse-power each, in which ferro-silicon is made, the daily production being from five to eight tons. This firm is also conducting experiments on the reduction of iron ores in electric furnaces. The Alogma Steel Co., at Sault Ste. Marie, makes ferro-silicon for its own consumption.

The imports of ferro-manganese, ferro-silicon, etc., into Canada since 1887 are shown in Table 13, the statistics indicating to some extent the home market for these products.

IRON.—TABLE 13.

Imports of Ferro-Manganese, etc., 1887-1908.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		$			$
*1887	123	1,435	†1898	1,418	22,516
*1888	1,883	29,812	†1899	1,160	22,539
*1889	5,868	72,108	†1900	1,149	39,064
*1890	696	18,895	†1901	1,512	38,954
*1891	2,707	40,711	†1902	6,513	150,977
*1892	1,311	23,930	†1903	6,350	162,710
*1893	529	15,858	†1904	2,975	75,554
*1894	284	9,885	†1905	12,935	246,815
†1895	164	5,408	†1906	15,023	462,739
†1896	652	12,811	†1907 (9 months)	16,414	610,875
†1897	426	9,233	†1908	17,417	612,062

* These amounts include: ferro-manganese, ferro-silicon, spiegel, steel bloom ends and crop ends of steel rails, for the manufacture of iron or steel.

† Ferro-silicon, spiegeleisen, and ferro-manganese.

STEEL.

Returns for the year 1908 from eight companies making steel showed a total output of ingots and castings of 588,763 short tons valued at $10,916,602, as compared with 706,982 tons valued at $15,612,590 from seven companies in 1907.

These figures are made up as follows:—

IRON.—TABLE 14.

Production of Steel, 1907 and 1908.

Description.	1907.		1908.	
	Short Tons.	Value.	Short Tons.	Value.
		$		$
Ingots, open-hearth (basic)	459,240	9,157,703	443,442	7,684,277
" Bessemer (acid)	225,989	4,293,791	135,557	2,535,287
Castings, open-hearth	20,602	2,031,380	9,051	617,126
Other steels	1,151	129,716	713	79,912
Total	706,982	15,612,590	588,763	10,916,602

Statistics of production of steel ingots and castings since 1894 are given in the following table, the figures from 1894 to 1906 inclusive having been collected and published by the American Iron and Steel Association, those for 1907 and 1908, being as above.

IRON.—TABLE 15.

Annual Production of Steel Ingots and Castings, 1894-1908.

Calendar Year.	Short Tons.	Calendar Year.	Short Tons.	Calendar Year.	Short Tons.
1894	28,767	1899	24,640	1904	166,381
1895	19,040	1900	26,406	1905	451,863
1896	17,920	1901	29,214	1906	639,396
1897	20,608	1902	203,881	1907	706,982
1898	24,125	1903	203,296	1908	588,763

Following is a list of firms making steel:—

Dominion Iron & Steel Co., Sydney, C.B.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Montreal Steel Works, Ltd., Montreal, Que.
The Algoma Steel Co., Sault Ste. Marie, Ont.
The Hamilton Steel & Iron Co., Hamilton, Ont.
The Wm. Kennedy Sons., Ltd., Owen Sound, Ont.
The Ottawa Steel Castings Co., Ltd., Ottawa, Ont.
The Ontario Iron & Steel Co., Ltd., Welland, Ont.

The American Iron and Steel Association collects and publishes annually very complete statistics of the production of iron and steel in Canada, as well as in the United States, and we are indebted to this authority[1] for the following statistics of the production of finished rolled iron and steel in Canada:—

'Finished Rolled Iron and Steel.—The production of finished rolled iron and steel in Canada in 1908 amounted to about 496,517 long tons, as compared with about 600,179 long tons in 1907, a decrease of 103,662 tons, or over 17·2 per cent. Of the total production in 1908 about 65,505 tons were iron, and about 431,012 tons were steel, against about 81,093 tons of iron and about 519,086 tons of steel in 1907.

'The following table gives the production of leading articles of finished rolled iron and steel in Canada in the last five years:—

Products—Gross Tons.	1904.	1905.	1906.	1907.	1908.
Rails	36,216	178,385	312,877	311,461	268,692
Structural shapes and wire rods	11,195	48,350	48,351	65,541	41,520
Plates and sheets	3,102	4,944	15,202	18,493	11,656
Nail plate	5,030	4,110	2,183	1,720	2,126
All other finished rolled forms	124,495	149,037	193,129	202,964	172,523
Total	180,038	385,826	571,742	600,179	496,517

[1] Annual Statistical Report of the American Iron and Steel Association for 1908, p. 82.

'The following table gives the production of all kinds of finished rolled iron and steel in Canada from 1895 to 1908, in gross tons:—

Years.	Gross Tons.	Years.	Gross Tons.	Years.	Gross Tons.
1895	66,402	1900	100,690	1905	385,826
1896	75,043	1901	112,007	1906	571,742
1897	77,021	1902	161,485	1907	600,179
1898	90,303	1903	129,516	1908	496,517
1899	110,642	1904	180,038		

'Forged Iron and Steel.—The total production of forged iron and steel by rolling mills and steel works in Canada in 1908 amounted to about 14,738 tons, of which about 2,300 tons were iron, and about 12,438 tons were steel.

'Cut Nails and Wire Nails.—In 1908 the rolling mills and steel works in Canada which operated cut nail or wire nail factories, produced about 298,000 kegs of steel cut nails and steel wire nails of 100 pounds each, as compared with about 313,200 kegs in 1907, and about 347,000 kegs in 1906.

'Active Rolling Mills and Steel Works.—In 1908 there were twenty-five works in five provinces which made steel ingots or castings, or rolled iron or steel into finished forms, against twenty-two works in five provinces in 1907, a gain of three works. Of the total in 1908 there were nineteen works which rolled iron or steel into finished forms, and six works which made steel ingots or castings, but not finished forms of rolled iron or steel; while in 1907 the number of works which rolled iron or steel into finished forms was sixteen, and the number of works which did not produce finished rolled forms was six. There were two idle rolling mills and steel works in Canada in 1908.

'Of the twenty-five rolling mills and steel works in Canada which were active in 1908, five were located in Nova Scotia, six in Quebec, twelve in Ontario, one in New Brunswick, and one in Manitoba.'

BOUNTIES.

Bounties on iron and steel made in Canada were provided for by the Dominion government in 1897 (Chapter 6, Statutes of Canada, 1897). This Act was amended in 1899 (Chapter 8, Statutes of Canada, 1899), and again in 1903 (Chapter 68, Statutes of Canada, 1903). The latter Act provided for the payment of bounty until June 30, 1907. On April 27, 1907, a new Act was passed (Chapter 24, Statutes of Canada, 1907), providing for the further payment of bounties from January 1, 1907, to December 31, 1910, and in the case of pig iron made by electric smelting until December 31, 1912. The Act is as follows:—

An Act Respecting Bounties on Iron and Steel made in Canada.

(Assented to, 27th April, 1907.)

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. The Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the undermentioned articles when manufactured in Canada for consumption therein, viz.:—

(*a*) In respect of pig iron manufactured from ore, on the proportion from Canadian ore produced during the calendar year:—

1907	$2 10 per ton.
1908	2 10 "
1909	1 70 "
1910	0 90 "

(*b*) In respect of pig iron manufactured from ore, on the proportion from foreign ore produced during the calendar year:—

1907	$1 10 per ton.
1908	1 10 "
1909	0 70 "
1910	0 40 "

(c) On puddled iron bars manufactured from pig iron made in Canada during the calendar year:—

1907	$1 65 per ton.
1908	1 65 "
1909	1 05 "
1910	0 60 "

(*d*) In respect of rolled, round wire rods not over three-eighths of an inch diameter, manufactured in Canada from steel produced in Canada from ingredients of which not less than fifty per cent of the weight thereof consists of pig iron made in Canada, when sold to wire manufacturers for use, or when used in making wire in their own factories in Canada, on such wire rods made after the thirty-first day of December, one thousand nine hundred and six, six dollars per ton.

(*e*) In respect of steel manufactured from ingredients of which not less than fifty per cent of the weight thereof consists of pig iron made in Canada, on such steel made during the calendar year:—

1907	$1 65 per ton.
1908	1 65 "
1909	1 05 "
1910	0 60 "

2. No bounty shall be paid under the foregoing provisions in respect of iron or steel made in Canada by electric process after the thirty-first day of December, one thousand nine hundred and eight.

1. The Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the undermentioned articles when manufactured in Canada for consumption therein, viz.:—

(*a*) On pig iron manufactured from Canadian ore by the process of electric smelting during the calendar year:—

1909	$2 10	per ton.
1910	2 10	"
1911	1 70	"
1912	0 90	"

(*b*) On steel manufactured by electric process direct from Canadian ore, and on steel manufactured by electric process from pig iron smelted in Canada by electricity from Canadian ore during the calendar year:—

1909	$1 65	per ton.
1910	1 65	"
1911	1 05	"
1912	0 60	"

2. Bounty, as on pig iron under this section, may be paid upon the molten iron from the ore which in the electric furnace enters into the manufacture of steel by the direct process, the weight of such iron to be ascertained from the weight of the steel so manufactured.

3. No bounty shall be paid on steel ingots from which steel blooms and billets for exportation from Canada are manufactured.

4. The Governor in Council may make regulations to carry out the intention of this Act.

5. The Minister of Trade and Commerce shall be charged with the administration of this Act.

6. Chapter 8 of the Statutes of 1899, Chapter 68 of the Statutes of 1903, and Chapter 39 of the Statutes of 1904, are repealed.

7. This Act shall be deemed to have come into force on the first day of January, one thousand nine hundred and seven.'

The amount of bounties paid on iron and steel during the calendar years 1907 and 1908, as kindly furnished by the Department of Trade and Commerce, was as follows:—

IRON.—TABLE 16.

Bounty paid during the Calendar Years 1907 and 1908.

Product on which Bounty was paid.	1907.		1908.	
	Tons.	Bounty.	Tons.	Bounty.
		$		$
Pig iron made from Canadian ore.	95,914·97	201,421 47	101,647	213,458 34
" " imported ore.	537,803·45	591,583 80	517,427	569,169 93
Total pig iron	633,718·42	793,005 27	619,074	782,628 27
Steel ingots	666,589·87	1,099,873 37	556,289	917,876 63
Steel wire rods	68,736·22	412,417 26	49,630	297,778 68
Totals	1,369,044·51	2,305,295 90	1,224,993	1,998,283 58

The amount of bounties paid to the several companies, and the quantities of the different products on which the bounties were paid, as compiled from the reports of the Auditor General, are shown in the accompanying tables for the fiscal period of nine months ending March, 1907, and twelve months ending March, 1908.

Bounties paid on Pig Iron manufactured in Canada during nine months ending March, 1907.

Company.	On Pig Iron from Canadian Ore.		On Pig Iron from Imported Ore.		Total Bounties.
	Tons.	Bounties.	Tons.	Bounties.	
		$ cts.		$ cts.	$ cts.
Algoma Steel Co., Ltd.	16,567·49	21,568 50	99,533·63	83,087 44	104,655 94
Canada Iron Furnace Co., Ltd.:					
Midland, Ont.	1,657·38	2,640 70	24,407·34	20,712 54	23,353 24
Radnor Forges, Que.	2,760·06	3,986 49	1,635·32	1,453 62	5,440 11
Deseronto Iron Co., Ltd.	385·00	404 25	3,135·00	2,194 50	2,598 75
Dominion Iron and Steel Co., Ltd.			161,754·42	135,631 23	135,631 23
Electric Reduction Co., Ltd.	112·00	235 20			235 20
Hamilton Steel and Iron Co., Ltd.	23,315·38	32,027 42	24,974·71	21,714 48	53,741 90
Londonderry Iron and Mining Co., Ltd.	21,013·98	28,505 79			28,505 79
John McDougall & Co.	1,412·63	2,062 58			2,062 58
Nova Scotia Steel and Coal Co.			33,600·60	29,006 54	29,006 54
	67,223·92	91,430 93	349,041·02	293,800 35	385,231 28

Bounty paid on Steel Ingots and Puddled Iron Bars, during nine months ending March, 1907.

Company.	Tons.	Bounty.
		$ cts.
Algoma Steel Co., steel ingots	191,734·62	243,636 54
Dominion Iron and Steel Co., steel ingots	188,825·52	234,844 28
Hamilton Steel and Iron Co., steel ingots	39,582·43	50,220 47
" " " puddled iron bars	296·82	311 66
Nova Scotia Steel and Coal Co., steel ingots	34,789·09	46,557 84
	455,228·48	575,570 79

Bounties paid on articles manufactured from Steel, during nine months ending March, 1907.

Company.	Tons.	Bounties.
		$ cts
Dominion Iron and Steel Co., Ltd., Sydney, C.B., steel wire rods (not more than $\frac{3}{8}$" diameter) at $6	49,761·175	298,567 05
Hamilton Steel and Iron Co., angles, etc., at $3	7,134·740	21,404 22
Montreal Rolling Mills Co., angle bars, at $3	293·730	881 19
Nova Scotia Steel and Coal Co., Ltd., angles and plates, at $3	6,048·830	18,146 51
	.....	338,998 97

Bounties paid on Pig Iron manufactured in Canada, Fiscal Year 1907-8.

Company.	On Pig Iron from Canadian Ore.		On Pig Iron from Imported Ore.		Total Bounties.
	Tons.	Bounties.	Tons.	Bounties	
		$ cts.		$ cts.	$ cts.
Algoma Steel Co., Ltd.	29,462·07	61,870 36	122,399·32	134,639 26	196,509 62
Atikokan Iron Co., Ltd.	8,258·22	17,210 46	.....	.....	17,210 46
Canada Iron Furnace Co., Ltd.:					
Midland, Ont.	6,591·68	13,842 52	21,346·70	23,481 38	37,323 90
Radnor Forges, Que.	5,211·60	10,944 36	2,677·13	2,944 86	13,889 22
Deseronto Iron Co., Ltd.	938·00	1,969 80	4,845·00	5,329 50	7,299 30
Dominion Iron and Steel Co., Ltd.	33·60	70 56	317,399·76	349,139 74	349,210 30
Hamilton Steel and Iron Co., Ltd.	37,083·00	77,874 28	52,079·85	57,287 81	135,162 09
Londonderry Iron and Mining Co., Ltd	17,829·29	37,441 52	.....	.....	37,441 52
John McDougall & Co.	2,556·25	5,368 12	.....	.....	5,368 12
Nova Scotia Steel and Coal Co., Ltd	458·00	961 80	57,673·11	63,440 42	64,402 22
	108,421·71	227,553 78	578,420·87	636,262 97	863,816 75

Bounties paid on Steel Ingots and Steel Wire Rods, Fiscal Year 1907-8.

Company.	Steel ingots at $1.65.		Steel wire rods at $6.	
	Tons.	Bounty.	Tons.	Bounty.
		$ cts.		$ cts.
Algoma Steel Co., Ltd	204,555·08	337,515 88		
Dominion Iron and Steel Co	322,769·81	532,570 20	57,855·81	347,134 89
Hamilton Steel and Iron Co., Ltd	52,926·20	87,328 22		
Lake Superior Iron and Steel Co	10,606·42	17,500 60		
Nova Scotia Steel and Coal Co	70,929·73	117,034 04		
Ontario Iron and Steel Co	152·59	251 77		
	661,939·83	1,092,200 71	57,855·81	347,134 89

Total bounties paid to each company for the nine months ending March 31, 1907, and for the Fiscal Year ending March 31, 1908.

Corporations.	1907.	1908.
	$ cts.	$ cts.
Algoma Steel Co., Ltd	348,292 48	534,025 50
Atikokan Iron Company, Ltd		17,210 46
Canada Iron Furnace Co., Ltd	28,793 35	51,213 12
Deseronto Iron Co., Ltd	2,598 75	7,299 30
Dominion Iron and Steel Co., Ltd	669,042 56	1,228,915 39
Electric Reduction Co., Ltd	235 20	
Hamilton Steel and Iron Co., Ltd	125,678 25	222,490 31
Londonderry Iron and Mining Co., Ltd	28,505 79	37,441 52
John McDougall & Co	2,062 58	5,368 12
Lake Superior Iron and Steel Co		17,500 60
Montreal Rolling Mills Co	881 19	
Nova Scotia Steel and Coal Co., Ltd	93,710 89	181,436 26
Ontario Iron and Steel Co		251 77
	1,299,801 04	2,303,152 35

EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.

The value of the exports of iron and steel products from Canada in 1908 was $2,098,138, as compared with $1,607,368 in 1907. Details are shown in Table 17 following:—

IRON.—TABLE 17.

Exports of Iron and Steel goods the product of Canada during the Calendar Years 1907 and 1908.

	1907.		1908.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Stoves..... No.	698	8,077	651	8,258
Castings, N.E.S..... $	.....	33,595	.....	28,062
Pig iron..... Tons.	439	13,504	290	10,614
Machinery (linotype machines).....	.....	33,926	.....	126,590
" N.E.S.....	.....	436,793	.....	285,257
Sewing machines..... No.	4,193	77,232	9,697	109,002
Typewriters..... "	5,430	163,719	3,720	169,939
Scrap iron and steel..... Cwt.	229,229	185,430	92,566	73,807
Hardware, tools, etc..... $	.....	48,909	.....	57,631
" N.E.S..... "	.....	128,417	.....	59,304
Steel and manufactures of..... "	.....	477,766	.....	1,169,674
Totals.....	.....	1,607,368	.....	2,098,138

The total imports of iron and steel goods, as compiled from the annual reports of Trade and Navigation, are given in Table 19, showing the imports subject to duty, and Table 20, showing the imports free of duty.

The total value of the imports during the fiscal year ending March, 1908, was $61,819,698, as compared with a value of $43,222,626 during the nine months ending March, 1907, and a value of $43,235,380 during the twelve months ending June 30, 1906.

The weights or quantities are in many cases not given, so that it is not possible to state the total tonnage of iron and steel imported. A minimum estimate of the tonnage imported can, however, be arrived at by selecting those items for which the weight is given. This has been done and the results are given in Table 18. It is apparent that the imports of iron and steel during the nine months ending March, 1907, exceeded 783,025 tons; while during the twelve months ending March, 1908, the imports exceeded 1,064,133 tons.

IRON.—TABLE 18.

Imports of some Iron and Steel products of which the quantities are available.

Material.	Nine months ending March, 1907.	Twelve months ending March, 1908.
	Tons.	Tons.
Pig iron	150,157	212,290
Ferro-products and chrome steel	16,582	17,661
Ingots, blooms, billets, puddled bars, etc	19,150	6,356
Scrap and scrap steel	39,945	69,213
Plates and sheets	107,701	126,172
Bars, rods, hoops, bands, etc	106,175	98,640
Structural iron and steel	173,411	373,871
Rails and connexions	78,288	52,706
Pipe and fittings	16,637	25,080
Nails and spikes	3,537	2,741
Wire	58,239	57,046
Forgings, castings and manufactures	13,203	22,357
Total	783,025	1,064,133

IRON.—TABLE 19.

Imports of Iron and Steel Goods subject to Duty.

Material.		Nine Months ending March, 1907.		Twelve Months ending March, 1908.	
		Quantity.	Value.	Quantity.	Value.
Agricultural implements, N.O.P., viz.:—					
Binding attachments	$				639
Cultivators and weeders	No	1,896	12,942	5,491	44,983
Drills, seed	"	5,269	177,287	2,887	87,334
Farm, road or field rollers	"	117	8,328	123	18,052	
Forks, pronged	"	,817	4,573	11,466	6,548
Harrows	"	5,620	82,759	3,446	50,988
Harvesters, self-binding	"	2,876	315,360	880	85,662
Hay loaders	"	220	10,402	562	26,432
Hay tedders	"	82	3,838	44	1,374
Hoes	"	2,043	613	4,436	1,034
Horse rakes	"	697	14,337	1,117	28,474
Knives, hay or straw	"	5,832	1,047	1,729	1,207
Knives, edging	"	5	23	180	223
Lawn mowers	"	1,321	6,309	2,305	12,884
Manure spreaders	"	2,262	212,783	800	73,407
Mowing machines	"	290	8,815	1,673	47,668
Ploughs	"	17,818	498,444	16,551	438,129
Post hole diggers	"	687	558	1,589	1,019
Potato diggers	"	449	18,147	1,044	41,179
Rakes, N.O.P	"	4,181	1,142	11,967	3,350
Reapers	"	219	10,895	531	25,688
Scythes	Doz.	736	3,854	2,441	12,951
Sickles or reaping hooks	"	163	289	222	463
Snaths	"			4	17
Spades and shovels of iron or steel, N.O.P.	"	6,523	22,886	6,469	29,877
Spade and shovel blanks, and iron or steel cut to shape for the same	"			3,720	5,788
Parts of agricultural implements paying 12½ per cent and 17½ per cent	$		46,235		314,193
" " " 12½, 17½ and 20 per cent	"		332,263		314,598
All other agricultural implements, N.O.P.	"		48,147		75,259
Anvils and vises	"		60,334		70,537
Cart or wagon skeins or boxes	Lbs.	405,634	9,917	277,945	7,035
Springs N.O.P. and parts thereof, of iron or steel, for railway, tramway, or other vehicles	Cwt.	57,788	154,418	48,471	128,001

Imports of Iron and Steel Goods subject to duty.

Material.		Nine months ending March, 1907.		Twelve months ending March, 1908.	
		Quantity.	Value.	Quantity.	Value.
Axle and axle parts, N.O.P., and axle blanks and parts thereof of iron or steel for railway, tramway, or other vehicles	Cwt.	.....	.....	43,895	136,558
Bar iron or steel, rolled, whether in coils, bundles, rods or bars, comprising rounds, ovals, squares and flats, N.O.P.	"	1,352,400	2,147,709	1,497,690	2,580,823
Butts and hinges N.O.P.	$	.....	75,261	.....	65,773
Canada plates, Russia iron, tern plate, and rolled sheets of iron and steel coated with zinc, spelter or other metal, of all widths or thicknesses, N.O.P.	Cwt.	237,872	558,091	79,722	262,134
Castings, iron or steel, N.O.P.	$	.....	297,824	.....	593,672
Cast iron pipe of every description	Cwt.	279,505	360,203	431,034	598,358
Cast scrap iron	Tons	13,852	198,686	26,371	458,489
Chains, coil chains, chain links, and chain shackles of iron or steel of $\frac{5}{16}$" diameter, and over	Cwt.	47,815	159,365	81,991	281,304
Chain, malleable sprocket or link belting for binders	$	.....	53,603	(See free list)	.....
Chains, N.O.P.	"	.....	62,804	.....	52,864
Tacks, shoe	Lbs.	5,627	547	16,735	1,033
Nails, brads, spikes and tacks of all kinds, N.O.P.	"	66,221	4,412	269,331	16,346
Engines, etc.:—					
Locomotives for railways	No.	38	180,264	195	1,238,089
Motor cars for railways and tramways	"	.....	.....	11	12,002
Engines, fire	"	2	1,953	28	19,380
" gasoline	"	1,479	305,535	3,230	693,153
" steam	"	1,972	564,881	659	422,585
Boilers, steam	"	.....	.....	517	274,158
" N.O.P.	"	.....	.....	1,197	67,161
Fire extinguishing machines, including sprinklers for fire protection	$	.....	36,270	.....	51,014
Fittings, iron or steel, for iron or steel pipe of every description	Lbs.	5,324,865	338,651	7,077,317	499,050
Flat eye-bar blanks, not punched or drilled, for use exclusively in the manufacture of bridges or of steel structural work, or in car construction	Tons.	.....	.....	89	5,224
Ferro-silicon, spiegeleisen, and ferro-manganese	"	16,414	610,875	17,417	612,062
Forgings of iron and steel of whatever size, shape, or in whatever stage of manufacture, N.O.P., and steel shafting, turned, compressed or polished and hammered, drawn or cold rolled iron or steel bars or shapes, N.O.P.	Lbs.	3,052,107	151,204	3,021,923	149,219
Hardware, viz.: Builders, cabinet-makers, upholsterers, harness-makers, saddlers and carriage hardware, including curry-combs, N.O.P.	$	.....	597,567	.....	578,090
Horse, mule and ox shoes	"	.....	8,758	.....	10,212

Iron or steel billets, weighing not less than 60 lbs. per lineal yard	Cwt.	.....	.....	297,329	416,163
" ingots, cogged ingots, blooms, slabs, puddled bars, and loops, or other forms, N.O.P., less finished than iron or steel bars, but more advanced than pig iron, except castings	"	383,003	467,554	94,441	135,177
" bridges or parts thereof, iron or steel structural work, columns, shapes or sections, drilled, punched or in any further stage of manufacture than as rolled or cast, N.O.P	Tons.	67,433	194,551	244,992	645,608
Iron in pig	"	150,127	2,280,860	210,053	3,448,125
" charcoal	"	30	675	2,237	45,475
Locks of all kinds	$	.....	256,835	.....	386,405
Machines, machinery, etc. :—					
Automobiles and motor vehicles of all kinds	No.	350	531,028	674	912,371
" " " parts of	$	.....	.....	.....	136,858
Fanning mills	No.	1,307	18,202	1,648	23,051
Grain crushers	"	42	1,259	113	2,801
Windmills and complete parts thereof	"	519	27,556	708	36,171
Ore crushers and rock crushers, stamp mills, cornish and belted rolls, rock drills, air compressors, cranes, derricks and percussion coal cutters	$	.....	115,588	.....	178,951
Portable machines :—					
Fodder or feed cutters	No.	415	5,023	203	2,302
Horse-powers for farm purposes	"	12	1,209	25	2,321
Portable engines with boilers in combination and traction engines for farm purposes	"	530	583,598	700	1,033,868
Portable sawmills and planing mills	"	38	38,241	21	23,352
Steam shovels	"	.....	.....	14	71,052
Threshing machine separators	"	637	326,439	649	386,583
" " " parts of, including wind-stackers, baggers, weighers, and self-feeders for same, and finished parts thereof for repairs, when imported separately	$	.....	.....	.....	266,427
Threshing machine outfits, when consisting of traction or portable engine and separator	"	.....	36,653	.....	.....
All other portable machines, N.O.P., and parts	No.	1,056	160,597	.....	96,254
Sewing machines	"	13,317	254,071	16,065	268,198
" " parts of	$	.....	.....	.....	96,745
Slot machines	No.	533	16,547	784	22,569
Machines, typewriting	"	4,420	283,350	7,058	546,068
" type-casting and type-setting, and parts thereof, adapted for use in printing offices	"	15	59,474	109	241,445
Machines specially designed for ruling, folding, binding, embossing, creasing or cutting paper or cardboard, when for use exclusively by printers, bookbinders and by manufacturers of articles made from paper or cardboard, including parts thereof, composed wholly or in part of iron, steel, brass or wood	$	.....	.....	595	135,899
Machines for carding, spinning, weaving or knitting, imported by manufacturers for such purposes	$	.....	157,508	.....	707,949
Lithographic presses and type-making accessories for same	"	.....	.....	.....	38,331
Printing presses	"	.....	.....	.....	257,522
All machinery composed wholly or in part of iron or steel, N.O.P., and iron or steel castings, and iron or steel integral parts of all machinery specified in tariff item 453	"	.....	5,028,003	.....	8,005,310

Imports of Iron and Steel Goods subject to Duty

Material.		Nine months ending March, 1907.		Twelve months ending March, 1908.	
		Quantity.	Value.	Quantity.	Value.
Malleable iron castings	Cwt.	14,620	51,252	12,788	53,561
Nails and spikes, composition and sheathing nails	Lbs.	21,192	3,899	17,603	2,862
Nails and spikes, cut (ordinary builders)	Cwt.	48,941	90,105	4,124	10,359
Railway spikes	"	.....	.....	29,850	59,665
Nail wire of all kinds, N.O.P.	"	3,583	12,477	7,870	27,017
Nails and spikes, wrought and pressed, trunk, clout, coopers, cigar box, Hungarian, horse-shoe and other nails	Lbs.	137,989	7,452	.....	.....
Mould boards, or shares or plough plates, land sides and other plates for agricultural implements, cut to shape from rolled plates of steel, but not moulded, punched, polished or otherwise manufactured	Cwt.	36,180	100,070	(free list)	.....
Pulleys, belt for power transmission		.....	470		
Pumps, hand, N.O.P.	No.	.....	153,049	14,566	80,299
Iron and steel railway bars or rails of any form, punched or not, N.O.P., for railways, which term for the purposes of this item shall include all kinds of railways, street railways and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connexion with the business of common carrying of goods or passengers	Tons.	72,811	1,867,865	49,187	1,278,084
Railway fish-plates	"	4,960	215,045	1,225	55,193
Railway tie-plates	"	.....	.....	859	40,046
Rolled iron or steel angles, tees, beams, channels, girders and other rolled shapes or sections, not punched or drilled or further manufactured than rolled, N.O.P.	Cwt.	953,024	1,298,390	660,869	1,064,890
Rolled iron or steel beams, channels, angles and other rolled shapes of iron and steel, not punched, drilled or further manufactured than rolled, weighing not less than 35 lbs. per lineal yard, not being square, flat, oval or round shapes, and not being railway bars or rails	"	458,975	704,889	1,474,074	2,202,516
Rolled iron or steel angles, beams, channels, building or structural rolled sections or shapes, not punched, drilled or further manufactured than rolled, N.O.P., and flat eye bar blanks not punched or drilled	"	288,392	415,164	.....	.....
Rolled iron or steel hoop, band, scroll or strip, 8" or less in width, No. 18 gauge and thicker, N.E.S.	"	31,677	54,379	.....	.....
Rolled iron or steel hoop, band, scroll or strip, 12" or less in width, No. 13 gauge and thicker, N.O.P.	"	28,740	51,790	52,735	99,977
Rolled iron or steel hoop, band, scroll or strip thinner than No. 18 gauge, N.E.S.	"	25,391	73,158	.....	.....

Rolled iron or steel hoop, band, scroll or strip, No. 14 gauge and thinner, galvanized or coated with other metal or not, N.O.P	"	28,776	62,670	105,568	285,670
Rolled iron or steel sheets or plates, sheared or unsheared, and skelp iron or steel, sheared or rolled grooves, N.O.P	Cwt.	277,333	458,046	317,512	539,220
Rolled iron or steel plates not less than 48" wide and exceeding ½" in thickness	"	3,163	5,000		
Rolled iron or steel plates not less than 30" in width and not less than ¼" in thickness, N.O.P	"	342,157	543,283	419,733	666,288
Rolled iron or steel sheets, No. 17 gauge and thinner, N.O.P	"	177,435	390,899		
Rolled iron or steel sheets and strips, polished or not, No. 14 gauge and thinner, N.O.P	"	83,316	183,429	230,839	581,624
Rolls of chilled iron or steel	"	12,536	32,293	1,998	6,930
Sad or smoothing hatters' and tailors' irons	$		11,304		7,706
Safes, doors for safes and vaults	"		139,198		147,004
Screws, iron and steel, commonly called 'wood screws,' N.O.P., including lag or coach screws, plated or not, and machine or other screws, N.O.P	Gross.	167,586	24,561	200,357	41,141
Scales, balances, weighing beams, and strength-testing machines of all kinds	$		106,128		195,464
Shafting, round, steel, in bars not exceeding 2½" diameter	Cwt.			43,387	89,428
Sheets, flat, of galvanized iron or steel	"	240,595	765,816	153,069	484,585
Sheets, iron or steel, corrugated, galvanized	"	2,813	8,982	2,812	9,456
Sheets, iron or steel, corrugated, not galvanized	"	965	1,910	522	2,084
Skates of all kinds, roller or other, and parts thereof	Pairs.	72,397	73,273	114,340	94,616
Skelp iron or steel, sheared or rolled in grooves, imported by manufacturers of wrought iron or steel pipe, for use exclusively in the manufacture of wrought iron or steel pipe in their own factories	Cwt.	669,532	965,335	704,709	1,201,942
Steel billets, N.O.P	"			32,681	48,672
Stoves of all kinds, for coal, wood, oil, spirits or gas	$		433,427		469,881
Stove urns of metal, and dovetails, chaplets and hinge tubes of tin for use in the manufacture of stoves	"				16,267
Swedish rolled iron and Swedish rolled steel-nail rods under ½" diameter, for the manufacture of horseshoe nails	Cwt.	14,373	33,766	(Free list.)	
Switches, frogs, crossings and intersections for railways	"	10,334	46,550	28,692	143,781
Tubing:—					
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4" diameter, N.O.P	$		88,733		371,795
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4" and less in diameter, N.O.P	"		102,858		321,982
Seamless steel tubing, valued at not less than 3½ cents per lb	Cwt.	680	3,045	5,331	29,942
Rolled or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements	$		3,764		7,884
Iron or steel pipe or tubing, plain or galvanized, riveted, corrugated or otherwise specially manufactured, including lockjoint pipe, N.O.P	"				221,140
Boiler tubes of wrought iron or steel, including flues and corrugated tubes for marine boilers	"		309,690		
Tubes, seamless steel for bicycles	"		11,560		
Tubes of rolled steel, seamless, not joined or welded, not more than 1½" diameter	$		7,952		
Iron or steel pipe, not butt or lap welded, and wire bound wooden pipe, not less than 30" internal diameter, when for use exclusively in alluvial gold mining	"				130,265
Tubing, wrought iron or steel, plain or galvanized, threaded and coupled, or not, over 2" diameter, N.E.S	"		264,334		

Imports of Iron and Steel Goods subject to Duty

Material.		Nine months ending March, 1907.		Twelve months ending March, 1908.	
		Quantity.	Value.	Quantity.	Value.
Tubing, wrought iron or steel, plain or galvanized, threaded and coupled, or not, 2" or less in diameter	$		30,816		
Other iron or steel tubes or pipes	"		61,766		
Ware—Agate, granite, or enamelled iron or steel ware	"		124,343		113,407
Ware—Galvanized sheet iron, or of galvanized sheet steel manufactures, N.O.P.	"		23,508		
Ware—Iron or steel hollow ware, plain black or coated, N.O.P., and nickel and aluminium kitchen or household hollow ware	"		70,457		34,217
Wire bale ties	Bundles of 250 ties	2,456	4,566	629	685
Wire bound wooden pipe, N.O.P.					29
Wire cloth or woven wire and netting of iron or steel	Lbs.	487,953	33,092	1,559,650	85,769
Wire, crucible cast steel, valued at not less than 6 cents per lb	"	73,523	7,076	146,064	23,689
Wire screens, doors and windows	$		8,513		7,377
Wire buckthorn strip fencing, woven wire fencing, and wire fencing of iron and steel, N.O.P., not to include woven wire or netting made from wire smaller than No. 14 gauge, not to include fencing or wire larger than No. 9 gauge	Lbs.	637,805	23,609	1,969,592	57,924
Wire, iron or steel galvanized 9-12 and 13 gauge	Cwt.	447,496	458,082		
Wire, single or several, covered with cotton, linen, silk, rubber or other material, including cable so covered	Lbs.	1,508,528	264,094	2,237,772	442,416
Wire of iron and steel all kinds, N.O.P.	"	8,610,772	232,263	11,099,983	310,090
Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire and wire cables, N.O.P.	"	2,875,631	217,080	5,503,924	408,945
Iron or steel nuts, rivets or bolts with or without threads, nut bolt, and hinge blank, and T and strap hinges of all kinds, N.O.P.	Cwt.	37,653	150,734	48,555	199,218
Iron or steel scrap, wrought, being waste or refuse, including punchings, cuttings, and clippings of iron or steel plates or sheets having been in actual use: crop ends of tin plate bars, blooms and rails, the same not having been in actual use	"	509,954	412,666	656,501	506,698
Penknives, jack-knives, and pocket knives of all kinds	$		72,541		131,597
Knives and forks of steel, plated or not, N.O.P	"		220,699		318,820
All other cutlery, N.O.P.	"		277,549		496,726
Guns, rifles including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other fire arms	"		571,286		630,449

Bayonets, swords, fencing foils, and masks	"		1,638		4,583
Needles of any material or kind, N.O.P	"		74,020		95,343
Steel, chrome steel	Cwt.	3,367	15,826	4,871	21,785
Steel plate, universal mill or rolled edge plates of steel over 12" wide, imported by manufacturers of bridges or of structural work, or for use in car construction		46,730	74,789	269,118	415,686
Steel plate universal mill or rolled edge bridge plate imported by manufacturers of bridges	Cwt.	117,593	166,538		
Steel in bars or sheets to be used exclusively in the manufacture of shovels when imported by the manufacturers of shovels	"			25,227	48,063
Rolled iron or steel, or cast steel in bars, bands, hoops, scroll or strip, sheet or plate of any size, thickness or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cts. per lb	"	61,582	294,521	74,796	494,585
Steel in bars, bands, hoops, scroll or strip, sheet or plates of any size, thickness or width, when of greater value than 2½ cts. per lb., N.O.P	"	85,301	454,429		
Steel balls adapted for use in bearings of machinery and vehicles	$		5,054		13,718
Steel wool	Cwt.		341	387	1,584
Tools and implements—					
Adzes, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs and track tools, picks, mattocks and eyes or poles for the same	$		61,132		76,797
Axes	Doz.	3,114	18,064	5,730	35,383
Saws	$		166,292		181,750
Files and rasps, N.O.P			71,872		87,046
Tools, hand or machine, of all kinds, N.O.P			902,191		1,017,391
Knife blades or blanks, and table forks of iron and steel, in the rough, not handled, filed, ground or otherwise manufactured	"		1,175		202
Manufactures, articles or wares of iron and steel, or, of which iron and steel (or either) are the component materials of chief value, N.O.P	"		3,018,633		3,980,631
Totals			38,444,744		51,485,456

Imports of Iron and Steel Goods free of Duty.

Material.		Nine months ending March, 1907.		Twelve months ending March, 1908.	
		Quantity.	Value.	Quantity.	Value.
Anchors for vessels	Cwt.	4,384	14,107	7,067	24,488
Chain, malleable sprocket or link belting	$				185,416
Cream separators, and steel bowls for			404,150		448,569
Cream separators—materials which enter into the construction and form part of when imported by manufacturers of cream separators to be used in the manufacture thereof	$		112,351		136,476
Gas buoys—The following articles and materials, when imported by manufacturers of automatic gas buoys and automatic gas beacons, for use in the manufacture of such buoys and beacons for the Government of Canada or for export, viz., iron or steel tubes over 16″ diameter, flanged and dished steel heads made from boiler plate, over 5 feet in diameter; hardened steel balls, not less than 3″ diameter; acetelyne gas lanterns and parts thereof, and tobin bronze in bars or rods	$				200,054
Iron or steel, rolled round wire rods, in the coil, not over ⅜″ diameter, when imported by wire manufacturers for use in making wire in the coil in their own factories	Cwt.	221,006	306,039	197,247	295,122
Boiler plate of iron or steel not less than 30″ width, and not less than ¼″ thickness, for use exclusively in the manufacture of boilers	"	262,819		262,819	460,423
Flat galvanized iron or steel sheets	"	51,908	174,235	281,850	942,880
Rolled iron and steel, and cast steel in bars, band, hoop, scroll or strip, sheet or plate of any size, thickness or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cts. per lb.	"			61,243	441,416
Rolled iron or steel sheets in strips, polished or not, 14 gauge and thinner, N.O.P.	"			376,944	960,765
Rolled iron or steel, hoop, band, scroll or strip, No. 14 gauge and thinner, galvanized or coated with other metal or not, N.O.P.	"	3,852	6,746	22,230	47,878
Iron or steel, beams, sheets or plates, ankles, knees, masts or parts thereof, and cable chains for wooden, iron, steel or composite ships or vessels	"	255,062	391,412	173,520	302,351
Locomotive and car wheel tires of steel in the rough	"	74,806	178,427	148,525	341,727
Scrap iron and scrap steel, old, and fit only to be remanufactured, being part of or recovered from any vessel wrecked in waters subject to the jurisdiction of Canada	"	12,000	6,197	200,340	176,518

Machinery:—					
Articles of metal as follows, when for use exclusively in mining and metallurgical operations viz., coal cutting machines, except percussion coal cutters; coal heading machines; coal augers; rotary coal drills; core drills; miners safety lamps and parts thereof, also accessories for cleaning, filling, and testing such lamps; electric or magnetic machines for separating or concentrating iron ores; furnaces for the smelting of copper, zinc and nickel ores; converting apparatus for metallurgical processes in metals; copper plates, plated or not; machinery for extraction of precious metals by the chlorination or cyanide process; amalgam safes; automatic ore samplers; automatic feeders; retorts; mercury pumps; pyrometers; bullion furnaces; amalgam cleaners; blast furnace blowing engines; wrought iron tubing, butt or lap welded, threaded or coupled, or not, over 4" diameter; and integral parts of all machinery mentioned in this item	$		891,731		1,060,945
Blowers of iron or steel of a class or kind not made in Canada, for use in the smelting of ores, or in the reduction, separation or refining of metals; rotary kilns, revolving roasters and furnaces of metal of a class or kind not made in Canada, designed for roasting ore, mineral rock or clay; furnace slag trucks and slag pots of a class or kind not made in Canada	$				47,687
Appliances of iron or steel, of a class or kind not made in Canada, and elevators and machinery of floating dredges, when for use exclusively in alluvial gold mining	"		124,552		415,930
Well-drilling, and apparatus of a class or kind not made in Canada for drilling for water, natural gas or oil, and for prospecting for minerals, not to include motive power	"		228,138		165,638
Briquette making machines	"				10,130
Newspaper printing presses, of not less value by retail than $1,500 each, of a class or kind not made in Canada	No.	75	257,142	90	361,278
Machinery and tools not manufactured in Canada up to the required standard necessary for any factory to be established in Canada for the manufacture of rifles for the Government of Canada	$		7,166		5,678
All materials, or parts in the rough, unfinished, and screws, nuts, bands and springs to be used in rifles to be manufactured at any such factory for the Government of Canada	"		53,601		15,148
Machinery of every kind, and structural iron and steel for use in the construction and equipment of factories for the manufacture of sugar from beet root	"		29,340		25,804
Mould boards or shares, or plough plates, land sides, and other plate for agricultural implements, when cut to shape from rolled plates of steel, but not moulded, punched, polished or otherwise manufactured	Cwt.	30,768	88,864	69,851	207,966
Steel balls adapted for use on bearings on machinery, and vehicles	$		1,988		4,409
Steel, rolled, for saws and straw cutters not tempered, or ground, nor further manufactured than cut to shape without indented edges	Cwt.	13,723	126,328	18,115	158,379
Steel strips, and flat steel wire when imported into Canada by manufacturers of buckthorn and plain strip fencing, for use exclusively in their own factories in the manufacture thereof	"	22	83	188	871
Steel wire, Bessemer soft drawn spring of Nos. 10, 12, and 13 gauge, respectively, and homo steel spring wire of Nos. 11 and 12 gauge, respectively, when imported by manufacturers of wire mattresses, to be used exclusively in their own factories in the manufacture of such articles	"	4,656	11,849	9,294	24,202
Steel, crucible sheet, 11 to 16 gauge, 2½" to 18" wide, for the manufacture of mower and reaper knives when imported by manufacturers thereof for use exclusively in the manufacture of such articles in their own factories	"	7,873	35,947	11,433	49,779

Imports of Iron and Steel Goods free of Duty.

Material.		Nine months ending March, 1907.		Twelve months ending March, 1908.	
		Quantity.	Value.	Quantity.	Value.
Steel No. 20 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of corset steels, clock springs, and shoe shanks, imported by manufacturers of such articles for exclusive use in the manufacture of such articles in their own factories		253	823	208	1,228
Steel wire, flat, of 16 gauge or thinner, imported by the manufacturers of crinoline, and corset wires and dress stays, for use exclusively in the manufacture of such articles in their own factories	Cwt.	3,391	19,725	3,765	24,631
Steel, No. 12 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of buckle clasps, bed fasts, furniture casters, and ice-creepers, imported by the manufacturers of such articles, for use exclusively in the manufacture of such articles in their own factories	"	378	3,640	1,520	4,245
Steel No. 24 and 17 gauge, in sheets 63" long and from 18" to 32" wide, when imported by the manufacturers of tubular bow sockets for use exclusively in the manufacture of such articles in their own factories	"	1,508	3,477	2,327	5,832
Steel springs for the manufacture of surgical trusses, when imported by manufacturers of surgical trusses for use exclusively in the manufacture thereof in their own factories	Lbs.	1,454	976	969	706
Swedish rolled iron, and Swedish rolled steel nail rods, under half an inch in diameter, for the manufacture of horse shoe nails	Cwt.	....	....	22,360	44,168
Steel seamless tubing valued at not less than 3½ cents per pound	"	230	3,890	1,000	10,465
Steel or iron tubes, rolled, not joined or welded, not more than 1⅛" diameter, N.O.P.	$	....	....	....	10,423
Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine boilers	$	....	....	....	655,203
Barbed fencing wire of iron or steel	Cwt.	356,605	815,084	241,520	572,766
Wire, crucible cast steel, valued at not less than 6 cents per lb.	Lbs.	1,680,018	77,501	14,340	2,765
Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge	Cwt.	192,012	402,373	608,039	1,341,416
Wire, steel, valued at not less than 2⅝ cents per lb. when imported by manufacturers of rope, for use exclusively in the manufacture of rope	"	....	....	35,460	142,467
Totals		....	4,777,882	....	10,334,242

LEAD.

The production of lead in Canada in 1907 and 1908 was obtained entirely from the Province of British Columbia, and the following statistics given are those collected and published by the Provincial Mineralogist for that Province. The quantities represent the metal contained in ore shipped to mills and smelters as determined by smelter and mill returns, and are somewhat in excess of the actual amount of lead recovered, which would represent the quantity available for consumption.

The production of lead in ore in 1907 was 47,738,703 pounds, as compared with 54,608,217 pounds in 1906; a decrease of 6,869,514 pounds, or 12·6 per cent. In 1908 the production suffered a further falling off to 43,195,733 pounds, or a decrease of 4,542,970 pounds, or 9·5 per cent as compared with 1907.

Statistics showing the lead content of ores shipped since 1887 are given in Table 1 following:—

LEAD.—TABLE 1.

Annual Production.

Calendar Year.	Lbs.	Price per Lb.	Value.
		Cts.	$
1887	204,800	4·500	9,216
1888	674,500	4·420	29,812
1889	165,190	3·930	6,488
1890	105,000	4·480	4,704
1891	88,665	4·350	3,857
1892	808,420	4·090	33,064
1893	2,135,023	3·730	79,636
1894	5,703,222	3·290	187,636
1895	16,461,794	3·230	531,716
1896	24,199,977	2·980	721,159
1897	39,018,219	3·580	1,396,853
1898	31,915,319	3·780	1,206,399
1899	21,862,436	4·470	977,250
1900	63,169,821	4·370	2,760,521
1901	51,900,958	4·334	2,249,387
1902	22,956,381	4·069	934,095
1903	18,139,283	4·237	768,562
1904	37,531,244	4·309	1,617,221
1905	56,864,915	4·707	2,676,632
1906	54,608,217	5·657	3,089,187
1907	47,738,703	5·325	2,542,086
1908	43,195,733	4·200	1,814,221

A large portion of the lead ore mined in Canada is now treated and refined in Canadian smelters and refineries, the balance being exported to the United States and Europe for refining.

10,084—7½

Returns of smelter production have been received by this Branch for 1908, and show the total quantity of lead contained in base bullion, or recovered as refined, to have been 37,666,066 pounds.

The quantity of lead contained in ore and concentrates and base bullion exported was, according to the Customs returns, 4,511,931 pounds. Deducting from this the quantity of lead contained in base bullion exported, and allowing for a loss of 5 per cent in smelting the ore and concentrates exported, we estimate the total quantity of lead obtained from Canadian ores shipped in 1908 and available for consumption as about 40,891,448 pounds.

Lead smelters were in operation at Marysville in East Kootenay, owned by the Sullivan Group Mining Co., and at Trail, West Kootenay, operated by the Consolidated Mining & Smelting Company of Canada.

Previous to 1904 lead ores mined in Canada were either exported or were reduced in Canadian furnaces to lead bullion carrying gold, silver, etc., which product was then exported for refining.

A lead refinery, however, is now being operated at Trail, B.C., in connexion with the smelter there (the electric process being employed) and pig lead and lead pipe of exceptional purity are being produced. The refinery also produces fine gold, fine silver, refined antimony, and copper sulphate.

The production of refined lead, including pig lead and lead pipe, etc., has been as follows :—

	Refined lead produced.
1904	7,519,440
1905	15,804,509
1906	20,471,314
1907	26,607,461
1908	36,549,274

The refined lead finds a market in Canada, the United States, and the Orient, about 38 per cent of the production in 1908 being exported chiefly to China and Japan.

The Carter White Lead Co. of Canada, Ltd., manufacturers of white lead at Montreal, use Trail lead exclusively. Their plant is equipped to use about 7,000 tons per annum.

Prices.—The average monthly price of lead on the New York market during 1907 was 5·325 cents per pound, as compared with 5·657 cents in 1906, a decrease of 5·9 per cent. In 1908 the average price was 4·200 cents, a decrease of 1·125 cents or 21·1 per cent, as compared with 1907.

Following is a statement of the average monthly prices of lead in New York during 1906, 1907, and 1908, as published by the Engineering and Mining Journal.

Monthly Average Prices of Lead in New York.

Month.	Cents per Lb.			Month.	Cents per Lb.		
	1906.	1907.	1908.		1906.	1907.	1908.
January	5·600	6·000	3·691	July	5·750	5·288	4·447
February	5·464	6·000	3·725	August	5·750	5·250	4·580
March	5·350	6·000	3·838	September	5·750	4·813	4·515
April	5·404	6·000	3·993	October	5·750	4·750	4·351
May	5·685	6·000	4·253	November	5·750	4·376	4·330
June	5·750	5·760	4·466	December	5·900	3·658	4·213
Average for the year					5·657	5·325	4·200

The average monthly prices of soft lead in London, England, as published by Julius Matton of London, and Metallgesellschaft of Frankfort-on-the-Main, were, from 1901 to 1908, as follows :—

Average Monthly Prices of Lead in London.

£ per long ton.

Month.	1901.			1902.			1903.			1904.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	15	18	6	10	11	4	11	6	1	11	11	2
February	14	13	4	11	12	4	11	14	2	11	11	10
March	13	7	7	11	10	2	13	4	6	12	—	9
April	12	8	5	11	11	11	12	8	1	12	5	1
May	12	5	6	11	12	—	11	16	—	11	15	11
June	12	6	10	11	5	5	11	8	9	11	10	5
July	12	3	—	11	4	8	11	7	8	11	13	4
August	11	13	10	11	2	5	11	2	11	11	14	9
September	11	19	1	10	17	10	11	3	4	11	15	9
October	11	12	—	10	14	11	11	2	2	12	3	9
November	11	5	4	10	14	4	11	2	2	12	17	10
December	10	10	8	10	15	1	11	3	7	12	15	6
Yearly average	12	10	5	11	5	3	11	11	7	11	19	8

Month.	1905.			1906.			1907.			1908.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	12	17	6	16	17	6	19	16	8	14	10	6
February	12	9	3	16	0	4	19	11	6	14	5	6
March	12	5	11	15	17	9	19	14	7	14	1	4
April	12	13	2	15	16	6	19	16	4	13	13	10
May	12	15	3	16	13	6	19	17	7	13	2	7
June	13	—	—	16	15	6	20	6	—	12	15	7
July	13	12	2	16	11	7	20	8	2	12	19	6
August	13	19	2	17	1	3	19	5	3	13	9	10½
September	13	19	—	18	4	4	19	17	6	13	3	6
October	14	13	7	19	7	9	18	13	—	13	7	3
November	15	6	9	19	5	6	17	4	11	13	12	2
December	17	1	—	19	12	6	14	9	4	13	3	6
Yearly average	13	14	5	17	7	—	19	1	10	13	10	5

Bounties.—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The act of 1903 provided for the payment under certain restrictions of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price of lead in London rose to £16 or over per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The act of 1903 provided that payment of bounty should cease on June 30, 1908, and as only a portion of the funds provided had been used, a new act was passed in the latter year providing for further bounty payments at the rate of 75 cents per hundred pounds, or approximately £3 10s. per ton of 2,240 lbs., subject to the restriction that when the price of lead in London exceeds £14 10s. the bounty shall be reduced by such excess.

The act, together with the regulation based upon it, is reproduced herewith in full.

'ACT 7-8 EDWARD VII, CHAPTER 43.

AN ACT RESPECTING THE PAYMENT OF BOUNTIES ON LEAD CONTAINED IN LEAD-BEARING ORES MINED IN CANADA.

Assented to July 20th, 1908.

Whereas under the provisions of an Act passed on the 24th day of October, 1903, being chapter 31 of the Acts of 1903, payment of a bounty on lead contained in lead-bearing ores mined in Canada, not to exceed five hundred thousand dollars in any fiscal year, was authorized to be paid until the thirtieth day of June, 1908;

and whereas the total amount of bounty paid thereunder up to the thirty-first day of March, 1908, was six hundred and sixty-seven thousand four hundred and four dollars, and it is estimated that a further amount of forty-five thousand dollars will be payable on or before the thirtieth day of June, 1908, leaving unexpended about one million seven hundred and eighty-eight thousand and seventy-eight dollars of the total amount authorized to be paid under the provisions of the said chapter 31: Therefore His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. The Governor in Council may authorize the payment of a bounty of seventy-five cents per one hundred pounds on lead contained in lead-bearing ores mined in Canada, on and after the first day of July, 1908, such bounty to be paid to the producer or vendor of such ores; Provided that the sum to be paid as such bounty shall not exceed five hundred thousand dollars in any year ending on the thirtieth day of June: Provided also that when it appears to the satisfaction of the Minister charged with the administration of this Act that the standard price of pig lead in London, England, exceeds fourteen pounds ten shillings sterling per ton of two thousand two hundred and forty pounds, such bounty shall be reduced by the amount of such excess.

2. The total amount of bounty payable under the provisions of chapter 31 of the Acts of 1903, and of this Act, shall not exceed two million five hundred thousand dollars.

Payment of the said bounty may be made from time to time to the extent of sixty per cent upon smelter returns showing that the ore has been delivered for smelting at a smelter in Canada. The remaining forty per cent may be paid at the close of the fiscal year, upon evidence that all such ore has been smelted in Canada.

2. If at the close of any year it appears that during the year the quantity of lead produced, on which the bounty is authorized, exceeds thirty-three thousand three hundred and thirty-three tons of two thousand pounds, the rate of bounty shall be reduced to such sum as will bring the payments for the year within the limit mentioned in section 1.

3. If at any time it appears to the satisfaction of the Governor in Council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor in Council may authorize the payment of bounty at such reduced rates as he deems just, on the lead contained in such ores mined in Canada and exported for treatment abroad.

4. If at any time it appears to the satisfaction of the Governor in Council that products of lead are manufactured in Canada direct from lead ores mined in Canada without the intervention of the smelting process, the Governor in Council may make such provision as he deems equitable to extend the benefits of this Act to the producers of such ores.

5. The bounties payable under the provisions of this Act shall cease and determine on the thirtieth day of June, one thousand nine hundred and thirteen.

6. The Governor in Council may make regulations for carrying out the intention of this Act.

REGULATIONS under the provisions of the Act 7-8, Edward VII, Chapter 43 intituled "An Act to provide for the payment of Bounty on Lead contained in the lead-bearing ores mined in Canada."

(As authorized by Order in Council on the 3rd August, 1908.)

1. The Minister of Trade and Commerce is charged with the administration of this Act.

2. All producers or vendors of lead-bearing ores who desire to avail themselves of the provisions of the Act above quoted, and to be paid bounty, shall, before making claim for such bounty, notify the Minister of their intention to claim under the provisions of the Act, and shall declare the name of the mine producing such ore, its situation, the names of the President, Secretary, and Manager, as well as the name of the official authorized to make claim. Notice shall be given the Minister of changes in ownership and management. Where the bounty is claimed by Lessees, the consent of the owner shall be shown.

3. All claims for the payment of bounty shall be made and substantiated under the oath of the Manager of the mine, or of the official authorized to make the claim.

4. Claims may be made monthly, that is immediately after the close of each calendar month, and be in such form, and contain such evidence, as may seem to the Minister from time to time necessary.

5. No claims made otherwise than in conformity with these regulations, and in form required by the Minister, shall be recognized, allowed or paid by the Minister.

6. The smelting of all such ores shall at all times be under the supervision of the officer of the Department of Trade and Commerce, appointed or detailed for the purpose.

7. The supervising officer may at any time demand and receive a portion of the floor sample of any ore delivered at the smelter for smelting purposes.

8. The rate of bounty shall be computed according to the London quotation upon the day the ore is taken into stock at the smelter, such day not to be later than the last day of the calendar month during which the ore was unloaded from cars at the smelter grounds.

9. The lead contents of ores shall for the purpose of this Act be ascertained by fire assay, as used in ordinary commercial assaying.

10. The books of the claimants, and those of the smelting works at which the ore is smelted, shall be at all times open to the inspection of such supervising officer, and of any officer of the Department of Trade and Commerce who may be detailed by the Minister for the purpose.

11. All claims shall be substantiated by the oath of the Manager of the Smelting Works at which the ores are smelted, and shall be verified and certified

to by the officer of the Department of Trade and Commerce, appointed to supervise the smelting at the works where it has been carried on.

12. The cost of the supervision shall be paid by the claimants and may be deducted *pro rata* according to the quantity smelted during the fiscal year from the amount payable to such claimants at the close of each fiscal year.'

Statement of Bounties paid on Lead during the fiscal years 1899 to 1909.

Year ending.	Bounty paid.	Year ending.	Bounty paid.
June 30, 1899	$ 76,665	June 30, 1906	$ 90,196
" 30, 1900	43,335	March 31, 1907, (9 months)	1,995
" 30, 1901	30,000	" 31, 1908	51,001
" 30, 1902		" 31, 1909	307,433
" 30, 1903	4,380		
" 30, 1904	195,627	Total	1,131,277
" 30, 1905	330,645		

Exports and Imports: According to Trade and Navigation reports the total quantity of lead contained in ore, or concentrates, or pig lead, exported during the calendar year 1908, was 18,454,594 pounds valued at $622,454, as compared with 25,591,883 pounds valued at $1,029,898 in 1907.

Details of exports in 1907 and 1908 are as follows:—

Exports of Lead 1907 and 1908.

	Lead in Ore, Concentrates, etc.		Pig Lead.	
	Lbs.	Value.	Lbs.	Value.
1907				
To United States	13,817,389	$532,235	4,590	$ 230
To Other Countries	8,160,788	333,706	3,609,116	163,727
Totals	21,978,177	865,941	3,613,706	163,957
1908				
To United States	719,086	20,514	168,866	5,329
To Other Countries	3,792,845	132,880	13,773,797	463,731
Totals	4,511,931	153,394	13,942,663	469,060

The exports of lead since 1873 are shown in Table 2.

LEAD.—TABLE 2.

Exports of Lead.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
1873		$1,993	1891		$5,000
1874		127	1892		2,509
1875		7,510	1893		3,099
1876		66	1894	5,792,700	144,509
1877		720	1895	23,075,892	435,071
1878			1896	26,480,320	462,095
1879		230	1897	43,802,697	925,144
1880			1898	37,375,678	885,485
1881			1899	15,799,518	466,950
1882		32	1900	57,642,029	1,917,690
1883		5	1901	45,590,995	1,804,687
1884		36	1902	17,761,484	457,170
1885			1903	18,624,303	426,466
1886			1904	25,868,823	559,461
1887		724	1905	41,657,403	1,046,541
1888		18	1906	21,436,022	736,007
1889		18	1907	25,591,883	1,029,898
1890			1908	18,454,594	622,454

Statistics of the annual imports since 1880 of lead and manufactures of lead are shown in Tables 3 and 4; imports of litharge in Table 5; and imports of dry white and red lead in Table 6.

The principal imports during the fiscal years 1907 and 1908 were as follows:—

	1907 (9 months).		1908 (12 months).	
	Tons.	Value.	Tons.	Value.
Old, scrap, pig and block	3,979	$277,470	3,196	$284,604
Bars and sheets	686	56,630	862	75,186
Pipe	37	3,923	125	11,783
Shot and bullets	44	3,859	11	1,221
Manufactures of lead		74,911		112,287
Tea lead	823	79,732	1,081	118,635
Litharge	566	49,183	952	90,785
Total	6,135	545,708	6,227	694,501
Metallic lead contained in imported lead pigments	2,380		4,165	
	8,515		10,392	

The production of refined lead, as already shown, was in 1908, 18,274 tons; while the exports of pig lead were 6,971 tons, leaving 11,303 tons as the consumption of Canadian lead. The imports of lead during the fiscal year 1908 are shown

above to have been 10,392 tons, not including certain manufactures of lead valued at $112,287, so that the total consumption of lead in 1908 probaby exceeded 22,000 tons.

LEAD.—TABLE 3.

Imports of Lead.

Fiscal Year.	Old, Scrap, and Pig.		Bars, Blocks, Sheets.		Total.	
	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.
1880					30,298	$124,117
1881	16,236	$ 56,919	18,222	$70,744	34,458	127,663
1882	36,655	120,870	10,540	35,728	47,195	156,598
1883	48,780	148,759	8,591	28,785	57,371	177,544
1884	39,409	103,413	9,704	28,458	49,113	131,871
1885	36,106	87,038	9,362	24,396	45,468	111,434
1886	39,945	110,947	9,793	28,948	49,738	139,895
1887	61,160	173,477	14,153	41,746	75,313	215,223
1888	68,678	196,845	14,957	45,900	83,635	242,745
1889	74,223	213,132	14,173	43,482	88,396	256,614
1890	101,197	283,096	19,083	59,484	120,280	342,580
1891	86,382	243,033	15,646	48,220	102,028	291,253
1892	97,375	254,384	11,299	32,368	108,674	286,752
1893	94,485	215,521	12,403	32,286	106,888	247,807
1894	70,223	149,440	8,486	20,451	78,709	169,891
1895	67,261	139,290	6,739	16,315	74,000	155,605
1896	72,433	173,162	8,575	23,169	81,008	196,331
1897	65,279	158,381	10,516	29,175	75,795	187,556
	Old, Scrap, Pig, and Block.*		Bars and Sheets.†		Total.	
1898	88,420	$260,779	22,214	$39,041	110,634	$ 299,820
1899	114,659	283,432	44,796	39,833	159,455	323,265
1900	62,361	207,819	15,493	53,506	77,854	251,325
1901	(a)85,321	97,011	16,295	78,316	101,616	175,327
1902	(a)122,279	104,672	18,596	49,261	140,875	153,933
1903	(a)98,530	67,821	11,535	35,398	110,065	103,219
1904	(a)94,602	121,165	14,102	39,644	108,704	160,809
1905	(a)57,074	133,775	17,792	51,972	74,866	185,747
1906	82,729	271,105	16,106	57,185	98,835	328,290
1907	79,575	277,470	13,710	56,630	93,285	334,100
1908	63,921	284,604	17,253	75,186	81,174	359,790

* Duty 15 per cent.
† Duty 25 per cent.
(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

LEAD.—TABLE 4.

Imports of Lead Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880	$ 15,400	1890	$ 25,600	1900	$ 194,736
1881	22,629	1891	23,893	1901	107,260
1882	17,282	1892	22,636	1902	120,020
1883	25,556	1893	33,783	1903	134,151
1884	31,361	1894	29,361	1904	129,093
1885	36,340	1895	38,015	1905	147,177
1886	33,078	1896	50,722	1906	163,793
1887	19,140	1897	60,735	1907	162,425
1888	18,816	1898	63,179	1908	243,926
1889	16,315	1899	91,497		

LEAD.—TABLE 5.

Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880	3,041	$14,334	1895	11,955	$32,953
1881	6,126	22,129	1896	10,710	32,817
1882	4,900	16,651	1897	12,028	34,538
1883	1,532	6,173	1898	11,446	32,904
1884	5,235	18,132	1899	9,530	32,518
1885	4,990	16,156	1900	9,139	29,176
1886	4,928	16,003	1901	11,132	51,944
1887	6,397	21,865	1902	13,002	47,021
1888	7,010	23,808	1903	13,921	47,761
1889	8,089	31,082	1904	9,894	32,633
1890	9,453	31,401	1905	17,865	57,736
1891	7,979	27,613	1906	10,165	39,836
1892	10,384	34,343	1907	11,311	49,183
1893	7,685	24,401	1908 Duty free	19,052	90,785
1894	38,547	28,685			

The imports of white and red lead and orange mineral in 1908 amounted to 7,830,860 pounds valued at $420,537. In 1903 the imports were 19,208,786 pounds, the falling off being due to the establishment of lead-corroding works at Montreal. Detailed statistics of imports of lead pigments in 1907 and 1908 are as follows, the statistics of imports since 1885 being shown in Table 6.

Imports of White and Red Lead in 1907 and 1908.

——	1907 (9 months).		1908 (12 months).	
	Lbs.	Value.	Lbs.	Value.
Lead, white dry	4,856,850	$ 234,127	6,115,739	$ 328,768
Lead, white ground in oil	222,110	11,596	513,179	28,443
Lead, red, dry and orange mineral	877,666	44,906	1,201,942	63,326
	5,956,626	290,629	7,830,860	420,537

LEAD.—TABLE 6.

Imports of Dry White and Red Lead and Orange Mineral, and White Lead ground in Oil.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
1885	5,404,753	$ 198,913	1897	10,310,463	$ 347,589
1886	6,703,077	213,258	1898	12,682,808	448,659
1887	6,998,820	233,725	1899	14,507,945	514,842
1888	6,361,334	216,654	1900	14,679,920	634,492
1889	7,066,465	267,236	1901	10,241,601	461,368
1890	10,859,672	381,959	1902	15,584,164	603,582
1891	8,560,615	337,407	1903	19,208,786	758,371
1892	10,288,766	351,686	1904	16,925,585	662,098
1893	10,865,183	364,680	1905	17,376,588	638,381
1894	10,958,170	353,053	1906	10,412,891	417,444
1895	8,780,052	282,353	1907	5,956,626	290,629
1896	11,711,496	367,569	1908	7,830,860	420,537

Ontario.

There was no production of lead reported from Ontario in 1907 or 1908. The property of the Stanley Smelting Works was taken over by the Canadian Lead Mining & Smelting Company, Ltd., with head office at Kingston, Ont., and mines at Perth Road. This Company proposes to erect a custom smelter at Kingston Harbour for the treatment of lead and silver ores.

British Columbia.

As already stated the total lead production in Canada in 1907 and 1908 was derived from this Province. In other years, however, there has been a small production from other provinces, and the following table is given to show the production of this Province separately, the statistics of quantity being those published by the Provincial Mineralogist of British Columbia.

LEAD.—TABLE 7.

British Columbia:—Production.

Calendar Year.	Lbs.	Value.	Price per Pound.	Calendar Year.	Lbs.	Value.	Price per Pound.
			Cts.				Cts.
1887.....	204,800	$ 9,216	4·50	1898 ...	31,693,559	1,198,017	3·780
1888.....	674,500	29,813	4·42	1899....	21,862,436	977,250	4·470
1889.....	165,100	6,488	3·93	1900....	63,158,621	2,760,031	4·370
1890.....	Nil.	.....	.....	1901....	51,582,906	2,235,603	4·334
1891.....	"	.....	.....	1902....	22,536,381	917,005	4·069
1892.....	808,420	33,064	4·09	1903....	18,089,283	766,443	4·237
1893.....	2,131,092	79,490	3·73	1904....	36,646,244	1,579,086	4·309
1894.....	5,703,222	187,636	3·29	1905....	56,580,703	2,663,254	4·707
1895.....	16,461,794	531,716	3·23	1906....	52,408,217	2,964,733	5·657
1896.....	24,199,977	721,159	2·98	1907....	47,738,703	2,542,086	5·325
1897.....	38,841,135	1,390,513	3·58	1908....	43,195,733	1,814,221	4·200

LEAD.—TABLE 8.

British Columbia:—Production by Districts.

——	1905.	1906.	1907.	1908.
	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar.....	5,500	.....	.....	.....
East Kootenay—				
Fort Steele.....	48,248,828	44,487,481	37,526,194	30,204,788
Other Districts.....	149,584	167,691	73,842	358,270
West Kootenay—				
Ainsworth.....	1,002,114	3,173,353	3,654,775	4,790,216
Nelson	1,368,388	1,034,553	1,582,113	345,424
Slocan..	5,399,330	2,975,674	4,305,826	6,572,268
Other Districts.....	339,883	469,000	570,534	903,552
Yale	67,076	100,465	25,419	21,215
	56,580,703	52,408,217	47,738,703	43,195,733

From the last table it will be seen that 70·6 per cent of the production in 1908 was derived from East Kootenay, 10·1 per cent from Ainsworth, 0·79 per cent from Nelson, and 15·2 per cent from the Slocan districts of West Kootenay.

The most important producing silver lead mine in Canada is undoubtedly the St. Eugene situated at Moyie on Moyie lake, and owned and operated by the Consolidated Mining and Smelting Company of Canada. According to the annual report of the Company the ore mined during the twelve months ending June 30, 1908, was 155,419 tons producing 24,523 tons of concentrates, the ratio of concentrates being 6·3 to 1. The concentrates contained 595,909 ounces of silver and 28,054,312 pounds of lead, or an average of 24·3 ounces of silver per ton and 57·2 per cent lead. The concentrates are shipped to the Trail smelter for treatment and refining. The managing director in the annual report makes the following statement respecting the development of the mine:—

"The probable ore reserves of the St. Eugene group, Moyie, are nearly 50 per cent greater than a year ago. Ore 50 per cent better in grade than last year's average has been found between the 600 ft and 800 ft levels, on the main vein above the 1,500 ft level, and between the 1,900 ft and 2,000 ft levels. Between the 1,700 ft and 1,800 ft levels, a new avenue, called No. 2½, has been located, and this avenue has also been found and partly developed upon the 1,900 ft level. Another new avenue, (which will be designated as Fifth Avenue) located approximately 120 feet farther in the hill than Fourth Avenue, is being developed on the 1,900 ft and 2,000 ft levels.

"In the report of last year, it was mentioned that the 2,000 ft level did not promise to yield as much tonnage as the 1,900 ft level; but present indications are that the 2,000 ft level will produce more ore than the 1,900 ft level, or any other level in the mine. The grade of the ore is, however, lower than that produced from the upper workings. Some bodies of low grade material have been found on the 2,100 ft level, and a raise from this level shows ore of workable grade. Prospecting upon this level is still incomplete. Drifting and cross-cutting upon the 2,200 ft level are progressing, and one or two low grade ore bodies have been found. It will require six months or a year to determine the amount of ore upon this level.

"The main St. Eugene shaft is 24 feet below the 2,400 ft level, or 749 feet vertically below the collar of the shaft."

The other important shipping lead mines of the Fort Steele division were the North Star and the Sullivan, which together shipped about 10,000 tons of ore.

The Mining Recorder for the Slocan division reported to the Provincial Mineralogist that "There was, approximately, 8,600 tons of silver-lead ore shipped from the division during the year just closed, averaging in values, 100 ounces in silver and 30 per cent lead; there are 14 mines in this district which ship in carload lots, and 10 in smaller lots, of from one to ten tons."

The mines in this division shipping over 1,000 tons were the Vancouver, Standard, Rambler-Cariboo, and Richmond Eureka.

According to similar authority the most notable work done in the Ainsworth Mining division in 1908 was at the old Bluebell mine on Kootenay lake, and at the Amalgamated Whitewater and Whitewater Deep mines on Kaslo creek.

"The Bluebell, situated on the east side of Kootenay lake (Riondel P. O.), is owned by the Canadian Metal Co., and controlled in France. Little underground work was done during the first half of the year, pending the completion of the concentration plant. No development was carried on, there having been made previously available for milling some 300,000 tons of ore. About June 1, the lead concentrator was ready for work, and, from that time to the end of the year, about 19,000 tons were milled. During September and the greater part of October operations were suspended, while a new conveyer system was being installed. Except for this interruption, operations were continuous, and about 55 men, all told, have been regularly employed. The conditions under which work is carried on at this property are exceptionally favourable to low costs, and the ex-

perience of the past six months has shown that, under these conditions, a profit can be earned from lead alone. The magnetic separation of the iron and zinc sulphides is about to be undertaken, and it is hoped that, early in 1909, the experiments in this direction will have resulted in a manner favourable to the earning of further profit, so important to the encouragement of the necessarily large capital involved. The ore of this mine consists of about one-third lead and zinc sulphides, one-third pyrrhotite and other iron sulphides, and one-third quartz and limestone, the whole, carrying about two and a half ounces of silver to the ton, chiefly associated with the lead."

Report of the Minister of Mines for British Columbia, 1908, p. 92.

NICKEL.

The production of nickel from the ores of the Sudbury district in Ontario, which more than doubled between 1904 and 1906, has shown a slight falling off during 1907 and 1908. The year 1906 was a year of maximum production, the quantity of nickel contained in matte shipped being 21,490,955 pounds. In 1907 the quantity of nickel contained in matte shipped was 21,189,793 pounds, a decrease as compared with 1906 of 301,162 pounds, or 1·4 per cent; while in 1908 a further falling off of 2,046,682 pounds or 9·7 per cent is shown, the production for the last year being 19,143,111 pounds.

The ore, which is generally described as a nickeliferous pyrrhotite with chalcopyrite, is first roasted and then smelted and converted at Copper Cliff and Victoria mines to a high grade matte, carrying from 77 to 82 per cent of the combined metals nickel and copper, which is shipped to the United States and Great Britain for refining.

The quantity of matte shipped in 1907 was 22,025 tons averaging 48 per cent nickel and 32 per cent copper, while the shipments of matte in 1908 were 21,210 tons averaging 45·1 per cent nickel and 35·3 per cent copper.

The following were the aggregate results of the operations on the nickel-copper deposits of Ontario in 1906, 1907, and 1908 :—

	1906. Tons of 2,000 lbs.	1907. Tons of 2,000 lbs.	1908. Tons of 2,000 lbs.
Ore mined	343,814	351,916	409,551
Ore smelted	340,059	359,076	360,180
Bessemer matte produced	20,364	22,041	21,197
" " shipped	20,310	22,025	21,210
Copper contents of matte shipped	5,265	6,996	7,503
Nickel " "	10,745	10,595	9,572
Spot value of matte shipped	$4,628,011	$3,289,382	$2,930,989
Wages paid	1,117,420	1,278,694	1,286,265
Men employed	1,417	1,660	1,690

According to Customs returns exports of nickel in matte, etc., were for twelve months ending December 31, as follows :—

	1906. Lbs.	1907. Lbs.	1908. Lbs.
To Great Britain	2,716,892	2,518,338	2,554,486
To United States	17,936,953	16,857,997	16,865,407
	20,653,845	19,376,335	19,419,893

The above figures of production do not include the nickel contents of the silver-cobalt ores from the Cobalt district, of which it is difficult to obtain satisfactory returns. The shippers of silver-cobalt ores receive little or no return for the nickel contents, although this metal forms an important constituent of the ore, and is possibly to some extent saved by the refiners.

During 1908 the price of refined nickel in New York was quoted during the first nine months at from 45 to 50 cents per pound, and during the balance of the year at from 40 to 45 cents according to size and terms of order.

In 1907 the price remained fairly steady throughout the year, the weekly statement[1] being "for large lots: New York, the chief producer, quotes 45 to 50 cents per pound according to size and terms of order. For small quantities 50 to 65 cents same delivery."

Statistics of the production of nickel are shown in the following table, the quantity representing the metal contained in the matte shipped, and the value being based on the final value of the metal in a refined state.

For statistics of the quantities of ore treated, the matte produced, etc., reference may be made to a previous chapter on metallurgical production.

NICKEL.—TABLE 1.

Annual Production.

Calendar Year.	Pounds of Nickel in Matte Shipped.	Average Price per lb. at New York	Value.	Calendar Year.	Pounds of Nickel in Matte Shipped.	Average Price per lb. at New York	Value.
			$				$
1889	*830,477	60c.	498,286	1899	5,744,000	36c.	2,067,840
1890	1,435,742	65c.	933,232	1900	7,080,227	47c.	3,327,707
1891	4,035,347	60c.	2,421,208	1901	9,189,047	50c.	4,594,523
1892	2,413,717	58c.	1,399,956	1902	10,693,410	47c.	5,025,903
1893	3,982,982	52c.	2,071,151	1903	12,505,510	40c.	5,002,204
1894	4,907,430	38⅛c.	1,870,958	1904	10,547,883	40c.	4,219,153
1895	3,888,525	35c.	1,360,984	1905	18,876,315	40c.	7,550,526
1896	3,397,113	35c.	1,188,990	1906	21,490,955	41.64	8,948,834
1897	3,997,647	35c.	1,399,176	1907	21,189,793	45c.	9,535,407
1898	5,517,690	33c.	1,820,838	1908	19,143,111	43c.	8,231,538

*Calculated from shipments made by rail.

The companies engaged in mining and smelting nickel ores are:—

The Canadian Copper Co., (The International Nickel Company) of Copper Cliff, Ont., and New York.

The Mond Nickel Company, Victoria Mines, Ont., and London, Eng.

The Lake Superior Power Co., (The Lake Superior Corporation), Sault Ste. Marie, Ont., is also an owner of important mines which, however, have not been operated during several years past.

[1] Engineering and Mining Journal, New York.

Although nickel is one of the minor constituents of the rich silver ores of the Cobalt district, statistics of the quantities of this mineral contained in these ores have not been included in the accompanying statistics of production.

The Ontario Bureau of Mines, however, reports the quantity of nickel contained in ore shipped from Cobalt as follows :—

Year.	Tons of nickel.
1904	14
1905	75
1906	160
1907	370
1908	612

An interesting development of the metallurgical industry in Canada has been the production of nickel oxide. A small quantity was made during 1908 at the Metallurgical Works of the Coniagas Reduction Company at Thorold, Ont., from ores from the Coniagas mine at Cobalt. Other products from the same ore being refined silver bullion and white arsenic.

Statistics of the exports of nickel as compiled from the Customs Department's reports are shown in Table 2, and the imports in Table 3.

NICKEL.—TABLE 2.

Exports of Nickel contained in ore, matte or other product.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Lbs.	Value.
	$		$			$
1890	89,568	1897	723,130	1903	12,699,227	1,116,099
1891	667,280	1898	1,019,363	1904	11,233,869	1,091,349
1892	293,149	1899	939,915	1905	17,318,059	1,569,693
1893	629,692	1900	1,031,030	1906	20,653,845	2,042,965
1894	559,356	1901	751,080	1907	19,376,335	2,280,374
1895	521,783	1902	1,007,211	1908	19,419,893	1,866,624
1896	658,213					

NICKEL.—TABLE 3.

Imports of Nickel and Nickel Anodes.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1890	3,154	1897	4,737	1903	26,177
1891	3,889	1898	5,882	1904	14,682
1892	3,208	1899	9,449	1905	19,076
1893	2,905	1900	6,988	1906	15,976
1894	3,528	1901	12,029	1907	19,511
1895	4,267	1902	15,448	1908	36,870
1896	4,787				

10,084—8½

The only other important producer of nickel ore outside Canada is the French colony of New Caledonia. The exports of nickel ore from this source since 1898 have been as follows in metric tons :—

Exports of Nickel Ore from New Caledonia.*

Year.	Metric Tons.	Year.	Metric Tons.	Year.	Metric Tons.
1898.....	53,200	1902.....	129,653	1906.....	118,890
1899.....	103,908	1903.....	77,360	1907.....	120,106
1900.....	100,319	1904.....	98,655	1908.....	.....
1901.....	133,814	1905.....	125,289		

*Statistique de L'Industrie Minérale en France et en Algérie, Paris.

Practically all of the above ore is smelted in France, Germany, and England.

The production of raw nickel at smelting works (partly estimated) is given by the "Metallgesellschaft" as follows, in metric tons :—

Production of Raw Nickel at Smelting Works in Metric Tons.

Producing Country.	1901	1902	1903	1904	1905	1906	1907	1908
United States of North America, and Canada	3,600	4,700	5,100	6,000	4,500	6,500	6,500	6,000
England.....	1,800	1,300	1,700	2,200	3,100	3,200	3,200	2,800
Germany (1)	1,700	1,600	1,600	2,000	2,700	2,800	2,600	2,600
France.....	1,800	1,100	1,500	1,800	2,200	1,800	1,800	1,400
Total production (2).....	8,900	8,700	9,900	12,000	12,500	14,300	14,100	12,800

(1) The figures of production stated for Germany only cover the output in the Kingdom of Prussia; nickel is also produced in the Kingdom of Saxony, but no data are obtainable of this production, which is, however, not important.

(2) The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway, and the United States of America, comes from New Caledonian and Canadian ores.

Statistics of the average yearly prices of nickel in Europe are also given by the same authority as follows :—

Yearly average prices of Nickel in Europe in cents per pound and Marks per Kilogram.

Year.	Prices in Marks per Kilo.	Cents per Lb.	Year.	Marks per Kilo.	Cents per Lb.
1889.....	4·50	48·6	1899.....	2·50	27·0
1890.....	4·50	48·6	1900.....	3·00	32·4
1891.....	4·50	48·6	1901.....	2·90–3·20	31·3–34·6
1892.....	4·50	48·6	1902.....	2·90–3.50	31·3–37·8
1893.....	3·80	41·0	1903.....	3·00–3·75	32·4–40·5
1894.....	3·60	38·9	1904.....	3·00–3·75	32·4–40·5
1895.....	2·60	28·1	1905.....	3·00–3·75	32·4–40·5
1896.....	2·50	27·0	1906.....	3·00–4·00	32·4–43·2
1897.....	2·50	27·0	1907.....	3·20–3·75	34·6–40·5
1898.....	2·50	27·0	1908.....	3 00–3·50	32·4–37·8

Mark=23·8 cents. Kilogram=2·20462 lbs.

MONEL METAL.

A new alloy of nickel and copper has recently been introduced to commerce under the name of Monel metal, of which it may be interesting to give some particulars here.

The properties of the new alloy, which consists of nickel and copper in the ratio of 3 to 1, have been investigated by the International Nickel Company, and the following description has been published by the Mineral Industry of New York :—

"Throughout its entire manufacture this alloy acts as a single metal. It is sold in New York at 2 cents above the market price for copper.

"In smelting and refining the matte from which 'Monel metal' is made, the nickel and copper are not extracted or refined and, therefore, appear in the finished product in the same relative proportions. As the treatment consists merely in eliminating the impurities except a small percentage of reduced iron, the cost of production is much less than that of pure nickel, which is difficult and expensive of isolation."—(Ontario Bureau of Mines, 1908).

A typical analysis of Monel metal is as follows: nickel, 68 to 72 per cent; iron, 0·5 to 1·5 per cent; sulphur, 0·014 per cent; carbon, 0·073 to 0·15 per cent; copper to balance. This alloy is silver-white and takes a brilliant finish, which it retains indefinitely. On prolonged exposure the surface assumes a greyish cast, which may be easily removed with a polishing cloth. In the rolled sheets, the surface assumes on heating a coating of oxide which has great resistance to acids. Samples of the rolled metal show no loss in 56 days' test in pumping 40 degrees sulphuric acid.

Monel metal melts at 1350 degrees C. It can be rolled perfectly from 900 to 1200 degrees, and its annealing temperature is above 875 degrees. It can be finished hard or soft, like sheet copper. Its specific gravity, as cast, is from 8·86 to 8·87, and when rolled, from 8·94 to 8·95.

Cast Monel metal is made in two grades, with qualities that compare very favourably with the specifications for carbon-steel castings. In the rolled and annealed condition Monel metal is stronger than nickel steel.

During 1908 about 300,000 square feet of Monel sheets were used to roof the Pennsylvania tunnel station in New York city. The manufacturers, who have tested this material for roofing, state that they find it as easily worked as copper. The sheets are silvery white, exceedingly flexible and malleable, and are handled in exactly the same way as sheet copper. The rolled metal has been drawn into wire of all sizes down to 0·004″. This latter is as soft and pliable as a silk thread. In the form of wire, exhaustive tests have been made of the metal for window screens, bed springs, filter cloths and other purposes where its incorrodibility makes it especially effective. In small articles, such as tacks, bolts, screws, angle braces and such stamped work as door and window trimmings, hinges, gas and electric fittings, and other small articles too numerous to mention, it is rapidly finding its way into the market. The metal works on the lathe as well as soft steel. It has been spun and pressed into hollow ware, kitchen utensils, watch cases, finger bowls, etc., with the same ease as copper or silver. One of the most satisfactory uses of Monel metal is in seamless tubes for condensers and boilers for automobiles and motor boats. The metal draws perfectly into a smooth tube and its high elastic limit and tensile strength, combined with incorrodibility, are of especial value in light machinery."

SILVER.

Owing to the rapid development of the Cobalt silver camp in Ontario during the past three years, the production of silver in Canada has, in point of value, taken second place in the list of our mineral productions, being exceeded only by coal.

The total production of silver contained in ores of all kinds, shipped to smelters or otherwise treated, was in 1908 reported as equivalent to 22,106,233 fine ounces, as compared with a production of 12,779,799 ounces in 1907, an increase of 9,326,434 ounces or 73 per cent.

The average value per ounce of fine silver in 1908, according to New York quotations, was only 52·864 cents per ounce, as compared with an average value of 65·327 cents in 1907, a decrease of about 24 per cent. Despite this severe fall in price, however, the total value of the silver production in 1908, which was $11,686,239, shows an increase of $3,337,580, or 40 per cent over the value $8,348,659 in 1907.

A comparison of the production in 1907 and 1906 shows an increase in 1907 of 4,306,420 ounces or 50·8 per cent in quantity, and $2,689,204 or 47·5 per cent in value, the average price in 1907 having been slightly less than in 1906.

Statistics of the annual production of silver since 1887 are shown in Table 1.

SILVER.—TABLE 1.

Annual Production, 1887–1908.

Year.	Ozs.	Value.	Average price per oz.	Year.	Ozs.	Value.	Average price per oz.
		$	Cts.			$	Cts.
1887	355,083	347,271	98·00	1898	4,452,333	2,593,929	58·26
1888	437,232	410,998	94 00	1899	3,411,644	2,032,658	59·58
1889	383,318	358,785	93·60	1900	4,468,225	2,740,362	61·33
1890	400,687	419,118	104·60	1901	5,539,192	3,265,354	58·95
1891	414,523	409,549	98·00	1902	4,291,317	2,238,351	52·16
1892	310,651	272,130	86·00	1903	3,198,581	1,709,642	53·45
1893	.....	330,128	77·00	1904	3,577,526	2,047,095	57·22
1894	847,697	534,049	63·00	1905	6,000,023	3,621,133	60·35
1895	1,578,275	1,030,299	65·28	1906	8,473,379	5,659,455	66·79
1896	3,205,343	2,149,503	67·06	1907	12,779,799	8,348,659	65·33
1897	5,558,446	3,323,395	59·79	1908	22,106,233	11,686,239	52·86

From 1887 to 1893 the production ranged in value between $300,000 and $400,000, and was derived chiefly from the Provinces of Ontario and Quebec. The next three years saw a rapid increase in the production due to the development of the silver-lead ore deposits in British Columbia, and in 1896 a production of over $2,000,000 is recorded. From that year until 1905 the production varied from

$2,000,000 to $3,500,000, rising rapidly during the next three years to $11,686,239 in 1908, as a result of the discovery of the rich ores of the Cobalt district.

Ontario in 1905 produced 40·9 per cent of the total output. In 1906 this was increased to 63·7 per cent, and in 1907 to 78·1 per cent. In 1908 the proportion obtained from Ontario was 87·8 per cent and was practically all from the Cobalt district, the contribution of British Columbia being only 11·9 per cent. Statistics of the annual production in each of the provinces are separately shown in Table 2.

The average price of fine silver in New York during 1908 varied between a maximum of 56 cents per ounce in February and a minimum of 48·7 cents per ounce in December, the average being 52·864 cents per ounce.

In London the average price of silver in 1908 was 24·402 pence per standard ounce of a fineness of 925.

For the year 1907 the average price in New York was 65·327 cents, the highest being 68·8 cents in February, and the lowest 54·56 cents in December of that year.

The average monthly prices of silver in New York from 1904 to 1908, and in London during 1908, are shown in tabulated form below.

Average Monthly Prices of Silver.

Months.	New York.—Cents per fine ounce.					London.—Pence per Standard ounce (a)
	1904.	1905.	1906.	1907.	1908.	1908.
January	57·055	60·690	65·288	68·673	55·678	25·738
February	57·592	61·023	66·108	68·835	56·000	25·855
March	56·741	58·046	64·597	67·519	55·365	25·570
April	54·202	56·600	64·765	65·462	54·505	25·133
May	55·430	57·832	66·976	65·981	52·795	24·377
June	55·673	58·428	65·394	67·090	53·663	24·760
July	58·095	58·915	65·105	68·144	53·115	24·514
August	57·806	60·259	65·949	68·745	51·683	23·858
September	57·120	61·695	67·927	67·792	51·720	23·877
October	57·923	62·034	69·523	62·435	51·431	23·725
November	58·453	63·849	70·813	58·677	49·647	22·933
December	60·563	64·850	69·050	54·565	48·769	22·493
Average for the year	57·221	60·352	66·791	65·327	52·864	24·402

(a) 925 parts fine.

The statistics of silver production given in Table 1, as already explained, represent approximately the silver contents of the ores shipped. Important quantities of silver are now being produced in Canada, both as fine metal and as silver bullion ranging in fineness from 850 to 998·2.

Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Co. of Canada, chiefly from the silver-lead ores of that Province, and is shipped to China, the United States, and to the Ottawa mint.

The annual production of fine silver at Trail since 1904 nas been as follows :—

Year.	Fine Ozs.	Year.	Fine Ozs.
1904	551,450	1907	1,631,422
1905	1,088,328	1908	1,956,039
1906	1,263,809	Total	6,491,048

In Ontario, ores from the Cobalt district are now being treated at three metallurgical works, operated by the following companies :—

The Canadian Copper Co., at Copper Cliff, Ont.

The Deloro Mining & Reduction Co., at Deloro, Ont.

The Coniagas Reduction Co., at Thorold, Ont.

Silver bullion of fineness varying from 850 to 998·2 is produced at these works, other products being white arsenic, and in the case of the Coniagas plant, nickel oxide and cobalt oxide. In each case residues carrying silver, arsenic, cobalt, and nickel are shipped to the United States for further refining. The silver bullion is in most instances not sufficiently fine to be shipped to the Ottawa mint and finds a market in the United States and in England.

The bullion shipped in 1907 contained 4,449,722 fine ounces of silver, and in 1908, 11,168,689 fine ounces. About 51 per cent of the total production in 1908 was, therefore, recovered in Canada as fine metal or as silver bullion.

SILVER.—TABLE 2.

Production by Provinces, 1887-1908.

Calendar Year.	Ontario.		Quebec.		British Columbia.		Yukon Territory.	
	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.
		$		$		$		$
1887	190,495	186,304	146,898	143,666	17,690	17,301	.....	.....
1888	208,064	195,580	149,388	140,425	79,780	74,993	.....	.....
1889	181,609	169,986	148,517	139,012	53,192	49,787	.....	.....
1890	158,715	166,016	171,545	179,436	70,427	73,666	.....	.....
1891	225,633	222,926	185,584	183,357	3,306	3,266	.....	.....
1892	41,581	36,425	191,910	168,113	77,160	67,592	.....	.....
1893	.....	8,689	.....	126,439	.....	195,000	.....	.....
1894	.....	.....	101,318	63,830	746,379	470,219	.....	.....
1895	.....	.....	81,753	53,369	1,496,522	976,930	.....	.....
1896	.....	.....	70,000	46,942	3,135,343	2,102,561	.....	.....
1897	5,000	2,990	80,475	48,116	5,472,971	3,272,289	.....	.....
1898	85,000	49,521	74,932	43,655	4,292,401	2,500,753	.....	.....
1899	202,000	120,352	40,231	23,970	2,939,413	1,751,302	230,000	137,034
1900	161,650	99,140	58,400	35,817	3,968,175	2,427,548	290,000	177,857
1901	151,400	89,250	41,459	24,440	5,151,333	3,036,711	195,000	114,953
1902	145,000	75,632	42,500	22,168	3,917,917	2,043,586	185,900	96,965
1903	17,777	9,502	28,600	15,287	2,996,204	1,601,471	156,000	83,382
1904	206,875	118,376	15,000	8,533	3,222,481	1,843,935	133,170	76,201
1905	2,451,356	1,479,442	19,620	11,841	3,439,417	2,075,757	89,630	54,093
1906	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	63,665	42,522
1907	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908	19,398,545	10,254,847	13,299	7,030	2,631,389	1,391,058	63,000	33,304

Quebec.

The small quantity of silver credited to the Province of Quebec for a number of years represents a small silver content of the pyrite ores mined at Capelton and Eustis in the Eastern townships.

Ontario.

From a production valued at only $118,376 in 1904, the silver output of this Province has grown to a value of over $10,000,000 in 1908. Not only does it contribute 88 per cent of the total silver production of Canada, but it now forms a very appreciable part (about 10 per cent in 1908) of the total silver output of the world.

In 1908, according to returns received at this Department, the total shipments, including ore and concentrates, were 25,682 tons containing 19,298,545 ounces of silver, besides important quantities of cobalt, arsenic, and nickel.

The total value of the ore shipped was returned as $8,960,060, while the value of the silver calculated at the average price of silver for the year would be $10,254,847.

The total ore shipments in 1907 were 14,644 tons, reported as containing 9,982,363 ounces of silver valued at $6,521,178 calculated at the average price of fine silver for that year.

In the following table a record of the shipments since 1904 is given, the figures for the first three years being those published by the Ontario Bureau of Mines.

Silver Production of Cobalt Mines, 1904-1908.

Year.	No. of shipping mines.	Ore shipped Tons.	Silver contents Ozs.	Ozs. per ton.	Value of Silver.	Average silver value per ton.
					$	$
1904	4	158	206,875	1,309	118,376	749
1905	16	2,144	2,451,356	1,143	1,473,192	687
1906	17	5,335	5,401,766	1,013	3,607,894	676
1907	25	14,644	9,982,363	682	6,521,178	445
1908	30	25,682	19,398,545	755	10,254,847	399

As the camp has developed the average grade of the ore shipped has gradually diminished, although the introduction of concentration plants in 1908 and their increased use in the future will no doubt tend to keep the ore shipped up to a high standard.

No statistics are given regarding the nickel, cobalt or arsenic content of these ores, for the reason that complete information is not available. The mining companies are paid nothing for the nickel and arsenic contents and for only a small

portion of the cobalt contents[1]. The Ontario Bureau of Mines estimates that the shipments in 1906 would average about 6 per cent cobalt, 3 per cent nickel, and 27 per cent arsenic; and in 1907,5 per cent cobalt, $2\frac{1}{2}$ per cent nickel, and 20 per cent arsenic. Nearly 30 per cent of the ore shipped from Cobalt was treated in metallurgical works in Canada, and white arsenic is being produced therefrom, of which record will be found under smelter production.

While the greater number of the operating companies hold unrestricted titles to their properties, several (nine in number) are operated, on a royalty basis, on mineral lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. Arthur A. Cole, Mining Engineer to the T. & N. O. Commission, in his annual report, has compiled some very interesting statistics covering the whole district, with respect to ore shipments, concentration, power and labour, prices paid for ore, etc., from which the following has been freely drawn :—

[1] See schedules of purchasing companies.

Shipments from the Cobalt District for the Calendar Year, 1908, (in short tons.)

Mine.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Buffalo	89·83	63·20	53·35	51·94	46·22	41·57	31·78	43·75	32·35	00·40	54·25	28·26	536·90
Casey Cobalt	.....	.....	10·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	10·00
Chambers-Ferland	.....	.....	.....	.....	.....	.....	.....	30·61	59·19	69·96	30·23	33·90	223·89
City of Cobalt	.....	50·00	60·97	55·26	.....	112·23	82·79	21·64	123·60	115·25	65·55	73·75	761·04
Cobalt Central	20·00	.....	24·85	28·74	23·72	26·27	20·11	22·63	48·53	41·41	20·53	.....	‡276·79
Cobalt Lake	24·44	32·45	30·76	1·96	33·25	.....	48·93	.....	22·81	30·37	.....	.....	225·97
Cobalt Townsite	20·80	.....	20·56	.....	.....	.....	21·90	69·95	20·00	.....	24·50	.....	177·71
Coniagas	67·86	32·45	93·30	.....	62·13	62·65	41·45	31·89	94·58	63·20	32·09	28·65	610·25
Crown Reserve	.....	6·84	.....	19·27	.....	22·56	22·00	28·20	30·01	136·05	206·57	185·45	657·35
Drummond	.....	46·17	.....	.....	28·13	19·80	85·73	152·35	546·34	121·94	76·41	84·51	1,161·38
Foster	54·30	.....	.....	.....	34·90	.....	.....	.....	29·60	.....	72·40	.....	191·20
Kerr Lake	20·64	21·05	92·73	30·57	31·30	79·50	31·20	31·34	38·14	162·80	29·95	91·02	660·24
King Edward (Watts)	32·00	61·45	25·90	.....	65·22	30·08	29·00	56·61	37·93	.....	.....	.....	338·19
La Rose	459·97	71·06	388·37	431·90	161·90	180·94	467·07	638·85	429·25	524·69	601·57	487·60	4,843·17
McKinley-Darragh	64·70	193·52	121·33	181·66	126·24	125·05	174·14	95·51	26·53	186·37	379·64	133·70	1,808·39
Nancy Helen	.....	.....	69·52	.....	.....	.....	111·40	.....	.....	.....	20·40	.....	201·32
Nipissing	188·97	127·32	125·93	105·79	293·12	234·98	366·67	243·80	600·91	396·42	412·87	475·18	3,571·96
Nova Scotia	20·39	.....	20·00	13·80	53·47	21·50	20·11	21·70	19·53	26·55	20·90	.....	237·95
O'Brien	202·89	264·27	258·78	125·53	392·00	286·96	358·97	363·23	376·60	284·49	290·68	255·11	3,459·51
Peterson Lake (Little Nipissing)	.....	.....	.....	.....	.....	20·05	20·62	.....	.....	.....	.....	.....	40·67
Provincial	.....	.....	24·60	51·24	.....	.....	.....	.....	.....	.....	.....	.....	75·84
Right of Way	.....	.....	29·35	.....	90·04	60·37	88·59	90·48	136·96	100·76	31·90	122·59	750·04
Silver Bar	0·58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·58
Silver Cliff	26·80	.....	.....	.....	.....	.....	.....	.....	.....	.....	63·77	69·87	160·44
Silver Leaf	31·00	.....	.....	35·40	32·26	.....	31·73	.....	.....	66·64	.....	.....	197·03
Silver Queen	125·40	.....	119·59	21·95	59·25	.....	124·21	123·59	125·59	89·43	.....	96·69	885·70
Timiskaming	29·70	26·90	56·12	60·50	46·30	92·88	20·65	50·65	80·97	91·80	59·77	178·96	795·20
Timiskaming and Hudson Bay	.....	99·05	36·15	.....	29·76	31·85	31·40	190·40	143·80	345·89	122·93	63·00	1,094·23
Tretheway	.....	88·80	153·11	96·49	159·14	133·85	115·65	180·43	26·97	95·93	65·60	292·72	1,408·69
Victoria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·47	0·47
Totals	1,481·27	1,184·53	1,815·27	1,312·00	1,768·35	1,583·09	2,346·10	2,487·61	3,049·19	2,950·75	2,682·51	2,701·43	25,362·10

‡88·80 of this amount is to be credited to Bailey, which is now under lease to the Cobalt Central.

Ore Shipments from the Cobalt District for the Years 1904 to 1908.

Mine.	1904.	1905.	1906.	1907.	1908.	Totals.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Bailey			30·00		88·80	118·80
Buffalo		200·80	992·80	1,241·54	*536·90	2,972·04
Casey Cobalt					10·00	10·00
Chambers-Ferland					223·89	223·89
City of Cobalt				50·61	761·04	811·65
Cobalt Central				77·33	187·99	265·32
Cobalt Lake					225·97	225 97
Cobalt Townsite				143·22	177·71	320·93
Colonial			15·00	40·38		55·38
Coniagas		30·60	422·02	2,447·37	*616·25	3,510·24
Crown Reserve					657·35	657·35
Drummond	0·50	32·15	274·70	104·13	1,161·38	1,572·86
Foster		83·85	117·00	312·13	191·20	704·18
Green Meehan			37·03	98·39		135·42
Imperial Cobalt				14·61		14·61
Kerr Lake		54·95	158·35	319·76	660·24	1,193·30
King Edward (Watts)		19·00		31·12	338·19	388·31
La Rose	60·05	607·86	854·61	2,815·45	4,843·17	9,181·14
Lawson		14·61		61·12		75·73
McKinley-Darragh	20·00	447·09	80·45	742·42	1,808·39	3,098·35
Nancy Helen				30·10	201·32	231·42
Nipissing	57·00	486·02	2,125·08	2,538·26	3,571·96	8,778·32
Nova Scotia			43·95	272·21	237·95	554·11
O'Brien		26·32	114·18	1,491·61	3,459·51	5,091·62
Peterson Lake (Little Nipissing)					40·67	40·67
Provincial					75·84	75·84
Princess				3·93		3·93
Red Rock				45·71		45·71
Right of Way			46·25	129·37	750·04	925·66
Silver Bar					0·58	0·58
Silver Cliff					160·44	160·44
Silver Leaf		9·00		46·36	197·03	252·39
Silver Queen		44·73	130·94	478·57	385·70	1,539·94
Timiskaming				204·32	795·20	999·52
Timiskaming Cobalt			20·47	67·98		88·45
Timiskaming and Hudson Bay				149·53	1,094·23	1,243·76
Tretheway	21·00	218·58	198·48	833·58	1,408·69	2,680·33
University		16·00	155·28	60·23		231·51
Victoria					0·47	0·47
Violet		16·00	20·00			36·00
White Silver Mining Co		28·45				28·45
Totals	158·55	2,336·01	5,836·59	14,851·34	25,362·10	48,544·59

NOTE.—The tonnage shipped during 1908 was greater than the total production of the four previous years.

* See "Concentration".

"The outputs for 1907 and 1908 were distributed for treatment as follows :—

Country.	1907.		1908.	
	Tons.	Per cent.	Tons.	Per cent.
Canada	2,585·05	17·40	7,401·14	29·18
Great Britain	167·34	1·13	222·08	0·88
Germany			299·46	1·18
United States	12,098·95	81·47	17,439·42	68·76
Total	14,851·34	100·00	25,362·10	100·00

Almost all the ore treated in Canada was high grade, so that while the tonnage was less than one-third of the total, the value was greater than that of all the ore shipped out of the country.

With respect to concentration, Mr. Cole reports :—

"Concentration now takes a very important position in the district's development. Undoubtedly in some instances the shipments to the smelters are smaller than formerly, due to the reduction of tonnage by concentration, nevertheless in most cases the tonnage is increased by the amount of the concentrates, as the ore treated is of such a low grade that it could not stand the freight and treatment charges without concentration."

Six mills are now in successful operation in the camp, and four more are under construction.

They belong to the following companies :—

The Buffalo Mines Company, Limited.
The Standard Cobalt Mines, Limited (Cobalt Central).
The Coniagas Mines, Limited.
King Edward Cobalt Silver Mines.
The Northern Customs Concentrators, Limited, (formerly Muggley).
Nipissing Reduction Company.

Under construction :—

Colonial Mining Company.
McKinley-Darragh-Savage Mines of Cobalt, Limited.
Nova Scotia Mining Company.
O'Brien Mine.

The following table gives the tonnage of ore milled, the concentrates made, and the concentration ratio for the mills during 1908 :—

Concentration in Cobalt for 1908.

Mill.	Mines.	Ore milled.	Concentrates.	Concentration.
		Tons.	Tons.	Ratio.
Buffalo	Buffalo	10,200	251·00	40-1
Cobalt Central	Bailey	4,246	97·15	44-1
	Big Pete	9,163	143·90	64-1
	Crown Reserve	669	15·22	44-1
Coniagas	Coniagas	13,605	304·00	45-1
King Edward	King Edward	1,043	21·35	38-1
McKinley-Darragh (Old Mill)	McKinley-Darragh	450	20·00	28-1
Northern Customs Concentrator	City of Cobalt	2,194	50·61	43-1
	Cobalt Townsite	1,000	31·03	32-1
	Right of Way	1,500	36·46	41-1
	Silver Queen	3,253	70·63	46-1
Nipissing Reduction Co	Foster	85	10·00	9-1
	King Edward	40	1·50	27-1
	Nipissing	1,950	40·00	49-1
	Silver Leaf	35	1·00	35-1
	Totals	49,433	1,093·85	45-1

At the mines without mills the grade of ore is raised by cobbing, washing and handpicking. The ore is usually first passed over a grizzly or coarse screen, as the screenings generally carry enough values to be of shipping grade without further treatment. At the Crown Reserve and Tretheway mines jigs are used in addition to the handpicking."

"The Northern Customs Concentrators, Limited (formerly the Muggley Concentrator), and the Nipissing Reduction Company are custom mills, while the Cobalt Central mill accepts some custom work, as well as the treatment of ore from the Cobalt Central mines.

The Northern Customs Concentrators, Limited, is now treating ores on the following contract schedule :—

On ore yielding less than 20 ounces silver per ton crushed, retain 10 ounces and return balance with 50 per cent of other metals that can be sold.

20 to 40 ounces silver pay 55 per cent.
40 to 60 " " 60 "
60 to 80 " " 65 "
80 to 100 " " 70 "

The Nipissing Reduction Company will treat ores on a flat rate of $3 per ton or on the following percentage basis :—

For ores assaying, when received at the mill :—

20 to 40 ounces silver pay 50 per cent silver values.
40 to 60 " " 55 " "
60 to 80 " " 60 " "
80 to 100 " " 65 " "
100 to 150 " " 68 " "

Power and Labour—"Two power plants are being installed on the Montreal river, and it is expected that before the end of 1909 power will be delivered in Cobalt by them, in one case in the form of compressed air, and in the other, electricity. The introduction of this power is likely to cut down the present cost by at least fifty per cent.

There are now about 3,500 men employed in the mines at Cobalt and in the immediate vicinity.

The horse-power capacity of the camp is as follows :—

At the end of	Boiler Horse-Power.
1904	Zero.
1905	150
1906	3,406
1907	7,918
1908	9,700

There are now 61 compressors, which have a maximum capacity of 39,336 cubic feet of free air per minute."

A complete list of the smelters receiving and treating the ores of the district is also given by Mr. Cole, together with schedules of charges or basis of payment of each.

"The following smelting companies have received and treated ore from Cobalt during 1908 :—

Anglo-French Nickel Company, Swansea, Wales.
American Smelting & Refining Co., Perth Amboy, N.J., and Denver, Col.
Balbach Smelting & Refining Co., Newark, N.J.
Beer, Sondheimer Co., Hamburg, Germany.
Canadian Copper Co., Copper Cliff, Ont.
Coniagas Reduction Company, Thorold, Ont.
Consolidated Mining & Smelting Co. of Canada, Trail, B.C.
Deloro Mining & Reduction Co., Deloro, Ont.
Pennsylvania Smelting Company, Carnegie, Pa.
The United States Metal & Refining Co., Chrome, N.J.

Anglo-French Nickel Company, Swansea, Wales.

In the early part of 1908 this Company paid the following prices for cobalt :—

8	to 10	per cent	cobalt,	35	cents per pound of cobalt.
10·1 to 12	"	"	40	"	"
12·1 to 14	"	"	45	"	"
14·1 to 16	"	"	50	"	"
16 per cent or over		"	55	"	"

After April the prices offered were 10 cents per pound lower than above, and at the end of the year they were out of the market entirely. There is every likelihood that the next price offered will be still lower.

American Smelting & Refining Co., New York.

The Company received ores from Cobalt at its plants at Perth Amboy, N.J., and Denver, Col. The schedule offered was as follows:—

For ores assaying 1,500 ounces or over per ton.

Silver.—Pay for 94 per cent of the silver contents at the New York quotations.

Treatment Charge.—$10 per ton of 2,000 pounds, dry weight, plus one-half cent on each ounce of silver contained.

Arsenic.—An addition to the working charge will be made at the rate of twenty-five cents per dry ton, for each per cent of arsenic in excess of 5 per cent. Sampling free.

Payment.—Thirty days after agreement of assays.

For ores under 1,500 ounces and over 60 ounces per ton.

Silver.—Payment for 93 per cent of the silver contents at the New York quotations.

Treatment Charge.—$9 per ton of 2,000 pounds, dry weight, plus one-half cent on each ounce of silver contained.

Arsenic.—An addition to the working charge will be made at the rate of twenty-five cents per dry ton, for each per cent of arsenic in excess of 5 per cent.

Payment.—Forty-five days after date of sampling.

If a mine is willing to contract for a total year's output of 1,000 tons the following schedule is offered:—

For ores under 1,500 ounces and over 60 ounces.

Silver.—Pay for 95 per cent of the silver contents at the New York quotations.

Treatment Charge.—$7 per ton of 2,000 pounds, dry weight; in case of cash settlement the treatment charge is $7.50 per ton.

No payment for cobalt or nickel.

No penalties for insoluble.

Arsenic.—An addition to the working charge will be made at the rate of twenty-five cents per dry ton for each per cent of arsenic in excess of 5 per cent.

Payment.—Payment forty-five days after agreement of assays.

The freight from Cobalt to Perth Amboy is $10.20 per ton, and from Cobalt to Denver $11.20 per ton.

Most of the low grade ore shipped to this Company is treated in Denver, while the high grade goes to Perth Amboy, N.J.

Balbach Smelting & Refining Company, Newark, N.J.

This Company only entered the market occasionally and had no standing schedule. The ore purchased was high grade.

Beer, Sondheimer and Company of Hamburg, Germany.

This German Company purchased high grade ore in the Cobalt camp on the following schedule:—

Silver.—Pay for 94 per cent of silver assay.

Treatment Charge.—$44 smelting charge per dry ton.

Freight.—$10 freight guarantee per gross ton. Beer, Sondheimer and Co. to supply barrels free of charge, suitable for transporting the ores.

Payment.—70 per cent paid immediately against Ledoux & Company's assays. 30 per cent paid three days after settlement of assays of Dr. Fred. Claudet of the Bank of England. Interest at six per cent (6 %) till due date. Dr. Claudet's expenses to be paid by Beer, Sondheimer and Co.

Canadian Copper Company, Copper Cliff, Ontario.

All purchases of Cobalt ores are made through the Orford Copper Company, of New York. The purchasing schedule was as follows :—

Purchaser to make payment for .—

75 %	of silver	per ton	of ore (2,000 lbs.)	when same assays	100 ozs. Ag and over.
84	"	"	"	200	"
86	"	"	"	300	"
87	"	"	"	400	"
89	"	"	"	500	"
90	"	"	"	600	"
92	"	"	"	800	"
93	"	"	"	1,000	"
93¼	"	"	"	1,300	"
93½	"	"	"	1,600	"
94½	"	"	"	2,000	"
94¾	"	"	"	3,000	"
$10	per ton of ore (2,000 lbs.)		when same contains	6 %	cobalt and over.
20	"		"	8	"
30	"		"	12	"

No payment will be made for cobalt in ores containing less than 6 per cent cobalt, nor in which the nickel contents are greater than the cobalt contents. Further, purchaser reserves the right to return, at shipper's expense, any such ores (*i.e.* nickel contents higher than cobalt contents) received at Copper Cliff.

Ore to be delivered by seller to the Canadian Copper Company f.o.b. cars, Copper Cliff, Ont. Ore to be at shipper's risk until sampling is undertaken, as purchaser can assume no responsibility for the ore until same has been taken into its sampler.

Purchaser to sample at his expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux and Company of New York, at seller's expense, which assays are to govern in settlement.

Payment of 70 per cent of the silver returnable to the seller, as per the above scale, to be made at the New York official price for silver on the first settlement date, which shall be 35 days after the date on which sampling of the ore is completed, and the balance, 30 per cent, on the second settlement date, on the New York official price of silver on that day, which shall be 90 days after sampling of the ore is completed. The purchaser, however, reserves the right to deliver upon either or both of the settlement dates above specified, in lieu of

cash, at his option, such silver bullion (commercial bar silver) as is due the seller in settlement upon these dates, such delivery to be made in New York city.

Payment for cobalt will be made as per the above scale when the cobalt content of the ore comes within the specifications mentioned, settlement for same to be made on the first due date for silver, namely, in 35 days after completion of sampling of ore.

Purchaser has named a rate of 75 per cent silver to return to the shipper on ore running from 100 to 200 ounces per ton of 2,000 lbs. This is to be considered as a penalty clause and to apply in such cases where ores under 200 ounces have been shipped by mistake. Purchaser does not agree to accept regular shipments of ore which run less than 200 ounces of silver per ton of 2,000 pounds.

Coniagas Reduction Company, Limited, of Thorold, Ont.

Up to the present time the only ore treated by this smelter came from the Coniagas mine. It is likely, however, that custom smelting will be started during 1909.

The Consolidated Mining & Smelting Co., of Canada, Trail, B. C.

This smelting Company has so far only purchased several test carload lots.

Deloro Mining & Reduction Company, Deloro, Ont.

Tariff on Cobalt Silver Ores and Concentrates.

Silver.—Pay for 98 per cent of silver contents.

Treatment Charge.—$20 per ton of ore and a refining charge of one cent per ounce of silver contained.

Terms of Payment.—75 per cent of net proceeds at New York quotation 30 days after completion of sampling. 25 per cent of net proceeds at New York quotation 90 days after completion of sampling.

Cobalt.—On ore containing 6 per cent and over, 10 cents per pound for cobalt contained. No payment will be made for cobalt in ores containing more nickel than cobalt. Payment for cobalt to be made with the second payment for silver. Ledoux & Company's assays accepted with the usual provisions as to umpire assays in case of unusual differences. Above assays to be made at shipper's expense. No charge for sampling. Ore to be delivered in carload lots f.o.b., Marmora station, C. O. R. This tariff is subject to change without notice.

Pennsylvania Smelting Company, Pittsburgh, Pa., Works at Carnegie, Pa.

Ores from Cobalt ranging from 50 ounces to 500 ounces per ton are purchased by the Pennsylvania Smelting Company on the following schedules:—

Silver.—Pay for 95 per cent silver, less one cent per ounce.

Treatment charge.—Nine dollars per ton. Settling price, average for 20 days following date of arrival. No payment for cobalt or nickel. The freight rate from Cobalt to Carnegie, Pa., is $8.80 per ton.

United States Metal and Refining Company, Chrome, N.J.

This Company bought only an occasional carload of high grade ore on special quotations."

A number of the shipping companies at Cobalt have published in annual reports some details of their operations, from which the following extracts have been taken.

Buffalo Mines, Ltd.; year ending April 30, 1909.

"During the year 25,760 tons were broken, of which 7,283 tons were left in the mine and 18,477 tons were hoisted. Of the ore hoisted, 13,005 tons went to the mill, and 5,472 tons were added to the stock piles on the surface.

"The mine produced 13,005 tons of milling ore containing an average of 43·4 ounces of silver per ton, or 565,313 ounces. The mine also produced about 150 tons of high grade ore which averaged over 3,000 ounces of silver per ton, or 451,251 ounces, making a total of 1,016,564 ounces. In addition to this there is the ore left in the mine and added to the stock piles during the year, amounting to 12,755 tons, which will contain approximately the same percentage of silver as the ore milled.

"The mill treated during the year, 13,005 tons, which averaged 43·4 ounces of silver per ton, of which we recovered 86 per cent as follows: 279,872 ounces on the jigs, also 8,809 ounces of metallics picked from the jig concentrates and converted into bullion, and 192,048 ounces on the tables, or a total of 480,729 ounces recovered, or 317 tons of concentrates, averaging over 1,500 ounces of silver per ton."

Coniagas Mines, Ltd., year ending Oct. 31, 1908.

"The total silver produced by this property during the past year is 1,444,229 ounces, making a total to date of 3,444,000 ounces, and a careful estimate of the ore in sight as actually developed by the underground workings amounts to thirteen million ounces.

"Your Company owns the issued capital stock of the Coniagas Reduction Company, Limited, with the exception of six shares issued to directors to qualify.

"The works at Thorold are now handling the product of your mine and are running commercially as regards the production of refined silver and refined white arsenic, and we expect to place refined cobalt oxide and nickel oxide on the market very shortly, thus refining and marketing all the valuable constituents of your ores by a process which is confidently expected to yield a substantial profit."

Crown Reserve Mining Co., Ltd., year ending December 31, 1908.

Total Production.

Total Shipments 1908.	Weight (Lbs.)	Ozs. Silver.	Gross Value.	Freight and Treatment.	Net Value.
High grade	799,881	1,645,570·13	$833,604 57	$50,433 80	$783,170 77
Low grade	461,689	53,384·85	26,746 05	5,127 93	21,618 12
On hand, Dec. 31, 1908	*40,000	100,000·00	50,000 00	.....	50,000 00
Total	1,301,570 (650·785 tons)	1,798,954·98	910,350 62	55,561 73	854,788 89

* Estimated.

VALUE OF ORE PER TON.

High grade	4,156·71 ozs.
Low grade	231·25 ozs.

COST OF ORE.

Operating expenses, including development and all charges except construction	$ 50,406 76	per oz. 2·802c.
Marketing expenses, including smelter deductions, freight, treatment, Head Office expenses, handling ore, etc.	84,666 80	" 4·706c.
Total expenses	$135,073 56	7·508c.
Total cost of Buildings, Plant and Equipment	$71,000 00	

Kerr Lake Mining Co., year ending Aug. 31, 1909.

"The production during the year amounts to 2,668,648 ounces of silver produced from 1,072 tons of ore (average contents per ton 2,489 ounces), and 600,000 pounds of screenings. The gross value of this production is, at 50 cents an ounce, $1,334,324.

"Our cost for producing this ore amounts to $193,799.46. The average gross value of ore per ton was $1,244.70 at 50 cents per ounce for silver.

"The management is pleased to report that it has been enabled to continue the policy of the Directors of putting at least two tons of ore in sight for every ton which it has mined during the year.

"During the year, we have averaged 222,387 ounces as the regular monthly production, and we hope to increase this during the coming year.

Costs at the mine, including all expenses of development, per ounce	7·26 cents.
Shipping, treatment, and sundry costs per ounce	5·12 "
Total	12·38 "

La Rose Consolidated Mines Co., Twelve Months ending May 31, 1909.

Shipments.

June 1, 1908, to May 31, 1909.

—	Dry Tons.	Net Value per ton.	Gross Ozs. Silver.	Net Value.	Per cent of total Net Value.
		$		$	
Silver-cobalt-nickel ore	1671·8260	663 32	2,264,895·49	1,108,947·09	84·0
Low grade siliceous ore	4318·5200	41 72	604,646·43	186,539·86	14·1
Low grade cobalt ore	39·8430	78 90	1,288·58	3,143·75	·2
Concentrates	31·6210	272 13	18,528·51	8,605·13	·7
Nuggets	1·8605	6,940 12	26,347·57	12,912·09	1·0
Total	6063 6705	217 71	2,915,706·58	1,320,147 92	100·0

Average Assay of Shipments.

—	Ozs. Silver per ton.	Per cent Cobalt.	Per cent Nickel.	Per cent Arsenic.
Silver-cobalt-nickel ore	1,354·7	8·28	8·26	36·27
Low grade siliceous ore	140·0			
Low grade cobalt ore	32·3	12·57		
Concentrates	586·0			27·46
Nuggets	14,161·8			
Average of Total	480·8			

Summary of Shipments for Year ending May 31, 1909.

Dry tons shipped	6,063·6705
Gross ounces silver contained	2,915,706·58
Gross silver value	$1,492,046 70
Average price received per oz.—cents	51·173
Received from sales of cobalt	$24,059 52
Received from sales of arsenic	$322 15
Gross silver value plus cobalt and arsenic paid for	$1,516,428 37
Smelter deduction, freight, and treatment	$196,280 45
Net value received from ore sales	$1,320,147 92

The cost of producing silver is estimated at $78.43 per ton of ore, or 16·31 cents per ounce of silver.

Nipissing Mines Company, year ending Dec. 31, 1908.

Shipments in 1908,

——	Dry Tons.	Net Value per ton.	Gross Ozs. Silver.	Net Value.	Per cent of total net value.
		$		$	
High grade ore	694·7180	1,530 86	2,192,210·22	1,063,518 13	78·0
Low grade siliceous ore	2,643·5125	81 78	554,930·70	216,190 78	15·8
Low grade cobalt ore	159·6320	117 29	15,620·19	18,723 71	1·4
Nuggets	7·1365	9,157 24	131,170·33	65,350 64	4·8
Total	3,504·999	389 10	2,893,931·44	1,363,783 26	100·0%

Average Assay of Shipments.

——	Ozs. Silver per ton.	Per cent Cobalt.	Per cent Nickel.	Per cent Arsenic.
High grade ore	3,155·5	10·01	5·48	37·69
Low grade siliceous ore	209·9			
Low grade cobalt ore	97·8	10·59		
Nuggets	18,380·2			
Average of Total	825·7			

Summary of Shipments 1908.

Dry tons shipped	3,504·999
Gross ounces silver contained	2,893,931·44
Gross silver value	$1,504,098 26
Average price received per oz.—cents	51·974
Cobalt paid for—lbs	69,685
Received from sales of cobalt	$21,568 40
Arsenic paid for—lbs	28,445
Received from sales of arsenic	$284 45
Gross silver value plus cobalt and arsenic paid for	$1,525,951 11
Smelter deduction, freight, and treatment	$162,167 85
Net value received from ore sales	$1,363,783 26

This Company reports the cost of production at $167.91 per ton of ore, or 20·7 cents per ounce of silver.

British Columbia.

The chief sources of the silver production in this Province are the silver lead ores of East and West Kootenay, supplemented by the silver contained in the gold-copper-silver ores of Rossland, the Boundary and Coast districts, etc. The total production in 1908, as reported by the Provincial Mineralogist, was 2,631,389 ounces as compared with 2,745,448 ounces in 1907, a decrease of 114,059 ounces or 4·1 per cent.

About 77 per cent was obtained from ores in which the silver was found associated with lead, the remainder being found chiefly in conjunction with copper bearing ores.

The Slocan district, including Ainsworth, Slocan, Slocan City, and Trout Lake Mining divisions, provided about 50 per cent of the total provincial output of silver for the year 1908, and the Fort Steel mining division about 24 per cent all from argentiferous galena.

The production by districts is shown in the following table :—

SILVER.—TABLE 3.

Production in British Columbia by Districts, 1904-1908.

	1904.	1905.	1906.	1907.	1908.
Cassiar	185	477	26	2,291	14,169
Kootenay East—					
Fort Steele division	590,186	1,137,872	1,049,536	821,367	641,855
Other divisions	20,964	16,880	22,174	3,955	3,384
Kootenay West—					
Ainsworth division	90,004	99,781	165,915	301,322	314,142
Nelson "	198,795	116,729	211,122	236,837	25,067
Slocan "	1,540,170	1,045,948	571,613	590,998	848,595
Trail Creek "	181,830	147,753	126,174	126,661	129,558
Other divisions	148,201	121,551	79,262	122,232	173,675
Yale—					
Osoyoos	245,155	630,407	671,661	469,206	451,323
Yale	625	3,863	1,034	223	23
Coast and other districts	206,366	118,156	91,745	70,356	29,598
Totals	3,222,481	3,439,417	2,990,262	2,745,448	2,631,389

Yukon.

The figures of silver production in the Yukon given in Table 2 represent the silver alloyed with the placer gold obtained from that district. On an average about one ounce of silver is contained in each five ounces of crude bullion. In 1908 about 41,000 ounces of silver are credited to the placers and 22,000 ounces to the concentrates, shipped from the Windy Arm district. In the latter district, the ores of which carry values in silver, the chief operator was the Conrad Consolidated Mines, now known as the Yukon District Gold Mining Company, Ltd. A considerable tonnage of ore was mined, and about 1,500 tons put through the concentrator, producing 150 tons of concentrates. During 1908 the district was visited by Mr. Cairnes of the Geological Survey who reported that :—

"Since the season of 1905 the Venus has been worked continuously with very satisfactory results, so that now a large amount of ore has been blocked out and some small, though high-grade shipments have been made to outside points. During the past year this is the only property in the district upon which work of

any considerable importance has been performed; the reason for this inactivity being chiefly difficulties in company organization, etc., rather than the lack of promising conditions on the claims themselves.

"The first concentrating mill built in the Yukon has, this season, been completed. It is situated on Windy Arm just below the Venus, the ore being carried from the workings to the mill by an aerial tramway. A 100 h. p. boiler, and a 75 h. p. engine, at present generates the motive power, but a water-power plant is being installed. The ore is first hand-sorted, then passed over a grizzly and the overs crushed by a Blake crusher. The ore is sized by trommels giving three products. Fine crushing is performed by a set of high-speed rolls and a Huntington mill. A set of jigs and four Callow screens concentrate the crushed and sized materials. The slimes are settled in six Callow settling tanks, and afterwards concentrated on three Wilfley tables and two Frue vanners.

The mill appears to have been well designed and constructed, and it is hoped that its erection will mark the introduction of the properties of the Conrad district into the class of producing mines."

EXPORTS.

The following table shows the statistics of silver contained in ore matte or other form exported from Canada since 1886, as compiled from the Reports of Trade and Navigation published by the Customs Department.

SILVER.—TABLE 4.

Exports of Silver in Ore Matte, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1886	25,957	1894	359,731	1902	1,820,058
1887	206,284	1895	994,354	1903	1,989,474
1888	219,008	1896	2,271,959	1904	1,904,394
1889	212,163	1897	3,576,391	1905	2,777,218
1890	204,142	1898	2,902,277	1906	5,686,444
1891	225,312	1899	1,623,905	1907	9,941,849
1892	56,688	1900	2,341,872	1908	12,403,482
1893	213,695	1901	2,026,727		

ZINC.

The production of zinc ore in Canada in 1908 is reported as 452 tons valued at $3,215, all having been derived from the Richardson mine in Olden township, Frontenac county, Ontario.

Several thousand tons of zinc concentrates were shipped from British Columbia mines late in the year, but as smelter returns had not been received at the close of the year, these were not included by the Provincial Mineralogist in his statement of the year's production, but will be credited to the year 1909. The Whitewater and Whitewater Deep mines are reported to have shipped about 5,000 tons of zinc concentrates produced during 1908, together with about 2,500 tons accumulated from previous years' operations.[1]

The Canadian Metal Co. is also reported to have shipped a considerable tonnage from their plant at the Bluebell mine in Kootenay lake.[1]

In 1907 the ore shipments were 1,573 tons valued at $49,100, being made up of 217 tons of ore valued at $3,000 from the Richardson mine in Ontario, and 1,356 tons valued at $46,100 from British Columbia mines. Of the latter amount the Lucky Jim mine of the Slocan shipped 1,120 tons which had been mined in 1906.

The zinc smelting plant erected at Frank, Alberta, by the Canadian Metal Company, still remains idle, and the furnace at Nelson built for the reduction of zinc ores by the Snyder Electro Thermic Smelting process has not yet reached the stage of commercial operation, so that all the zinc ores shipped have been sent to the United States and Europe for reduction.

The United States tariff on zinc ores has for a number of years been subject to differences of opinion, and a number of contradictory decisions have been rendered with respect to it. Recently, however, the tariff has been revised, and is as follows :—

On ores containing less than 10 per cent, free of duty.

On ores containing 10 per cent or more and less than 20 per cent, $\frac{1}{4}$c. per lb.

On ores containing 20 per cent or more and less than 25 per cent, $\frac{1}{2}$c. per lb.

On ores containing 25 per cent or more, one cent per pound.

All rates being based on the metallic contents of the zinc.

Statistics of the production and imports of zinc are given in Tables 1 to 4.

The imports of zinc in block and sheets, and of spelter totalled, during the fiscal year 1908, about 4,298 tons valued at $505,450, in addition to about $19,240 worth of manufactures of zinc.

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[1]Minister of Mines report for British Columbia, 1908, pp. 24, 94.

ZINC.—TABLE 1.

Annual Production of Zinc.

Calendar Year.	Zinc Ore Shipped.		Metallic Zinc in Ore Shipped.	
	Tons.	Spot Value.	Pounds.	Final Value.
1898	1,162	$ 11,000	788,000	$ 36,011
1899	865	18,165	814,000	46,805
1900	261	4,810	212,000	9,342
1901				
1902	158	1,659	142,200	6,882
1903	1,000	10,500	900,000	48,660
1904	597	3,700	477,568	24,356
1905	9,413	139,200	*	*
1906	1,154	23,800	*	*
1907	1,573	49,100	*	*
1908	452	3,215	*	*

* Figures not available.

ZINC.—TABLE 2.

Imports of Zinc in Blocks, Pigs, and Sheets.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880	13,805	$67,881	1890	18,236	92,530	1900	28,748	156,167
1881	20,920	94,015	1891	17,984	105,023	1901	20,527	103,457
1882	15,021	76,631	1892	21,881	127,302	1902	34,871	141,560
1883	22,765	94,799	1893	26,446	124,360	1903	26,646	142,827
1884	18,945	77,373	1894	20,774	90,680	1904	25,553	138,057
1885	20,954	70,598	1895	15,061	63,373	1905	25,141	141,514
1886	23,146	85,599	1896	20,223	80,784	1906	24,462	158,438
1887	26,142	98,557	1897	11,946	57,754	1907 (9 mos.)	18,427	126,221
1888	16,407	65,827	1898	35,148	112,785	1908duty free	30,362	191,081
1889	19,782	83,935	1899	18,785	107,477			

ZINC.—TABLE 3.

Imports of Spelter.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880	1,073	5,301	1890	14,570	71,122	1900	5,836	29,416
1881	2,904	12,276	1891	6,249	31,459	1901	14,621	58,283
1882	1,654	7,779	1892	13,909	62,550	1902	18,356	80,757
1883	1,274	5,196	1893	10,721	49,822	1903	23,159	110,817
1884	2,239	10,417	1894	8,423	35,615	1904	33,952	164,751
1885	3,325	10,875	1895	9,249	30,245	1905	37,941	206,244
1886	5,432	18,238	1896	10,897	40,548	1906	50,137	290,686
1887	6,908	25,007	1897	8,342	32,826	1907 (9 mos.)	42,465	269,044
1888	7,772	29,762	1898	2,794	13,561	1908 Dutyfree	55,593	314,369
1889	8,750	37,403	1899	5,450	29,687			

*Spelter in blocks and pigs.

ZINC.—TABLE 4.

Imports of Zinc, Manufactures of.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880	$ 8,327	1890	6,472	1900	11,475
1881	20,178	1891	7,178	1901	6,882
1882	15,526	1892	7,563	1902	6,683
1883	22,599	1893	7,464	1903	9,754
1884	11,952	1894	6,193	1904	12,682
1885	9,459	1895	5,581	1905	11,912
1886	7,345	1896	6,290	1906	12,917
1887	6,561	1897	5,145	1907 (9 months)	12,556
1888	7,402	1898	10,503	1908	19,240
1889	7,233	1899	14,661		

1908	Zinc seamless drawn tubing	Duty Free.		53
	" manufactures of, N.O.P	25 %		$ 19,187
	Total			$ 19,240

MISCELLANEOUS METALLIC MINERALS.

ALUMINIUM.

The Northern Aluminium Company have extensive works at Shawenegan Falls, Que., where they manufacture aluminium from imported ores. They have also a well equipped wire mill where the metal is made into aluminium wire and cables, which are now used extensively in transmission of electricity. No Canadian raw material is used, but it is interesting to mention the industry as it may stimulate search and prospecting for ores of aluminium. The Northern Aluminium Company use bauxite imported from France, Germany, and the United States.

There being but one firm engaged in production, we are precluded from publishing statistics of production.

The exports of aluminium during the past five years have been as follows :—

Exports of Aluminium.

Calendar Year.	Ingots, bars, etc.		Manufactures.
	Lbs.	Value.	Value.
1904	1,288,314	$ 278,270	$ 118
1905	2,535,386	508,219	1,588
1906	4,521,486	899,113	2,244
1907	5,478,203	1,109,353	1,499
1908	1,713,800	399,785	1,727

Prices.—The price of aluminium in New York during the first half of January, 1908, was about 38 cents per pound. About the middle of the month the quotation was reduced to 33 cents and remained constant until the middle of October when a further reduction took place, the prices quoted until the end of the year ranging from 22 to 24 cents. During the last months of the year the prices quoted in Europe were from 13 to 14 cents per pound.

ANTIMONY.

Direct returns from the mines did not record any production of antimony ore during 1908. The trade statistics, however, show an export of antimony ore, chiefly to Great Britain, during the first three months of the year, of 148 tons, valued at $5,443, and this figure has been taken as production.

In 1907 the production was 2,016 tons of antimony ore shipped, valued at $65,000, and 63,850 pounds of refined antimony valued at $5,108.

In British Columbia some of the lead ores contain a small percentage of antimony, about one-third of one per cent, and some refined antimony was produced at Trail during 1907. Owing to the low price of the metal in 1908, however, it was considered unprofitable to attempt to recover the metal.

The discovery of a large body of stibnite in the Slocan district was referred to in the last report. The owners, the Golden Canon Gold and Silver Mining Company, did some development work in 1907 but made no shipment. No work was done on the property in 1908.

In Nova Scotia the Dominion Antimony Company operated their mine at West Gore in Hants county during 1907, throughout the year, but closed down in 1908 owing to legal difficulties. The quantity of ore mined in 1907 was 4,480 tons, and 2,016 tons were shipped. A concentrating mill was erected for the treatment of these ores and its operation was reported to be a complete success.

In New Brunswick the Canadian Antimony Company have been opening up the old antimony mines at St. George, but no shipments have been made as yet.

Statistics of production, exports, and imports are given in the three following tables:—

Annual Production of Antimony Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886	665	$31,490	1898	1,344	$20,000
1887	584	10,860	1899 to 1904	Nil.	Nil.
1888	345	3,696	1905 (a)	527	.....
1889	55	1,100	1906 (a)	782	.....
1890	26½	625	1907	2,016	65,000
1891	10	60	1908 (b)	148	5,443
1892 to 1897	Nil.	Nil.			

(a) As recorded by the Nova Scotia Department of Mines; no value given.
(b) Exports.

Exports of Antimony Ores.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1880	40	$1,948	1892 to 1897	Nil.	Nil.
1881	34	3,308	1898	1,232	$15,295
1882	323	11,673	1899	6¾	190
1883	165	4,200	1900	210	3,441
1884	483	17,875	1901	10	1,643
1885	758	36,250	1902	90	13,658
1886	665	31,490	1903	33	4,332
1887	229	9,720	1904	160	7,237
1888	352½	6,894	1905	525	27,118
1889	30	695	1906	420	17,064
1890	38	1,000	1907	1,327	37,807
1891	3½	60	1908	148	5,443

Imports of Antimony.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
1880	42,247	$ 5,903	1895	79,707	$ 6,131
1881	.....	7,060	1896	163,209	9,557
1882	183,597	15,044	1897	134,661	8,031
1883	105,346	10,355	1898	156,451	12,350
1884	445,600	15,564	1899	289,066	16,851
1885	82,012	8,182	1900	186,997	20,001
1886	80,787	6,951	1901	350,737	24,714
1887	87,827	7,122	1902	504,822	39,276
1888	120,125	12,242	1903	868,146	65,434
1889	119,034	11,206	1904	418,943	27,112
1890	117,066	17,439	1905	186,454	12,828
1891	114,084	17,483	1906	403,918	56,297
1892	180,308	17,680	1907 (9 mos)	321,385	71,493
1893	181,823	14,771	1908	484,899	66,484
1894	139,571	12,249			

		Duty.		
1908	Antimony, or regulus of, not ground, pulverized or otherwise manufactured	Free.	380,287	49,648
	Antimony salts	"	104,612	16,836
	Total		484,899	66,484

COBALT.

Cobalt is an important constituent of the rich silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the "Cobalt" district, Province of Ontario. The metal is also found as a constituent of the nickel-copper ores of the Sudbury district in the same Province.

With the exception of a small amount of cobalt oxide recovered during 1908 at the metallurgical works of the Coniagas Reduction Co., at Thorold, Ont., from the ores of the Coniagas mine at Cobalt, there has been no production of this metal in Canada.

Small quantities of ores have been shipped from the Cobalt district primarily as cobalt ores. With respect to the greater part of the ore shipped in which silver was the chief constituent of value, most of the purchasing smelters made no allowance whatever for cobalt. The Canadian Copper Co., and the Deloro Mining and Reduction Co., however, each paid for cobalt in the ore when the cobalt went 6 per cent or over, provided that the nickel contents were lower than the cobalt contents.[1]

No complete statistics are available either as to the total amount of cobalt contained in the ores shipped, as determined by sampling analyses, or as to the amount of cobalt finally recovered by the purchasing companies.

The Ontario Bureau of Mines has estimated the cobalt contents of the ore shipped as shown in the following table in which the value received by the shippers for cobalt is also shown.

Year.	Ores shipped.	Estimated total cobalt contents.	Per cent.	Value received by shippers for cobalt.
	Tons.	Tons.	%	$
1904	158	16	10·1	19,960
1905	2,144	118	5·5	100,000
1906	5,335	321	6·0	80,704
1907	14,644	739	5·0	104,426
1908	25,624	1,224	4·7	111,118

In 1908 returns received by this Branch showed total shipments of 25,682 tons of ore; the returns of cobalt contents, though incomplete, showed a total of 928 tons, or an average of 3·6 per cent. The amount paid the mining companies for cobalt was reported as $113,423.

[1] See purchasing schedules of these companies, pages 130, 131.

Of the above ore shipments 7,182 tons were treated in metallurgical works in Canada, and with the exception of a few hundred pounds of cobalt oxide obtained at the works at Thorold, the cobalt remained in the residues, which were shipped chiefly to United States smelters for treatment. The residues contained 692,170 pounds of cobalt, or an average of 4·82 per cent of the ore treated. If the ore exported be assumed to average as high in cobalt as the ore treated in Canada the total cobalt contents in 1908 would be at least 1,235 tons.

The Nipissing Mines Company, as stated in its last annual report, shipped during the twelve months ending Dec. 1908, 694·718 tons of high grade silver ore averaging 10·01 per cent cobalt, and 159·632 tons of low grade cobalt ore averaging 10·59 per cent cobalt, the total cobalt contents of the shipments being 172,892 pounds. Only 69,685 pounds of cobalt were paid for, however, by the purchasing smelters, for which the Company received $21,568.40.

The Larose Consolidated Mines Co., during the twelve months ending May 31, 1909, shipped 1,671·826 tons of high grade silver ore averaging 8·28 per cent cobalt, and 39·843 tons of low grade cobalt ore averaging 12·57 per cent cobalt. The amount paid for cobalt, however, by the purchasing smelter, was only $24,059.52.

The price of cobalt oxide (78·6 per cent Co) in New York during 1907 remained uniformly at $2.50 per pound. In 1908 the price fell to $1.45 in April, and to $1.40 in November.

The production of cobalt oxide in the United States in 1908 is stated in the 'Mineral Industry' to have been about 100,000 pounds.

MERCURY.

There has been no production of mercury 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. These veins are in a zone of decomposed volcanic rock of Tertiary age.

Production of Mercury.

Calendar Year.	Flasks (76½ lbs.)	Price per flask.	Value.
1895	71	$ 33 00	$ 2,343
1896	58	33 44	1,940
1897	9	36 00	324

Imports of Mercury.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
1882	2,443	$ 965	1891	29,775	$ 20,223	1900	85,342	$ 51,987
1883	7,410	2,991	1892	30,936	15,038	1901	140,610	94,564
1884	5,848	2,441	1893	50,711	22,998	1902	97,283	56,615
1885	14,490	4,781	1894	36,914	14,483	1903	164,968	91,625
1886	13,316	7,142	1895	63,732	25,703	1904	151,107	80,658
1887	18,409	10,618	1896	77,869	32,343	1905	103,330	48,412
1888	27,951	14,943	1897	76,058	33,534	1906	150,364	69,505
1889	22,931	11,844	1898	59,759	36,425	1907 (9 mos.)	98,368	45,662
1890	15,912	7,677	1899	103,017	51,695	1908 Duty free	178,411	76,549

MOLYBDENUM.

Although there are numerous occurrences of molybdenite in Canada of more or less undetermined value, there has been very little production of the mineral.

In 1902, about 6,500 pounds of molybdenum valued at $400 were reported as having been taken from a deposit in the township of Laxton, county of Victoria, by John Webber of Toronto.

In 1903, Mr. A. W. Chisholm of Kingston reported the shipment to the United States and elsewhere of 85 tons of molybdenum ore, valued at $1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 5, concession XIV, Sheffield township, Addington county.

10,084—10½

PLATINUM.

The chief source of the platinum production in Canada has been the placer gravels of British Columbia, principally in the Similkameen River district. The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and these are now being partly recovered. During 1902, 1903, and 1904, considerable quantities of platinum were recovered from accumulated residues resulting from the treatment of the mattes from Sudbury.

In 1906 there was practically no production of platinum from placer deposits, while the amount of platinum metals recovered from the treatment of the nickel-copper mattes is reported by the Ontario Bureau of Mines to have been 314 ounces valued at $5,652. This has been tabulated under palladium.

During 1907 and 1908 there has been no production recorded either of platinum or metals of the platinum group.

The Provincial Mineralogist of British Columbia reports that "While platinum is found in many of the alluvial gold workings where it can be saved as a by-product, the saving of it in a small way is attended with so much trouble that it has been practically neglected and no appreciable production made."

Annual Production of Platinum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1887	5,600	1894	950	1901	457
1888	6,000	1895	3,800	1902	46,502
1889	3,500	1896	750	1903	33,345
1890	4,500	1897	1,600	1904	10,872
1891	10,000	1898	1,500	1905	500
1892	3,500	1899	825	1906	*
1893	1,800	1900	Nil.		

*See under Palladium.

Imports of Platinum.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1883	113	1892	1,952	1901	20,263
1884	576	1893	14,082	1902	19,357
1885	792	1894	7,151	1903	21,251
1886	1,154	1795	3,937	1804	28,112
1887	1,422	1896	6,185	1905	61,719
1888	13,475	1897	9,031	1906	54,494
1889	3,167	1898	9,781	1907	113,485
1890	5,215	1899	9,671	1908*	60,390
1891	4,055	1900	57,910		

*Platinum wire and platinum in bars, strips, sheets or plates, platinum retorts, pans, condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works. Duty free.

PALLADIUM.

It has been known for a long time that palladium is present in the nickel ore of the Sudbury district, but in past years no definite information could be obtained as to whether the metals of the platinum group were saved in the treatment which the ores and mattes underwent. As far back as 1889 it was discovered that sperrylite, the arsenide of platinum, which is present in the Sudbury ores, contained traces of palladium, but the occurrence was noted as being only of mineralogical interest. Of late years, however, the producers of platinum have not been able to supply the demand, and palladium is being considered as a possible substitute on account of its malleability and high melting point (palladium 1500°C, platinum 1750°C).

The metal palladium, as well as platinum, as already explained, has been recovered from the residues resulting from the treatment of the nickel-copper ores of Sudbury, Ont., and statistics of production as obtained by the Ontario Bureau of Mines have been as follows:—

		Ozs.	Value.
1902	Palladium	4,411	$86,014
1903	"	3,177	61,952
1904	"	952	18,564
1905	Metals of the Platinum Group	1,562	28,116
1906	" "	314	5,652
1907-1908*		Nil.	Nil.

*Ontario Bureau of Mines Report, 1908.

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 recent discovery of cassiterite near New Ross, Lunenburg county, Nova Scotia. This occurrence has not yet been found of economic value. It has been visited by several officers of the Geological Survey, and reports upon it may be found in the Summary Report of the Geological Survey Branch of the Department of Mines for 1907, pages 77 and 80 to 83, and in the Report for 1908, page 154.

The imports of tin and manufactures thereof, into Canada, are shown in the following table :—

Imports of Tin and Tinware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1880	281,880	1890	1,289,756	1900	2,418,455
1881	413,924	1891	1,206,918	1901	2,339,109
1882	790,285	1892	1,594,205	1902	2,293,958
1883	1,274,150	1893	1,242,994	1903	2,712,186
1884	1,018,493	1894	1,310,389	1904	2,389,557
1885	1,060,883	1895	973,397	1905	2,791,757
1886	1,117,368	1896	1,237,684	1906	3,336,948
1887	1,187,312	1897	1,274,108	1907	2,719,813
1888	1,164,273	1898	1,550,851	1908	4,059,281
1889	1,243,794	1899	1,372,813		

		Duty	$
1908	Tin crystals	Free.	2,894
	Tin in blocks, pigs and bars	"	1,282,004
	Tin plates and sheets	"	2,437,540
	Tin foil	"	79,897
	Tinware, plain, japanned or lithographed, and all manufactures of tin, N.E.S	25 %	256,638
	Tin strip waste	Free.	308
	Total		4,059,281

TUNGSTEN.

The known occurrence of tungsten ores at several localities in Canada, and the special values of the metal in the metallurgy of steel were considered of sufficient importance to justify a special investigation of the ores of this metal in Canada, which was undertaken by the Mines Branch in 1908. The work was entrusted to Mr. T. L. Walker, Ph. D., of Toronto University, and his report covering all the reported occurrences of tungsten ores in Canada has now been published. In concluding his report Mr. Walker states that:—

"The investigation of material for this report has rendered it possible to make a complete statement of the distribution of tungsten ores in Canada, Since beginning the work, information has been obtained from mining engineers assayers and others, regarding occurrences of these ores which were not known except in the immediate vicinity of the mines where the ores had been found. From the chemical examination of concentrates many new sources of tungsten have been revealed. In most instances the quantity of ore available is insignificant, in others the grade is very low. Such discoveries have their importance, however, since they indicate the probability of the discovery of richer or larger deposits in the vicinity. During the past summer, scheelite deposits of a very promising character were discovered in Halifax county, N.S. This discovery may in some measure be regarded as one of the indirect results of this investigation.

"It cannot be claimed that there are in Canada any well developed and established tungsten ore mines. On the other hand there are numerous districts where these ores occur, and there are many claims well worth developing. Hitherto no tungsten production has been credited to Canada in our mineral statistics. It would seem very strange, if, from the known tungsten claims and tungsten regions, some regular mines should not result from exploration."

Probably the most important deposits from the point of view of possible economic working are those discovered in 1908 in Halifax county, Nova Scotia. Mr. Faribault of the Geological Survey, visited these deposits in October of that year and has described them in his Summary Report. [1]

The first discovery of these tungsten mineral veins was in the Moose River Gold district on Stillwater brook. Mr. Faribault states that:—

"Fourteen veins bearing scheelite have so far been uncovered by Messrs. Reynolds and Currie, all of which occur in slate bands interstratified between beds of quartzite and dip north at angles of 60 to 75 degrees. They are comprised in a well defined zone 200 feet wide, limited on the north by the north syncline and on the south by the middle anticline. In depth these veins will probably be found to terminate at the syncline, but being of deep-seated origin they are undoubtedly

[1] Summary Report Geological Survey 1908 p. 155.

underlaid by a succession of other veins which should offer a promising field for deep mining. Further exploration will probably disclose scheelite veins outside that zone, especially south of the middle anticline, where the rocks are more crumpled and fractured, but the veins may not be so well defined and continuous. Several large interbedded quartz veins are exposed on the north side of the south anticline 200 feet south of the west bend on the brook. One of these is 10 feet thick, and forms a prominent saddle of white quartz, pitching west on the anticline. These veins have more the characteristics of the gold-bearing veins and do not appear to carry scheelite.

"The extent of the mineralized area is not known, but veins enough have been exposed to show the importance of the deposit from an economic point of view. That the area is much larger than might be supposed from the veins exposed by Messrs. Reynolds and Currie is shown by the fact that scheelite was found in drift in a line extending 300 yards west from Stillwater brook, and in an isolated boulder a mile and a quarter west. Some was found in situ about half a mile east, in a vein 20 feet south of the Johnston shaft, also in a vein just east of the main road at Moose River Gold mines, as well as on the dump at Kaulbach's last vertical shaft. Scheelite has, therefore, been found over a space of 3 miles along the Moose River anticline. Further systematic prospecting along this anticline should reveal other veins, and the fact that those thus far found are of the regular bedded type, should be of much assistance to the intelligent prospector in the pursuit of his work."

NON-METALLIC PRODUCTS.

ABRASIVE MATERIALS.

The abrasives produced in Canada comprise corundum, the various sandstone abrasives, such as grindstones, pulpstones, whetstones, etc., and tripolite or infusorial earth.

CORUNDUM.

The trade depression of 1908 seriously affected the production of corundum in Canada, the mills of the two operating companies being closed down for the first ten months of that year.

Detailed statistics of output and shipments during 1907 and 1908 are as follows :—

	1907.	1908.
Rock treated	60,532 tons.	2,678 tons.
Grain corundum graded	5,365,257 lbs.	212,150 lbs.
Shipments—		
Grain corundum sold in Canada	328,000 "	198,600 "
" " sold in other countries	3,457,450 "	1,980,190 "
Total sales	3,785,450 lbs.	2,178,790 lbs.

The mining of corundum in Canada was begun in 1900, the mineral being found in Radcliffe, Carlow and adjacent townships. Two companies have been mining corundum rock and operating mills for the separation of the mineral for several years. The Canada Corundum Company, the original and larger operator, has worked the Craig mine at Craigmont in Renfrew county, while the Ashland Emery and Corundum Company, which operates on a comparatively small scale, has a mine and mill at Burgess mines in the same district. The former Company, owing to the decline in demand for its product, and having on hand a large assorted stock of grain corundum, shut down its plant on Nov. 30, 1907.

In November, 1908, a company was organized under the name of the Manufacturers Corundum Co., Ltd., to operate the plant of this Company under lease. The greater part of the remainder of the year was spent in preparing for operations, so that the full plant was in operation for about 20 days only.

Statistics of shipments since 1900 are shown as follows :—

Grain Corundum.	Lbs.	Value.	Average Price.
		$	Cents.
1900	6,000	300	5·00
1901	773,590	46,415	5·97
1902	1,535,730	84,465	5·49
1903	1,406,000	77,510	5·51
Tons corundum ore	267	2,670	($10 00)
1904	1,986,290	109,545	5·51
1905	3,288,267	149,153	4·48
1906	4,548,176	204,973	4·50
1907	3,785,450	177,922	4·70
1908	2,178,790	100,398	4·60

Statistics since 1900, showing the quantities of ore treated, the corundum produced, and the sales or shipments are given in the following table :—

ABRASIVE MATERIALS—TABLE 1.

Production of Corundum Ore and Corundum.

Calendar Year.	Corundum-bearing rock treated.	Grain Corundum Graded.	Grain Corundum sold in Canada.	Grain Corundum Exported.	Total of Grain Corundum.
	Tons.	Tons.	Tons.	Tons.	Tons.
1900	.....	60	.....	.....	3
1901	4,134	444	85	302	387
1902	7,996	806	106	662	768
1903	(a) 8,877	839	85	618	703
1904	28,187	1,654	116	877	993
1905	23,571	1,681	140	1,504	1,644
1906	45,719	2,914	162	2,112	2,274
1907	60,532	2,682	164	1,728	1,892
1908	2,678	106	99	990	1,089

(a) In addition to this amount which was milled in Canada, 267 tons of ore were mined and shipped to the United States for treatment there.

GRINDSTONES, PULPSTONES, ETC.

The manufacture of grindstones is an industry which has been carried on for many years in the Provinces of Nova Scotia and New Brunswick. The output to-day is no greater than it was twenty years ago, and there has been comparatively little variation from year to year. The total production, including wood pulpstones, etc., in 1907 was 5,414 tons valued at $60,376, and in 1908 was 3,843 tons valued at $48,128.

These abrasives are quarried from the Millstone-grit of the Carboniferous formation, which occupies a large portion of the surface of the eastern half of the Province of New Brunswick and the northern and northwestern parts of Nova Scotia. The localities at which quarrying operations are chiefly carried on are at

Lower cove, and Quarry island near Merigomish, in Nova Scotia, and in New Brunswick on Chaleur bay and at Woodpoint and Rockport on the Bay of Fundy.

The grindstones are all shipped in a finished condition and are worth from $10 to $12 per ton.

About 63 pulpstones were shipped in 1908, which found a market in Canadian and United States pulp mills. These stones are made 27″ face by 54″ diameter, and weigh about 2½ tons each. They sell at $75 per stone. Scythe or whetstones are manufactured by one firm. These are put up in one-quarter gross boxes, thirty pounds to the box, and are worth about $50 per ton; about 450 gross were made in 1908. At some of the quarries there is a considerable production of foundation and building stone, besides rough stone for breakwater and harbour works.

Statistics of the production by provinces since 1886 are given in the table following:—

ABRASIVE MATERIALS.—TABLE 2.

Annual Production of Grindstones.

Calendar Year.	Nova Scotia.		New Brunswick.		Total.		Average Value per Ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		$		$		$	$
1886	1,765	24,050	2,255	22,495	4,020	46,545	11 58
1887	1,710	25,020	3,582	38,988	5,292	64,008	12 10
1888	1,971	20,400	3,793	30,729	5,764	51,129	8 87
1889	712	7,128	2,692	23,735	3,404	30,863	9 07
1890	850	8,536	4,034	33,804	4,884	42,340	8 67
1891	1,980	19,800	2,499	22,787	4,479	42,587	9 51
1892	2,462	27,610	2,821	23,577	5,283	51,187	9 69
1893	2,112	21,000	2,488	17,379	4,600	38,379	8 34
1894	2,128	16,000	1,629	16,717	3,757	32,717	8 71
1895	1,400	14,000	2,075	17,932	3,475	31,932	9 19
1896	1,450	14,500	2,263	18,810	3,713	33,310	8 97
1897	1,407	17,500	3,165	24,840	4,572	42,340	9 26
1898	1,422	12,350	3,513	32,425	4,935	44,775	9 07
1899	1,378	10,300	3,133	32,965	4,511	43,265	9 59
1900	1,411	12,600	4,128	40,850	5,539	53,450	9 65
1901	358	3,200	4,223	42,490	4,581	45,690	9 97
1902	1,074	8,118	3,559	36,000	4,633	44,118	9 52
1903	1,337	9,562	4,201	38,740	5,538	48,302	8 72
1904	1,029	7,332	3,620	35,450	4,649	42,782	9 20
1905	1,020	10,200	4,520	52,175	5,540	62,375	11 25
1906	1,023	9,680	4,340	50,134	5,363	59,814	11 15
1907	551	4,480	4,863	55,896	5,414	60,376	11 15
1908	473	4,803	3,370	43,325	3,843	48,128	12 52

The imports of grindstones into Canada, principally into the Provinces of Ontario and Quebec, reached a total value in 1908 of $65,125, made up of grindstones not mounted and not less than 3 feet in diameter to the value of $56,319, and other grindstones to the value of $8,806.

The imports of all abrasives, including grindstones, burrstones, emery, and pumice stone, reached a total valuation in 1908 of $96,232.

Statistics of the exports and imports of grindstones and other abrasives are shown in tables following :—

ABRASIVE MATERIALS.—TABLE 8.

Exports of Grindstones.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1884	28,186	1892	23,567	1901*	29,130
1885	22,606	1893	21,672	1902*	24,489
1886	24,185	1894	12,579	1903*	27,659
1887	28,769	1895	16,723	1904*	35,612
1888	28,176	1896	19,139	1905*	24,868
1889	29,982	1897	18,807	1906*	31,978
1890	18,564	1898*	25,588	1907	32,534
1891	28,433	1899*	23,288	1908	19,721
		1900*	42,128		

* Including stone for the manufacture of grindstones.

ABRASIVE MATERIALS.—TABLE 4.

Imports.

Fiscal Year.	Grindstones.		Burrstones. (c) Value.	Emery. (a) Value.	Mfrs. of Emery. (b) Value.	Pumice Stone. (d) Value.
	Tons.	Value.				
		$	$	$	$	$
1880	1,044	11,714	12,049	.....	.....	.....
1881	1,359	16,895	6,337	.....	.....	.....
1882	2,098	30,654	15,143	.....	.....	.....
1883	2,108	31,456	13,242	.....	.....	.....
1884	2,074	30,471	5,365	.....	.....	.....
1885	1,148	16,065	4,517	5,066	4,920	9,384
1886	964	12,803	4,062	11,877	5,832	2,777
1887	1,309	14,815	3,545	12,023	4,598	3,594
1888	1,721	18,263	4,753	15,674	4,001	2,890
1889	2,116	25,564	5,465	13,565	3,948	3,232
1890	1,567	20,569	2,506	16,922	5,313	3,003
1891	1,381	16,991	2,089	16,179	6,665	3,696
1892	1,484	19,761	1,464	17,782	6,492	3,282
1893	1,682	20,987	3,552	17,762	5,606	3,798
1894	1,918	24,426	3,029	14,433	2,223	4,160
1895	1,770	22,834	2,172	14,569	7,775	3,609
1896	1,862	26,561	2,049	16,287	11,913	3,721
1897	1,521	25,547	1,827	16,318	11,231	2,903
1898	.....	22,217	1,813	17,661	15,478	3,829
1899	.....	27,476	1,759	21,454	22,343	5,973
1900	.....	34,382	1,546	19,312	25,615	5,604
1901	.....	39,068	5,762	16,311	22,190	5,516
1902	.....	40,838	2,559	14,476	23,892	7,254
1903	.....	53,388	586	18,058	22,177	6,152
1904	.....	46,039	35	21,626	29,273	6,537
1905	.....	49,747	2,607	21,980	33,250	8,447
1906	.....	59,627	2,661	21,781	42,080	9,053
1907 (9 months)	.....	40,780	245	20,498	41,086	5,745
1908	.....	65,125	3,396	26,159	57,760	8,917

a Emery in bulk, crushed or ground. Duty free.
b Emery and carborundum wheels and manufactures of emery or carborundum.
(*c*) Burrstones in blocks, rough or unmanufactured, not bound up or prepared by binding into mill-stones.
(*d*) Pumice and pumice stone, ground or unground. Duty free.

TRIPOLITE.

No shipments of tripolite during 1906 were reported. During the past two years small shipments were made from St. Anns, Cape Breton, by the Premier Tripolite Company of New York.

Statistics of shipments since 1896 are shown following.

ABRASIVE MATERIALS.—TABLE 8.

Annual Shipments of Tripolite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1896	644	9,960	1903	835	16,700
1897	15	150	1904	320	6,400
1898	1,017	16,660	1905	200	3,600
1899	1,000	15,000	1906	Nil.	Nil.
1900	336	1,950	1907	30	225
1901	850	15,300	1908	30	195
1902	1,052	16,470			

ASBESTOS.

Asbestos is mined in Canada in the Eastern townships, Province of Quebec, at Black Lake, Thetford, East Broughton, and Danville. Other occurrences of the mineral have been noted, and some shipments were at one time made from the township of Denholm, in the county of Wright, north of the city of Ottawa, but the first-mentioned districts are the only localities in which mining is at present being carried on. The mining of asbestos in this region dates from about 1878, and statistics of production since 1880 are shown in tables following. The value of the annual output has grown from less than $25,000 in 1880 to over $2,573,000 in 1908, so that next to coal this is now one of the most important of non-metallic mineral products, and supplies a very large proportion of the world's demand. A special report on this subject has been published by this Branch, though now unfortunately out of print. A revised edition is, however, in course of preparation.

PRODUCTION.

A portion of the output is sufficiently high grade to be shipped as crude; the greater part, however, is crushed and the fibre extracted by special machinery. A uniform system of classification has not yet been adopted by the operating companies, but for statistical purposes the shipments have been classified on a valuation basis, the crude being divided into two classes and the mill fibre into three grades; the short fibred, asbestic, and sand, being separately classified.

The total shipments in 1908 aggregated 90,773 tons valued at $2,573,335, as compared with shipments in 1907 of 90,426 tons valued at $2,505,042, the shipments in 1908 being the largest both in tonnage and value yet recorded. Details are given in Table 1.

ASBESTOS.—TABLE 1.

Production by Classes, Calendar Years 1907 and 1908.

	1907.			1908.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		$	$ cts.		$	$ cts.
Crude, No. 1	1,419	374,275	263 76	857½	257,752	300 59
" 2	2,908	456,357	156 93	2,488	411,480	165 38
Mill stock, No. 1	3,675	300,925	81 88	5,282⅔	425,448	80 54
" " 2	43,821	1,247,078	28 46	45,545½	1,345,750	29 33
" " 3	10,307	106,132	10 30	12,374¼	114,931	9 29
Total asbestos	62,130	2,484,767	39 99	66,548	2,555,361	38 40
Total asbestic	28,296	20,275	0 72	24,225	17,974	0 74
Grand total	90,426	2,505,042	.....	90,773	2,573,335	.....

While the average prices in each class are given in the above, the classification is based approximately on the following maximum and minimum prices per ton:—

Range of Prices of Asbestos During the Years 1907-8.

—	1907.	1908.
	$ cts. $ cts.	$ cts. $ cts.
Crude, No. 1	225 00 to 300 00	267 00 to 350 00
" 2	100 00 " 200 00	75 00 " 225 00
Mill stock, No. 1	57 00 " 163 00	60 00 " 100 00
" " 2	18 00 " 50 00	20 00 " 50 00
" " 3	8 00 " 15 00	5 00 " 13 00
Asbestic	0 50 " 2 00	0 35 " 1 16

Although the total tonnage shipped in 1908 was only 347 tons in excess of the 1907 shipments, it will be seen that the amount of crude shipped in 1908, despite a higher average price, was less than the 1907 crude shipments by 981 tons. The fibre shipments on the other hand were 5,399 greater in 1908, and brought a higher average return per ton of $1.22. The asbestic shipments in 1908 were 4,071 less than in 1907.

In Table 2, following, the production of crude asbestos and mill stock since 1903 is separately shown. The statistics indicate that during the past six years there has been only a slight increase in the quantity shipped as crude, although the average price has nearly doubled; while on the other hand the shipments of mill stock have increased over 125 per cent in the same time, with an increase of over 50 per cent in the average price per ton obtained.

ASBESTOS.—TABLE 2.

Annual Production of Crude and Mill Stock 1903-1908.

Calendar Year.	Crude.			Mill Stock.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		$	$ cts.		$	$ cts.
1903	3,134	361,867	115 46	27,995	554,021	19 79
1904	4,410	534,874	121 28	31,201	678,628	21 75
1905	3,767	472,859	125 53	46,902	1,013,500	21 61
1906	3,841	635,345	165 41	56,920	1,401,083	24 61
1907	4,327	830,632	191 97	57,803	1,654,135	28 62
1908	3,345½	669,232	200 04	63,202	1,886,129	29 84

Table 3 shows the total shipments of asbestos and asbestic separately for each year since 1880.

ASBESTOS.—TABLE 3.

Annual Production since 1880.

Calendar Year.	Asbestos.			Asbestic.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		$	$ cts.		$	$ cts.
1880 (a)	380	24,700	65 00			
1881 (a)	540	35,100	65 00			
1882 (a)	810	52,650	65 00			
1883 (a)	955	68,750	71 99			
1884 (a)	1,141	75,097	65 82			
1885 (a)	2,440	142,441	58 38			
1886 (a)	3,458	206,251	59 64			
1887	4,619	226,976	48 92			
1888	4,404	255,007	57 90			
1889	6,113	426,554	69 78			
1890	9,860	1,260,240	127 81			
1891	9,279	999,878	107 76			
1892	6,082	390,462	64 20			
1893	6,331	310,156	86 81			
1894	7,630	420,825	55 15			
1895	8,756	368,175	42 05			
1896	10,892	423,066	38 84	1,358	6,790	5 00
1897	13,202	399,528	29 99	17,240	45,840	2 66
1898	16,124	475,131	29 47	7,661	16,066	2 10
1899	17,790	468,635	26 34	7,746	17,214	2 22
1900	21,621	729,886	33 76	7,520	18,545	2 47
1901	32,892	1,248,645	37 96	7,325	11,114	1 52
1902	30,219	1,126,688	37 28	10,197	21,631	2 20
1903	31,129	915,888	29 42	10,548	13,869	1 31
1904	35,611	1,213,502	34 08	12,854	12,850	1 00
1905	50,669	1,486,359	29 33	17,594	16,900	0 96
1906	60,761	2,036,428	33 52	21,424	23,715	1 11
1907	62,130	2,484,767	39 99	28,296	20,275	0 72
1908	66,548	2,555,361	38 40	24,225	17,974	0 74

(a) Figures of export taken as production.

EXPORTS AND IMPORTS.

Supplying as it does the greater part of the world's demand, the Canadian output of asbestos finds a wide distribution.

During the twelve months ending March 31, 1908, exports were made as follows:—

Countries.	Tons.	Value.	Countries.	Tons.	Value.
		$			$
Great Britain	5,347	237,152	Italy	814	21,678
Belgium	3,372	86,871	Japan	97	3,177
France	2,332	50,612	United States	46,846	1,322,890
Germany	225	8,195	Total	59,033	1,730,575

Exports to Great Britain, United States, Germany and other countries during the past six calendar years are shown in Table 4, and total exports each year since 1892 in Table 5.

ASBESTOS.—TABLE 4.

Exports of Canadian Asbestos by Countries, 1903-1908.

Calendar Year.	To Great Britain.		To United States.		To Germany.		To Other Countries.		Total Exports.		Average per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		$		$		$		$		$	$ cts.
1903	2,743	40,120	24,252	714,781	1,429	25,150	3,356	110,982	31,780	891,033	28 04
1904	6,602	210,175	25,957	762,300	2,463	94,141	2,250	94,271	37,272	1,160,887	31 15
1905	9,731	305,056	29,696	811,080	2,969	100,061	4,635	169,918	47,031	1,386,115	29 47
1906	9,435	318,313	39,767	1,058,513	3,654	82,117	6,998	230,314	59,854	1,689,257	28 22
1907	5,432	200,909	44,861	1,312,582	225	8,195	6,235	147,613	56,753	1,669,299	29 41
1908	5,221	288,290	50,503	1,314,337	341	9,470	5,145	230,666	61,210	1,842,763	30 11

ASBESTOS.—TABLE 5.

Annual Exports, Calendar Years 1892-1908.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		$	$ cts.			$	$ cts.
1892	5,380	373,103	69 35	1901	32,269	1,069,918	33 16
1893	5,917	338,707	57 24	1902	31,074	995,071	32 02
1894	7,987	477,837	59 82	1903	31,780	891,033	28 04
1895	7,442	421,690	56 66	1904	37,272	1,160,887	31 14
1896	11,842	567,967	47 96	1905	47,031	1,386,115	29 47
1897	15,570	473,274	30 40	1906	59,854	1,689,257	28 22
1898	15,346	494,012	32 19	1907	56,753	1,669,299	29 41
1899	17,883	473,148	26 46	1908	61,210	1,842,763	30 11
1900	16,993	693,105	39 61				

Although the chief source for the raw material, Canada does not as yet manufacture all the asbestos goods required for home consumption. There is, therefore, a considerable importation of asbestos goods under the import classification 'Asbestos in any form other than crude and all manufactures of,' the duty being 25 per cent. The annual value of the imports is shown in Table 6.

ASBESTOS.—TABLE 6.

Imports Fiscal Years 1885-1908.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1885	674	1893	19,181	1901	50,829
1886	6,831	1894	20,021	1902	52,464
1887	7,836	1895	26,094	1903	75,465
1888	8,793	1896	23,900	1904	83,827
1889	9,943	1897	19,032	1905	116,836
1890	13,250	1898	26,389	1906	137,974
1891	13,298	1899	32,607	1907 (9 months)	127,509
1892	14,090	1900	43,455	*1908	190,980

* Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

Outside of Canada the chief asbestos producing country is Russia, the output from which in 1907 is reported as 9,352 metric tons. The United States, Cape Colony, and Cyprus are also producers, though the quantity is not important.

Table 7 shows the principal productions since 1902.

ASBESTOS.—TABLE 7.

World's Production 1902-1908 in Metric Tons, (2204·6 lbs.).

—	1902.	1903.	1904.	1905.	1906.	1907.	1908.
Canada (b)	27,414	28,240	32,306	45,967	55,122	56,364	60,372
United States (c)	912	805	1,343	2,820	1,538	592	849
Russia (e)	4,507	5,624	7,502	7,266	9,201	(a) 9,356	*
Cape Colony (e)	(g) 41	(g) 276	373	454	473	548	*
Cyprus (e)					(g) 19	(g) 89	*

* Figures not available.
(a) Provisional. (b) Mines Branch, Ottawa. (c) United States, Geological Survey.
(e) Home Office, London. (g) Exported.

10,084—11½

The following is a list of the principal producing companies in Canada:—

List of Operators.

Dominion Asbestos Co., Ltd., Montreal, 415 Merchants Bank Building.
Standard Asbestos Co., Ltd., " 415 " "
Union Asbestos Mines, Calmon, Que.
Johnston's Asbestos Co., Ltd., Thetford Mines, Que.
Bell Asbestos Mines, " "
Beaver Asbestos Co., " "
King Asbestos Mines " "
The Asbestos and Asbestic Co., Ltd., Asbestos, Que.
Broughton Asbestos Fibre Co., East Broughton Sta., Que.
The Quebec Asbestos Co., Sherbrooke, Que.
Eastern Townships Asbestos Co., East Broughton Sta., Que.
The Frontenac Asbestos Mining Co., Ltd., East Broughton Sta., Que.
British Canadian Asbestos Co., Ltd., Black Lake, Que.

COMPANIES PROSPECTING OR EXPECTING TO OPERATE.

Megantic Mining Co., Montreal, 88 McGill St.
W. H. Lambly, Inverness, Que.
Brompton Lake Asbestos Co., Montreal, 17 Victoria Square.
The Asbestos Mining & Manufacturing Co., Sherbrooke, Que.
Boston Asbestos Co., Ltd., East Broughton Sta., Que.
Robertson Asbestos Mining Co., Drummondville, Que.
The Ling Asbestos Co., East Broughton Sta., Que.
The Thetford Asbestos & Exploration Co., Thetford, Que.
The Imperial Asbestos Co., Montreal, Que.
La Compagnie d'Amiante Champlain, 81 Rue St. Pierre, Que.
The B and A Asbestos Co., Robertsonville, Que.
The Berlin Asbestos Co., Robertson Sta., Que.

CHROMITE.

With regard to the output of chromite in Canada during the past four years, the production has shown comparatively little variation.

The shipments in 1907 were 7,196 tons valued at $72,901, made up of 3,545 tons classed as high grade valued at $41,931 (chiefly concentrates), and 3,651 tons of low grade, valued at $30,970.

In 1908 the total shipments were returned as 7,225 tons valued at $82,008, made up of 3,472 tons of concentrates valued at $45,300, and 3,753 tons of crude ore, valued at $36,708.

In neither of these years was the output as large as in 1906, when the shipments were given as 9,035 tons valued at $91,859.

Prices realized in 1908 were perhaps slightly better than in 1907.

Statistics of production since 1886 are shown in Table 1 following, the total during the last six years being divided into high and low grade. Material classed as high grade includes both ore and concentrates ranging from 48 per cent to 50 per cent Cr_2O_3 and higher, while the low grade is composed chiefly of crude ore.

CHROMITE.—TABLE 1.

Annual Production in Canada, 1886-1908.

Calendar Year.	High Grade			Low Grade.			Totals.		
	Short Tons.	Value.	Average Prices.	Short Tons.	Value.	Average Prices.	Short Tons.	Value.	Average Prices.
		$	$ cts.		$	$ cts.		$	$ cts.
1886	.....	.....	.....	.....	.....	.....	60	945	15 75
1887	.....	.....	.....	.....	.....	.....	38	570	15 00
1888 to 1893	.....	.....	.....	.....	.....	.....	.....	No Output	.....
1894	.....	.....	.....	.....	.....	.....	1,000	20,000	20 00
1895	.....	.....	.....	.....	.....	.....	3,177	41,300	13 00
1896	.....	.....	.....	.....	.....	.....	2,342	27,004	11 53
1897	.....	.....	.....	.....	.....	.....	2,637	32,474	12 31
1898	.....	.....	.....	.....	.....	.....	2,021	24,252	12 00
1899	.....	.....	.....	.....	.....	.....	2,010	21,842	10 86
1900	.....	.....	.....	.....	.....	.....	2,335	27,000	11 56
1901	.....	.....	.....	.....	.....	.....	1,274	16,744	13 14
1902	.....	.....	.....	.....	.....	.....	900	13,000	14 44
1903	2,842	44,280	15 58	667	6,849	10 27	3,509	51,129	14 57
1904	4,650	53,976	16 08	1,424	13,170	9 25	6,074	67,146	11 05
1905	.....	.....	.....	8,575	93,301	10 88	8,575	93,301	10 88
1906	4,975	57,484	11 55	4,060	34,375	8 47	9,035	91,859	10 17
1907	3,545	41,931	11 83	3,651	30,970	8 48	7,196	72,901	10 13
1908	3,472	45,300	13 05	3,753	36,708	9 78	7,225	82,008	11 35

The chromite finds its chief market in the United States, although a few carloads are shipped annually to Canadian points.

The exports of chromite from Canada, as compiled from the monthly reports of Trade and Navigation, are given in Table 2. It must be pointed out, however, that these figures show some peculiar discrepancies. In the first place the exports to Great Britain are evidently not chromite, but may be ferro-chrome, while in the second place the quantities given as exported to the United States are much less than is stated by the shippers to have found a market in that country.

CHROMITE.—TABLE 2.

Exports during the calendar years 1895-1908.

Calendar Year.	To Great Britain.		To United States.		To Other Countries.		Total Exports.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$		$
1895							2,908	42,236
1896							2,466	31,411
1897							2,106	26,254
1898							1,683	20,783
1899							1,509	19,876
1900							368	8,259
1901							2,259	25,444
1902							740	7,535
1903	62	4,650	914	15,319	37	555	1,013	20,524
1904	192	11,395	2,859	45,649	287	3,292	3,338	60,336
1905	153	11,030	1,966	23,362			2,119	34,392
1906			891	10,188			891	10,188
1907	108	10,400	784	9,400			892	19,800
1908			4,571	56,864			4,571	56,864

It will be observed that the exports to Great Britain average in value from $60 to $96 per ton, while those to the United States range between $11 and $16 per ton, and it may be inferred that the exports to Great Britain possibly represent ferro-chrome which may have been entered with the chromite by the Customs officers in the absence of a more definite classification.

In the following table a comparison is given of the trade returns in chromite between Canada and the United States, as published by the Canadian Customs Department and the United States Department of Commerce respectively, in order to further illustrate the discrepancies referred to in Table 2.

Twelve months ending June 30.	Imports of Chromite into the United States from Canada[1].		Exports of Chromite from Canada to the United States[2].	
——	Short Tons.	Value.	Short Tons.	Value.
		$		$
1904	2,790	36,322	2,032	40,298
1905	6,489	70,934	2,635	31,007
1906	9,951	107,580	1,808	21,293
1907	6,179	66,115	612	7,606
1908	6,505	69,009	2,654	32,940

[1] The Foreign Commerce and Navigation of the United States, Washington, long ton in original changed to short ton.
[2] Monthly Reports, Trade and Navigation, Ottawa.

We are forced to the conclusion that a larger quantity of chromite, particularly during the years 1904 to 1908, has been exported to the United States than is shown by the Canadian trade returns.

The chromite is mined in the Eastern townships, Province of Quebec, chiefly in the township of Coleraine at Little Lake St. Francis and Black Lake, the operating companies being the Dominion Chrome Company and the Black Lake Chrome and Asbestos Company, both operating under one management. A couple of car loads were also shipped by the D'Israeli Chrome Mines, Ltd., from the property of Mr. J. O. Brousseau, in Garthby township.

Other mines in the district, owned by the American Chrome Company and the Canadian Chrome Company, were idle during the year.

Chrome iron ore is chiefly used for the manufacture of ferro-chrome alloys, and chromium salts for pigments, and is also used for linings in steel and copper furnaces. Ferro-chrome is manufactured at Buckingham, Que., by the Electric Reduction Company, from Eastern Township ores, and shipments of these ores have also been made to the steel furnaces at Sydney and Sault Ste. Marie.

Prices in New York in 1907 and 1908 were practically uniform, ranging from $17 to $20 per long ton for 50 per cent ore.

As an illustration of the possible market in the United States for Canadian chrome iron ore, the following table shows the imports into that country during the year ending June 30, 1908.

CHROMITE.—TABLE 3.

Imports into the United States, year ending June 30, 1908, in tons of 2,240 lbs.*

Imports from	Long Tons.	Value.	Average Value per Ton.
		$	$
Belgium	197	2,492	12 65
France	468	7,776	16 39
Germany	.....	20	.....
Greece	9,921	136,996	13 81
United Kingdom	4,336	57,719	13 31
Canada	5,808	69,009	11 88
India	35	357	10 20
Turkey in Asia	439	5,312	12 10
French Oceania	20,458	221,460	10 82
Portuguese Africa	2,200	32,600	14 82
Totals	43,862	533,600	12 17

* The Foreign Commerce and Navigation of the United States, 1908.

THE WORLD'S PRODUCTION.

The world's production of chromite in 1907 was probably between 90,000 and 100,000 metric tons as a minimum. Turkey has been a large producer of this mineral, but only incomplete records of exports are available. The following table contains a summary of available records of chromite supplies from 1903 to 1908.

CHROMITE.—TABLE 4.

World's Production of Chromite in metric tons (2,204·6 lbs.).

Locality.	1903	1904	1905	1906	1907	1908
Australia (a)	1,982	403	53	15	30	...
Bosnia and Herzegovina (a)	147	278	186	320	310	*
Canada (d)	3,183	5,510	7,779	8,196	6,528	6,554
Greece (a)	8,478	6,530	8,900	11,530	11,730	*
India (a)	...	...	2,751	4,445	7,391	*
New Caledonia (Production	...	(a) 47,247	(a) 76,933	(b) 84,241	(b) 3,800	*
" (Exports	(b) 21,437	(b) 42,437	(b) 51,374	(a) 57,367	(c) 31,552	(c) 46,309
Rhodesia (a)	...	...	Nil.	3,308	7,273	(e) 12,118
Russia (a)	16,421	26,575	27,047	16,976	*	*
Norway (a)	Nil.	154	Nil.	Nil.	...	*
United States (f)	152	125	22	109	295	(c) 284
Turkey (g)	No complete statistics available.					

* Statistics not yet available.

(a) Home Office, London.
(b) L'Industrie Minérale, Paris.
(c) Mineral Industry, New York, 1908.
(d) Department of Mines, Ottawa.
(e) Rhodesia "Chamber of Mines".
(f) Geological Survey, United States.
(g) Turkey is one of the most important producers of chromite, the ore being found in many parts of both European and Asiatic Turkey. Unfortunately no complete records of production are available. According to statistics collected and published by the Home Office, the exports from several ports during the years 1903 to 1907 were as follows, in metric tons:—

—	1903.	1904.	1905.	1906.	1907.
Salonica	9,000	8,00	5,700	5,600	4,900
Kossova	...	3,100	3,000	4,100	2,800
Derendge and Marmora ports	12,000 to 15,000	12,000 to 15,000	12,000 to 15,000	13,000 ...	12,000 to 14,000
Smyrna	2,030	838	...	1,080	...
Adana	...	To value of £500	£2,824	...	£1,000
Adalia	...	...	...	...	700

Imports of chrome iron ore into the United States from Turkey, during the fiscal years from 1903 to 1907 inclusive, aggregated 28,482 long tons, while the imports into Great Britain from Turkey during the six years from 1903 to 1907 inclusive, were 91,800 long tons.

COAL.

Ever since 1896, each year has shown a marked increase over the preceding one in the figures representing the annual tonnage of coal extracted from the Canadian mines, and not once has this growth suffered a set-back sufficient to show a decrease in the succeeding year. This is, of course, a natural consequence of Canada's development, not only industrially but also agriculturally, since the fuel for domestic uses in the prairie provinces is almost exclusively coal and lignite. As the growth of a country can be closely gauged by the increase in the production and consumption of coal, it may be interesting to point out that in 1874, which is about the earliest year for which we have a comparatively reliable record, the production of coal in Canada was 1,063,742 tons; it took twelve years of growth to double this annual production, and in 1886, 2,116,653 tons were recorded; this latter figure took another twelve years to double, and in 1898, 4,173,108 tons were produced; but at this point the rate of increase grows considerably, and six years later, in 1904, the 1898 figure of production was doubled and 8,254,595 tons were recorded. Four years later, in 1908, the increase is approximately 2,250,000 tons, showing a rate which is rather lower than for the previous few years, but if we consider that both 1907 and 1908 were unfavourable to the coal industry, it is not unlikely that in two or three years from now the annual production may be double that of 1904.

It is, moreover, to be noticed that the value of the production of *coal alone* in 1908 exceeded by nearly $3,000,000 the value of the *total mineral production* of Canada during the year 1896.

In 1907, during the first part of the year, great activity prevailed in coal mining throughout the whole of Canada, but towards the latter part of that year, as well as the greater part of 1908, several causes contributed to a decrease in the operations of the collieries, among which were the financial and industrial depression which marked that period throughout America; labour troubles in the collieries which resulted in a decreased output, and a severe winter which in the spring of 1907, especially in the western provinces, materially impeded the means of transportation and paralyzed traffic, giving rise in many cases to very serious shortages of fuel for industrial and domestic uses.

The coal mined in Canada comprises the three varieties, anthracite, bituminous, and lignite. The bituminous forms by far the largest proportion of the output, being mined exclusively in the Maritime provinces, in British Columbia, and in the Crowsnest Pass region of southwestern Alberta. It is, of course, difficult to draw any sharp lines of demarcation between the different varieties

of coal, as the produce of some mines might be equally well placed in one or the other of the classes according to the classification adopted; but roughly speaking we may say that out of 11,000,000 tons produced in Canada in 1908, about 10,000,000 tons may be classified as being bituminous.

Only one mine works an anthracite coal seam. This is at Bankhead, near Banff, Alberta; but the output of this mine is larger than that of any one of the lignite mines of the Province.

In the past, the anthracite and the lignite which are produced exclusively in Alberta and Saskatchewan, had been used mainly for domestic purposes; but lately the Alberta anthracite has entered the industrial field and is now used to some extent in gas producers. It is very probable that lignite will before long also be used industrially in the same way, as experiments conducted by the governments of both the United States and Canada show that it can very advantageously be used in this manner.

Table 1 shows that the production of coal in Canada in 1907 was 10,511,426 short tons, valued at $24,381,842; and in 1908 it reached 10,886,311 tons, valued at $25,194,573; these values being at the pit mouth. The production of 1907 shows an increase of 748,825 tons, or 7·67 per cent as compared with 1906. The increase in 1908 as compared with 1907 was lower, being only 374,885 tons, or 3·5 per cent; but considering the adverse industrial conditions which prevailed during the early part of 1908 these figures are still very gratifying.

It may be mentioned that in this report the word production applies to the amount of coal which is actually used, or sold by the producers, in contradistinction to output, which applies to the coal extracted from the mine. Some of this output goes to the stock on hand at the end of the year, and is taken into account in the following year's production.

COAL.—TABLE 1.

Production by Provinces, 1906-7-8, in tons of 2,000 lbs.

Province.	1906.		1907.		1908.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Nova Scotia	6,220,505	$11,108,044	6,354,133	$12,764,999	6,652,539	$13,364,476
British Columbia	2,146,262	5,748,915	2,364,898	7,390,306	2,333,708	7,292,838
Alberta	1,246,360	2,614,762	1,591,579	3,836,286	1,685,661	4,127,311
Saskatchewan	108,398	164,146	151,232	252,437	150,556	253,790
New Brunswick	34,076	68,152	34,584	77,814	60,000	135,000
Yukon Territory	7,000	28,000	15,000	60,000	3,847	21,158
Totals	9,762,601	19,732,019	10,511,426	24,381,842	10,886,311	25,194,573

Table 2 gives comparisons of the coal production of the various provinces during the last three years, with increases and decreases in tons and percentages.

COAL.—TABLE 2.

Comparison of Production 1906 with 1907, and 1907 with 1908.

Province.	(i) Increase or (d) Decrease.					
	Years 1906 and 1907.			Years 1907 and 1908.		
		Tons.	Per cent.		Tons.	Per cent.
Nova Scotia	(i)	133,628	2·15	(i)	298,406	4 70
British Columbia	(i)	218,636	10·19	(d)	31,190	1·32
Alberta	(i)	345,219	27·70	(i)	94,082	5·91
Saskatchewan	(i)	42,834	39·52	(d)	676	0·01
New Brunswick	(i)	508	1·49	(i)	25,416	73·49
Yukon Territory	(i)	8,000	114·29	(d)	11,153	74·35
Totals for Canada	(i)	748,825	7·67	(i)	374,885	3·56

Table 3 gives the annual production of coal of Canada, with comparisons showing increases or decreases each year as compared with the preceding year.

COAL.—TABLE 3.

Annual Production showing the Increase or Decrease each year.

Year.	Tons.	Value.	Average Value per Ton.	Increase (i) or Decrease (d) in Tonnage.	Increase (i) or Decrease (d) per cent.
		$	$		
1785 to 1873	*8,534,455	.....	.....	.....	.....
1874	1,063,742	1,763,423	1 66	.....	.....
1875	1,039,974	1,747,016	1 68	(d) 23,768	(d) 2·2
1876	994,762	1,729,546	1 74	(d) 45,212	(d) 4·3
1877	1,036,670	1,794,415	1 73	(i) 41,908	(i) 4·2
1878	1,089,744	1,941,285	1 78	(i) 53,074	(i) 5·1
1879	1,126,497	2,050,639	1 82	(i) 36,753	(i) 3·4
1880	1,482,714	2,657,194	1 79	(i) 356,217	(i) 31·6
1881	1,537,106	2,688,621	1 75	(i) 54,392	(i) 3·7
1882	1,848,148	3,248,446	1 76	(i) 311,042	(i) 20·2
1883	1,818,684	3,109,635	1 71	(d) 29,464	(d) 1·6
1884	1,984,959	3,593,831	1 81	(i) 166,275	(i) 9·1
1885	1,920,977	3,417,807	1 78	(d) 63,982	(d) 3·2
1886	2,116,653	3,739,840	1 77	(i) 195,676	(i) 10·2
1887	2,429,330	4,388,206	1 81	(i) 312,677	(i) 14·8
1888	2,602,552	4,674,140	1 80	(i) 173,222	(i) 7·1
1889	2,658,303	4,894,287	1 84	(i) 55,751	(i) 2·1
1890	3,084,682	5,676,247	1 84	(i) 426,379	(i) 16·0
1891	3,577,749	7,019,425	1 96	(i) 493,067	(i) 16·0
1892	3,287,745	6,363,757	1 94	(d) 290,004	(d) 8·1
1893	3,783,499	7,359,080	1 95	(i) 495,754	(i) 15·1
1894	3,847,070	7,429,468	1 93	(i) 63,571	(i) 1·7
1895	3,478,344	6,739,153	1 94	(d) 368,726	(d) 9·6
1896	3,745,716	7,226,462	1 93	(i) 267,372	(i) 7·7
1897	3,786,107	7,303,597	1 93	(i) 40,391	(i) 1·1
1898	4,173,108	8,224,288	1 97	(i) 387,001	(i) 10·2
1899	4,925,051	10,283,497	2 09	(i) 751,943	(i) 18·0
1900	5,777,319	13,742,178	2 38	(i) 852,268	(i) 17·3
1901	6,486,325	12,699,243	1 96	(i) 709,006	(i) 12·3
1902	7,466,681	15,210,877	2 04	(i) 780,356	(i) 15·1
1903	7,960,364	15,942,833	2 00	(i) 493,683	(i) 6·6
1904	8,254,595	16,592,231	2 01	(i) 294,231	(i) 3·7
1905	8,667,948	17,520,263	2 02	(i) 413,353	(i) 5·0
1906	9,762,601	19,732,019	2 02	(i) 1,094,653	(i) 12·6
1907	10,511,426	24,381,842	2 32	(i) 748,825	(i) 7·7
1908	10,886,311	25,194,573	2 32	(i) 374,885	(i) 3·5

* The total production for the years 1785 to 1873 is made up as follows :—

Nova Scotia 1785 to 1873.....8,053,670 tons of 2,000 pounds
British Columbia 1836 to 1873..... 480,785 " " " "

The following table shows the proportionate contribution of each province to the grand total of the coal production of Canada at various times between the years 1874 and 1899, and yearly between 1899 and 1908.

Province.	1874.	1890.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
	%	%	%	%	%	%	%	%	%	%	%	%
Nova Scotia New Brunswick	91	71	64·2	62·9	64·4	69·4	71·3	68·0	65·5	64·07	60·79	61·40
*Saskatchewan	.....	.....	.....	0·7	0·7	0·9	1·5	1·5	1·2	1·11	1·44	1·37
*Alberta	.....	4	6·8	5·4	5·2	5·4	6·2	8·0	10·8	12·77	15·14	15·42
British Columbia	8	25	29·0	31·0	29·6	24·2	21·0	22·5	22·4	21·98	22·50	21·77
Yukon Territory	.....	.....	.....	.....	0·1	0·1	0·0	.....	0·1	0·07	0·13	0·04

* Alberta and Saskatchewan were established as provinces on September 1, 1905. For the purpose of comparison, the coal production during the years previous to that date has been separated according to the present boundaries of these provinces.

The figures of the above table bring out the steady development of the coal industry in the prairie Provinces of Alberta and Saskatchewan. In 1900 these two Provinces were only contributing a little over 6 per cent, whereas in 1908 their aggregate production represents 16·79 per cent of the total production of Canada.

The following tables give the statistics of exports of coal from Canada, taken from the Trade and Navigation Report. The United States constitutes the main market for coal exported, as 80 per cent of it was sent to that country. The exports of coal from Canada to the United States are made from Nova Scotia and British Columbia, each of these Provinces contributing about an equal share.

Exports of Coal produced in Canada during 1906-7-8.

Exported to	1906.		1907.		1908.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
Great Britain	4,390	13,719	8,514	25,106	5,557	18,065
United States	1,587,249	4,104,676	1,691,016	4,278,870	1,385,223	3,564,390
Newfoundland	170,032	391,987	131,784	357,005	194,034	532,121
Other countries	73,370	228,115	62,760	218,583	145,019	546,801
Totals	1,835,041	4,738,497	1,894,074	4,879,564	1,729,833	4,661,377

COAL.—TABLE 4.

Exports.

Calendar Year.	Produce of Canada.	Not the Produce of Canada.	Calendar Year.	Produce of Canada.	Not the Produce of Canada.
	Tons.	Tons.		Tons.	Tons.
1873	420,683	5,403	1891	971,259	77,827
1874	310,988	12,859	1892	823,733	93,988
1875	250,348	14,026	1893	960,312	102,827
1876	248,638	4,995	1894	1,103,694	89,786
1877	301,317	4,829	1895	1,011,235	96,836
1878	327,959	5,468	1896	1,106,661	116,774
1879	306,648	8,468	1897	986,130	101,848
1880	432,188	14,217	1898	1,150,029	99,189
1881	395,382	14,245	1899	1,293,169	101,004
1882	412,682	37,576	1900	1,787,777	62,776
1883	486,811	44,388	1901	1,573,661	53,894
1884	474,405	62,665	1902	2,090,268	23,453
1885	427,937	71,003	1903	1,954,629	27,138
1886	520,703	78,443	1904	1,557,412	27,308
1887	580,965	89,098	1905	1,635,287	86,792
1888	588,627	84,316	1906	1,835,041	44,758
1889	665,315	89,294	1907	1,894,074	101,778
1890	724,486	82,534	1908	1,729,833	102,071

COAL.—TABLE 5.

Exports: Nova Scotia and British Columbia.

Calendar Year.	Nova Scotia.		*British Columbia.	
	Tons.	Value.	Tons.	Value.
		$		$
1874	252,124	647,539	51,001	278,180
1875	179,626	404,351	65,842	256,018
1876	126,520	263,543	116,910	627,754
1877	173,389	352,453	118,252	590,263
1878	154,114	293,795	165,734	698,870
1879	113,742	203,407	186,094	608,845
1880	199,552	344,148	219,878	775,008
1881	193,081	311,721	187,791	622,965
1882	216,954	390,121	179,552	628,437
1883	192,795	336,088	271,214	946,271
1884	222,709	430,330	245,478	901,440
1885	176,287	349,650	250,191	1,000,764
1886	240,459	441,693	274,466	960,649
1887	207,941	390,738	356,657	1,262,552
1888	165,863	330,115	405,071	1,605,650
1889	186,608	396,830	470,683	1,918,263
1890	202,387	426,070	503,882	1,977,191
1891	194,867	417,816	767,734	2,958,695
1892	181,547	407,980	599,716	2,317,734
1893	203,198	470,695	708,228	2,693,747
1894	310,277	633,398	770,439	2,855,216
1895	241,091	534,479	728,283	2,692,562
1896	380,149	787,270	679,799	2,507,752
1897	307,128	642,754	630,341	2,221,737
1898	309,158	629,363	813,843	2,948,428
1899†	459,260	827,941	781,809	2,947,369

*See foot-note, Table 16. †Since 1899, exports by provinces have not been published in Trade and Navigation report.

The following tabulation shows the disposal of the coal mined in Canada during the years 1907 and 1908, as compiled from the returns received from the producers:—

Distribution of Coal mined in Canada during the years 1907-8.

—	1907.	1908.
Sales in Canada	7,358,135	7,715,203
Sales for export to United States	1,514,182	1,218,656
" " other countries	129,957	297,291
Total sales	9,002,274	9,231,150
Used by producers for the manfacture of coke	751,907	708,674
" " colliery consumption and workmen	757,185	946,487
Stock on hand January 1	212,559	183,443
" " December 31,	190,224	230,335
Difference	− 22,335	+ 46,892
Loss due to washing, breakage or other causes	351,783	157,610
Total output	10,840,874	11,090,813

The imports of coal into Canada are given in Table 6. The coal dust column comprises the bituminous coal which goes through a ¾" mesh screen.

COAL.—TABLE 6.

Imports of Coal into Canada.

	Bituminous Coal.		Anthracite Coal and Anthracite Dust.		Bituminous Coal Dust.	
Fiscal Year.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
1880	457,049	1,220,761	516,729	1,509,960	3,565	8,877
1881	587,024	1,741,568	572,092	2,325,937	337	666
1882	636,374	1,992,081	638,273	2,666,356	471	960
1883	911,629	2,996,198	754,891	3,344,936	8,154	10,082
1884	1,118,615	3,613,470	868,000	3,831,283	12,782	14,600
1885	1,011,875	3,197,539	910,324	3,909,844	20,185	20,412
1886	930,949	2,591,554	995,425	4,028,050	36,230	36,996
1887	1,149,792	3,126,225	1,100,165	4,423,062	31,401	33,178
1888	1,231,234	3,451,661	*2,138,627	5,291,875	28,808	34,730
1889	1,248,540	3,255,171	1,291,705	5,199,481	39,980	47,139
1890	1,409,282	3,528,959	1,201,335	4,595,727	53,104	29,818
1891	1,598,855	4,060,896	1,399,067	5,224,452	60,127	36,130
1892	1,615,220	4,099,221	1,479,106	5,640,346	82,091	39,840
1893	1,603,154	3,967,764	1,500,550	6,355,285	109,585	44,474
1894	1,359,509	3,315,094	1,530,522	6,354,040	117,573	49,510
1895	1,444,928	3,321,387	1,404,342	5,350,627	181,318	52,221
1896	1,538,489	3,299,025	1,574,355	5,667,096	210,386	53,742
1897	1,543,476	3,254,217	1,457,295	5,695,168	225,562	59,609
1898	1,684,024	3,179,595	1,460,701	5,874,685	229,445	45,556
1899	2,171,358	3,691,946	1,745,460	6,490,509	276,547	44,717
1900	2,439,764	4,310,964	1,654,401	6,602,912	330,174	98,349
1901	2,516,392	4,956,025	1,933,283	7,923,950	414,432	275,559
1902	3,047,392	5,712,058	1,652,451	7,021,939	489,548	264,550
1903	3,511,412	7,776,717	1,456,713	7,028,664	550,883	420,317
1904	4,053,900	9,108,208	2,275,018	10,461,223	608,041	544,128
1905	4,176,274	8,002,896	2,604,137	12,093,371	650,261	343,456
1906 *	4,495,550	8,360,348	2,200,863	10,304,308	747,251	489,180
Calendar Year.	Bituminous round and run of mine.				Bituminous slack such as will pass through a ¾" screen.	
1907	6,370,152	13,232,445	3,141,873	14,506,129	1,139,256	1,219,949
1908	(a) 6,025,574	12,516,748	(b) 3,160,110	14,478,536	(c) 1,111,811	1,355,677

(a). Duty, 53c. per ton. (b). Coal, anthracite, and anthracite coal dust; duty free. (c). Duty 20 per cent, not over 13c. per ton.

* In the anthracite column the imports show a very considerable increase in 1888 over 1887, an increase of over 94 per cent, the falling off again in 1889 being quite as remarkable. The average values per ton for the three years 1887, 1888, and 1889, were $4.02, $2.47 and $4.03 respectively. Although a duty of 50c. per ton on anthracite coal was removed May 13, 1887, it is hardly thought this would account for the changes indicated, and unless some error may possibly have crept into the Trade and Navigation report, no explanation is available.

In 1908 the total consumption of coal in Canada amounted to 19,351,902 short tons, made up as follows: 9,156,478 tons of coal produced in Canada, and 10,195,424 tons of imported coal. According to these figures Canada produces only 47·3 per cent of the coal which it consumes. It must be noted, however,

that if all the coal mined in Canada had been used in the country, it would have constituted over 56 per cent of the consumption. In 1907 the figures were: total consumption, 19,166,855 tons, made up of 8,617,352 tons of Canadian coal, and 10,549,503 tons of imported coal, representing proportions of 45 per cent and 55 per cent respectively.

Consumption of Coal in Canada, 1907-8.

	1907.		1908.	
	Tons.	Tons.	Tons.	Tons.
Production, Table 3	10,511,426		10,886,311	
Exports of Canada, Table 4	1,894,074		1,729,833	
Home consumption of Canadian coal		8,617,352		9,156,478
Imports, Table 6	10,651,281		10,297,495	
Exports not produce of Canada, Table 4	101,778		102,071	
Canadian consumption of imported coal		10,549,503		10,195,424
Total consumption of coal in Canada		19,166,855		19,351,902

The following table gives the statistics of the consumption of coal in Canada, and the respective proportions of imported coal and Canadian coal consumed in the country:—

COAL.—TABLE 7.

Consumption of Coal in Canada, 1886-1908.

Calendar Year.	Canadian.	Imported.	Total.	Percentage Canadian.	Percentage Imported.	Consumption per capita.
	Tons.	Tons.	Tons.			Tons.
1886	1,595,950	1,884,161	3,480,111	45·9	54·1	0·758
1887	1,848,365	2,192,260	4,040,625	45·7	54·3	0·871
1888	2,013,925	3,314,353	5,328,278	37·8	62·2	1·137
1889	1,992,988	2,490,931	4,483,919	44·4	55·6	0·946
1890	2,360,196	2,581,187	4,941,383	47·8	52·2	1·031
1891	2,606,490	2,980,222	5,586,712	46·7	53·3	1·153
1892	2,464,012	3,082,429	5,546,441	44·4	55·6	1·133
1893	2,823,187	3,110,462	5,933,649	47·6	52·4	1·198
1894	2,743,376	2,917,818	5,661,194	48·5	51·5	1·130
1895	2,467,109	2,933,752	5,400,861	45·7	54·3	1·066
1896	2,639,055	3,206,456	5,845,511	45·1	54·9	1·140
1897	2,799,977	3,124,485	5,924,462	47·3	52·7	1·143
1898	3,023,079	3,274,981	6,298,060	48·0	52·0	1·200
1899	3,631,882	4,092,361	7,724,243	47·0	53·0	1·454
1900	3,989,542	4,361,563	8,351,105	47·8	52·2	1·561
1901	4,912,664	4,810,213	9,722,877	50·5	49·5	1·810
1902	5,376,413	5,165,938	10,542,351	51·0	49·0	1·927
1903	6,005,735	5,491,870	11,507,605	52·2	47·8	2·055
1904	6,697,183	6,909,651	13,606,834	49·2	50·8	2·346
1905	7,032,661	7,343,880	14,376,541	48·9	51·1	2·396
1906	7,927,560	7,398,906	15,326,466	51·7	48·3	2·425
1907	8,617,352	10,549,503	19,166,855	45·0	55·0	2·946
1908	9,156,478	10,195,424	19,351,902	47·3	52·7	2·826

It is gratifying to note the very large increase in the consumption of coal per capita as shown in the last column of Table 7. From a little over three-quarters of a ton per year per head of the population in 1886, it had doubled to more than one and a half tons in 1900, and in 1907 it had reached the high figure of 2·946 tons.

It is interesting to note that the Mines Branch of the Department of Mines of Canada is at present conducting an important series of experiments on the coals and lignites of Canada. These tests are being carried on at McGill University on commercial samples of five to ten tons. They include boiler tests, gas producer tests, washing tests, coking tests, and very extensive series of analyses. It is expected that the report will be issued in the latter part of 1909.

Nova Scotia.

Tables 8, 9, 10, and 11, give the statistics of the coal industry in Nova Scotia. Table 8 shows that the coal production in 1908 was 6,652,539 tons valued at $13,364,476, and that in the last few years there has been a steady increase in tonnage.

Table 9 gives the coal trade by countries. This brings out the fact that Cape Breton is responsible for over 72 per cent of the production of the Province, and of this, 65 per cent is to be credited to the Dominion Coal Company.

COAL.—TABLE 8.

Nova Scotia:—Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Sales, Tons, 2,240 lbs.	Colliery Consumption, Tons, 2,240 lbs.	Production,* Tons, 2,240 lbs.	Output, Tons, 2,000 lbs.	Sales, Tons, 2,000 lbs.	Colliery Consumption, Tons, 2,000 lbs.	Production,* Tons, 2,000 lbs.	Price per Ton, 2,240 lbs.	Value of Production.
									$	$
1872	880,950	785,914	110,341	896,255	986,664	880,224	123,582	1,003,806	1 75	1,568,446
1873	1,051,467	881,106	108,398	989,504	1,177,643	986,839	121,406	1,108,245	1 75	1,731,632
1874	872,720	749,127	119,582	868,709	977,446	839,022	133,932	972,954	1 75	1,520,240
1875	781,165	706,795	124,110	830,905	874,905	791,610	139,003	930,613	1 75	1,454,084
1876	709,646	634,207	113,788	747,995	794,804	710,312	127,443	837,755	1 75	1,308,991
1877	757,496	687,065	98,841	785,906	848,396	769,513	110,702	880,215	1 75	1,375,339
1878	770,603	693,511	88,627	782,138	863,075	776,732	99,262	875,994	1 75	1,368,741
1879	788,271	688,624	84,787	773,411	882,863	771,259	94,961	866,220	1 75	1,353,469
1880	1,032,710	954,659	96,831	1,051,490	1,156,635	1,069,218	108,451	1,777,669	1 75	1,840,108
1881	1,124,270	1,035,014	107,888	1,142,902	1,259,183	1,159,216	120,834	1,280,050	1 75	2,000,079
1882	1,365,811	1,250,179	111,381	1,361,560	1,529,708	1,400,200	124,747	1,524,947	1 75	2,382,730
1883	1,422,553	1,297,523	111,949	1,409,472	1,593,259	1,453,226	125,383	1,578,609	1 75	2,466,576
1884	1,389,295	1,261,650	116,769	1,378,419	1,556,011	1,413,048	130,781	1,543,829	1 75	2,412,233
1885	1,352,205	1,254,510	127,624	1,382,134	1,514,470	1,405,051	142,939	1,547,990	1 75	2,418,735
1886	1,502,611	1,373,666	142,421	1,516,087	1,682,924	1,538,506	159,512	1,698,018	1 75	2,653,152
1887	1,670,830	1,519,684	139,777	1,659,461	1,871,330	1,702,046	156,550	1,858,596	1 75	2,904,057
1888	1,776,128	1,576,692	157,443	1,734,135	1,989,263	1,765,895	176,336	1,942,231	1 75	3,034,735
1889	1,756,279	1,555,107	158,131	1,713,238	1,967,032	1,741,720	177,107	1,918,827	1 75	2,998,167
1890	1,984,001	1,786,111	161,240	1,947,351	2,222,081	2,000,444	180,589	2,181,033	1 75	3,407,864
1891	2,044,784	1,849,945	174,983	2,024,928	2,290,158	2,071,938	195,981	2,267,919	1 75	3,543,624
1892	1,942,780	1,752,934	175,092	1,928,026	2,175,913	1,963,286	196,103	2,159,389	1 75	3,374,046
1893	2,223,042	1,977,543	205,425	2,182,968	2,489,807	2,214,848	230,076	2,444,924	1 75	3,820,194
1894	2,250,631	2,060,920	196,206	2,257,126	2,520,707	2,308,231	219,751	2,527,982	1 75	3,949,970
1895	1,999,756	1,793,098	193,639	1,986,737	2,239,727	2,008,270	216,875	2,225,145	1 75	3,476,790
1896	2,292,675	2,046,828	192,975	2,239,803	2,567,796	2,292,447	216,132	2,508,579	1 75	3,919,655
1897	2,340,031	2,044,672	181,716	2,226,388	2,620,835	2,290,032	203,522	2,493,554	1 75	3,896,179
1898	2,262,656	2,121,126	167,428	2,288,554	2,534,175	2,375,661	187,519	2,563,180	1 75	4,004,970
1899	2,865,443	2,633,989	177,460	2,811,449	3,209,296	2,950,067	198,755	3,148,822	2 00	5,622,898
1900	3,298,791	2,998,737	236,563	3,235,300	3,694,646	3,358,585	264,951	3,623,536	2 50	8,088,250
1901	3,821,033	3,411,127	301,434	3,712,561	4,279,557	3,820,462	337,606	4,158,068	1 75	6,496,982
1902	4,725,480	4,229,120	379,198	4,608,318	5,292,538	4,736,614	424,702	5,161,316	2 00	9,216,636
1903	5,215,562	4,565,720	481,903	5,047,623	5,841,429	5,113,607	539,731	5,653,338	2 00	10,095,246
1904	5,131,985	4,551,740	444,904	4,996,644	5,747,823	5,097,949	498,292	5,596,241	2 00	9,993,288
1905	5,197,877	4,613,818	427,774	5,041,592	5,821,622	5,167,476	479,107	5,646,583	2 00	10,083,184
1906	5,844,813	5,093,131	460,891	5,554,022	6,546,191	5,704,307	516,198	6,220,505	2 00	11,108,044
1907	5,775,503	5,062,351	611,012	5,673,333	6,468,563	5,669,800	684,333	6,354,133	2 25	12,764,999
1908	6,076,330	5,224,787	576,509	5,939,767	6,805,489	5,851,761	645,690	6,652,539	2 25	13,364,476

* This production is obtained by adding sales and colliery consumption. For sales previous to 1872, see report of the Department of Mines, Nova Scotia, 1883, page 51.

COAL.—TABLE 9.

Nova Scotia:—Coal Trade by Counties, Calendar Years 1906-7-8.

Calendar Year.	Cumberland.		Pictou.		Cape Breton.		Other Counties.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
	Short tons.	Short tons.	Short tons.	Short tons.	Short tons.	Short tons.	Short tons.	Short tons.
1906.	659,734	566,308	769,496	657,310	4,804,407	4,221,293	312,554	259,396
1907.	476,828	397,579	750,476	627,024	4,194,774	3,730,651	353,425	307,049
1908.	662,157	530,648	849,802	678,026	4,840,653	4,267,346	452,877	375,742

COAL.—TABLE 10.

Nova Scotia:—Output by Collieries during Fiscal Years ending September 30, 1907-8.[1]

Colliery.	1907.	1908.
Cape Breton County.	Tons of 2,000 lbs.	Tons of 2,000 lbs.
Dominion Coal Company	3,871,769	4,274,993
Nova Scotia Steel and Coal Co	744,132	741,832
North Atlantic Collieries	*15,465	65,830
McKay Mining Company	6,217	15,187
Sydney Coal Company	3,419	5,377
Cape Breton Coal Co	1,561	
Cumberland County.		
Cumberland Railway and Coal Co	379,724	466,068
Maritime Coal, Railway, and Power Co., Chignecto	49,440	17,740
" " " " Joggins	56,431	57,266
Minudie Coal Co	49,400	54,205
Strathcona Coal Co	26,510	26,799
Great Northern Coal Co	2,339	3,053
Atlantic Grindstone and Coal Co	5,341	964
Colchester County.		
Colchester Coal Co		4,425
Pictou County.		
Acadia Coal Co	431,207	463,436
Intercolonial Coal Co	337,669	353,461
Marsh Colliery	50,876	53,586
Inverness County.		
Inverness Coal and Railway Company	292,324	317,748
Mabou Coal Co	9,300	21,560
Port Hood Coal Co	85,213	111,664

* Made up as follows: Gowrie and Blockhouse, 14,366 tons; North Atlantic Collieries, 1,099 tons.

In Cape Breton county the main feature of the coal industry has been the opening of two new collieries by the Dominion Coal Company in the Lingan basin. These are called Collieries No. 12 and No. 14 respectively. They are connected with the Sydney and Louisburg railway by a spur line seven miles in length, and the first shipment from No. 12 was effected in August, 1908. This makes a total of twelve collieries now being operated by the Dominion Coal Company.

The North Atlantic Collieries Company, successors to the Gowrie & Blockhouse Collieries, have sunk a new shaft to the Blockhouse seam, which was struck at a depth of 125 feet, showing 9 feet of coal. Previously the total output of this colliery in the last few years was altogether from the Gowrie system, but it is expected that in the near future the main production will be from the new workings of the Blockhouse seam.

[1] From the Reports of the Department of Mines of Nova Scotia.

A new company, the Colonial Coal Company, has acquired the old mine of the Toronto Coal Company on Bras d'Or lake, which had been abandoned for several years, and this is now being put in order for an output of 200 to 300 tons per day.

In the Pictou field the Acadia Coal Company have proceeded with the development of their new Allan shaft colliery. Two shafts, 130 feet distant, were sunk to cut all the workable seams of this district. The deeper of the two is over 1,500 feet. The intention of the Acadia Coal Company is to develop this colliery into the largest producer of the Pictou field.

In Cumberland county the Maritime Coal, Railway, and Power Company acquired the property of the Canada Coal Company, comprising the Joggins coal area, the Joggins mine, and the railway connecting Joggins and Maccan on the Intercolonial. The old mine has been closed and a new one, entered by three slopes 2,500 feet long, has been started and was in shipping order at the close of 1908. The new mine is laid out and equipped for a possible production of 1,000 tons a day.

The Maritime Coal, Railway, and Power Company have, moreover, built a well equipped and modern power station at Chignecto, where part of the output of their mine is converted into electric power which is disposed of at Amherst, Maccan, and other points within a radius of about fifteen miles.

The power plant in the main consists of one 500 kilowatt generator, compound Robb engine and Robb boilers fired by Jones underfeed stoker.

Table 11, which follows, is compiled from the returns made to the government of Nova Scotia, and is very interesting inasmuch as it shows the markets in which the coal production of Nova Scotia finds an outlet. It will be noticed that the Province of Nova Scotia in 1907 consumed 36·51 per cent of its production, and 35·56 per cent in 1908. The decrease of these two years as compared with 1906, which figures in the table as 37·92 per cent, is probably due to the fact that the bunker coal is included in that year, whereas in 1907 and 1908 it is given as a separate item of 4·05 per cent and 3·53 per cent respectively. The main market, outside of Nova Scotia, is the Province of Quebec, which is supplied by the St. Lawrence route. The United States market shows a decrease from year to year since 1906, having figured as 14·78 per cent in that year; 12·21 per cent in 1907, and only 9·11 per cent in 1908.

COAL.—TABLE 11.

Nova Scotia:—Distribution of Coal Sold.

Markets.	Fiscal Years ending September 30.					
	1906.		1907.		1908.	
	Tons of 2,000 lbs.	%	Tons of 2,000 lbs.	%	Tons of 2,000 lbs.	%
Nova Scotia—						
Transported by land	1,622,131	27·82	1,740,736	30·80	1,804,377	29·37
" " sea	589,014	10·10	322,773	5·71	380,332	6·19
Total, Nova Scotia	2,211,145	37·92	2,063,509	36·51	2,184,709	35·56
New Brunswick	487,068	8·35	478,383	8·46	571,570	9·30
Prince Edward Island	86,026	1·48	86,792	1·54	70,931	1·15
Quebec Province	1,948,014	33·41	1,914,743	33·88	2,293,352	37·33
Newfoundland	167,447	2·87	164,082	2·90	231,909	3·77
United States	862,148	14·78	690,269	12·21	559,592	9·11
West Indies	.....	.....	2,910	0·05	.....	.....
Mexico	.....	.....	8,502	0·15	.....	.....
St. Pierre	.....	.....	.....	.....	9,976	0·16
Bunker coal	.....	.....	229,121	4·05	216,554	3·53
Other countries	69,556	1·19	13,981	0·25	5,261	0·09
Totals	5,831,404	100·00	5,652,292	100·00	6,143,854	100·00

New Brunswick.

The coal production of New Brunswick is derived from the Grand Lake coal field, in Queens county, where a comparatively large number of small mines—probably thirty or forty—are intermittently operated. It is very difficult to obtain accurate figures of production from this Province, but according to a reliable estimate made by the provincial authorities, the production in 1908 would be about 60,000 tons valued at $135,000. This is a considerable increase over the previous year's production.

COAL.—TABLE 12.

New Brunswick:—Production.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		$	$ cts.			$	$ cts.
1887	10,040	23,607	2 35	1898	6,160	9,240	1 50
1888	5,730	11,050	1 93	1899	10,528	15,792	1 50
1889	5,673	11,733	2 07	1900	10,000	15,000	1 50
1890	7,110	13,350	1 95	1901	17,630	51,857	2 94
1891	5,422	11,030	2 03	1902	18,795	39,680	2 11
1892	6,768	9,375	1 39	1903	16,000	40,000	2 50
1893	6,200	9,837	1 59	1904	9,112	18,224	2 00
1894	6,469	10,264	1 59	1905	29,400	58,800	2 00
1895	9,500	14,250	1 50	1906	34,076	68,152	2 00
1896	7,500	11,250	1 50	1907	34,584	77,814	2 25
1897	6,000	9,000	1 50	1908	60,000	135,000	2 25

Saskatchewan.

The coal consumption in Saskatchewan is mainly for domestic uses, as wood is scarce in the Province. Owing to the conditions which prevailed during the early part of 1907, viz., a shortage of railway cars for coal shipments, accompanied by an unusually severe winter and heavy snowfall which paralyzed traffic, the Province of Saskatchewan experienced a serious shortage of fuel during the first four months of 1907, which caused great inconvenience and suffering among the settlers and in the cities. However, the reaction which followed resulted in an increased output for 1907, during which stocks for the following winter were accumulated. It follows that the tonnage in 1908 shows a decrease of 676 tons as compared with the previous year. This, however, is abnormal, especially if we consider the large influx of new settlers who yearly assist in increasing the development and the population of the Province.

Table 13, following, gives the statistics of the coal production of Saskatchewan since 1890. Saskatchewan was established as a province on September 1, 1905. For the purpose of statistics the coal production previous to that date is that of the area included by the present boundaries of the Province.

COAL.—TABLE 13.

Saskatchewan:—Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.
		$	$cts.
1890	200	200	1 00
1891	....	.....	.....
1892	5,400	9,325	1 73
1893	8,325	12,485	1 50
1894	†15,051	15,153	1 01
1895	15,769	31,538	2 00
1896	16,706	25,059	1 50
1897	25,000	37,500	1 50
1898	25,000	37,500	1 50
1899	25,000	37,500	1 50
1900	40,500	60,750	1 50
1901	45,000	72,000	1 60
1902	70,400	112,640	1 52
1903	116,703	169,618	1 45
1904	124,885	187,021	1 50
1905	107,596	152,334	1 42
1906	108,398	164,146	1 51
1907	151,232	252,437	1 67
1908	150,556	253,790	1 69

† Including a small quantity from the Turtle Mountain district, Manitoba.

Another noteworthy feature of the coal industry in Saskatchewan in 1907 and 1908 was the attempt of the government of Saskatchewan to go into the coal mining industry. The following paragraph concerning this venture is quoted from official information received at this office: 'The mine is located in township

32, ranges XX and XXI, west of the 3rd meridian. In this area eight bore-holes were made, ranging in depth from 114 to 246 feet. In range XX one bore-hole failed to show any appearance of coal, while the other bore-holes in this range showed only slight traces of coal in thin layers. In range XXI, however, the bore-holes showed that coal appeared in seams ranging from 1 to 6 feet in thickness. A shaft has been sunk and cribbed almost to the bottom. The cribbing was reported, however, to be in very poor shape.

'During 1908, the year following the above report, a shaft was sunk, and it was discovered that the bore-holes had crossed the seams of coal in a diagonal direction, and that the coal thickness of the seams was only about 50 per cent of what had been reported. Operations were carried on for a short time but were discontinued.'

Alberta.

In 1908 the coal production of Alberta was 1,685,661 tons, an increase of 441 per cent over the production of 1900, which was 311,450 tons. This remarkable growth is a natural consequence of the development of the Province, both agriculturally and industrially. A noteworthy feature of the coal industry of Alberta is that only 6 per cent of the production is exported, so that 94 per cent of the coal mined in the Province is consumed in Canada. The product of the coal mines of Alberta may be roughly divided into 32 per cent lignite, and 68 per cent bituminous and anthracite.

In 1908 we have only a comparatively small increase to record as compared with 1907. This is due to several unfavourable causes which militated against the coal industry. The industrial depression that prevailed over the whole of the North American continent not only affected the smelting industry of British Columbia, which was an important outlet for the bituminous coal of southwestern Alberta, but diminished immigration; and this, as well as some labour troubles, contributed to cause a slight check in the very high rate of increase which has prevailed in Alberta for the last ten years. This, however, is only temporary, and it may safely be expected that 1909 will show a considerable increase over 1908.

Table 14, following, gives the figures of the annual production of coal in Alberta since 1887. For the years previous to 1905 the production is that of the territory enclosed by the present boundaries of the Province.

COAL.—TABLE 14.

Alberta:—Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.
		$	$ cts.
1887	74,152	157,577	2 13
1888	115,124	183,354	1 59
1889	97,364	179,640	1 85
1890	128,753	198,293	1 54
1891	174,131	437,243	2 51
1892	178,970	460,605	2 57
1893	230,070	586,260	2 55
1894	184,940	473,827	2 56
1895	169,885	382,526	2 25
1896	209,162	581,832	2 78
1897	242,163	630,408	2 60
1898	315,088	788,720	2 50
1899	309,600	774,000	2 50
1900	311,450	778,625	2 50
1901	340,275	850,687	2 50
1902	402,819	960,601	2 38
1903	495,893	1,117,541	2 25
1904	661,732	1,404,524	2 12
1905	931,917	1,993,915	2 14
1906	1,246,360	2,614,762	2 10
1907	1,591,579	3,836,286	2 41
1908	1,685,661	4,127,311	2 45

On July 4, 1907, the Board of Railway Commissioners for Canada issued the following order amongst others: 'No railway company subject to the legislative authority of the parliament of Canada shall burn lignite coal on its locomotive engines as fuel for transportation purposes, until such time as the Board shall otherwise order or direct. Lignite coal includes all varieties of coal, the properties of which are intermediate between wood and coal of the older formations. Every such railway company burning or permitting to be burned lignite coal on its locomotive engines in contravention of the regulation herein in this behalf shall be subject to a penalty of twenty-five dollars.

'This regulation shall take effect and be operative on and from the first day of September, 1907.

'This regulation shall not have effect during the months of December, January, February or March in any year.'

This ruling, which is a preventive measure against fire set by sparks issuing from locomotives, affects the coal mined east of Macleod on the Crows Nest line of the Canadian Pacific railway; east of Cochrane on the main line of the railway, and along the Macleod, Calgary, and Edmonton sections of the Canadian Pacific railway, as well as the lignite of the Edmonton district.

The following figures concerning the classified coal output of Alberta are quoted from the report of the provincial inspector of mines for 1908. There is a slight difference between this total and that compiled from the returns received

at this office, owing to the fact that the figures of production compiled by this department represent the amount of coal which is actually used or finds its way to the market, whereas the figures of the provincial report are those of the coal extracted from the mines, some of which goes to the stock piles, and a part is lost in preparing for market.

CLASSIFICATION OF OUTPUT OF COAL IN ALBERTA DURING THE YEAR 1908.

	Tons.
Lignite coal	584,334
Bituminous coal	1,011,571
Anthracite coal	249,095
Coal used in coke production	128,397
Coke produced	75,657
Briquettes produced	36,261

It may be here mentioned that the anthracite is very carefully prepared for the market and divested of all its friable parts. As a result, a large proportion of anthracite dust is produced. A part of this is manufactured into briquettes, which find a ready market for domestic use.

Yukon.

In 1908 the production of coal in the Yukon was much lower than in previous years. This is probably due to the fact that considerable stock was accumulated in 1907, which was drawn upon for domestic consumption in 1908.

COAL.—TABLE 15.

Yukon Territory:—Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.
		$	$ cts.
1901	*5,864	86,230	14 70
1902	4,910	37,280	7 59
1903	1,849	29,584	16 00
1904	.....	.....	.....
1905	7,000	21,000	3 00
1906	7,000	28,000	4 00
1907	15,000	60,000	4 00
1908	3,847	21,158	5 50

* Part of this production was mined in 1900.

The average value of the coal given in the last column of the table represents the value of the coal at the mine. The price of the coal delivered at Dawson varies between $12 and $18 a ton.

In 1907 coal was mined in the Yukon in two fields, viz., in the Tantalus field on the Lewes river in southern Yukon, and on Coal creek, a small tributary of the Yukon, which joins the stream fifty-eight miles below Dawson.

The Tantalus field is the more important, as coal of a marked bituminous character exists there in large quantities, whereas the product of the other field is lignitic in character.

There are at present two well established collieries in the Tantalus field, which supply the fuel for the steamers running between Whitehorse and Dawson; the coal is also used for domestic purposes, and for generating power in Dawson.

In 1908 the production came altogether from the Tantalus field.

British Columbia.

Table 16 gives statistics of the coal production in British Columbia since 1836. It will be noticed that the output in 1908 shows a decrease of 107,671 long tons as compared with the previous year, which had the highest output ever recorded. But the coal which actually found its way to the markets or was consumed at the collieries, viz., home consumption and exports, which we give as the production for the year, showed a decrease in 1908 of only 27,848 long tons, considerable quantities having been drawn from stock piles.

In both 1907 and 1908 the main coal producers of British Columbia were the same as previous years, viz., the Crow's Nest Pass Coal Company, in East Kootenay; the Wellington Colliery Company, and the Western Fuel Company, both of the latter in the Vancouver Island fields. It is worthy of notice, however, that to these three companies, which were the only ones to ship coal in 1906, a number of other producing mines were added in 1907, when six companies made returns of shipments; and still more in 1908 when the number was further increased to nine.

In 1907 the production of coal in the Province was 2,111,516 long tons, an increase of 195,211 long tons, or 10·18 per cent over 1906. This total was made up of 916,265 long tons used in Canada, 673,114 long tons exported as coal, (by far the greater part to the United States), 165,918 long tons for colliery consumption and local sales, and 356,219 long tons charged into the coke ovens. In 1908 the sales in Canada were 931,929 long tons, exports of coal 597,157 long tons, colliery consumption 174,950 long tons, and used for making coke, 379,632 long tons, a total of 2,083,668 long tons; which is 27,848 tons less than the production of 1907, or a decrease of 1·3 per cent.

The following tabulation shows the markets in which the British Columbia coal and coke were disposed of in 1907 and 1908:—

Coal.	1907.			1908.		
	Coast.	Crowsnest and Nicola valley.	Total.	Coast.	Crowsnest and Nicola valley.	Total.
		Long tons.			Long tons.	
Sold for consumption in Canada..	688,332	227,933	916,265	703,931	227,998	931,929
" export to United States..	359,666	291,410	651,076	300,445	266,829	567,274
" " other countries.	22,038	.....	22,038	29,883	.....	29,883
	1,070,036	519,343	1,589,379	1,034,259	494,827	1,529,086
Coke.		Short tons			Short tons	
Sold for consumption in Canada..	16,593	157,903	174,496	3,253	231,638	234,891
" export to United States..	.....	67,076	67,076	3,492	38,300	41,792
" " other countries.	.....	.....	.....	.....	.....	.....
	16,593	224,979	241,572	6,745	269,938	276,683

Table 16, following, gives the statistics of the coal production of British Columbia from the early days of the industry to the present.

COAL.—TABLE 16.

British Columbia:—Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Home Consumption, Tons, 2,240 lbs.	Sold for Export, Tons, 2,240 lbs. ‡	Production.* Tons, 2,240 lbs.	Production.* Tons, 2,000 lbs.	Price per ton, 2,240 lbs.	Value.
						$	$
1836-52..	10,000				11,200	4 00	40,000
1852-59...	25,398				28,446	4 00	101,592
1859§....	1,989				2,228	4 00	7,956
1860.....	14,247				15,957	4 00	56,988
1861.....	13,774				15,427	4 00	55,096
1862.....	18,118				20,292	4 00	72,472
1863.....	21,345				23,906	4 00	85,380
1864.....	28,632	From 1836 to 1873, inclusive, the output is taken as production.			32,068	4 00	114,528
1865.....	32,819				36,757	4 00	131,276
1866.....	25,115				28,129	4 00	100,460
1867.....	31,239				34,988	4 00	124,956
1868.....	44,005				49,286	4 00	176,020
1869.....	35,802				40,098	4 00	143,208
1870.....	29,843				33,424	4 00	119,372
1871-2-3..	148,459				166,274	4 00	593,836
1874.....	81,547	25,023	56,038	81,061	90,788	3 00	243,183
1875.....	110,145	31,252	66,392	97,644	109,361	3 00	292,932
1876.....	139,192	17,856	†122,329	140,185	157,007	3 00	420,555
1877.....	154,052	24,311	115,381	139,692	156,455	3 00	419,076
1878.....	170,846	26,166	164,682	190,848	213,750	3 00	572,544
1879.....	241,301	40,294	192,096	232,390	260,277	3 00	697,170
1880.....	267,595	46,513	225,849	272,362	305,045	3 00	817,086
1881.....	228,357	40,191	189,323	229,514	257,056	3 00	688,542
1882.....	282,139	56,161	232,411	288,572	323,201	3 00	865,716
1883.....	213,299	64,786	149,567	214,353	240,075	3 00	643,059
1884.....	394,070	87,388	306,478	393,866	441,130	3 00	1,181,598
1885.....	365,596	95,227	237,797	333,024	372,987	3 00	999,072
1886.....	326,636	85,987	249,205	335,192	375,415	3 00	1,005,576
1887.....	413,360	99,216	334,839	434,055	486,142	3 00	1,302,165
1888.....	489,301	115,953	365,714	481,667	539,467	3 00	1,445,001
1889.....	579,830	124,574	443,675	568,249	636,439	3 00	1,704,747
1890.....	678,140	177,075	508,270	685,345	767,586	3 00	2,056,035
1891.....	1,029,097	202,697	806,479	1,009,176	1,130,277	3 00	3,027,528
1892.....	826,335	196,223	640,579	836,802	937,218	3 00	2,510,406
1893.....	978,294	207,851	768,917	976,768	1,093,980	3 00	2,930,304
1894.....	1,012,953	165,776	827,642	993,418	1,112,628	3 00	2,980,254
1895.. ...	939,654	188,349	756,334	944,683	1,058,045	3 00	2,834,049
1896.....	894,882	261,984	634,238	896,222	1,003,769	3 00	2,688,666
1897.....	802,296	290,310	619,360	910,170	1,019,390	3 00	2,730,510
1898.....	1,136,485	375,423	752,863	1,128,286	1,263,680	3 00	3,384,858
1899.....	1,306,324	526,058	751,711	1,277,769	1,431,101	3 00	3,833,307
1900.....	1,590,178	685,667	914,184	1,599,851	1,791,833	3 00	4,799,553
1901.....	1,691,557	799,666	914,163	1,713,829	1,919,488	3 00	5,141,487
1902.....	1,641,626	837,871	776,809	1,614,680	1,808,441	3 00	4,844,040
1903.. ...	1,450,663	947,499	549,449	1,496,948	1,676,581	3 00	4,490,844
1904.....	1,685,698	1,129,465	533,593	1,663,058	1,862,625	3 00	4,989,174
1905.....	1,736,696	1,089,667	647,343	1,737,010	1,945,452	3 00	5,211,030
1906.....	1,899,076	1,236,476	679,829	1,916,305	2,146,262	3 00	5,748,915
1907.....	2,219,602	1,438,402	673,114	2,111,516	2,364,898	3 50	7,390,306
1908.....	2,111,931	1,486,511	597,157	2,083,668	2,333,708	3 50	7,292,838

* This production is obtained by adding 'Home Consumption' and 'Sold for Export.'

† 52,935 tons of this amount were exported as sales without the division into 'Home Consumption' and 'Sold for Export.'

‡ The figures in the 'Sold for Export' column do not agree as they should with those given in Table 5, the only explanation being that the data in the two cases are from different sources, and it has not been possible to find out the cause of the difference.

§ Two months only.

The Crow's Nest Pass Coal Company continues to be the largest producer in the East Kootenay field. In 1908 the returns from this Company show that coal was shipped from their three collieries, situated at Michel, Coal Creek, and Carbonado respectively. This latter colliery was idle for some eighteen months during 1906 and 1907, but it has been reopened and shipments resumed.

One of the features of the year in the Crowsnest district has been the first shipment of coal from the Hosmer colliery at Hosmer, which was made in December, 1908. Development operations were begun in 1907 at this mine, and have been pushed actively since that time. The Hosmer Mines, Limited, have now an extensive colliery and plant, modern in all its details, designed for a daily output of 4,000 tons, which is expected to give a large production in 1909.

Another new Company operating in this field has made returns of shipments, viz., the Corbin Coal and Coke Company, whose mine is on the south fork of Michel creek. This Company is also likely to have a large output in the near future. The Nicola Valley branch of the Canadian Pacific railway, which runs from Spences Bridge to the town of Nicola, was completed in the summer of 1907, giving access by rail to the coal mines of that region. The first shipment of coal from the mines of the Nicola Valley Coal and Coke Company was made in August, 1907.

The years 1907 and 1908 have been marked on the island of Vancouver by the opening of new collieries, and resumption of work on some which had been abandoned for a long time. In 1908, the mines from which shipments were made were: the Nanaimo and the Northfield mines of the Western Fuel Company; the Extension and Cumberland mines of the Wellington Colliery Company; the Fiddick Colliery of South Wellington Coal Mines, Limited; the Gilfillan Colliery of Macgowan & Co.; the New East Wellington Colliery of the Vancouver Nanaimo Coal Mining Company.

Besides the operation of mines which have reached the shipping stage, a great deal of prospecting work has been done throughout the year in coal fields which are yet in the prospective stages, such as the Upper Elk district; the vicinity of Princeton; Malcolm island; the Skeena district and others. There is no doubt that most of these will be heard from in the near future.

LABOUR AND ACCIDENTS.

We give below some tables and statements concerning labour employed during the year 1908 in the coal industry of the three main coal producing provinces of Canada, viz., Nova Scotia, Alberta, and British Columbia. The figures are compiled for the most part from the reports of the respective provincial governments.

NOVA SCOTIA.

*Employment Statistics of the Coal Industry, year ended September 30, 1908.

Company.	Method of Work.	Average number of days per month.	Distribution of Colliery Workmen.			Total Horses.	Accessory Operations.			Approximate number employed at points of discharge.	Total Workmen.
			Surface.	Underground.	Cutting Coal.		Transportation.	Commercial.	Up-keep, repairs, construction.		
Dominion Coal Co	Bord and pillar	24½	1,044	3,849	1,480	608	866	253	316	1,000	8,808
Nova Scotia Steel and Coal Co	" "	26	258	686	680	90	225	65	20	50	1,984
" " Pictou	" "	24	20	50	41	1	.....	4	.....	.....	115
Cumberland Railway and Coal Co	" "	18½	324	636	480	86	293	18	.....	55	1,806
Acadia Coal Co	Longwall, bord and pillar	25	403	534	507	78	8	18	184	24	1,678
Intercolonial Coal Co	" "	24	1,016	422	295	37	20	5	5	3	1,766
Maritime Railway and Coal Co., Joggins	"	24½	10	8	6	6	.....	4	123	.....	151
" " " Chignecto	Bord and pillar	25	38	61	53	8	.....	4	.....	.....	156
Inverness Railway and Coal Co	" "	26	122	303	289	32	74	6	40	16	850
Mabou and Gulf Coal Co	" "	26	25	34	21	3	7	1	1	.....	89
Sydney Coal Co	" "	21	2	5	5	1	.....	1	1	.....	14
Mackay Mining Co	" "	23	10	10	15	.....	.....	1	2	.....	38
North Atlantic Collieries	" "	20¼	55	75	74	22	.....	4	.....	178	386
Port Hood-Richmond Ry. and Coal Co	" "	22	62	90	73	10	.....	4	.....	.....	229
Great Northern Coal Co	" "	26	12	.....	24	.....	3	.....	.....	.....	39
Minudie Coal Co	Longwall	21½	33	36	92	.....	4	2	.....	.....	167
Strathcona Coal Co	" advancing	21	17	80	48	6	.....	2	.....	.....	147
Atlantic Grindstone and Coal Co	"	22	2	2	4	1	.....	1	.....	.....	9
The Colchester Coal Co	Bord and pillar	22¾	12	6	8	.....	.....	2	.....	.....	28
		23¼	3,465	6,887	4,195	989	1,500	395	692	1,326	18,460

NOTE.—Distribution of workmen in accessory operations. 'Transportation,' including railways, shops, piers, banking station and all factors of transportation. 'Commercial,' including offices, (outside colliery offices) warehouses, stores, and accounting. 'Construction,' includes all construction-men outside of colliery organization.

* Nova Scotia Department of Mines Report for 1908.

Alberta.

We were unable to obtain the details of the distribution of men employed in the Alberta coal mines. The number of workmen employed in the coal and lignite mines of Alberta in 1908, according to the report of the provincial inspector of mines, was 3,780, of which 2,681 were employed underground, and 1,099 on the surface. We give below a schedule of the average wages which ruled for various classes of labour in the mines during the year. The day's work is eight hours underground and ten hours on the surface.

	Per day.
Fire bosses, rock miners, miners in wet places, blacksmiths, mine carpenters, power house engineers, machine men.	$3 50
Tipple engineers, locomotive engineers (surface)	3 25
Machinists	3 20
Shot lighters, bratticemen, timbermen, drivers (wet places), team drivers, tracklayers, miners, machine men helpers, car repairers	3 00
Locomotive helpers (surface)	2 80
Timbermen helpers, drivers, tracklayer helpers, locomotive engineers (underground), switchmen, chute loaders, timber handlers, hoistmen, rope riders	2 75
Bratticemen, helpers, labourers (underground), couplers, pushers, pithead men, teamsters, blacksmith helpers, firemen, fanmen, lampmen, machinists' helpers	2 50
Outside labourers	2 00
Switch boys, slate pickers, car oilers, railway car handlers, etc.	$1 25 to 2 25

British Columbia.

The following tables are compiled from the Report of the Minister of Mines of British Columbia for the year 1908:—

Number of Hands employed in Coal Mining in British Columbia in 1908.

Labour.	Coast Collieries—Nicola Valley.		East Kootenay Collieries.		Total.
	Underground.	Surface.	Underground.	Surface.	
Supervision and clerical assistance	48	52	52	36	188
Whites:—miners	1,130	.....	769	.....	1,899
miners' helpers	462	.....	220	.....	682
labourers	482	77	289	443	1,291
mechanics and skilled labourers	80	174	385	275	914
boys	136	41	31	16	224
Japanese	110	37	.....	.....	147
Chinese	235	482	.....	8	725
Indians	3	.....	.....	.....	3
	2,686	863	1,746	778	6,073

Average Daily Wages, Salaries, Etc.

	Coast District.		East Kootenay.		Nicola Valley.	
	Underground.	Surface.	Underground.	Surface.	Underground.	Surface.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Supervision and clerical	.....	.....	5.75-5.00	3.00-5.00	.....	.....
Whites:—miners	3.30-6.50	.....	3.00-3.75	.....	4.50	.....
miners' helpers	2.86	.....	2.50-2.75	.....	2.50	.....
labourers	2.86-3.30	2.75	2.50	2.25	.....	2.50-2.75
mechanics and skilled labourers	2.86-3.30	3.00-4.50	.....	2.75-4.00	.....	3.30-5.00
boys	1.10-2.45	0.50-1.65	.....	1.25	.....	1.00
Japanese	.....	.....	.....	.....	.....	.....
Chinese	.....	1.50-1.75	.....	1.50	.....	.....
Indians	.....	.....	.....	.....	.....	.....

The returns of some of the important coal companies are not published in the Report of the Minister of Mines; therefore, the above figures do not necessarily represent the average of the wages paid by all the coal companies. However, they are believed to be sufficiently accurate to be of interest.

From the same sources we have compiled the following table:—

Accidents in Canadian Collieries during the year 1908.

Nature of Accident.	Nova Scotia.			Alberta.			British Columbia.		
	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.
Fall of coal, rock	15	37	39	4	12	4	8	16	17
Gas or dust explosions	10	.....	.....	5	6	1	1	.....	8
Explosives	1	2	6	.....	2	.....	.....	2	4
Miscellaneous	15	31	62	2	18	8	9	32	23
	41	70	107	11	38	13	18	50	52
Total men employed	.....	18,460	.....	.....	3,780	.....	.....	6,095	.....

For Nova Scotia the statement is for the year ending September 30, 1908; for the other provinces the calendar year is taken.

COKE.

In 1908 three Provinces contributed to the production of oven coke in Canada, viz., Nova Scotia, Alberta, and British Columbia. From returns received the coal used in the manufacture of coke was 1,315,904 short tons, which gave an output of 852,296 tons of coke, or a yield of 64·7. Besides this yield of coke, some by-products are recovered from the ovens of the Dominion Iron and Steel Company at Sydney; these by-products are tar and ammonia. The ammonia gas is extracted from the oven gas and used in the manufacture of ammonium sulphate. The tar is sold to the Dominion Tar and Chemical Company, whose works are contiguous to the coke oven plant, and this product is further treated for the manufacture of refined tar, pitch of various grades, benzole, creosote, carbolic acid, etc. Returns of the production of these are not received at this office.

By provinces the production for 1907 and 1908, in tons of 2,000 lbs., was as follows:—

Coke Production, 1907.

Province.	Coal charged to Ovens.	Output of Coke.	Stock on Hand.		Coke sold or used.	Value of Sales, etc.
			Jan. 1.	Dec. 31.		
	Tons.	Tons.	Tons.	Tons.	Tons.	$
Nova Scotia	832,916	529,851	845	6,586	524,110	1,991,047
Alberta	112,887	73,782	3,686	1,147	76,321	297,595
British Columbia	398,864	249,663	1,745	9,836	241,572	1,294,826
Totals	1,344,667	853,296	6,276	17,569	842,003	3,583,468

Coke Production, 1908.

Nova Scotia	754,478	499,551	6,586	208	505,929	1,658,151
Alberta	128,398	75,657	588	600	75,645	309,019
British Columbia	433,028	277,088	9,836	10,241	276,683	1,482,191
Totals	1,315,904	852,296	17,010	11,049	858,257	3,449,361

Tonnage of coke sold, or used in 1907 shows an increase of 59,948 tons, or 7·67 per cent, as compared with 1906; that used or sold in 1908 an increase of 16,254 tons, or 1·93 per cent as compared with 1907.

The statistics of the coke production as represented by coke sold or used since 1886 are given in the following table:—

COKE.—TABLE 1.

Annual Production, 1886-1908.

Calendar Year.	Tons.	Value.	Value per ton.
		$	$ cts.
1886	35,396	101,940	2 88
1887	40,428	135,951	3 36
1888	45,373	134,181	2 96
1889	54,539	155,043	2 84
1890	56,450	166,298	2 95
1891	57,084	175,592	3 08
1892	56,135	160,249	2 85
1893	61,078	161,790	2 65
1894	58,044	148,551	2 56
1895	53,356	143,047	2 68
1896	49,619	110,257	2 22
1897	60,686	176,457	2 91
1898	87,600	286,000	3 26
1899	100,820	350,022	3 47
1900	157,134	649,140	4 13
1901	365,531	1,228,225	3 36
1902	502,043	1,519,185	3 03
1903	561,318	1,734,404	3 09
1904	554,083	2,032,048	3 66
1905	700,488	2,436,211	3 48
1906	782,055	2,863,503	3 66
1907	842,003	3,583,468	4 26
1908	858,257	3,449,361	4 02

Table 2, which follows, gives the statistics of the coke production for the last eleven years, divided into provinces.

COKE.—TABLE 2.

Production of Coke by Provinces, 1897-1908.

Calendar Year.	Nova Scotia.		British Columbia.		Alberta.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
1897	41,532	90,950	19,154	85,507	.....	.....
1898	48,400	111,009	39,200	175,000	.....	.....
1899	62,459	178,767	38,361	171,255	.....	.....
1900	61,767	223,395	95,367	425,745	.....	.....
1901	222,694	590,560	142,837	637,665	.....	.....
1902	363,330	899,930	138,713	619,255	.....	.....
1903	371,745	888,094	189,573	846,310	.....	.....
1904	275,927	805,022	257,172	1,148,090	20,984	78,936
1905	386,366	1,054,712	269,256	1,202,035	44,866	179,464
1906	476,364	1,540,976	236,205	1,054,485	69,486	268,042
1907	524,110	1,688,070	241,572	1,049,432	76,321	297,595
1908	505,929	1,658,151	276,683	1,482,191	75,645	309,019

It will be noticed that in 1908 the tonnage of the coke production of Nova Scotia and Alberta, respectively, shows a decrease. However, this was more than made up by an increase of production from British Columbia, making the total for Canada for the year 16,254 tons in excess of that of 1907. The coke produced in Nova Scotia is used almost exclusively in blast furnaces for the smelting of iron ores. None of it is exported.

The smelting industries of southern British Columbia, and of the east coast of Vancouver island, constitute the main market for the coke produced in Alberta and British Columbia, consuming nearly 75 per cent of the total production; while some 25 per cent is exported for the use of similar industries in the United States. There is, of course, a small local consumption by foundries and for domestic use; but this accounts for only a very small percentage of the total.

Table 3 gives the exports of coke, which are all to the United States.

COKE.—TABLE 3.

Exports of Coke to the United States, 1897-1908.

Calendar Year.	Tons.	Value.
		$
1897	2,987	6,078
1898	3,774	8,394
1899	5,557	18,726
1900	41,529	131,278
1901	57,505	176,990
1902	62,568	180,920
1903	32,608	135,957
1904	102,463	345,031
1905	116,071	509,908
1906	37,003	168,571
1907	70,617	320,357
1908	58,708	248,759

Coke is imported into Canada from the United States mainly to supply the iron and steel industries of Ontario. In 1908 these imports amounted to 619,269 tons. The figures for this year cannot be compared with those for 1907, as the latter, owing to the change made in the fiscal year, are only for nine months, from July 1, 1906, to March 31, 1909.

COKE.—TABLE 4.

Imports of Oven Coke, 1880-1908.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		$			$
1880	3,837	19,353	1895	43,235	149,434
1881	5,492	26,123	1896	61,612	203,826
1882	8,157	36,670	1897	83,330	267,540
1883	8,943	38,588	1898	135,060	347,040
1884	11,207	44,518	1899	141,284	362,826
1885	11,564	41,391	1900	187,878	506,839
1886	11,858	39,756	1901	308,786	680,138
1887	15,110	56,222	1902	267,142	842,815
1888	25,487	102,334	1903	256,723	1,222,756
1889	29,557	91,902	1904	221,050	765,123
1890	36,564	133,344	1905	371,593	807,842
1891	38,533	177,605	1906	480,222	1,311,375
1892	43,499	194,429	1907*	400,536	1,132,680
1893	41,821	156,277	1908 Duty free.	619,269	2,166,036
1894	42,864	176,996			

*For nine months only.

Coke is manufactured from coal mined in five of the coal basins of Canada, viz., the Sydney field, the Pictou field, both in Nova Scotia; the Frank-Blairmore field in southwestern Alberta; the Crowsnest field in East Kootenay, and the Comox field on Vancouver island, both of the latter in British Columbia.

The following table shows the proportionate yield in coke from the coals of the various fields charged into the ovens. These percentages of coke produced relatively to the coal charged have been compiled from the returns of the last four years.

Year.	Sydney Field.	Pictou Field.	Frank-Blairmore Field.	Crowsnest Field.	Comox Field, Vancouver island.
1905	62·90	50·22	65·14	64·38	49·61
1906	63·65	53·41	66·74	62·29	38·90
1907	64·22	54·81	65·36	63·97	49·10
1908	66·42	55·81	58·92	65·08	49·73
Average*	61·42	52·84	63·68	63·97	47·15

*The average has been computed from the total coal charged during the four years and the total coke output resulting.

In the Sydney field the ovens used are all by-product ovens; whereas the coal of the Pictou field is made into coke in bee-hive ovens. We may here mention that a certain amount of Springhill coal, Cumberland field, is mixed with this coal, which it has not been possible to separate to calculate the yield in coke.

In the Blairmore field both Belgian ovens and bee-hive ovens are used. On Vancouver island the coke is made in bee-hive ovens.

It may be interesting to point out that in this last field only the fine screenings are used in the manufacture of coke. This coal is thoroughly washed before being charged into the ovens, and the refuse resulting from this treatment often amounts to 50 per cent. This refuse is rejected, and only the washed coal is charged into the ovens. The yield is computed from the quantity of washed coal.

PEAT.

In 1907, returns of production of peat were received from only one company, viz., the Interwest Peat Fuel Company, which manufactured 50 tons, valued at $200. This Company had just completed the installation of their plant and started operations when the buildings were destroyed by fire.

In 1908, the only production of peat fuel recorded was 60 tons, manufactured on the Anrep machine at Victoria Road peat bog, Victoria county, Ont., and which it is intended to use for experimental purposes at the fuel testing plant of the Department of Mines, Ottawa.

Sales of Peat during the past nine years have been reported as follows:—

	Tons.	Value.
1900	400	$1,200
1901	220	600
1902	475	1,663
1903	1,100	3,300
1904	800	2,400
1905	80	260
1906	474	1,422
1907	50	200
1908	60	180

A great deal of experimental work has been done in the past, and is at present being carried on, towards establishing the peat fuel industry on a sound basis in the Canadian provinces which are devoid of fossil fuel deposits.

The results obtained so far by individual experimenters have been disappointing, and although this industry is very successfully carried on in several European countries, it is yet in the initial stages in Canada after several years of trials.

The failures may be entirely ascribed to lack of knowledge of the properties, to the employment of impracticable methods of working, and to the choice of unsuitable bogs on the part of the peat companies.

Recognizing the great services that the successful establishment of this industry would render in the Canadian provinces, which have to rely on the United States for the greater part of their supply of fuel, the Mines Branch of the Department of Mines initiated two years ago a systematic investigation, which, it is hoped, will go a long way towards helping the successful exploitation of the peat bogs and the production of peat fuel from this source for industrial and domestic purposes.

In 1907, Mr. Erik Nyström was commissioned by Dr. Haanel, Director of the Mines Branch, to investigate the processes in use in Europe, and an exhaustive report on peat and lignite was published. This work was followed by the study of several individual peat bogs, easy of access, favourably situated for a peat fuel market, or for disposing of power generated from the peat at the bog.

This report, which gives the results of the investigation of the Mer Bleue, Alfred, Welland, Newington, Perth, and Victoria peat bogs, was issued in the early part of 1909, and may be obtained by applying to the Director of Mines Branch, Department of Mines, Ottawa.

The following is a tabulated statement of the main results of this investigation:—

Ontario Peat Bogs.*

Location.	Mer Bleue Peat Bog. Tps. of Gloucester and Cumberland near Ottawa.	Alfred Peat Bog. Tps. of Alfred and Caledonia, Prescott county.	Welland Peat Bog. Tps. of Wainfleet and Humberstone, Welland county.	Newington Peat Bog. Tps. of Osnabruck, Roxborough, and Cornwall, Stormont county.	Perth Peat Bog. Tp. of Drummond, near Perth.	Victoria Road Peat Bog. Tps. of Bexley and Carden, Victoria county.
Total area of bog.....Acres.	5,004	6,800	4,900	3,800	3,800	67
Workable area 5 feet and over in depth..... "	3,440	5,414	3,465	2,913	3,162	31
Area of maximum average depth.....	347 acres, 16 ft. deep.	1,014 acres, 16½ ft. deep.	588 acres, 11 ft. deep.	120 acres, 26 ft. deep.	106 acres, 16 ft. deep.	3 acres, 15 ft. deep.
Volume of workable peat.....Cub. yds.	38,442,494	70,270,200	30,796,480	46,566,478	38,445,222	402,441
Tons of fuel, with contents, 25 per cent moisture.....	5,125,655	9,369,000	4,106,000	6,208,800	5,126,000	53,000
Average partial analysis of absolutely dry peat.....Fixed carbon.	25·35	25·39	25·20	26·27	24·97	25·18
Average partial analysis of absolutely dry peat.....Vol. matter..	67·44	68·42	69·52	68·04	70·92	69·52
Average partial analysis of absolutely dry peat.....Ash.....	7·37	6·18	5·28	5·69	4·10	5·30

*See Bulletin No. 1 (2nd Edition) Investigation of Peat Bogs, 1908-9, issued by Mines Branch, Department of Mines, Ottawa.

For the purpose of demonstrating the industrial applicability of peat fuel, the Mines Branch is at present erecting a testing plant, where peat will be used in gas producers for generating power. Any owners wishing to have their peat bog investigated and reported upon can communicate on the subject with the Director of the Mines Branch.

Moreover, it may be mentioned that the Mines Branch has secured, by purchase, part of the Alfred bog, which will be worked for the purpose of demonstration, and also for supplying peat fuel to the testing plant at Ottawa.

GRAPHITE.

Statistics of graphite production include both the ore sold crude and the graphite refined and sold as such. In 1907 the total shipments were 579 tons valued at $16,000, comprising 459 tons of ore valued at $11,000, and 120 tons of refined product valued at $5,000. In 1908 the shipments totalled 251¼ tons valued at $5,565, of which 250 tons valued at $5,400 were crude, and 1¼ tons valued at $165 were refined.

Statistics of annual production since 1886 are shown in Table 1.

GRAPHITE.—TABLE 1.

Annual Production.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1886	500	4,000	1898	.....	13,698
1887	300	2,400	1899	1,130	24,179
1888	150	1,200	1900	1,922	31,040
1889	242	3,160	1901	2,210	38,780
1890	175	5,200	1902	1,095	28,300
1891	260	1,560	1903	728	23,745
1892	167	3,763	1904	452	11,760
1893	Nil.	Nil.	1905	541	16,735
1894*	3	223	1906	387	18,300
1895	220	6,150	1907	579	16,000
1896	139	9,455	1908	251¼	5,565
1897	436	16,240			

*Exports.

The exports of graphite are shown in Table 2. The record for 1908 indicates an exportation of graphite to the value of $11,034, which probably includes some ore returned by the mines as having been shipped in 1907. The total imports of graphite as shown in Table 3 were valued at $83,592 in 1908, as compared with $60,833 in 1907.

GRAPHITE.—TABLE 2.

Exports of Graphite.

Year.	Crude.		Manufactures.	Total Value.
	Tons.	Value.	Value.	
		$	$	$
1886				3,586
1887				3,017
1888				1,080
1889				538
1890				1,529
1891				72
1892				3,952
1893	1	38	10	48
1894	3	223		223
1895	544	4,803	30	4,833
1896	136	9,126	354	9,480
1897	205	2,988	1,337	4,325
1898	591	11,527	1,571	13,098
1899	1,237	19,326	3,164	22,490
1900	1,550	40,132	6,065	46,197
1901	1,194	30,535	4,567	35,102
1902	886	23,097	1,742	24,839
1903	412	26,230	17,412	43,642
1904	177	9,609	6,958	16,567
1905	254	7,596	518	8,114
1906	106	2,468	5,274	7,742
1907	121	3,036	2,847	5,883
1908	385	10,158	876	11,034

GRAPHITE.—TABLE 3.

Imports of Raw and Manufactured Graphite.

Fiscal Year.	Plumbago not ground.	Black Lead.	Ground and Manufactures.	Crucibles, Clay or Plumbago.	Total.
	$	$	$		$
1880	1,677	18,055	2,738		22,470
1881	2,479	26,544	1,202		30,225
1882	1,028	25,132	2,181		28,341
1883	3,147	21,151	2,141		26,439
1884	2,891	24,002	2,152		29,045
1885	3,729	24,487	2,805		31,021
1886	5,522	23,211	1,408		30,141
1887	4,020	25,766	2,830		32,616
1888	3,802	7,824	22,604		34,230
1889	3,546	11,852	21,789		37,187
1890	3,441	10,276	26,605		40,322
1891	7,217	8,292	26,201		41,710
1892	2,988	13,560	23,085		39,633
1893	3,293	16,595	23,051		42,939
1894	2,177	17,614	15,196	1,490	36,477
1895	2,586	13,922	16,361	5,627	38,496
1896	2,865	18,434	12,090	7,407	40,796
1897	1,406	17,863	14,768	5,906	39,943
1898	1,862	19,638	20,120	12,533	54,153
1899	4,979	21,334	22,140	14,350	62,803
1900	4,437	22,078	17,869	20,571	64,955
1901	2,357	25,646	11,016	38,874	77,893
1902	3,649	20,467	15,021	28,635	67,772
1903	2,870	22,559	12,493	34,624	72,546
1904	1,802	26,053	12,737	28,773	69,365
1905	2,499	30,743	13,192	31,353	77,787
1906	2,791	33,907	19,058	32,950	88,706
1907 (9 mos.)	3,176	16,646	13,740	27,271	60,833
1908	3,030	9,042	31,428	40,092	83,592

In 1906 the Canada Paint Co., as usual, shipped a small quantity of graphite from their property near Havelock, N. B. The Calumet Mining & Milling Graphite Co. did no work on their graphite property at Calumet, Que., during the year. In the Buckingham district the development of the Bell mines on the west half of lot 2, range V, was continued by Cosmo Kendall, and a small shipment of mill products made. In this district also the Natal Graphite Mining & Milling Company was doing development work on lot 3, range IV of Buckingham township.

In Ontario the Ontario Graphite Co. leased the Black Donald mine in February to the Black Donald Graphite Co., Ltd., Calabogie, Ont. The greater part of the year was spent in overhauling and refitting the entire plant in all its departments. At the close of the year this Company was capable of producing four tons per day of refined graphite in about 8 different grades, with every facility for doubling this capacity when required.

The Globe Refining Company did some mining on lots 21 and 22 in concession VI of Elmsley, county of Lanark, but no shipments were made.

Artificial Graphite :—The manufacture of artificial graphite in electric furnaces has been carried on for some years at Niagara Falls, New York, by the International Atcheson Graphite Company. A small plant has now been established on the Canadian side of the river at Niagara Falls, Ont., and the quantity of artificial graphite made during 1906 is reported by the manufacturers as 445,047 pounds.

In 1907 the quantity made was 407,779 pounds, and in 1908, 428,540 pounds.

GYPSUM.

There was a considerable falling off in the quantity of gypsum mined in Canada in 1908, due no doubt in a large measure to the general business depression of the year. The chief centres of production are in the Provinces of Nova Scotia and New Brunswick, the output from which finds a market mainly in the New England states. Small quantities are also mined in Ontario and Manitoba for home consumption.

A very large part of the gypsum mined is shipped in lump form as quarried, to calcining mills in the United States. From 5,000 to 10,000 tons are ground for use as land plaster, etc., while the balance, about 10 per cent, is calcined in Canada for the manufacture of plaster of Paris, wall plaster, and other products. Crude gypsum is also used in the manufacture of Portland cement.

The total quantity of gypsum mined and the quantity calcined during the past four years are shown hereunder.

Year.	Total Gypsum mined.	Gypsum calcined.
	Tons.	Tons.
1905	443,569	26,855
1906	492,759	28,831
1907	489,962	34,752
1908	375,444	48,727

The total value of the sales of gypsum products in 1908, including calcined and crude, was $575,701, representing 340,964 tons of material, as compared with a value of $646,914 and a tonnage of 485,921 in 1907.

Detailed statistics of the production and sales during the past four years of crude, crude ground, and calcined gypsum are shown in Table 1 ; while the total annual sales of gypsum products since 1886 are shown in Table 2, and the sales by provinces in Table 3.

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GYPSUM.—TABLE 1.

Sales and Shipments of Crude, Ground, and Calcined Gypsum, 1905-1908

	Crude (lump).			Crude Ground.		
	Tons.	Value.	Per ton.	Tons.	Value.	Average per ton.
		$	$ cts.		$	$ cts.
1905	412,155	409,146	0 99	3,255	8,779	2 70
1906	442,132	473,960	1 07	3,195	9,823	3 07
1907	454,668	473,831	1 04	6,732	16,268	2 42
1908	298,188	307,532	1 03	9,504	25,468	2 68

	Calcined.			Total Sales.		
	Tons.	Value.	Per ton.	Tons.	Value.	Average per ton.
		$	$ cts.		$	$ cts.
1905	26,748	168,243	6 29	442,158	586,168	1 32
1906	23,695	159,511	6 73	469,022	643,294	1 37
1907	24,521	156,815	6 40	485,921	646,914	1 33
1908	33,272	242,701	7 29	340,964	575,701	1 69

GYPSUM.—TABLE 2.

Annual Production of Gypsum Products.

Calendar Year.	Tons.	Value.	Average per ton.	Calendar Year.	Tons.	Value.	Average per ton.
		$	$ cts.			$	$ cts.
1886	162,000	178,742	1 10	1898	219,256	232,515	1 06
1887	154,008	157,277	1 02	1899	244,566	257,329	1 05
1888	175,887	179,393	1 01	1900	252,101	259,009	1 02
1889	213,273	205,108	0 96	1901	293,799	340,148	1 16
1890	226,509	194,033	0 86	1902	333,599	379,479	1 14
1891	203,605	206,251	1 01	1903	314,489	388,459	1 24
1892	241,048	241,127	1 00	1904	345,961	373,474	1 08
1893	192,568	196,150	1 02	1905	442,158	586,168	1 32
1894	223,631	202,031	0 90	1906	469,022	643,294	1 37
1895	226,178	202,608	0 89	1907	485,921	646,914	1 33
1896	207,032	178,061	0 86	1908	340,964	575,701	1 69
1897	239,691	244,531	1 02				

GYPSUM.—TABLE 3.

Annual Production by Provinces.

Calendar Year.	Nova Scotia.		New Brunswick.		Ontario.		Manitoba.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$		$
1887	116,346	116,346	29,102	29,216	8,560	11,715		
1888	124,818	120,429	44,369	48,764	6,700	10,200		
1889	165,025	142,850	40,866	49,130	7,382	13,128		
1890	181,285	154,972	39,024	30,986	6,200	8,075		
1891	161,934	153,955	36,011	33,996	5,660	18,300		
1892	197,019	170,021	39,709	65,707	4,326	5,399		
1893	152,754	144,111	36,916	41,846	2,898	10,193		
1894	168,300	147,644	52,962	48,200	2,369	6,187		
1895	156,809	133,929	66,949	63,839	2,420	4,840		
1896	136,590	111,251	67,137	59,024	3,305	7,786		
1897	155,572	121,754	82,658	118,116	1,461	4,661		
1898	132,086	106,610	86,083	121,704	1,087	4,201		
1899	126,754	102,055	116,792	151,296	1,020	3,978		
1900	138,712	108,828	112,294	145,850	1,095	4,331		
1901	170,100	136,947	121,595	189,709	1,504	5,692	600	7,800
1902	206,087	181,425	124,041	170,153	1,917	7,699	1,554	20,202
1903	189,427	173,881	119,182	172,080	2,720	21,988	3,160	20,510
1904	218,580	153,600	190,991	187,524	2,390	18,350	4,000	14,000
1905	272,252	298,248	163,553	232,586	1,853	23,834	4,500	31,500
1906	333,312	345,414	131,246	250,960	2,965	24,420	3,200	22,500
1907	357,411	380,859	118,106	213,638	10,404	52,417	.....	.....
1908	234,455	230,437	81,620	191,312	10,389	42,456	14,500	111,500

Statistics of exports and imports of gypsum as compiled from the reports of Trade and Navigation are shown in Tables 4, 5, and 6. The annual exports of crude gypsum, which are almost altogether from the Maritime provinces, are shown in Table 4. There is a small export of ground gypsum, the annual value of which is shown in Table 5. The imports of gypsum shown in Table 6 have until the past three or four years been comparatively small; however, during these years there has been a considerable increase in the imports of crude gypsum and of plaster of Paris.

GYPSUM.—TABLE 4.

Exports of Crude Gypsum.

Calendar Year.	Nova Scotia.		New Brunswick.		Ontario.		Total.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$		$
1874	67,830	68,164	.....	.....	.....	.....	67,830	68,164
1875	86,065	86,193	5,420	5,420	.....	.....	91,485	91,613
1876	87,720	87,590	4,925	6,616	120	180	92,765	94,386
1877	106,950	93,867	5,030	5,030	.....	.....	111,980	98,897
1878	88,631	76,695	16,335	16,435	489	675	105,455	93,805
1879	95,623	71,353	8,791	8,791	579	720	104,993	80,864
1880	125,685	111,833	10,375	10,987	875	1,240	136,935	124,060
1881	110,303	100,284	10,310	15,025	657	1,040	121,270	116,349
1882	133,426	121,070	15,597	24,581	1,249	1,946	150,272	147,597
1883	145,448	132,834	20,242	35,557	462	837	166,152	169,228
1884	107,653	100,446	21,800	32,751	688	1,254	130,141	134,451
1885	81,887	77,898	15,140	27,730	525	787	97,552	106,415
1886	118,985	114,116	23,498	40,559	350	538	142,833	155,213
1887	112,557	106,910	19,942	39,295	225	337	132,724	146,542
1888	124,818	120,429	20	50	670	910	125,508	121,389
1889	146,204	142,850	31,495	50,862	483	692	178,182	194,404
1890	145,452	139,707	30,034	52,291	205	256	175,691	192,254
1891	143,770	140,438	27,536	41,350	5	7	171,311	181,795
1892	162,372	157,463	27,488	43,623	.....	.....	189,860	201,086
1893	132,131	122,556	30,061	36,706	.....	.....	162,192	159,262
1894	119,569	111,586	40,843	46,538	.....	.....	160,412	158,124
1895	133,369	125,651	56,117	67,593	.....	.....	189,486	193,244
1896	116,331	109,054	64,946	77,535	.....	.....	181,277	186,589
1897	122,984	116,665	66,222	80,485	.....	.....	189,206	197,150
1898	99,215	93,474	70,399	81,433	.....	.....	169,614	174,907
1899	104,795	99,984	96,831	108,094	*½	12	201,626	208,090
1900	.....	.....	.....	.....	.....	.....	188,262	201,912
1901	.....	.....	.....	.....	.....	.....	236,247	231,594
1902	.....	.....	.....	.....	.....	.....	289,600	295,215
1903	.....	.....	.....	.....	.....	.....	287,496	311,580
1904	.....	.....	.....	.....	.....	.....	298,211	316,436
1905	.....	.....	.....	.....	.....	.....	359,246	388,474
1906	.....	.....	.....	.....	.....	.....	404,464	462,814
1907	.....	.....	.....	.....	.....	.....	375,026	424,794
1908	.....	.....	.....	.....	.....	.....	280,091	324,574

* Exported from British Columbia.

GYPSUM.—TABLE 5.

Exports of Ground Gypsum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1890	105	1897	6,763	1903	12,457
1891	588	1898	6,448	1904	2,333
1892	20,255	1899	8,123	1905	2,673
1893	22,132	1900	19,834	1906	2,934
1894	20,054	1901	15,337	1907	557
1895	22,233	1902	5,101	1908	9,765
1896	21,267				

GYPSUM.—TABLE 6.

Imports of Gypsum, etc.

Fiscal Year.	Crude Gypsum.		Ground Gypsum		Plaster of Paris.	
	Tons.	Value.	Lbs.	Value.	Lbs.	Value.
		$		$		$
1880	1,854	3,203	1,606,578	5,948	667,676	2,376
1881	1,731	3,442	1,544,714	4,676	574,006	2,864
1882	2,132	3,761	759,460	2,576	751,147	4,184
1883	1,384	3,001	1,017,905	2,579	1,448,650	7,867
1884	.....	3,416	687,432	1,936	782,920	5,226
1885	1,353	2,354	461,400	1,177	689,521	4,809
1886	1,870	2,429	224,119	675	820,273	5,463
1887	1,557	2,492	13,266	73	594,146	4,342
1888	1,236	2,193	106,068	558	942,338	6,662
1889	1,360	2,472	74,390	372	1,173,996	8,513
1890	1,050	1,928	434,400	2,136	693,435	6,004
1891	376	640	36,500	215	1,035,605	8,412
1892	626	1,182	310,250	2,149	1,166,200	5,595
1893	496	1,014	140,830	442	552,130	3,143
1894	.....	1,660	23,270	198	422,700	2,386
1895	603	960	20,700	88	259,200	1,619
1896	1,045	848	64,500	198	297,000	2,000
1897	.....	772	45,000	123	969,900	4,489
1898	1,147	1,742	35,700	293	329,600	2,025
1899	325	692	33,900	338	496,300	3,120
1900	77	958	6,300	69	849,100	6,492
1901	286	1,125	65,400	1,097	502,200	3,978
1902	541	1,697	56,700	249	475,300	2,641
1903	1,076	2,187	68,700	228	630,800	3,599
1904	249	663	106,800	559	625,100	2,885
1905	2,344	7,386	2,255,700	2,681	7,924,100	37,643
1906	6,332	22,008	1,968,690	1,799	12,866,500	43,742
1907 (9 mos.)	9,189	23,410	609,660	1,619	19,849,400	58,364
1908	9,393	36,510	382,500	1,781	15,020,000	51,328

Crude gypsum, duty free. Ground gypsum, duty 15 per cent. Plaster of Paris, duty 12½c. per 100 lbs.

In Nova Scotia the total quantity of crude gypsum mined in 1908 was 254,540 tons, as compared with 351,611 tons in 1907. Of the total in 1908 about 87 per cent was mined from quarries in Hants county at Windsor, Walton, Cheverie, Noel, etc., the balance being quarried at St. Anns, Victoria county, and Cheticamp, Inverness county.

At Cheticamp the Great Northern Mining Co., Ltd., under the management of M. W. Grandin, commenced operations in 1908. A mill was built, but the Company did not begin to grind gypsum until the latter part of September or to manufacture plaster of Paris until the middle of October. All goods manufactured were for the ports on the St. Lawrence, and shipments ceased on the close of navigation. The Victoria Gypsum Mining and Manufacturing Co. carried on operations as usual at St. Anns, but with a somewhat reduced output.

The Nova Scotia Cement and Plaster Co., Ltd., was organized to work deposits at Port Hastings in Inverness, but nothing was done further than to strip the surface covering from the deposit.

In Hants county the principal operators were the Wentworth Gypsum Co., Ltd., the Windsor Gypsum Co., and Albert Parsons. Shipments were made also by the Newport Plaster Mining and Manufacturing Co., the Windsor Plaster Co. which operates a small mill, the Noel Plaster Co. (W. B. O'Brien), and Lorenzo Ettinger.

In the Province of New Brunswick the principal shipper is the Albert Manufacturing Company of Hillsborough. In addition to shipping a large tonnage of crude gypsum this Company operated a large mill for the manufacture of plaster of Paris, shipping its product throughout Canada. The Hillsboro Plaster Co. also operates a quarry at Hillsborough, and from the Tobique River deposits in Victoria county a small quantity of gypsum is annually quarried by John E. Stewart of Andover, N.B. The total quantity of crude gypsum mined in New Brunswick in 1908 was 90,015 tons.

In Ontario 10,889 tons of crude were reported as having been mined in 1908. The Alabastine Company of Paris sells gypsum, crushed and ground, and manufactures plaster of Paris, and special wall finishes under the name alabastine. The Imperial Plaster Co. of Toronto quarried gypsum for its own use at Cayuga, while the Crown Gypsum Co., Ltd., built a crushing and calcining mill at York mines, Oneida township, and commenced to open up the properties formerly known as the Martindale, Taylor, and Donaldson mines.

The only operator in Manitoba is the Manitoba Gypsum Co. of Winnipeg. This Company has a mill and calcining works at Winnipeg, while the quarry is situated at the north end of Lake Manitoba. The Company has a narrow gauge railway of its own from the mine to Lake Manitoba, and a small fleet of steamers and barges which bring the raw material from the head of the lake to Totogan, from which point it is brought to Winnipeg on the Canadian Northern railway.

MANGANESE.

In the decade between 1880 and 1890 the manganese industry was a comparatively important one in Canada, when deposits were worked in New Brunswick and Nova Scotia, but for some years past the production has diminished to such an extent that the industry is at present practically abandoned.

Except for the years 1903 and 1904 no direct returns of production have been received since 1900, and the figures which appear in the table of production represent exports published by the Customs Department; the ore having probably been obtained from working over old dumps of ore which had accumulated at the mines.

In 1907 the Customs reports show exports of only one ton of manganese, and in the absence of more data this has been taken as the production. In 1908 neither exports nor production were recorded.

MANGANESE. TABLE 1.

Annual Production.

Calendar Year.	Tons.	Value.	Value. per ton.	Calendar Year.	Tons.	Value.	Value. per ton.
		$	$ cts.			$	$ cts.
1886	1,789	41,499	23 20	1898	50	1,600	32 00
1887	1,245	43,658	35 07	1899	1,581	20,004	12 65
1888	1,801	47,944	26 62	1900	30	1,800	60 00
1889	1,455	32,737	22 50	1901*	440	4,820	10 95
1890	1,328	32,550	24 51	1902*	172	4,062	23 62
1891	255	6,694	26 25	1903	91	2,775	30 49
1892	115	10,250	89 13	1904	66	2,740	41 51
1893	213	14,578	68 44	1905*	22	1,720	78 18
1894	74	4,180	56 49	1906*	93	925	9 95
1895	125	8,464	67 71	1907*	1	22	22 00
1896*	123¼	3,975	32 19	1908	.....	.....	.....
1897*	15¼	1,166	76 46				

* Exports.

MANGANESE.—TABLE 2.

Exports of Manganese re.

Calendar Year.	Nova Scotia.		New Brunswick.		Total.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
1873			1,031	20,192	1,031	20,192
1874	6	12	776	16,961	782	16,973
1875		200	194	5,314	203	5,514
1876	21	723	391	7,316	412	8,039
1877	106	3,699	785	12,210	891	15,909
1878	106	4,889	520	5,971	626	10,860
1879	154	7,420	1,732	20,016	1,886	27,436
1880	79	3,090	2,100	31,707	2,179	34,797
1881	200	18,022	1,504	22,532	1,704	40,554
1882	123	11,520	771	14,227	894	25,747
1883	313	8,635	1,013	16,708	1,326	25,343
1884	134	11,054	469	9,035	603	20,089
1885	77	5,054	1,607	29,595	1,684	34,649
1886	(a) 441	30,854	1,377	27,484	(a)1,818	53,338
1887	578	14,240	837	20,562	1,415	34,802
1888	87	5,759	1,094	16,073	1,181	21,832
1889	59	3,024	1,377	26,326	1,436	29,350
1890	177	2,583	1,729	34,248	1,906	36,831
1891	22	563	233	6,131	255	6,694
1892	84	6,180	59	2,025	143	8,205
1893	123	12,409	10	112	133	12,521
1894	11	720	45	2,400	56	3,120
1895	108	6,348	$\frac{3}{10}$	3	$108\frac{3}{10}$	6,351
1896	$123\frac{1}{2}$	3,975			$123\frac{1}{2}$	3,975
1897	$15\frac{1}{4}$	1,166			$15\frac{1}{4}$	1,166
1898	11	325			11	325
1899	67	2,328	3	82	70	2,410
1900					34	1,720
1901					440	4,820
1902					172	4,062
1903					135	1,889
1904					123	2,706
1905					22	1,720
1906					93	925
1907					1	22
1908						

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

MANGANESE.—TABLE 3.

Imports:—Oxide of Manganese.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1884	3,989	258	1897	70,663	2,741
1885	36,778	1,794	1898	130,456	5,047
1886	44,967	1,753	1899	141,356	5,539
1887	59,655	2,933	1900	126,725	4,155
1888	65,014	3,022	1901	272,134	8,176
1889	52,241	2,182	1902	476,331	5,360
1890	67,452	3,192	1903	279,611	8,051
1891	92,087	3,743	1904	275,696	7,051
1892	76,097	3,530	1905	235,289	6,832
1893	94,116	3,696	1906	244,620	5,508
1894	101,863	4,522	1907 (9 mos)	386,404	11,087
1895	64,151	2,781	1908	732,242	17,863
1896	108,590	4,075			

The decline of the manganese industry has not been due to the lack of deposits in Canada, for in both Nova Scotia and New Brunswick there are mines which were worked for years and from which large quantities could still be extracted. The main market for these ores would, of course, be the United States, this country having to rely to a large extent on imports of manganese ores to supply the wants of the steel industry. The imports of this nature into the United States amount annually to about 200,000 tons, valued approximately at $1,750,000. These come mainly from British India and from Brazil, although some Russian, French, Japanese, and Cuban ores are also imported. It may be interesting to note that the United States Steel Corporation require that the manganese ore which they buy contain 49 per cent metallic manganese, a maximum of 8 per cent silica, and a maximum of 0·25 per cent phosphorus. All ores which do not come up to that standard are penalized.

MICA.

The mining of mica in Canada is at present confined to the western part of the Province of Quebec and the eastern part of Ontario. In the former Province deposits of mica are being worked in the region to the north of the city of Ottawa, in the townships of Buckingham, Templeton, Hull, and Wakefield. In Ontario there are mica mines in the townships of North Burgess and South Sherbrooke, in Lanark county; South Burgess, in the county of Leeds; in the townships of Bedford and Loughborough in Frontenac county. Practically all the mica mined in Canada is of the amber variety, and is used as insulating material in the manufacture of electrical apparatus. The principal foreign market of Canadian mica is the United States; an appreciable part of the production is consumed in Canada, and a proportion which is increasing steadily finds its way to Great Britain and other European markets, where it comes into competition with mica from India and other countries.

As has been remarked in previous reports, the annual statistics of production of mica which have been published in the past have been somewhat unsatisfactory, for numerous reasons. The value of the mica varies greatly according to the preparation which it has undergone, of which there are several stages not well defined between the rough cobbed condition at the mine, and the prepared and selected mica as it leaves the trimming factory, and the returns received are not always specific as to which value is adopted. There are, moreover, a great number of small operators, who work deposits intermittently according to the conditions of the mica market, and it is very difficult to obtain complete returns from these.

In 1907, the demand for mica was very active, and the production reached a total value of $312,599, which is the highest yet recorded since the beginning of the industry. In 1908, however, there was a marked reaction, prices fell somewhat, the market was not as favourable as during the previous year, and as a result many of the smaller operators discontinued operations temporarily, and the value of the production fell to $139,871. In the figures for 1907 it is very probable that the returns received comprise mica which had undergone further preparation than the rough cobbing at the mine, and to which higher values had been ascribed. In the figures for 1908 an effort was made to collect figures of production on a more uniform basis, and this contributed to some extent to the decrease in the total value. Moreover, some operators report that they stored comparatively large quantities of mica mined during 1908, waiting for better prices to dispose of them.

The following tabulations give the statistics of the mica mining industry for the years 1907 and 1908 as made up from returns received from producers.

Mica reported as shipped during 1907.

Province.	Tons.	Value.	Value per ton.
		$	$ cts.
Quebec	318	224,197	705 02
Ontario	456	88,402	193 86
Total	774	312,599	403 86

Mica, rough and thumb trimmed, reported as shipped during 1908.

Province.	Tons.	Value.	Value per ton.
		$	$ cts.
Quebec	148	82,613	558 20
Ontario	288	57,258	198 81
Total	436	139,871	320 80

Mica, rough culled, reported as mined during 1908.

Province.	Tons.	Value.	Value per ton.
		$	$ cts.
Quebec	543	130,152	239 96
Ontario	357	72,210	202 28
Total	900	202,362	224 84

The following table gives the mica production of Canada since 1886. For 1908 the quantity reported as actually shipped has been adopted as production.

MICA.—TABLE 1.

Annual Production.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1886	29,008	1894	45,581	1902	135,904
1887	29,816	1895	65,000	1903	177,857
1888	30,207	1896	60,000	1904	160,777
1889	28,718	1897	76,000	1905	178,235
1890	68,074	1898	118,375	1906	303,913
1891	71,510	1899	163,000	1907	312,599
1892	104,745	1900	166,000	1908	139,871
1893	75,719	1901	160,000		

Table 2 following gives the exports of mica from Canada since 1887, as given by the Trade and Navigation Reports of Canada.

MICA.—TABLE 2.

Exports.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Tons.	Value.
	$		$			$
1887	3,480	1894	38,971	1902		391,812
1888	23,563	1895	48,525	1903		196,020
1889	30,597	1896	47,756	1904		198,482
1890	22,468	1897	69,101	1905		179,049
1891	37,590	1898	110,507	1906	912	581,919
1892	86,562	1899	153,002	1907	558	422,172
1893	70,081	1900	146,750	1908	290	198,839
		1901	152,553			

The exports for the calendar year 1908 were made up as follows:—

Exports of Canadian mica by countries.

To Great Britain	$ 81,050
To United States	115,005
To other countries	2,784
	$ 198,839

Table 3 gives the statistics of imports of Canadian mica into the United States since 1895, as published in the Foreign Commerce and Navigation of the United States. These figures are for the fiscal years ending June 30.

For the purpose of illustrating the relative importance of the imports of Canadian mica into the United States, as compared with those from other countries which also supply part of the mica consumed in the United States, the following table is given:—

MICA.—TABLE 3.

Imports of Mica into the United States.*

Year ending June 30.	Imports from Canada.		Total Imports from all Countries.	
	Tons.	Value.	Tons.	Value.
		$		$
1895	273	39,637	410	127,515
1896	310	57,908	632	214,997
1897	208	54,630	441	187,845
1898	233	53,854	313	94,294
1899	512	131,310	808	259,228
1900	549	136,981	1,019	314,882
1901	484	161,741	1,011	369,644
1902	427	184,287	903	384,818
1903	417	196,470	973	414,953
1904	287	137,191	693	306,937
1905	253	121,560	594	296,362
1906	539	328,991	1,206	731,484
1907	767	596,321	1,724	1,295,606
1908	172	140,166	655	567,550

* The Foreign Commerce and Navigation of the United States.

MINERAL PIGMENTS.

Under this heading are included the production of ochres and of barytes.

OCHRES.

It may be remarked here that all of the ochres mined are not used for the manufacture of paint. A certain proportion is shipped in the crude state to gas companies, where it is used for the purification of illuminating gas. The ochres for the manufacture of paints are as a rule calcined and ground on the spot and shipped after having undergone this preliminary preparation.

For the last seven years the production of ochres has not shown much variation, the value having varied between $25,000 and $36,000. In 1907, returns received show a production of 5,828 tons valued at $35,570; whereas in 1908, there is a decrease to record, the figures being for that year 4,746 tons valued at $30,440.

MINERAL PIGMENTS.—TABLE 1.

Annual Production of Ochres and Iron Oxides.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1886	350	2,350	1898	2,226	17,450
1887	485	3,733	1899	3,919	20,000
1888	397	7,900	1900	1,966	15,398
1889	794	15,280	1901	2,233	16,735
1890	275	5,125	1902	4,955	30,495
1891	900	17,750	1903	6,266	32,760
1892	390	5,800	1904	3,925	24,995
1893	1,070	17,710	1905	5,105	34,675
1894	611	8,690	1906	6,758	36,125
1895	1,339	14,600	1907	5,828	35,570
1896	2,362	16,045	1908	4,746	30,440
1897	3,905	23,560			

The working of ochre deposits is practically confined in Canada to one district situated between Champlain and Three Rivers, in the Province of Quebec, a short distance back from the shore of the St. Lawrence river.

Numerous other deposits of ochre are found in the Province of Quebec, but are not worked at present. In Ontario a small quantity of ochre was mined in 1907 from a deposit situated near Campbellville, but no production was reported in 1908.

The following are the firms which are mining ochres in Canada:—

Canada Paint Company, Montreal, Que.

Champlain Oxide Co., Three Rivers, Que.

Thos. H. Argall, Three Rivers, Que.

Ontario Mineral Paint Co., Campbellville, Ont.

The following tables give the statistics of the imports and exports of ochres.

MINERAL PIGMENTS.—TABLE 2.

Imports of Ochres.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1880	571,454	6,544	1895	793,258	12,048
1881	677,115	8,972	1896	1,159,494	16,954
1882	731,526	8,202	1897	1,504,044	18,504
1883	898,376	10,375	1898	2,126,592	26,307
1884	533,416	6,398	1899	2,444,698	31,092
1885	1,119,177	12,782	1900	2,474,537	32,017
1886	1,100,243	12,267	1901	2,092,067	27,267
1887	1,460,128	17,067	1902	2,530,743	33,909
1888	1,725,460	17,664	1903	3,215,346	42,243
1889	1,342,783	12,994	1904	2,767,580	36,636
1890	1,394,811	14,066	1905	3,122,690	35,887
1891	1,528,696	20,550	1906	4,321,530	57,397
1892	1,708,645	22,908	1907 9 months)	2,926,528	39,675
1893	1,968,645	23,134	1908	3,749,132	39,923
1894	1,358,326	18,951			

——	Duty.	1907.		1908.	
			$		$
Ochres and ochrey earths and raw siennas	20 %	1,256,546	15,194	1,731,036	18,042
Oxides, dry fillers, fire-proofs, umbers and burnt siennas N.E.S.	25 %	1,669,982	24,481	2,018,096	21,881
Total		2,926,528	39,675	3,749,132	39,923

MINERAL PIGMENTS.—TABLE 3.

Exports of Mineral Pigments, Iron Oxides, etc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1897	512	7,706	1903	676	12,770
1898	283	4,227	1904	416	7,260
1899	308	5,408	1905	353	7,704
1900	651	7,154	1906	139	2,379
1901	401	8,233	1907	191	10,043
1902	352	6,182	1908	125	4,850

BARYTES.

Barytes deposits are being worked in Nova Scotia, on the east side of Lake Ainslie, in Inverness county, and at Five Islands, Colchester county.

The figures of production of barytes show great variation from year to year, as shown by the following table, but as the consumption of this material is steadily increasing, the more constant demand will eventually result in a more even production.

MINERAL PIGMENTS.—TABLE 4.

Annual Production of Barytes.

Calendar Year.	Tons.	Value.	Average Value.	Calendar Year.	Tons.	Value.	Average Value.
		$	$ cts.			$	$ cts.
1885	300	1,500	5 00	1897	571	3,060	5 36
1886	3,864	19,270	4 98	1898	1,125	5,533	4 92
1887	400	2,400	6 00	1899	720	4,402	6 11
1888	1,100	3,850	3 50	1900	1,337	7,605	5 69
1889				1901	653	3,842	5 89
1890	1,842	7,543	4 09	1902	1,096	3,957	3 61
1891				1903	1,163	3,931	3 38
1892	315	1,260	4 00	1904	1,382	3,702	2 68
1893				1905	3,360	7,560	2 23
1894	1,081	2,830	2 62	1906	4,000	12,000	3 00
1895				1907	1,344	3,000	2 23
1896	145	715	4 93	1908	4,312	19,021	4 41

MINERAL PIGMENTS.—TABLE 5.

Imports of Barytes.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		$			$
1880	2,230	1,525	1886		62
1881	3,740	1,011	1887	379	676
1882	497	303	1888	236	214
1883		185	1889	1,332	987
1884		229	1890	1,322	978
1885	7	14			

The greater part of the barytes produced in Canada is exported to the United States, where an entrance duty of $1.50 per ton is paid when it is in the unmanufactured state, and $5.25 when manufactured.

The main use of barytes is as a cheapener of white paints, being used in combination with white lead, but it is also used in other industries, viz, in the manufacture of wall papers; for dressing calicoes; as loading material in rubber goods, and the various compounds of this element.

Besides the two deposits which are being worked there are numerous occurrences of barytes in Canada, some of which have been exploited, while others

have not been touched. Among the former may be mentioned the McKellar Island deposit on the north shore of Lake Superior, from which a considerable quantity has been extracted. The vein in which the barytes occurs here is said to be 45 feet wide, of which one-third consists of white barytes in bands of from 2 to 6 feet wide.

About four miles north of Kingston city, on the road to Elginburg, a very persistent vein of barytes is said to occur, ranging in width from a few inches to over 3 feet. The vein has been opened on lot 17, concession IV, Kingston township, and about 100 tons, mined at different times, have been taken to Kingston. There appear to be large quantities of material which, however, is somewhat impure.

In the Province of Quebec, in Hull township, lot 7, range X, four miles from the Gatineau river, a vein of barytes has been followed for 300 feet. It is from 2 to 4 feet in width and has been worked to depths of 20 feet.

In New Brunswick a certain amount of barytes has been extracted from a deposit situated one mile and a half east of Memramcook, in Westmorland county, but the material is reported to be rather impure.

In Nova Scotia deposits of barytes have been worked or are being worked at Lake Ainslie and Cheticamp in Inverness county; near River John, Pictou county; at Five Islands and in Stewiacke valley, east of Brookfield station in Colchester county.

10,084—15

MINERAL WATERS.

It is very difficult to arrive at accurate figures as regards the production of natural waters in Canada. In many places where mineral springs occur hotel and health resorts have been established, where there is a large consumption of mineral waters for drinking and bathing purposes, and it is practically impossible to obtain accurate figures of quantity or value of waters thus used. In previous years it was evident that the returns received did not represent the full share of the contribution of the mineral waters industry to the grand total of Canada's mineral production. To make up for this deficiency more or less arbitrary values were added to the total of returns received, but such methods are only approximate and always unsatisfactory.

In 1907 and 1908, efforts were made to collect fuller statistics of this product; it was decided to disregard the value of waters used for drinking and bathing purposes at the resorts, and to collect figures representing the value of such waters as actually found their way to the market, either in bulk or bottled.

Therefore, the figures for 1907 and 1908 are derived from the compilation of actual returns received. While they are not complete and certainly do not represent the full value of the products of this industry, it was thought advisable to give them thus, rather than add more or less arbitrary quantities based on mere approximations.

MINERAL WATERS.—TABLE 1.

Annual Production.

Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.
		$			$			$
1888.....	124,850	11,456	1895.....	739,382	126,048	1902.....	.....	100,000
1889.....	424,600	37,360	1896.....	706,372	111,736	1903.....	.....	100,000
1890.....	561,165	66,031	1897.....	749,691	141,477	1904.....	.....	100,000
1891.....	427,485	54,268	1898.....	555,000	100,000	1905.....	.....	100,000
1892.....	640,380	75,348	1899.....	.....	100,000	1906.....	.....	100,000
1893.....	725,096	108,347	1900.....	.....	75,000	1907.....	.....	136,020
1894.....	767,460	110,040	1901.....	.....	100,000	1908.....	.....	151,953

Table 2 presents the value of the imports of mineral waters for the fiscal year, as derived from the Customs returns.

MINERAL WATERS.—TABLE 2.

Imports.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1880	41,797	1890	71,521	1900	30,343
1881	55,763	1891	15,721	1901	40,802
1882	57,953	1892	17,913	1902	91,871
1883	49,546	1893	27,909	1903	108,130
1884	48,613	1894	28,130	1904	137,304
1885	55,864	1895	27,879	1905	161,790
1886	47,006	1896	32,674	1906	178,639
1887	52,989	1897	22,142	1907 (9 months)	143,416
1888	54,891	1898	33,314	1908	153,831
1889	66,331	1899	38,046		

——	1907.		1908.	
	Gals.	$	Gals.	$
Mineral waters, natural, not in bottle. Duty free	6,106	1,237	5,265	600
Mineral and aerated waters..... " 20 %	.....	142,179	.....	153,231
Total		143,416		153,831

NATURAL GAS.

In 1907, natural gas was produced in the Provinces of Ontario, Alberta, and Quebec: production in the respective Provinces ranking in the order named.

In 1908, no production was reported from the Province of Quebec, hence Ontario and Alberta are responsible for the total output of that year.

The production of natural gas is greatly on the increase. After a period of depression—1901 and 1902—when the old Essex field along the border of Lake Erie became exhausted, the industry began to revive, owing to the discovery of new pools in Haldimand, Kent, and Essex counties. Since then, each year has shown a substantial increase over the preceding one.

NATURAL GAS.—TABLE 1.

Annual Production since 1892.

Calendar Year.	Value.	Calendar Year.	Value.
	$		$
1892	150,000	1901	339,476
1893	376,233	1902	195,992
1894	313,754	1903	202,210
1895	423,032	1904	328,376
1896	276,301	1905	379,561
1897	325,873	1906	583,523
1898	322,123	1907	815,032
1899	387,271	1908	1,012,660
1900	417,094		

In 1907, the production of natural gas reached a total value of $815,032; an increase of $231,509, or 39·7 per cent, as compared with 1906. To this total the two main fields of Ontario, namely, the Welland and Haldimand fields, contributed about equal shares of 42 per cent each. About 10 per cent can be attributed to the fields in Kent, and Essex counties. Alberta and Quebec are responsible for 4½ per cent, and 1½ per cent respectively.

The development of the Haldimand field, which began producing only four years ago, and the new pools struck in Essex and Kent counties, were the most important factors in the increased production.

In 1908 there was a continuance of activity in the natural gas industry, and returns received show a total production valued at $1,012,660. This is by far the largest figure ever recorded, and shows an increase of $197,628, or 24·2 per cent, as compared with 1907; of $429,137, or 73·5 per cent as compared with 1906; and of $633,099, or 167 per cent as compared with 1905. Of the total for 1908, the Welland field contributed about 31 per cent; the Haldimand field, 51 per cent; the Essex and Kent fields, 11 per cent, and the Province of Alberta about 7 per cent.

The increase in the production is attributable to the expansion of the Haldimand field, as well as to increased production from all the other fields; with the exception of the Three Rivers field in the Province of Quebec, which became exhausted towards the end of 1907.

In connexion with this last field it may be interesting to quote the following extract from the annual report of the Superintendent of Mines of the Province of Quebec for 1907:—

'In July, 1907, the gas wells operated by the Canadian Gas and Oil Co., whose office is now in Three Rivers, were visited.

'The Company sank a certain number of wells in the vicinity of Louiseville, Yamachiche, and St. Barnabé, 13 of which struck gas in merchantable quantities. These wells begin with a diameter of 6 inch casing and generally strike gas at a depth of from 225 to 300 feet, that is in the neighbourhood of solid rock which seems, in that region, to be the Hudson River limestone that outcrops opposite Three Rivers on the other side of the River St. Lawrence. They pass through clay, fine sand, and gravel of variable thickness before striking the solid rock and gas. The Company has a boring plant and the work is done very rapidly. It has also sunk some testing wells: among others, one on the Yamachiche river, north of St. Barnabé, some twelve miles from the St. Lawrence. At the time of my visit it was 500 feet deep; it began directly on the Trenton limestone, 50 feet of which were pierced, then it met 200 feet of sandstone which seems to me to belong to the Potsdam formation; the remainder is Laurentian gneiss which is found at the northern end of the Trenton basin. This work was abandoned and another testing well begun farther south.

'The producing wells are cased and connected with the distributing line. I examined several of these wells and found the pressure good.

'The Company has laid down lines of pipes which supply gas to St. Barnabé, Yamachiche, and Louiseville, and in the summer of 1907 it completed a line of 8 inch pipe thirteen miles long for supplying gas in Three Rivers. It bought out the old gas company of that city and laid 6 inch pipes in the streets, which enables it to supply gas for heating and lighting at very low prices, which I mentioned in my previous report. The pressure in the city is reduced to four ounces.

'The gas of this region is very good and is not sulphurous. As to duration, everybody knows that it is surface gas, and I estimate that, in order to find more lasting reservoirs, it will be necessary to bore deeper into the rock and locate the wells towards the south.

'The fact must not be lost sight of that these reservoirs are not inexhaustible; that they should be dealt with sparingly, and preparations should be made for the future in case the gas should disappear.'

That the above remarks were opportune is shown by the fact that this gas field became exhausted before the end of 1907; and the Company had to discontinue the supply of gas to its subscribers.

The formations along the north shore of the St. Lawrence river are rather disturbed and broken; they are, therefore, not favourable to any large accumulation of gas in the rocks. In future operations in that region it would be well to make sure of a lasting supply of natural gas in the rocks before making large outlays for extensive systems of distribution.

In 1908, there were in Canada some 480 wells producing natural gas, distributed as follows: Welland field, 281; Haldimand field, 252; Kent and Essex fields, 35; Alberta, 12.

In the west, gas is reported to have been struck in merchantable quantities at Calgary, by the Calgary Natural Gas Company, after several years of persistent exploratory work. It is quite possible that in 1909 a production from the Calgary field will be recorded.

In Alberta, it is now proved that the existence of natural gas in commercial quantities is not confined to the city of Medicine Hat and immediate vicinity.

The Canadian Pacific railway, during the last few years, has been doing a great deal of drilling in search of oil and gas at various points in central Alberta, and has struck large flows of gas at Dunmore Junction, four miles east of Medicine Hat; at Suffield, some twenty-six miles northwest of that city; and at Bow Island, some forty miles southwest of the same point. At this last place it is reported that a flow of gas—estimated at 4,000,000 cubic feet per 24 hours—was struck at a depth of 1,900 feet. These occurrences may not, of course, prove that a continuous field exists between these points, and that natural gas would certainly be struck at any place between them, but it reveals a wide distribution, and an abundant supply of that almost ideal fuel.

That this fuel constitutes a very important asset in the regions where it exists, is proved by the repeated efforts put forth at different times by municipalities: groups of inhabitants interested in local industries, and consumers in Ontario, urging both provincial and federal governments to regulate the exports of natural gas from Canadian territories to the United States in such a way that only the surplus—after the Canadian consumers have been supplied—be allowed to be piped to cities across the border. In 1901, as a result of these numerous representations, the Ontario government cancelled the agreement granting permission to use the bed of the Detroit river to lay a pipe line to export the gas from the Essex field to Detroit, thus cutting off an outlet of export. Moreover, by the Supplementary Revenue Act of 1907, the same provincial government imposed a tax of 2 cents per thousand cubic feet on natural gas; 90 per cent of which tax is remitted when the gas is consumed in the Province. The gas allowed to go to waste is not subject to the remittance, but pays 2 cents per 1,000 feet, as in the case of gas exported.

It is also interesting to note the measures taken by the Dominion government in respect to the exportation of natural gas from Canadian fields. During the third session of the tenth Parliament, an Act was passed regulating the exporta-

tion of electric power, and certain liquids and gases. Of such importance commercially is this law, that it has been deemed advisable to reproduce it here in full.

6-7 EDWARD VII.—CHAP. 16.

AN ACT TO REGULATE THE EXPORTATION OF ELECTRIC POWER AND CERTAIN LIQUIDS AND GASES.

(Assented to 27th April, 1907.)

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. This Act may be cited as *The Electricity and Fluid Exportation Act.*

2. In this Act, unless the context otherwise requires,—

(*a*) 'export' and 'exportation,' when used with reference to electrical power or energy, mean respectively export and exportation from Canada by lines of wire or other conductor, and when used with reference to petroleum, natural gas, water or other fluid, whether liquid or gaseous, capable of being exported, mean respectively export and exportation from Canada through pipe lines or other like contrivances;

(*b*) 'power' means electrical power or energy produced in Canada;

(*c*) 'fluid' means petroleum, natural gas, water or other fluid, whether liquid or gaseous, capable of being exported by means of pipe lines or other like contrivances, and produced in Canada.

3. No person shall export any power or fluid without a license, or any power or fluid in excess of the quantity permitted by his license, or otherwise than as permitted by such license; Provided that any person who, immediately prior to the passing of this Act, is lawfully engaged in the exportation of power or fluid shall not, with respect to such exportation, be subject to the provisions of this Act until six months after this Act comes into force or until he has sooner obtained a license under this Act, unless and except in so far as his exportation at any time during the interval ratably exceeds in quantity of power or fluid the amount which he was exporting prior to the passing of this Act.

(2). No person shall, without a license, construct or place in position any line of wire or other conductor for the exportation of power, or any pipe line or other like contrivance for the exportation of fluid.

4. Subject to any regulations of the Governor in Council in that behalf, the Governor in Council may grant licenses, upon such conditions as he thinks proper, for the exportation of power or fluid where a right to export exists by lawful authority; and such license shall be revocable upon such notice to the licensee as the Governor in Council deems reasonable in each case.

5. Any such license may provide that the quantity of power or fluid to be exported shall be limited to the surplus, after the licensee has supplied for distribution to customers for use in Canada, power or fluid to the extent defined by such

license, at prices and in accordance with conditions, rules and regulations prescribed by the Governor in Council.

(2). Every such license shall be revocable at will by the Governor in Council if the licensee refuses or neglects to comply with any of the conditions imposed with regard to the supply and distribution of power or fluid in Canada.

6. Subject to any regulations of the Governor in Council in that behalf, the Governor in Council may grant licenses for the construction, placing or laying of any line of wire or other conductor for the exportation of power, or of any pipe line or other like contrivance for the exportation of fluid.

7. Every person who exports any such power or fluid contrary to the provisions of this Act shall, for each day on which any such export takes place, be liable to a penalty not exceeding five thousand dollars and not less than one thousand dollars.

8. Every person who, contrary to the provisions of this Act, constructs, places or lays in position any line of wire or other conductor for the exportation of power, or any pipe line or other like contrivance for the exportation of fluid, shall for each such offence be liable to a penalty not exceeding five thousand dollars and not less than one thousand dollars, and to forfeiture and confiscation of such line of wire or other conductor, or of such pipe line or other contrivance, which may forthwith upon such conviction be destroyed or removed by direction of the Governor in Council.

9. The Governor in Council may make regulations not inconsistent with this Act for giving effect to the object and intention thereof, and by such regulations may impose fees to be paid thereunder by applicants for licenses or others.

(2) Such regulations shall be laid before Parliament within fifteen days after the making thereof, or, if Parliament is not then in session, within fifteen days after the opening of the next session thereof.

10. The Governor in Council may, by proclamation published in *The Canada Gazette,* impose export duties, not exceeding ten dollars per annum per horsepower, upon power exported from Canada, or not exceeding ten cents per thousand cubic feet on fluid exported from Canada, and such duties shall be chargeable accordingly after the publication of such proclamation.

(2) The Governor in Council may, by proclamation published in like manner, from time to time remove or re-impose such duties or vary the amount thereof.

(3) The Governor in Council may, by proclamation published in like manner, exempt from the payment of such duties such persons as comply with the direction of the Governor in Council with regard to the quantity of power or fluid to be supplied by such persons for distribution to customers for use in Canada.

PETROLEUM.

The Province of Ontario was responsible for the total production of oil in Canada during both 1907 and 1908. Active drilling explorations in search of oil were carried on in Alberta and British Columbia, but no production has yet been reported from these western Provinces.

In 1904, an Act was passed by the Dominion government, providing for the payment of a bounty of 1½ cents per gallon on crude petroleum produced from wells in Canada. The payments are made on claims submitted by the producers of crude oil to the Minister of Trade and Commerce. These claims have to be substantiated as to quantity, by the certificate of the receiving stations, tanking companies, refineries or other purchasers, as well as by the supervising officers of the Department of Trade and Commerce. Moreover, declarations have to be made of the number and location of the wells from which the oil is derived; and all the books of the claimants are subject to examination at all times by the supervising officer of the department.

The bounty paid on the crude petroleum produced, gives, therefore, as accurate a basis as is available for a reliable statement of the annual production. In 1908 the total bounty paid was $277,193, representing a quantity of 527,987 barrels, of 35 gallons each, of crude petroleum.

Table 1, following, gives the production of oil in Canada since 1901, in barrels of 35 gallons, together with the total value, and average price per barrel:—

PETROLEUM.—TABLE 1.

Annual Production of Crude Petroleum since 1901.

Year.	Barrels of 35 Gallons.	Value.	Average Price Per Barrel.
		$	$ cts.
1901	622,392	1,008,275	1 620
1902	530,624	951,190	1 792
1903	486,637	1,048,974	2 155
1904	503,474	935,895	1 858
1905	634,095	856,028	1 350
1906	569,753	761,760	1 337
1907	788,872	1,057,088	1 340
1908	527,987	747,102	1 415

The figures for the years 1905 to 1908 are deduced from the bounty paid by the federal government; whereas the production for the years 1901 to 1904 is based on direct returns received from the refineries, and the producers. Further details of these figures are given below in tabular form:—

Production of Crude Oil, 1901 to 1904, based on Direct Returns.

Crude Oil.	1901.	1902.	1903.	1904.
	Bls.	Bls.	Bls.	Bls.
Received at refineries	508,677	443,333	410,280	455,074
Direct sales for industrial purposes	113,715	87,291	76,357	48,400
Total sales of crude oil	622,392	530,624	486,637	503,474
Total sales in gallons	21,783,720	18,571,840	17,032,295	17,621,590

Production of Petroleum estimated on the basis of the bounty of 1½ cents per gallon, paid by the Dominion Government, 1905 to 1908.

Petroleum.	Bounty Paid.	Production of Crude Oil Represented.	
	$	In Gals.	In Bls.
1905	332,900	22,193,336	634,095
1906	299,120	19,941,357	569,753
1907	414,158	27,610,526	788,872
1908	277,193	18,479,547	527,987

For the years previous to 1901, the production of crude oil was obtained from government inspection returns, by assuming a ratio of crude to refined. The statistics of production—on this basis—for the years 1881 to 1900, are given in Table 2:—

PETROLEUM.—TABLE 2.

Canadian Oils and Naphtha inspected, and corresponding quantities of Crude Oil.

Calendar Year.	Refined Oils Inspected.	Crude Equivalent Calculated.	Ratio of Crude to Refined.	Equivalent in Barrels of 35 Gallons.	Average Price Per Barrel of Crude.	Value of Crude Oil.
	Gals.	Gals.			$ cts.	$
1881	6,457,270	12,914,540	100:50	368,987	.....	.....
1882	6,135,782	13,635,071	100:45	389,573	.....	.....
1883	7,447,648	16,550,328	100:45	472,866	.....	.....
1884	7,993,995	19,984,987	100:40	571,000	.....	.....
1885	8,225,882	20,564,705	100:40	587,563	.....	.....
1886	7,768,006	20,442,121	100:38	584,061	0 90	525,655
1887	9,492,588	24,980,494	100:38	713,728	0 78	556,708
1888	9,246,176	24,332,042	100:38	695,203	1 02⅜	713,695
1889	9,472,476	24,664,144	100:38	704,690	0 92½	653,600
1890	10,174,894	26,776,037	100:38	795,030	1 18	902,734
1891	10,065,463	26,435,430	100:38	755,298	1 33¾	1,010,211
1892	10,370,707	27,291,334	100:38	779,753	1 26¼	984,438
1893	10,618,804	27,944,221	100:38	798,406	1 09½	874,255
1894	11,027,082	29,018,637	100:38	829,104	1 00¾	835,322
1895	10,674,232	25,414,838	100:42	726,138	1 49⅜	1,086,738
1896	10,684,284	25,438,771	100:42	726,822	1 59	1,155,647
1897	10,434,878	24,844,995	100:42	709,857	1 42½	1,011,546
1898	11,148,348	26,543,685	100:42	758,391	1 40	1,061,747
1899	11,927,981	28,399,955	100:42	808,570	1 48⅜	1,202,020
1900	13,428,422	24,867,449	100:54	710,498	1 62	1,151,007

By referring to Table 1, it will be noticed that the production for 1908 shows a considerable falling off, as compared with 1907. The decrease is 260,885 barrels, or 33·07 per cent in quantity; but, owing to the slightly increased prices which prevailed in 1908 for crude petroleum, the decrease in value is only $309,986, or 29·32 per cent. This decrease is mainly due to the diminished production of the Merlin field in East Tilbury and Raleigh townships in Kent county.

The Imperial Oil Company have kindly given us their estimate of the production of the various Ontario oil fields during 1907 and 1908, and by comparing these figures, the source of the falling off will be apparent. The figures of production do not quite agree with those calculated on the basis of the bounty paid; but they are very interesting for the purpose of comparison:—

Production of Ontario Oil Fields, 1907 and 1908.

District.	1907.	1908.
	Bls.	Bls.
Dutton	14,698	12,268
Leamington (Staples, Comber, and Blytheswood)	16,210	18,117
Bothwell	40,556	39,820
Richardson (Chatham)	941	2,882
Thamesville	1,139	853
Moore township	32,720	25,667
Oilsprings	55,813	61,252
East Tilbury and Raleigh	344,358	170,589
Romney	49,783	11,165
Petrolia, (includes all districts not enumerated above)	206,285	171,019
	762,503	513,632

Table 3 gives the value of the products manufactured during the respective years by the oil refineries of Canada. It is to be remembered, however, that the refineries use a considerable proportion of imported crude petroleum, which is probably equal in amount to the total production of Canadian crude oil; for in the fiscal year ending March 30, 1908, the imports of crude petroleum—as shown by the Customs' reports—amounted to nearly 25,000,000 gallons.

PETROLEUM.—TABLE 3.

Value of the Production of Canadian Oil Refineries.

Calendar Year.	Value.	Calendar Year.	Value.
	$		$
1887	1,288,109	1898	1,825,265
1888	1,401,459	1899	1,490,870
1889	1,414,184	1900	1,620,705
1890	1,638,420	1901	1,251,373
1891	1,534,509	1902	1,222,641
1892	1,782,365	1903	1,302,104
1893	1,675,784	1904	975,840
1894	1,567,134	1905	(a) 1,815,525
1895	1,806,237	1906	(a) 2,120,343
1896	1,876,913	1907	(a) 2,245,980
1897	1,672,429	1908	(a) 1,995,982

(a) Derived from both Canadian and imported crude oils.

The following tables give the statistics of the oil industry of Canada: oil inspected, exported, imported, etc., both crude and manufactured.

PETROLEUM.—TABLE 4.

Total Amount of Oil Inspected, Canadian and Imported.

Fiscal Year.	Refined in Canada.	Imported.	Total.	Canadian.	Imported.
	Gals.	Gals.	Gals.	%	%
1881	6,406,783	476,784	6,883,567	93·1	6·9
1882	5,910,747	1,351,412	7,262,159	81·4	18·6
1883	6,970,550	1,190,828	8,161,378	85·4	14·6
1884	7,656,001	1,142,575	8,798,586	87·0	13·0
1885	7,661,617	1,278,115	8,939,732	85·7	14·3
1886	8,149,472	1,327,616	9,477,088	86·0	14·0
1887	8,243,962	1,665,604	9,909,566	83·2	16·8
1888	9,545,895	1,821,342	11,367,237	84·0	16·0
1889	9,462,834	1,767,812	11,230,646	84·3	15·7
1890	10,121,210	2,020,742	12,141,952	83·4	16·6
1891	10,270,107	2,022,002	12,292,109	83·6	16·4
1892	10,238,426	2,429,445	12,667,871	80·8	19·2
1893	10,683,806	2,641,690	13,325,496	80·2	19·8
1894	10,824,270	5,633,222	16,457,492	65·8	34·2
1895	10,936,992	5,650,994	16,587,986	65·9	34·1
1896	10,533,951	5,807,991	16,341,942	64·5	35·5
1897	10,506,526	6,248,743	16,755,269	62·7	37·3
1898	10,796,847	6,880,734	17,677,581	61·1	38·9
1899	11,005,804	7,232,348	18,238,152	60·3	39·7
1900	13,014,713	*8,216,207	21,230,920	61·3	38·7
1901	12,674,977	*9,232,165	21,907,142	57·9	42·1
1902	10,494,874	*10,916,396	21,411,270	49·0	51·0
1903	8,615,892	*14,479,176	23,095,068	37·3	62·7
1904	7,292,113	*17,369,930	24,662,043	29·6	70·4
1905	17,520,035	*10,284,053	27,804,088	63·0	37·0
1906	18,634,155	*9,255,200	27,889,355	66·8	33·2
1907 (9 months)	15,365,933	*6,879,494	22,245,427	69·1	30·9
1908	22,887,026	*6,295,457	29,182,483	78·4	21·6

* Item (c) Table 6.

PETROLEUM.—TABLE 5.

Exports of Crude and Refined Petroleum, 1881-1908.

Calendar Year.	Crude Oil.		Refined Oil.		Total.	
	Gals.	Value.	Gals.	Value.	Gals.	Value.
		$		$		$
1881					501	99
1882					1,119	286
1883					13,283	710
1884					1,098,090	30,168
1885					337,967	10,562
1886					241,716	9,855
1887					473,559	13,831
1888					196,602	74,542
1889					235,855	10,777
189C					420,492	18,154
1891	446,770	18,471	585	104	447,355	18,575
1892	310,387	12,945	1,146	100	311,533	13,045
1893	107,719	3,696	2,196	394	109,915	4,090
1894	53,985	2,773	5,297	513	59,282	3,286
1895	22,831	1,044	10,237	2,023	33,068	3,067
1896	601	101	7,489	999	8,090	1,100
1897			342	49	342	49
1898	96	4	12,735	3,001	12,831	3,005
1899			3,425	859	3,425	859
1900	40	2	8,559	394	8,559	2,396
1901	14,168	691	375	66	14,543	757
1902	400	40	626	146	1,026	186
1903	350	15	1,013	190	1,363	205
1904	4,207	213	2,126	470	6,333	683
1905	35	2	7,228	2,078	7,263	2,080
1906	900	141	8,938	1,401	9,838	1,542
1907	1,125	102	3,132	575	4,257	677
1908			296	71	296	71

By glancing over Table 6, it will be perceived that a large quantity of crude oil is imported into Canada. The greater part of this goes to the refineries. In 1908, this importation of crude oil amounted to 24,866,963 gallons; representing 710,485 barrels, of 35 gallons each; which is a considerable increase over 1907, when it was 13,252,968 gallons, or 378,656 barrels.

PETROLEUM.—TABLE 6.

Imports of Petroleum and Products thereof, during the Fiscal Years 1907 and 1908.

Products.	1907 (9 mos. ending March.)		1908 (12 mos. ending March.)	
	Gals.	Value.	Gals.	Value.
		$		$
(*a*) Petroleum crude, fuel and gas oils (8233 specific gravity)	13,252,968	469,730	24,866,963	889,080
(*b*) Crude petroleum, gas oils (other than benzine and gasoline)	10,146	1,214	52,605	5,900
(*c*) Coal and kerosene, distilled, purified or refined, and petroleum, N.E.S.	6,879,494	578,329	6,295,457	503,829
(*d*) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite costing more than 30 cents per gallon	4,654	971	2,232	1,035
(*e*) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon	1,902,702	248,200	3,262,846	411,172
(*f*) Products of petroleum	1,595,897	181,817	1,834,615	195,003
Total	23,645,861	1,480,261	36,314,718	2,006,019

(*a*) Free. (*b*) Duty 1½c. per gal. (*c*), (*e*), and (*f*) Duty 2½c. per gal. (*d*) 20 per cent.

PETROLEUM.—TABLE 7.

Imports of Petroleum and Products thereof, years 1880-1908.

Fiscal Year.	Gals.	Value.	Fiscal Year.	Gals.	Value.
		$			$
1880	687,641	131,359	1895	7,577,674	525,372
1881	1,437,475	262,168	1896	8,005,891	735,913
1882	3,007,702	398,031	1897	8,415,302	697,169
1883	3,086,316	358,546	1898	9,074,311	724,519
1884	3,160,282	380,082	1899	10,394,208	763,303
1885	3,767,441	415,195	1900	9,633,647	864,833
1886	3,819,146	421,835	1901	11,082,822	982,640
1887	4,290,003	467,003	1902	13,220,005	1,107,207
1888	4,523,056	408,025	1903	18,799,312	1,643,371
1889	4,650,274	484,462	1904	24,521,115	2,152,623
1890	5,075,650	515,852	1905	35,296,332	2,151,514
1891	5,071,386	498,330	1906	32,624,410	1,908,177
1892	5,649,145	475,732	1907 (9 months)	23,645,861	1,480,261
1893	6,002,141	446,389	1908	36,314,718	2,006,019
1894	6,597,108	439,988			

PETROLEUM.—TABLE 8.

Imports of Crude and Manufactured Oils, other than Illuminating, 1881-1908.

Fiscal Year.	Gals.	Fiscal Year.	Gals.
1881	960,691	1895	1,106,993
1882	1,656,290	1896	1,079,965
1883	1,895,488	1897	802,286
1884	2,017,707	1898	1,047,026
1885	2,489,326	1899	1,017,278
1886	2,491,530	1900	1,406,700
1887	2,624,399	1901	1,838,966
1888	2,701,714	1902	2,296,353
1889	2,882,462	1903	4,316,010
1890	3,054,908	1904	7,141,109
1891	3,049,384	1905	25,002,047
1892	3,047,199	1906	23,365,674
1893	1,481,749	1907 (9 months)	16,761,713
1894	1,860,829	1908	30,017,029

* The figures for the years from 1881 to 1891, inclusive, represent the total imports of petroleum and products, less the quantity of imported illuminating oils, inspected by the Inland Revenue Department. For 1895 and subsequent years, the table is composed of items (*a*), (*b*), (*c*), and (*f*) of Table 6.

PETROLEUM.—TABLE 9.

Imports of Paraffin Wax, 1883-1908.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1883	43,716	5,166	1896	150,287	10,042
1884	39,010	6,079	1897	138,703	7,945
1885	59,967	8,123	1898	103,570	5,987
1886	62,035	7,953	1899	92,242	4,025
1887	61,132	6,796	1900	47,400	3,529
1888	53,862	4,930	1901	118,848	9,639
1889	63,229	5,256	1902	225,885	12,750
1890	239,229	15,844	1903	592,642	28,674
1891	753,854	50,275	1904	418,967	18,440
1892	733,873	48,776	1905	81,992	7,795
1893	452,916	38,935	1906	112,612	9,721
1894	206,099	15,704	1907 (9 months)	55,021	5,922
1895	163,817	11,579	1908	62,308	8,041

PETROLEUM.—TABLE 10.

Imports of Paraffin Wax Candles, 1880-1908.

Fiscal Year	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1880	10,445	2,269	1895	19,448	2,541
1881	7,494	1,683	1896	25,787	4,072
1882	5,818	1,428	1897	25,114	2,929
1883	7,149	1,734	1898	60,802	4,427
1884	8,755	2,229	1899	62,331	5,856
1885	9,247	2,449	1900	27,663	3,671
1886	12,242	2,587	1901	44,562	3,588
1887	21,364	3,611	1902	51,120	5,752
1888	22,054	2,829	1903	83,377	9,025
1889	8,038	1,337	1904	83,471	9,078
1890	7,233	1,186	1905	137,353	15,293
1891	10,598	2,116	1906	148,808	15,804
1892	9,259	1,952	1907 (9 months)	38,900	5,088
1893	8,351	1,735	1908	156,934	20,035
1894	10,818	1,685			

A reference to Tables 1 and 2 will show that, the production of crude oil in 1907 was the highest since 1899. This is accounted for by the active development of the Merlin or East Tilbury field, which although discovered in December, 1905, was at its best in 1907. During that year it was responsible for nearly 43 per cent of the total production of oil in Ontario. In 1908, this field did not produce as much as during the previous year, and is responsible for the greater part of the decrease in the total production.

OIL-SHALES IN NEW BRUNSWICK AND NOVA SCOTIA.

The oil-shale deposits of New Brunswick, which cover large areas in Kings, Albert, and Westmorland counties, have been known for a long period. As early as 1862, some steps were taken towards their exploitation as a source of mineral oil. This enterprise, however, was soon abandoned after the discovery of the Pennsylvania and other oil fields.

In 1908, the Albertite, Oilite, and Cannel Coal Co., Ltd., of New York—represented in New Brunswick by Mr. Matthew Lodge, of Moncton—took up again very actively the question of distillation of oil from these Albert shales, and 45 tons of the oil-shales—which occur at Baltimore in Albert county—were sent to Glasgow, Scotland, for the purpose of making a commercial test in the works of the Pumpherston Oil Company. Dr. R. W. Ells, on the recommendation of Dr. Eugene Haanel, Director of Mines, was commissioned to go to Scotland for the purpose of witnessing and reporting on these experiments. The preliminary report on these tests was published in the report of the Mines Branch, Department of Mines, for 1908. The results were very satisfactory, as the average yield per ton of shale was 40·09 gallons of crude oil, and 76·94 pounds of sulphate of ammonia. This compares very favourably with the shales which are worked so extensively in Scotland, the yield of which rarely exceeds 25 to 30 gallons of crude oil.

Should the New Brunswick enterprise become a commercial success there is little doubt that it will stimulate the exploitation of other oil-shale deposits which exist in places in Nova Scotia, notably at Stellarton in Pictou county. The Stellarton deposits were also worked to some extent in the early sixties.

The Mines Branch of the Department of Mines has installed a distillation furnace and apparatus in its chemical laboratory, for the purpose of testing oil-shales, determining their yield of crude oil, sulphate of ammonia, etc. It may be mentioned that the oil-shale industry is successfully carried on not only in Scotland, but in France and New South Wales. The outlook for the establishment of an oil-shale industry in Canada is very promising.

PHOSPHATE.

The greater part of the production of phosphate in Canada results from the exploitation of mica deposits, in which apatite occurs as an associated mineral, and is saved as a by-product.

This phosphate rock, or apatite, is used mainly for the manufacture of fertilizers and also for the production of phosphorus, this substance being manufactured by the Electric Reduction Company of Buckingham, Province of Quebec.

The Canadian phosphate industry during the last fifteen years has been very intermittent and spasmodic, as is shown by the irregularity of the annual production, which varies between the wide limits of 600 and 3,000 tons. Previous to 1892 this industry was very flourishing, but the discovery of immense deposits in the United States, which could be cheaply mined, caused it practically to collapse. In 1907, our returns show that a quantity of 824 tons of phosphate rock found its way to the market, representing a value of $6,018. The figures for 1908 show a considerable increase, having been 1,596 tons valued at $14,794.

The statistics of the phosphate industry are given in the following tables :—

PHOSPHATE.—TABLE 1.

Annual Production.

Calendar Year.	Tons.	Average Value per ton.	Value.	Calendar Year.	Tons.	Average Value per ton.	Value.
		$ cts.	$			$ cts.	$
1886	20,495	14 85	304,338	1898	733	5 00	3,665
1887	23,690	13 50	319,815	1899	3,000	6 00	18,000
1888	22,485	10 77	242,285	1900	1,415	5 02	7,105
1889	30,988	10 21	316,662	1901	1,033	6 07	6,280
1890	31,753	11 37	361,045	1902	856	5 79	4,953
1891	23,588	10 24	241,603	1903	1,329	6 18	8,214
1892	11,932	13 20	157,424	1904	817	5 62	4,590
1893	8,198	8 65	70,942	1905	1,300	6 48	8,425
1894	6,861	6 00	41,166	1906	850	7 50	6,375
1895	1,822	5 25	9,565	1907	824	7 30	6,018
1896	570	6 00	3,420	1908	1,596	9 26	14,794
1897	908	4 39	3,984				

10,084—16½

PHOSPHATE.—TABLE 2.

Exports.

Calendar Year.	Ontario.		Quebec.		Totals.	
	Tons.	*Value.	Tons.	*Value.	Tons.	*Value.
		$		$		$
1878	824	12,278	9,919	195,831	10,743	208,109
1879	1,842	20,565	6,604	101,470	8,446	122,035
1880	1,387	14,422	11,673	175,664	13,060	190,086
1881	2,471	36,117	9,497	182,339	11,968	218,456
1882	568	6,338	16,585	302,019	17,153	308,357
1883	50	500	19,666	427,168	19,716	427,668
1884	763	8,890	20,946	415,350	21,709	424,240
1885	434	5,962	28,535	490,331	28,969	496,293
1886	644	5,816	19,796	337,191	20,460	343,007
1887	705	8,277	22,447	424,940	23,152	433,217
1888	2,643	30,247	16,133	268,362	18,776	298,609
1889	3,547	38,833	26,440	355,935	29,987	394,768
1890	1,866	21,329	26,591	478,040	28,457	499,369
1891	1,551	16,646	15,720	368,015	17,271	384,661
1892	1,501	12,544	9,981	141,221	11,482	153,765
1893	1,990	11,550	5,748	56,402	7,738	67,952
1894	1,980	10,560	3,470	29,610	5,450	40,170
1895	.....	.....	250	2,500	250	2,500
1896	1	5	299	2,990	300	2,995
1897	70	450	165	400	235	850
1898	21	240	702	8,000	723	8,240
1899	215	1,850	93	1,725	308	3,575
1900	.....	.....	.....	.....	Nil	Nil
1901	.....	.....	.....	.....	6	120
1902	.....	.....	.....	.....	70	1,880
1903	.....	.....	.....	.....	1	20
1904	.....	.....	.....	.....	191	5,348
1905	.....	.....	.....	.....	40	1,253
1906	.....	.....	.....	.....	.....	.....
1907	.....	.....	.....	.....	.....	.....
1908	.....	.....	.....	.....	1	30

* These values do not compare with those in Table 1; the spot value is adopted for the production, while the exports are valued upon quite a different basis.

During the decade of 1880 to 1890 the phosphate industry was very prosperous in Canada, when the apatite deposits of the region of the Ottawa River basin, in western Quebec and eastern Ontario, were actively worked. The product of those phosphate mines was exported to both the United States and Europe. However, the discovery of the Florida and Tennessee deposits, which can be worked on a large scale and cheaply by steam shovels, and later on the discovery of the Algerian deposits, were the cause of the almost complete abandonment of the phosphate industry in Canada, where the mineral occurs as scattered deposits of apatite, which are rather expensive to work.

These apatite deposits, from which large supplies of phosphate could be obtained, constitute a reserve which represents valuable assets to the country, and should conditions warrant it a great number of mines and deposits could be started on short notice. That such a time is perhaps not far remote may be inferred by the reports drawn up by the committee on the conservation of natural

resources, appointed by the United States Government. In an interesting paper by F. B. Van Horn,[1] it is pointed out that, as growing crops deplete the soil of its phosphoric acid, if no steps are taken to return this substance, the soil must eventually become non-producing. He estimates that, on the basis of an increase of production at the rate of the past twenty years, the present visible available supply of phosphate rock in the United States will be exhausted in twenty-five years.

Dr. Van Hise[2] remarks that of the three plant foods required for the fertility of the soil, viz., nitrogen, potassium, and phosphorus, this last element is the most difficult to replace and to supply, and that the phosphate deposits constitute the most important source of this element.

After going into figures showing the loss of phosphoric acid from the soil, he remarks: "To make good the phosphorus lost to the soil in the United States by reckless disregard of the future, would require the present output of our mines for more than a century, even if at once it were possible to prevent further depletion of the soil, and no more of our phosphate rock were required to neutralize current waste."

Realizing the importance of conserving the phosphate resources, "on December 8th, 1908, the phosphate lands of the west (of the United States) were formally withdrawn from private entry, thus retaining these deposits of fundamental importance to the future of the nation as its property."[3]

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[1] The Phosphate Deposits of the United States, F. B. Van Horn, Conservation of Mineral Resources. United States Geological Survey, 1909.

[2] The Conservation of the Soil. By C. R. Van Hise, May, 1909. American Academy of Political and Social Science.

[3] Ibid.

PYRITES.

In the last few years, the production of pyrites has shown a steady increase, and in 1908 the figures represent the highest tonnage recorded since 1893. In 1907 the production was 46,243 tons valued at $212,491, and in 1908 it reached 47,336 tons valued at $224,824. This production is derived from deposits in the Provinces of Quebec and Ontario, and it is used for the manufacture of sulphuric acid, partly in Canada and partly in the United States.

The following tables give the statistics of the Canadian production of pyrites since 1886, the imports of brimstone and crude sulphur, and the exports of pyrites.

PYRITES.—TABLE 1.

Annual Production.

Calendar Year.	Tons, 2,000 lbs.	Value.	Calendar Year.	Tons, 2,000 lbs.	Value.
		$			$
1886	42,906	193,077	1898	32,218	128,872
1887	38,043	171,194	1899	27,687	110,748
1888	63,479	285,656	1900	40,031	155,164
1889	72,225	307,292	1901	35,261	130,544
1890	49,227	123,067	1902	35,616	138,939
1891	67,731	203,193	1903	33,982	127,713
1892	59,770	179,310	1904	37,180	134,033
1893	58,542	175,626	1905	33,339	125,486
1894	40,527	121,581	1906	42,743	169,990
1895	34,198	102,594	1907	46,243	212,491
1896	33,715	101,155	1908	47,336	224,824
1897	38,910	116,730			

PYRITES.—TABLE 2.

Imports :—Brimstone and Crude Sulphur.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1880	1,775,489	27,401	1895	4,900,225	56,965
1881	2,118,720	33,956	1896	6,934,190	63,973
1882	2,375,821	40,329	1897	8,672,751	87,719
1883	2,336,085	36,737	1898	38,026,798	373,786
1884	2,195,735	37,463	1899	24,517,026	265,799
1885	2,248,986	35,043	1900	21,128,656	215,433
1886	2,922,043	43,651	1901	23,856,651	270,608
1887	3,103,644	38,750	1902	24,640,735	325,307
1888	2,048,812	25,318	1903	24,412,737	259,123
1889	2,427,510	34,006	1904	19,364,730	204,663
1890	4,440,799	44,276	1905	23,435,140	242,251
1891	3,601,748	46,351	1906	43,047,672	436,156
1892	4,769,759	67,095	1907 (9 months)	25,854,615	277,439
1893	6,381,203	77,216	1908*	51,806,739	517,249
1894	5,845,463	61,558			

* Brimstone, crude or in roll or flour, or sulphur in roll or flour.

PYRITES.—TABLE 3.

Exports of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1894	8,532	33,205	1902	18,584	50,178
1895	7,705	38,298	1903	21,067	59,604
1896	15,002	33,837	1904	18,279	49,911
1897	15,096	30,812	1905	19,755	55,767
1898	9,804	26,387	1906	26,050	65,349
1899	15,599	34,084	1907	25,056	80,139
1900	17,620	41,182	1908	17,283	96,600
1901	24,971	57,263			

Quebec.

In 1907 two mines of pyrites in the Province of Quebec made returns of production. These were: the Nichols Chemical Company, working the Albert mines at Capelton; and the Eustis Mining Company, operating the Eustis mine at Eustis. In 1908 the former Company had closed the Albert mines, which were not worked during that year, and only the Eustis Mining Company recorded a production. However, prospecting and development work has been going on during the last two years at various points in the Eastern townships of the Province of Quebec on pyrite deposits, which also usually contain a certain proportion of copper pyrites. Among these properties in course of development may be mentioned the Suffield mine, in Ascot township, which, according to the report of the Superintendent of Mines of the Province of Quebec, has now several thousand tons of ore in heaps in the mine yard.

Ontario.

In Ontario the mining of pyrites as an ore of sulphur for the manufacture of sulphuric acid is developing steadily. In 1908 the following companies worked deposits of pyrites, but all did not ship, as several confined themselves to development work:—

Nichols Chemical Company, Sulphide, Ont.
Northern Pyrites Company, Dinorwic, Ont.
Northland Mining Company, London, Ont.

The pyrite deposits of Ontario have been made the subject of a report by Mr. E. L. Fraleck, published in the Sixteenth Ontario Bureau of Mines Report, for 1907.

The principal centre of the iron pyrites industry in Ontario is in Madoc township, where the Nichols Chemical Company, in 1907, erected, at Sulphide, a sulphuric acid plant which is in successful operation. The main supply of ore used in these works is derived from the Company's own mine, but they also buy ore from other workings opened in the vicinity. Deposits of pyrites also occur in the region, traversed by the Timiskaming and Northern Ontario railway, and one of these

situated near Rib lake, is being actively worked by the Northland Mining Company. The product from this mine is exported to the United States.

At the Helen iron mine in the Michipicoten district a large body of sulphur ore has been struck in the underground workings, and the Lake Superior Corporation, Sault Ste. Marie, who are working the iron mine, have made shipments of sulphur ore.

The Northern Pyrites Company are developing a very promising deposit on Big Vermilion lake, north of Minnitaki. This deposit is situated on the Lake Superior branch of the Grand Trunk Pacific, and the Company will begin shipping as soon as the railway is ready to receive freight.

According to the quotations of the Engineering and Mining Journal, in 1908, the price of pyrite f. o. b. at the mine or at Atlantic coast ports, varied between 9 cents and 13 cents per unit of sulphur contained, according to size of ore and the presence of deleterious elements. The availability of any pyrite deposit would, therefore, depend to a great extent on transportation facilities and on its distance from sulphuric acid works.

The following remarks taken from Mr. Fraleck's report mentioned above, on the requirements of pyrite deposits, are interesting :—

"(1) The deposit must be of sufficient size to warrant the cost of development necessary to maintain a constant supply;

(2) It must be favourably situated for transportation facilities;

(3) It must be free from any volatile impurities, such as lead, zinc, arsenic, etc. Through the development of the contact process, which necessitates washing of the gases, it is possible to utilize certain ores that formerly could only be employed for special purposes. Impure ores, however, notwithstanding high sulphur content, are heavily penalized.

(4) The ore must contain approximately at least 40 per cent of sulphur content. The scarcity of pyrite just at the present time, however, is such that an ore grading between 35 and 40 per cent would be saleable, especially if of good roasting quality, but at a somewhat diminished price on account of the extra material requiring to be handled.

(5) The ore must be of good roasting quality. A good burning pyrite ore will roast down to one-half per cent of sulphur in the cinder. If the gangue consists of easily fusible silicates this percentage will be correspondingly increased. With the improvements in roasting furnaces, however, in recent years, and more care and skill being exercised in the handling of the mechanical adjustments, better results are constantly being achieved, and probably as much depends upon skilful roasting as upon the character of the ore."

SALT.

The salt fields of southwestern Ontario are responsible for the whole Canadian production of salt in both 1907 and 1908. No returns of production were received from New Brunswick, or from Manitoba, where in years past a small local salt industry had developed, using as raw material the brine from some salt springs.

In 1907 the total sales of Canadian salt were 72,697 tons, valued at $342,315. This was a decrease of 4,023 tons, or 5·2 per cent as compared with 1906; but as a much greater proportion of fine table and dairy salt was made, the total value in 1907 was $13,185, or 4 per cent higher than in the previous year. In 1908 the sales were 79,975 tons valued at $378,798, an increase of 7,278 tons or 9·1 per cent in quantity, and $36,483, or 9·6 per cent in value, as compared with 1907.

The above values represent the value of the salt, exclusive of the packages. The value of the packages (barrels, bags, etc.,) used in 1908 was $168,019, and in 1907 the value was $149,823.

Detailed statistics of the production during the past five years, showing the total sales of salt, the value of the sales, (exclusive of packages), the values of the packages used, stock in manufacturers' hands at the end of each year, number of men employed and wages paid, are given in Table 1, while the total annual production since 1886 is given in Table 2.

SALT.—TABLE 1.

Detailed Statistics of Production, 1904-1908.

——		1904.	1905.	1906.	1907.	1908.
Sales of salt	Tons	69,477	67,340	76,762	72,697	79,975
Value of salt, (exclusive of packages)	$	321,778	320,858	329,130	342,315	378,798
Value of packages	$	140,216	113,004	147,705	149,823	168,019
Stock in manufacturer's hands at end of year	Tons	8,497	5,206	6,365	3,923	5,631
Men employed	No.	.....	191	210	215	207
Wages paid	$	.....	83,391	92,000	95,667	95,575

SALT.—TABLE 2.

Annual Production, 1886–1908.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1886	62,359	227,195	1898	57,142	248,639
1887	60,173	166,394	1899	59,339	254,390
1888	59,070	185,460	1900	62,055	279,458
1889	32,832	120,547	1901	59,428	262,328
1890	43,754	198,857	1902	64,456	292,581
1891	45,021	161,179	1903	62,452	297,517
1892	45,486	162,041	1904	69,477	321,778
1893	62,324	195,926	1905	67,340	320,858
1894	57,199	170,687	1906	76,720	329,130
1895	52,376	160,455	1907	72,697	342,315
1896	43,960	169,693	1908	79,975	378,798
1897	51,348	225,730			

As will be seen by the above table, the salt industry is slowly but steadily developing; the figures of production for 1908 being the highest yet recorded.

The salt fields of western Ontario are very extensive. The salt beds form part of the Onondaga formation of Silurian age, and the saliferous horizons underlie a territory extending from Kincardine to Lake Erie, bordering Lake Huron and the Detroit river. This basin measures an extreme length of 150 miles, with a maximum width of 40 miles at the centre and tapering towards the end. This would cover an area of over 2,500 square miles. An idea of the immense deposits of salt contained in this area may be gathered from the fact that a bore-hole sunk at Goderich, in Huron county, to a depth of 1,517 feet, went through six beds of salt, ranging in thickness from 6 feet to 35 feet; whereas at Windsor, in a well 1,672 feet deep, four beds were traversed, one of which is said to measure 250 feet in thickness.

So far, the salt industry of western Ontario is confined to the production of salt for the trade, but with such deposits, which are practically inexhaustible, there is a wide field for the establishment of a soda industry. The imports into Canada of the products of the soda industry reach a very high figure, as may be gathered from the following items of importation during the fiscal year ending in March, 1908.

—	Lbs. imported.	Value.
		$
Soda, ash or borilla	23,330,041	184,340
Soda bichromate	284,960	17,089
Caustic soda, in packages of 25 lbs. or more	10,067,829	189,976
Sal soda	11,449,841	107,054
Sulphate of soda	1,482,813	7,813

As at present carried on in western Ontario, the salt industry consists essentially in the production of table, dairy, and coarse salt, and a small quantity of land salt. These are manufactured by forcing water down bore-holes sunk to the rock salt bed, through a casing, inside of which is a pipe of smaller diameter. A powerful pump forces water down the outer tube; this dissolves the salt, eventually forming large cavities at the bottom of the well, which offer a great surface of salt to the action of the water. The water forced downwards is charged to saturation in the salt cavity, and as the rock is not fissured or porous, this brine is forced upwards through the inner tube. After a process of purification and settling, this brine is evaporated either in vacuum pans or in large open air vats, and after passing through mechanical dryers or over drying floors, the salt is ready for the market.

The following are analyses of brines obtained from wells in these salt fields. The figures are per 1,000 parts in weight.

Analyses of Brines.*

—	Sodium chloride.	Calcium chloride.	Magnesium chloride.	Sulphate of lime.	Specific gravity.	Degrees of salometer.
Goderich, sample taken August 19, 1866	259·000	0·432	0·254	1·882	1·205	100
Goderich, same well as above, November 5, 1868	236·410	0·190	0·410	4·858	1·187	92
Clinton well	204·070	0·470	0·184	5·583	1·157	80
Kincardine	241·350	0·840	0·230	3·264	1·191	94

* Analyses by Dr. T. Sterry Hunt, laboratory, Geological Survey of Canada. Figures are per 1,000 parts by weight.

The following tables give the statistics of the exports and imports of salt since 1880:—

SALT.—TABLE 2.

Exports.

Calendar Year.	Bus.	Value.	Calendar Year.	Bus.	Value.
		$			$
1880	467,641	46,211	1896	3,842	899
1881	343,208	44,627	1897	5,383	1,193
1882	181,758	18,350	1898	5,202	1,252
1883	199,733	19,492	1899	11,205	2,773
1884	167,029	15,291	1900	37,653	8,997
1885	246,794	18,756	1901	39,224	6,510
1886	224,943	16,886	1902	9,331	3,798
1887	154,045	11,526			
1888	15,251	3,987		Lbs.	
1889	8,557	2,390			
1890	6,605	1,667	1903	1,915,648	5,927
1891	5,290	1,277	1904	1,006,026	4,186
1892	2,000	504	1905	1,447,728	6,112
1893	4,940	1,267	1906	618,707	3,437
1894	4,639	1,120	1907	2,222,542	7,709
1895	4,865	959	1908	529,229	3,840

SALT.—TABLE 3.

Imports :—Salt Paying Duty.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1880	726,640	3,916	1895	8,498,404	29,881
1881	2,588,465	6,355	1896	7,665,257	24,550
1882	3,679,415	12,318	1897	11,911,766	33,470
1883	12,136,968	36,223	1898	11,068,785	32,792
1884	12,770,950	38,949	1899	11,781,453	32,839
1885	10,397,761	31,726	1900	11,028,337	30,180
1886	12,266,021	39,181	1901	11,625,688	34,087
1887	10,413,258	35,670	1902	13,892,849	39,605
1888	10,509,799	32,136	1903	14,554,693	41,785
1889	11,190,088	38,968	1904	29,779,183	73,826
1890	15,135,109	57,549	1905	18,473,868	58,056
1891	15,140,827	59,311	1906	21,366,064	59,805
1892	18,643,191	65,963	1907 (9 mos.)	21,834,435	58,553
1893	21,377,339	79,838	1908	31,019,400	79,341
1894	15,867,825	53,336			

—	Duty.	1907.*		1908.	
		Lbs.	Value.	Lbs.	Value.
			$		$
Salt, coarse, N.E.S.	5c. per 100 lbs.	12,231,955	25,309	17,340,300	27,264
Salt, fine, in bulk	5c. "	3,340,990	7,732		
Salt, N.E.S., in bags, barrels or other packages	7½c. "	6,261,490	25,512	13,679,100	52,077
Total		21,834,435	58,553	31,019,400	79,341

*Nine months.

SALT.—TABLE 4.

Imports :—Salt not Paying Duty.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1880	212,714,747	400,167	1895	201,691,248	332,711
1881	231,640,610	488,278	1896	205,005,100	338,888
1882	166,183,962	311,489	1897	215,844,484	312,117
1883	246,747,113	386,144	1898	202,634,927	293,410
1884	225,390,121	321,243	1899	183,046,365	267,520
1885	171,571,209	255,719	1900	193,554,550	295,253
1886	180,205,949	255,359	1901	216,271,603	339,887
1887	203,042,332	285,455	1902	238,648,737	385,629
1888	184,166,986	220,975	1903	232,708,675	361,185
1889	180,847,800	253,009	1904*	198,634,047	338,082
1890	158,490,075	252,291	1905*	196,907,500	340,954
1891	195,491,410	321,239	1906*	203,080,000	352,214
1892	201,831,217	314,995	1907†	139,459,900	240,841
1893	191,595,530	281,462	1908	200,944,800	350,878
1894	196,668,730	328,300			

* Salt imported from the United Kingdom, or any British possession, or imported for the use of the sea or gulf fisheries.

†Nine months only.

It is seen that the exports of salt are insignificant, but the imports are considerable; in fact, in value they amount to slightly more than the salt production of Canada. The following table has been inserted to give an approximate idea of the consumption of salt in Canada. The figures of production are for the calendar year, and those of imports for the fiscal year, and for that reason the table is not accurate, but is sufficiently so to serve the purpose.

Consumption of Salt in Canada in 1908.

	Lbs.	Value.
		$
Canadian salt, production in 1908	159,950,000	378,798
Less exports	529,229	3,840
	159,420,771	374,958
Imports of salt paying duty	31,019,400	79,341
" free of duty	200,944,800	350,878
	391,384,971	805,177

All the salt imported from Great Britain enters Canada free of duty. From other countries only salt imported for the express use of sea or gulf fisheries enters free of duty.

MISCELLANEOUS NON-METALLIC.

ARSENIC.

Up to 1903 the main source of the production of arsenic in Canada was the Deloro mine in Hastings county, Ontario. The arsenic was recovered at Deloro in the process of treating the auriferous mispickel ores found in the district. In 1902, however, the mine was closed, though the mill continued to work on tailings and ore from the dump until 1903, when operations ceased altogether. This property has recently been taken over by the Deloro Mining and Reduction Company, and the plant entirely rebuilt, with the object of treating ores from Cobalt district as well as the local mispickel ores. There was no production of white arsenic at the plant, however, during 1906.

The ore shipped from the Cobalt district contains important quantities of arsenic, though practically nothing is now paid to the mine owners for this mineral by the purchasing companies. Considerable quantities of these ores are, however, now being treated in Canada in metallurgical works, in which white arsenic is being recovered in addition to silver. There are three of these plants, one at Copper Cliff operated by the Canadian Copper Co., a second at Thorold operated by the Coniagas Reduction Co., and the third at Deloro, already mentioned.

The quantity of these ores thus treated in Canada in 1906 was 998 tons, from which there was recovered 201 tons of white arsenic valued at $14,058. In 1907 there were 2,266 tons treated, with a recovery of 330 tons of arsenic valued at $36,209, and in 1908 the ore treated was 7,182 tons, and the white arsenic recovered 715½ tons valued at $41,060.

No doubt a very large proportion of the arsenic contained in the ores exported is recovered in their treatment abroad.

The Ontario Bureau of Mines has estimated the total arsenical content of the Cobalt District ores shipped since 1904 as follows :—

Arsenical Content of Cobalt District Ores Shipped.

——	Ore Shipped.	Total Arsenic contained.	Per cent in ore.
	Tons.	Tons.	
1904	158	72	45·6
1905	2,144	549	25·6
1906	5,335	1,440	27·0
1907	14,788	2,958	20·0
1908	25,624	3,672	14·3

In addition to the Cobalt District ores, small quantities of arsenical ore have been shipped during the past two years by the Timagami Mining and Milling Co., Ltd., from their mine at Greys Siding on the Timiskaming and Northern Ontario railway, and also some arsenical concentrates by the Boston Richardson Mining Co. of Goldboro, Nova Scotia. According to information kindly furnished by H. S. Badger, the superintendent of the latter Company, the arsenical concentrate is the residue of the mill concentrates after the gold concentrates have been extracted by bromo-cyanide. The tailings as discharged from the cyanide vats carry about 40 per cent silica. These are re-concentrated to eliminate the silica, and brought down to a clean mispickel concentrate carrying from 38 per cent to 41 per cent metallic arsenic. It is dried, and shipped in sacks, most of it going to Swansea, and some to Belgium.

In the following tables the production of arsenical ore, and white arsenic, and the imports and exports of arsenic are shown :—

Annual Production of Arsenic.

Calendar Year.	Arsenic in Ore.		White Arsenic.	
	Tons.	Value.	Tons.	Value.
				$
1885			440	17,600
1886			120	5,460
1887			30	1,200
1888			30	1,200
1889			Nil.	Nil.
1890			25	1,500
1891			20	1,000
1892-3			Nil.	Nil.
1894			7	420
1895-8			Nil.	Nil.
1899			57	4,872
1900			303	22,725
1901			695	41,676
1902			800	48,000
1903			257	15,420
1904-5				
1906			201	14,058
1907	656	$11,094	330	36,209
1908	986	17,506	715½	41,060

Exports of White Arsenic.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value
		$			$
1902	547,698	16,192	1906	271,063	5,981
1903	395,573	10,583	1907	613,504	10,850
1904	146,000	6,900	1908	1,913,732	43,493
1905	108,000	5,400			

Annual Imports of Arsenic, 1880–1906.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$			$
1880.. ...	18,197	576	1889.....	69,269	2,434	1898.....	291,967	14,270
1881.....	31,417	1,070	1890.....	138,509	4,474	1899.....	582,383	24,203
1882.....	138,920	3,962	1891.....	115,248	4,027	1900.....	230,730	11,035
1883.....	51,953	1,812	1892.....	302,958	9,365	1901....	159,263	8,361
1884.....	19,337	773	1893.....	447,079	12,907	1902.....	106,857	6,004
1885.....	49,080	1,566	1894.....	292,505	10,018	1903....	298,375	11,824
1886.....	30,181	961	1895.....	1,115,697	31,932	1904.....	414,065	12,421
1887.....	32,436	1,116	1896.....	664,854	27,523	1905.....	268,274	7,661
1888.....	27,510	1,016	1897.....	152,275	8,378	1906Dutyfree	446,975	19,169

Imports of Arsenious Oxide and Sulphide of Arsenic.

Fiscal Year.	—	Lbs.	Value.
			$
1907 (9 months).....	Arsenious oxide.	252,473	16,011
	Arsenic, Sulphide of.....	95,843	6,116
			22,127
1908..	Arsenious oxide.....	378,174	26,804
	Arsenic, Sulphide of.....	125,322	7,531
			34,335

CALCIUM CARBIDE.

Statistics of the production of calcium carbide were collected by this Branch for the first time in 1908.

Three firms were engaged in the manufacture of this product, viz.—

The Shawenegan Carbide Co., Ltd., Shawenegan Falls, Que.

The Ottawa Carbide Co., Ltd., Ottawa, Ont.

The Wilson Carbide Co., Ltd., Merritton, Ont.

The total sales in 1908 were 6,864 tons valued at $417,150, or an average per ton of $60.77.

The production of calcium carbide in the Province of Ontario has been ascertained by the Ontario Bureau of Mines for a number of years, and the record is as follows :—

Calcium Carbide Production in Ontario.

Calendar Year.	Tons.	Value.	Per ton.	Calendar Year.	Tons.	Value.	Per ton.
		$	$ cts.			$	$ cts.
1900.....	1,005	60,300	60 00	1905.....	2,427	156,755	64 59
1901.....	2,771	168,792	60 91	1906..	2,626	162,780	61 98
1902.....	1,402	89,420	63 78	1907.....	2,667	173,763	65 15
1903.....	2,507	144,000	57 44	1908.	2,364	147,150	62 25
1904.....	2,343	152,295	65 00				

CHALK AND WHITING.

These materials are not produced in Canada, but statistics of their importation are given to show the market for them in Canada.

Annual Imports of Chalk and Whiting, 1880–1908.

Fiscal Year.	Chalk (a).	Whiting (b).		Fiscal Year.	Chalk (a).	Whiting (b).	
	Value.	Cwt.	Value.		Value.	Cwt.	Value.
	$		$		$		$
1880	2,117	84,115	26,092	1895	7,730	102,751	25,441
1881	2,768	47,480	16,637	1896	6,467	113,791	27,322
1882	2,882	36,270	16,318	1897	7,432	102,453	22,541
1883	5,067	76,012	29,334	1898	9,338	166,293	25,761
1884	2,589	76,268	28,230	1899	10,461	134,884	34,310
1885	8,003	67,441	23,492	1900	12,212	127,455	34,575
1886	6,583	65,124	25,533	1901	11,629	209,868	60,878
1887	5,635	47,246	15,191	1902	11,337	153,982	42,136
1888	5,865	76,619	20,508	1903	16,497	139,804	39,867
1889	5,336	84,658	22,735	1904	19,163	186,919	42,507
1890	7,221	96,243	27,471	1905	20,896	198,485	51,215
1891	8,193	84,679	27,504	1906	23,853	160,030	44,876
1892	9,558	102,985	26,867	1907 (9 mos)	17,446	128,018	33,453
1893	9,966	88,835	25,563	1908	24,122	228,699	63,499
1894	11,308	103,633	26,649				

(a) Chalk prepared. Duty, 20 per cent. (b) Whiting or whitening, gilder's whiting, and Paris white. Duty free.

FELDSPAR.

Feldspar has been shipped during the past two years from mines in Frontenac county, in the townships of Bedford and Portland. The principal operator is the Kingston Feldspar and Mining Co., of Kingston, Ont., while shipments were also made in 1907 by the Verona Mining Co., with head office at 706 Girard Building, Philadelphia.

The total shipments reported in 1907 were 12,584 tons valued at $29,819; while in 1908 the shipments had fallen off to 7,877 tons valued at $21,099.

There have been occasional shipments of feldspar from deposits in Templeton and adjoining townships of Quebec Province, though none have been reported during the past two years.

Production and Exports of Feldspar.

Calendar Year.	Production.		Exports.	
	Tons.	Value.	Tons.	Value.
		$		$
1890	700	3,500	.....	.....
1891	685	3,425	.....	.....
1892	175	525	.....	.....
1893	575	4,525	50	500
1894	Nil.	Nil.	Nil.	Nil.
1895	.....	*2,545	.....	2,545
1896	972	*2,583	972	2,583
1897	1,400	3,290	3,078	5,637
1898	2,500	6,250	1,542	4,396
1899	3,000	6,000	1,757	5,126
1900	318	1,112	379	1,116
1901	5,350	10,700	4,367	10,973
1902	7,576	15,152	7,374	13.708
1903	13,928	18,966	13,760	23,319
1904	11,083	22,166	13,960	29,263
1905	11,700	23,400	9,161	27,660
1906	16,948	40,890	18,183	60,312
1907	12,584	29,819	12,068	37,932
1908	7,877	21,099	9,524	34,045

* Exports.

Uses of Feldspar.

The following notes on the uses of feldspar are taken from an article on the subject by E. S. Bastin, in the 'Mineral Resources of the United States, for 1907.'

"The principal consumers of feldspar are the pottery and enamelled brick and electrical ware manufacturers, its main application being as a constituent part of both body and glaze in true porcelain, white ware, and vitrified sanitary ware, and as a constituent of the slip (underglaze) and glaze in so-called 'porcelain' sanitary wares and enamelled brick. The proportion of feldspar in the body of vitrified wares usually falls between 10 and 35 per cent, though sometimes more. Its melting point being lower than that of the other constituents, it serves as a flux to bind the particles together. In glazes the percentage of feldspar usually lies between 30 and 50. The trade demands that feldspar for pottery purposes be nearly free from iron-bearing minerals (biotite, garnet, hornblende, tourmaline, etc.) and contain little if any muscovite. In regard to the percentage of free quartz, the requirements vary with different potters. A few manufacturers of the finer grades of pottery demand less than 5 per cent of free quartz, and may even grind the spar themselves so as to be sure of its quality, preferring to ensure a constant product, even at higher cost, by themselves mixing the requisite quantity of quartz with the spar. Most potters get satisfactory results with 'Standard' ground spar carrying 15 to 20 per cent of free quartz, and in some cases the percentage runs even higher. In the finely ground mixture as it comes from the mills it is difficult to separate the quartz from the feldspar by physical methods on

account of the extreme fineness of the material. Chemical analysis seems to be the readiest means of determining whether its percentage is high or low.

"Feldspar is also used in emery and carborundum wheel manufacture as a flux to bind the abraiding particles together.

"Small quantities of feldspar are used in the manufacture of opalescent glass. The feldspar used for this purpose is ranked as No. 3 by the miners; it usually contains more free quartz and muscovite than that used for pottery purposes, and in most cases also contains fragments of iron-bearing minerals. Most of the spars known to the writer which are used for opalescent glass are notably richer in soda than in potash. They are usually ground only to a fineness of 50 to 60 mesh.

"Small quantities of carefully selected pure feldspar are used in the manufacture of artificial teeth. Some is used in the manufacture of scouring soaps and window washes, the fact that feldspar is slightly softer than glass rendering these soaps less liable to scratch windows or glassware than are the soaps in which quartz is the abrasive substance. One firm in New York State crushes pegmatite for poultry grit and for a covering for concrete and tarred surfaces to give the appearance of granite."

FLUORSPAR.

The occurrence of fluorspar has been noted on lot 1, concession IV of Madoc township, Hastings county, Ont., and some very fine crystals have been obtained from this deposit. In 1905 the deposit was opened by S. Wellington of Madoc, and a shipment of 12 tons made to Port Hope. No further shipments have been reported.

MAGNESITE.

The occurrence of magnesite in the township of Grenville, Argenteuil county, was recognized about eight years ago. A couple of tons were shipped in 1904 for experimental tests by Mr. M. B. McAllister, of Ottawa, and numerous samples were collected and analysed in the laboratory of the Geological Survey, a complete report on which will be found in the Annual Report of the Geological Survey, Vol. XIII, Part R. In 1907, Mr. T. J. Watters, of Ottawa, acquired the north half of lot 18, range XI of Grenville, and undertook some prospecting and development. About 120 tons, valued at $7 per ton, were shipped in 1908, finding a market in Montreal, Pittsburgh, and New York. Another 100 tons were produced but not shipped. The property is now in the hands of the Canadian Magnesite Co. of Montreal, and a large increase in shipments is expected in 1909.

10,084—17½

QUARTZ.

According to statistics published by the Ontario Bureau of Mines the production of quartz in that Province in 1908 was 44,741 tons valued at $52,830, as compared with 56,585 tons valued at $124,148 in 1907.

A record of quartz production, as far as has been ascertained, is shown in the following table. The greater part of the production shown for the past three years is represented by the material mined by the Canadian Copper Co. near Naughton, and used as a flux and for furnace linings in smelting the nickel-copper ores of the Sudbury district.

At the Richardson feldspar mine in Bedford township quartz is also being mined and shipped to Welland, Ont., about 6,000 tons having been thus shipped during the winter months of 1908-9. This quartz is used at Welland by the manufacturers of ferro-silicon.

Annual Production of Quartz.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1890	200	1,000	1899	600	1,260
1891–2	...	...	1900-1905	...	...
1893	100	500	1906	48,376	65,765
1894–5–6	10	50	1907	56,585	124,148
1897	...	...	1908	44,741	52,830
1898	284	570			

Imports of Silex:—Crystallized Quartz.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		$			$
1880	5,252	2,290	1895	2,882	1,881
1881	3,251	1,659	1896	3,289	2,174
1882	3,283	1,678	1897	2,564	3,415
1883	3,543	2,058	1898	3,104	2,773
1884	3,259	1,709	1899	3,951	2,595
1885	3,527	1,443	1900	4,021	2,876
1886	2,520	1,313	1901	3,562	2,106
1887	14,533	5,073	1902	4,388	3,858
1888	4,808	2,385	1903	3,514	2,762
1889	5,130	1,211	1904	5,547	4,409
1890	1,768	2,617	1905	8,931	4,475
1891	3,674	1,929	1906	7,465	8,347
1892	1,429	1,244	1907 (9 mos.)	11,964	12,969
1893	2,447	1,301	1908 Duty free.	24,938	19,166
1894	2,451	1,521			

TALC.

The production of talc during the past three years has varied from 1,000 to 1,500 tons per annum; a value of about $3 per ton being placed upon the talc at the mine.

The production in recent years has all been derived from the Henderson talc mine in the township of Madoc, county of Hastings. Formerly the output was exported to United States points and used chiefly in the manufacture of cosmetics. Recently, however, a mill has been erected at Madoc for grinding the crude talc and preparing it for the trade. Most of the finished material is now sold in Canada, and the greater part used in the paper trade.

Statistics of production of soapstone and talc since 1886 are as follows:—

Annual Production of Soapstone and Talc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1886	50	400	1898	405	1,000
1887	100	800	1899	450	1,960
1888	140	280	1900	1,420	6,365
1889	195	1,170	1901	259	842
1890	917	1,239	1902	689	1,804
1891	Nil	Nil	1903	990	2,739
1892	1,374	6,240	1904	840	1,875
1893	717	1,920	1905	500	1,800
1894	916	1,640	1906	1,234	3,030
1895	475	2,138	1907	1,534	4,602
1896	410	1,230	1908	1,016	3,048
1897	157	350			

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

The structural or building materials included under this heading comprise, in the order treated, cement, clay products of various kinds such as brick, pottery, sewer pipe and tile, etc.; lime, stone, comprising ordinary building stone, flagstones, granite, etc.; slate, silica brick, and sand and gravel.

CEMENT.

The production of natural rock cement, which was at one time an important factor in the Canadian cement industry, has rapidly decreased during recent years, and practically ceased in 1908. During this year there was no actual manufacture of natural rock cement, a few barrels only being sold from stock held over from the previous year. The production of Portland cement, on the

other hand, has shown an extremely rapid growth, having increased over ten fold during the past ten years. Statistics of the total annual sales of natural rock and Portland cement are shown in the following table:—

Annual Production of Cement.*

Calendar Year.	Natural Rock Cement.		Portland Cement.		Totals.	
	Bls.	Value.	Bls.	Value.	Bls.	Value.
		$		$		$
1887	.....	.....	.....	.....	69,843	81,909
1888	.....	.....	.....	.....	50,668	35,593
1889	90,474	69,790	Nil.	Nil.	90,474	69,790
1890	87,521	74,822	14,695	17,583	102,216	92,405
1891	90,846	103,479	2,633	5,082	93,479	108,561
1892	88,187	94,912	29,221	52,751	117,408	147,663
1893	126,673	130,167	31,924	63,848	158,597	194,015
1894	72,965	74,842	35,177	69,795	108,142	144,637
1895	66,219	60,795	62,075	112,880	128,294	173,675
1896	70,705	60,500	78,385	141,151	149,090	201,651
1897	85,450	65,893	119,763	209,380	205,213	275,273
1898	87,125	73,412	163,084	324,168	250,209	397,580
1899	117,367	119,308	255,366	513,983	396,753	633,291
1900	125,428	99,994	292,124	562,916	417,552	662,910
1901	133,328	94,415	317,066	565,615	450,394	660,030
1902	127,931	98,932	594,594	1,028,618	722,525	1,127,550
1903	92,252	74,655	627,741	1,150,592	719,993	1,225,247
1904	56,814	50,247	910,358	1,287,992	967,172	1,338,239
1905	14,184	10,274	1,346,548	1,913,740	1,360,732	1,924,014
1906	8,610	6,052	2,119,764	3,164,807	2,128,374	3,170,859
1907	5,775	4,043	2,436,093	3,777,328	2,441,868	3,781,371
1908	1,044	815	2,665,289	3,709,139	2,666,333	3,709,954

*Quantities sold or shipped.

According to returns (received from the manufacturers) the total quantity of Portland cement made in Canada in 1908 was 3,495,961 barrels of 350 pounds net; as compared with 2,491,513 barrels in 1907, or an increase of 1,004,448 barrels; or 40·3 per cent.

The total quantity of Canadian Portland cement sold in 1908 was 2,665,289 barrels as compared with 2,436,093 barrels in 1907, or an increase of 229,196 barrels or 9·4 per cent.

The total consumption of Portland cement in 1908, including Canadian and imported cements, was 3,134,338 barrels (of 350 pounds net); as compared with 3,108,723 barrels in 1907, or an increase of 25,615 barrels or 0·8 per cent.

In addition to the above, other important statistical returns respecting the stocks on hand at the beginning and end of the year, the total value and average price per barrel, the number of men employed and wages paid, the quantity and value of the imports, etc., for the years 1907 and 1908, are shown in comparative form in the following table:—

Comparisons of Production, Sales, and Imports of Portland Cement in 1907 and 1908.

——	1907.	1908.	Increase.	%	Decrease.	%
Cement sold..... Bls.	2,436,093	2,665,289	229,196	9·4	.....	
Cement manufactured..... "	2,491,513	3,495,961	1,004,448	40·3	....	
Stock on hand, Jan. 1..... "	299,015	383,349	84,334	28·2	.....	
" " Dec. 31..... "	354,435	1,214,021	859,586	242·5	.....	
Value of cement sold .... $	3,777,328	3,709,139	.....	.....	68,189	1·8
Average price per bl..... .... $	1.55	1.39	.....	.....	0.16	10·3
Wages paid..... $	956,080	1,275,638	319,558	33·4	.....	
Men employed..... No.	1,786	3,029	1,243	69·6	....	
Imports of Portland cement.. Bls.	672,630	469,049	.....	.....	203,581	30·3
Value of cement..... $	837,520	531,045	....	.....	306,475	36·6
Average price per bl..... $	1.24	1.13	....	.....	0.11	8·9
Total consumption of cement in Canada..... .....Bls.	3,108,723	3,134,338	25,615	0·8	.....	
No. of completed plants operated...	17	23	6	35·3	.....	
Total daily capacity of operating plants as at Dec. 31..... Bls.	14,400	27,500	13,100	90·9	....	

The production of Portland cement in 1908 was derived from 23 operating plants, with a total daily capacity of 27,500 barrels, equivalent to about 8,250,000 barrels per year of 300 days, or 10,000,000 if all plants were run continuously for the whole year. The operating plants were distributed as follows: one in Nova Scotia using blast furnace slag; one in Manitoba making a natural Portland cement; one in British Columbia, two in Alberta and three in Quebec using limestone and clay; and fifteen in Ontario, of which 12 use marl and 3 limestone. The total daily capacity of the plants using marl was 10,400 barrels, as compared with 17,100 barrels per day for all other plants. Of the total quantity of cement made in 1908, 1,573,090 barrels were made from marl, and 1,922,871 barrels from limestone and slag.

It is not possible to give the detailed production in all the provinces without divulging confidental returns. The following groupings, however, may be made: (1) Quebec and Nova Scotia; (2) Ontario; (3) Alberta, Manitoba, and British Columbia.

The production in these groups in 1907 and 1908 was as follows :—

(1) Quebec and Nova Scotia.

——		1907.	1908.	Increase.	%	Decrease.	%
Cement sold	Bls.	456,579	749,021	292,442	64·1	.....	
Cement manufactured	"	456,625	953,712	497,087	108·9	.....	
Stock on hand, Jan. 1	"	40,200	40,246	46	0·1	.....	
Stock on hand, Dec. 31	"	40,246	244,937	204,691	508·6	.....	
Value of cement sold	$	664,866	1,051,144	386,278	58·1	.....	
Wages paid	$	104,116	293,855	189,739	182·2	.....	
Men employed	No.	305	795	460	150·8	.....	
Total daily capacity of operating plants	Bls.	2,300	7,900	5,600	243·5	.....	

(2) Ontario.

——		1907.	1908.	Increase.	%	Decrease.	%
Cement sold	Bls.	1,775,484	1,518,886	.....	.....	256,598	14·5
Cement manufactured	"	1,816,662	2,016,737	200,075	11·0	.....	.....
Stock on hand, Jan. 1	"	242,248	314,579	72,331	29·9	.....	.....
Stock on hand, Dec. 31	"	283,426	812,430	529,004	186·6	.....	.....
Value of cement sold	$	2,705,167	1,909,815	.....	.....	795,352	29·4
Wages paid	$	684,964	636,955	.....	.....	48,009	7·0
Men employed	No.	1,192	1,619	427	35·8	.....	.....
Total daily capacity of operating plants	Bls.	9,400	14,900	5,500	58·5	.....	.....

(3) Manitoba, Alberta, and British Columbia.

——		1907.	1908.	Increase.	%	Decrease.	%
Cement sold	Bls.	201,030	397,382	193,352	94·8	.....	
Cement manufactured	"	218,226	525,512	307,286	140·8	.....	
Stock on hand, Jan. 1	"	16,567	28,524	11,957	72·2	.....	
Stock on hand, Dec. 31	"	30,763	156,654	125,891	409·2	.....	
Value of cement sold	$	407,295	748,180	340,885	83·7	.....	
Wages paid	$	167,000	344,828	177,828	106·5	.....	
Men employed	No.	289	615	326	112·8	.....	
Total daily capacity of operating plants	Bls.	2,700	4,700	2,000	74·1	.....	

Prices :—As already stated, the average price at the works during 1908, as returned by the manufacturers, was $1.39 per barrel. Prices in car lots, ex-package, at Toronto and Montreal, according to trade quotations, ranged from $1.90 in January to as low as $1.55 in December. In Winnipeg prices ruled during the latter half of the year at about $2.40.

Statistics of the annual production of Portland cement for a number of years, showing the quantity made, the quantity sold, stock on hand at the end of the year, value of sales, etc., are shown in the next table:—

Annual Production of Portland Cement.

Year.	Quantity Made.	Quantity Sold.	On hand Dec. 31.	Value of Sales.	Average per barrel.	Daily Capacity.
	Barrels.	Barrels.	Barrels.	$	$ cts.	Barrels.
1897	.....	119,763	.....	209,380	1 75	.....
1898	.....	163,084	.....	324,168	1 99	.....
1899	.....	255,366	.....	513,983	2 01	.....
1900	.....	292,124	.....	562,916	1 91	.....
1901	360,160	317,066	58,094	565,615	1 78	.....
1902	562,335	594,594	33,446	1,028,618	1 73	3,900
1903	714,136	627,741	128,386	1,150,592	1 83	4,850
1904	903,990	910,358	112,051	1,287,992	1 41	.....
1905	1,541,568	1,346,548	306,466	1,913,740	1 42	8,000
1906	2,152,562	2,119,764	302,356	3,164,807	1 49	10,500
1907	2,491,513	2,436,093	354,435	3,777,328	1 55	14,400
1908	3,495,961	2,665,289	1,214,021	3,709,139	1 39	27,500

Imports and Exports:—There is very little cement exported from Canada; only $34,591 worth being recorded for 1908. The imports of Portland cement, which were, previous to 1904, larger than the Canadian production, have been decreasing since 1906, and were in 1908 equivalent to only 17·6 per cent of the sales of Canadian cement, or 14·9 per cent of the total consumption. A duty of 12½ cents per 100 pounds, equivalent to 43¾ cents per barrel of 350 pounds net, is levied on imports. The weight of the package is, however, included for purposes of duty.

The imports of cement during 1907 and 1908 by countries were as follows:—

	1907.			1908.		
	Cwt.	%	Value.	Cwt.	%	Value.
			$			$
Great Britain	1,003,444	42·6	343,817	601,527	36·6	202,139
United States	1,134,113	48·2	431,343	902,576	55·0	283,899
Belgium	182,943	7·8	50,476	128,738	7·8	40,856
Other countries	33,704	1·4	11,884	8,831	0·5	4,151
Totals	2,354,204	100	837,520	1,641,672	99·9	531,045
Equivalent in barrels	672,630	.....	.....	469,049	.....	.....

Statistics of the exports of cement since 1891, and of the imports since 1880, are given in the two following tables:—

Exports of Cement.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1891	2,881	1897	644	1903	2,851
1892	938	1898	2,117	1904	5,494
1893	1,172	1899	2,733	1905	3,143
1894	482	1900	3,296	1906	7,551
1895	937	1901	1,514	1907	9,618
1896	1,328	1902	2,267	1908	34,591

Imports of Cement into Canada.

Fiscal Year.	Cement, N.E.S.* Bulk or bags.	Hydraulic Cement.		Portland Cement.	
		Barrels.	Value.	Barrels.	Value.
			$		$
1880	28	10,034	10,306		55,774
1881	298	7,812	7,821		45,646
1882	86	11,945	13,410		66,579
1883	548	11,659	13,755		102,537
1884	1,236	8,606	9,514		102,857
1885	1,315	5,613	5,396		111,521
1886	1,851	6,164	6,028		120,398
1887	1,419	6,160	8,784	102,750	148,054
1888	5,787	5,636	7,522	122,402	177,158
1889	10,668	5,835	7,467	122,273	179,406
1890	5,443	5,440	9,048	192,322	313,572
1891	2,890	3,515	6,152	183,728	304,648
1892	3,394	2,214	2,782	187,233	281,553
1893	2,909	4,896	8,060	229,492	316,179
1894	2,618	1,054	985	224,150	280,841
1895	2,112	5,333	7,001	196,281	242,813
1896	3,672	5,688	8,948	204,407	242,409
1897	4,318	2,494	3,937	210,871	252,587
		Cwt.		Cwt.	
1898	3,263	16,033	7,097	1,073,058	355,264
1899	8,929	1,678	694	1,300,424	467,994
1900	10,452	10,418	4,711	1,301,361	498,607
1901	4,890	17,784	6,865	1,612,432	654,595
1902	12,234	29,585	17,755	1,971,616	833,657
1903	16,281	13,690	6,333	2,316,853	868,131
1904	14,305	12,088	5,391	2,476,388	995,017
1905	18,489	16,961	10,690	4,228,394	1,234,649
1906	27,858	10,794	4,034	2,848,582	963,339
1907 (9 mos.)	16,201	1,192	685	1,551,493	523,120
1908	12,418	18,860	6,710	2,427,381	852,041

*Cement not elsewhere specified and manufactures of cement.

As there is very little cement exported from Canada, the consumption is practically represented by the Canadian sales together with the imports. On this basis, the total consumption of Portland cement in Canada in 1908 was 3,134,338

barrels (548,509 tons), made up of 2,665,289 barrels (466,426 tons) of Canadian cement, or 85 per cent, and 469,049 barrels (82,083 tons) of imported cement, or 15 per cent. As already indicated, 55 per cent of the imported cement came from the United States, and 36 per cent from Great Britain, and nearly 8 per cent from Belgium.

In 1907 the total consumption was 3,108,723 barrels (544,027 tons), of which 78 per cent was made in Canada and 22 per cent imported.

In 1901 the total consumption was 872,966 barrels (152,769 tons), of which only 36 per cent was made in Canada and 64 per cent was imported.

Following is an estimate of the consumption of Portland cement in Canada during the past eight years:—

Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Barrels.	%	Barrels.	%	Barrels.
1901	317,066	36	555,900	64	872,966
1902	594,594	52	544,954	48	1,139,548
1903	627,741	45	773,678	55	1,401,419
1904	910,358	54	784,630	46	1,694,988
1905	1,346,548	59	918,701	41	2,265,249
1906	2,119,764	76	665,845	24	2,785,609
1907	2,436,093	78	672,630	22	3,108,723
1908	2,665,289	85	469,049	15	3,134,338

The firms engaged in the manufacture of Portland cement in 1908 were as follows:—

Name.	Plant at	Head Office at
The Sydney Cement Co., Ltd.	Sydney, N. S.	Sydney, C.B.
The International Portland Cement Co., Ltd.	Hull, Que.	Ottawa, Ont.
Vulcan Portland Cement Co., Ltd.	Longue Pointe, Que.	Montreal, Que.
Lakefield Portland Cement Co.	Pointe aux Trembles, Que Lakefield, Ont.	" "
Canadian " "	Port Colborne, Ont. Marlbank, Ont.	Toronto, Ont.
Belleville " "	Point Ann, Ont.	Belleville, Ont.
The Imperial Cement Co., Ltd.	Owen Sound, Ont.	Owen Sound, Ont.
Grey & Bruce Portland Cement Co	" "	" "
Owen Sound Portland Cement Co., Ltd.	" "	" "
The Sun " "	Keppel tp., Ont.	" "
Hanover " "	Hanover, Ont.	Hanover, Ont.
The Ontario " "	Blue Lake, Ont	Brantford, Ont.
National " "	Durham, Ont.	Durham, Ont.
Lehigh " "	Belleville, Ont.	Allentown, Pa.
The Colonial " "	Keppel tp., Ont.	Wiarton, Ont.
Superior " "	Orangeville, Ont.	Orangeville, Ont.
The Western Ontario Portland Cement Co., Ltd.	Atwood, Ont.	Atwood, Ont.
The Commercial Cement Co., Ltd.	Babcock, Man.	Winnipeg, Man.
The Alberta Portland Cement Co., Ltd.	Calgary, Alta.	Calgary, Alta.
The Western Canada Coal & Cement Co.	Exshaw, Alta.	Ottawa, Ont.
Vancouver Portland Cement Co.	Tod Inlet, B.C.	Victoria, B.C.

Companies with plants in process of erection and companies proposing to erect plants :—

The Eastern Canada Portland Cement Co.	Quebec	Ottawa (Irvin).
The Lake Medal " "		Hamilton.
The Bell's Lake " "		Markdale.
The Brant " "	St. Marys	Brantford.
The Ben Allen " "	(Not erected yet)	Owen Sound.
The Manitoba Cement Co.		Winnipeg.
The Rocky Mountain Cement Co.	Blairmore	Blairmore, Alta.
The Raven Lake Portland Cement Co.		Victoria Road.

CLAY PRODUCTS.

The clay products produced in Canada comprise bricks of various kinds, including common, pressed, paving, ornamental or fancy, and firebrick, porous fireproofing bricks and blocks, sewer pipe, drain tile, and pottery. Owing to the large number of manufacturers, there being about 600, and the indifference of many in answering circular inquiries, the statistics of production are more or less incomplete. The statistics given represent actual sales ; material produced but held in stock until the end of the year not being recorded until disposed of.

According to the returns received, the total value of the clay products sold in 1908 was $4,871,403, as compared with a total valuation in 1907 of $5,772,117, a decrease of $900,714 or 16 per cent. The total value of the clay products sold in 1906 was $5,072,635, and in 1905 it was $4,695,925. As about 75 per cent of the total production consists of brick, the decreased sales in 1908 were no doubt due in large measure to the restriction of building operations in that year as a result of the general business depression, and also following the unusual activity in building operations during 1907 :—

The production in detail during two years was as follows :—

Production of Clay Products, 1907 and 1908.

	1907.			1908.		
	Quantity.	Value.	Per M	Quantity.	Value.	Per M
		$	$ cts.		$	$ cts.
Bricks—						
Common..... No.	439,015,556	3,455,524	7 87	408,305,768	2,982,255	7 31
Pressed..... "	78,922,092	794,722	10 07	53,480,764	517,180	9 67
Paving..... "	3,617,720	72,354	20 00	3,719,961	59,456	15 98
Ornamental.....	.....	47,288	.....	.....	18,535	.....
Firebrick and fireclay shapes, etc.....	.....	131,322	.....	.....	110,302	.....
Other clay bricks and blocks.....	.....	89,389	.....	.....	170,211	.....
Pottery.....	.....	253,809	.....	.....	200,541	.....
Sewer pipe.....	.....	667,100	.....	.....	514,362	.....
Tiles, drain.....	.....	260,609	.....	20,100,261	298,561	14 85
Totals.....	.....	5,772,117	.....	.....	4,871,403	.....

Practically all our productions of clay find a market in Canada, the only export recorded being brick, of which there were exported in 1907 about 802,000 valued at $6,193, and in 1908, 2,344,000 valued at $9,047. In addition to our own production we import for our consumption a very large value in clay products, including building and paving brick, tile and sewer pipe; also earthenware and chinaware of various kinds. The total value of these imports during the fiscal period of 1907 (9 months) was $2,371,806, and during the fiscal year 1908 (12 months), it was $3,538,060.

Imports of Clay Products, Fiscal Years 1907 and 1908.

Imports of.	1907 (9 mos.)	1908.
	$	$
Brick and Tiles—		
Bath brick	1,076	1,834
Building brick	88,144	139,105
Paving brick	23,256	61,346
Firebrick and stove linings, N.E.S	157,616	.....
Firebrick of a kind not made in Canada	349,185 (a)	639,347
Drain tile, not glazed	12,106	2,080
Drain pipe, sewer pipe, etc	93,458	125,747
Mfgs. of clay, N.O.P	45,845	110,097
	770,686	1,079,556
Earthenware and Chinaware—		
Brown coloured	9,625	22,847
Demijohns, churns, and crocks	3,342	17,836
Tableware of china, porcelain, white granite	902,798	1,555,517
China and porcelain	134,675	109,446
Tiles or blocks of	62,547	45,836
Earthenware tiles, N.O.P	67,027	116,480
Mfgs. of earthenware, N.O.P	81,987	83,309
Earthenware, N.O.P	154,379	239,513
	1,422,880	2,190,784
Clays—		
China clay	78,772	97,236
Fireclay	85,044	155,873
Pipe-clay	307	319
Clays, all other, N.O.P	14,117	14,292
	178,240	267,720
Grand total	2,371,806	3,538,060

(a) In 1907, classified as "for use in process of manufactures."

Clay Building Brick: The total production of clay building brick, including the common and pressed varieties, but excluding ornamental, paving, and firebrick, is shown by provinces for the years 1907 and 1908 in the next table.

In 1907 the total production was 517,937,648 valued at $4,250,246, comprising 439,015,556 common brick valued at $3,455,524, or an average value per thousand of $7.87; and 78,922,092 pressed brick valued at $794,722, or an average value per thousand of $10.07.

In 1908 the total production was 461,786,532 valued at $3,499,435, made up of 408,305,768 common brick valued at $2,982,255, or an average value of $7.30 per thousand; and 53,480,764 pressed brick valued at $517,180, or an average value per thousand of $9.67.

COMPARISON TABLE SHOWING TOTAL BRICK SALES BY PROVINCES.

Production of Clay Building Brick (Common and Pressed) 1907 and 1908.

——	1907.		1908.	
		$		$
Nova Scotia	19,646,000	110,338	9,125,000	56,064
New Brunswick	4,941,141	36,937	6,594,011	54,573
Quebec	104,394,709	715,922	145,711,677	972,575
Ontario	287,930,763	2,311,499	221,600,575	1,664,184
Manitoba	45,094,180	465,282	26,818,000	254,591
Saskatchewan	12,024,070	125,459	8,262,996	87,566
Alberta	31,384,740	353,672	25,521,911	240,336
British Columbia	12,522,045	131,137	18,152,362	169,546
Totals	517,937,648	4,250,246	461,786,532	3,499,435

Prices:—The price of brick is somewhat lower in the eastern parts of Canada than in the west. The average price of common brick in 1907 ranged between a minimum of $5.47 in Nova Scotia and a maximum of $10.67 in Alberta. In 1908 prices in the Maritime provinces and in Quebec were apparently somewhat higher than in 1907; while in Ontario and the western provinces lower prices prevailed in 1908.

The following table shows the average prices of common and pressed brick in the several provinces during 1907 and 1908.

Average Prices per Thousand of Common and Pressed Brick.

——	Common Brick.		Pressed Brick.	
	1907.	1908.	1907.	1908.
Nova Scotia	$ 5.47	$5.81	$12.53	$13.84
New Brunswick	7.45	8.17	8.21	16.70
Quebec	6.43	6.51	11.60	11.62
Ontario	7.61	7.24	9.45	8.74
Manitoba	10.19	9.24	13.67	15.45
Saskatchewan	10.43	10.46	.....	11.18
Alberta	10.67	8.60	17.89	12.97
British Columbia	10.45	9.21	20.95	20.40
Canada	7.87	7.31	10.07	9.67

The exports and imports of building brick since 1891 and 1880 respectively are shown in the two following tables. The exports have never been large, averaging for a number of years past about $6,000 in value per annum. For a number of years previous to 1903 the annual imports of building brick averaged only about $20,000 in value; during the past five years, however, the value of the imports has varied from $100,000 to nearly $200,000 per annum.

Exports of Building Bricks.

Calendar Year.	M.	Value.	Calendar Year.	M.	Value.
		$			$
1891	246	1,163	1900	546	4,528
1892	1,963	12,192	1901	646	5,189
1893	6,073	44,110	1902	2,110	12,786
1894	1,095	7,405	1903	891	5,699
1895	1,655	8,665	1904	696	5,357
1896	993	5,678	1905	754	5,888
1897	573	2,679	1906	697	6,541
1898	65	442	1907	802	6,193
1899	172	1,351	1908	2,344	9,047

Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
		$			$
1880	340	2,067	1895	575	4,705
1881	415	4,281	1896	1,057	23,189
1882	3,500	24,572	1897	2,094	10,336
1883	1,448	14,234	1898	639	6,652
1884	3,263	20,258	1899	2,611	21,306
1885	3,108	14,632	1900	1,792	19,305
1886	983	5,929	1901	2,800	20,677
1887	276	2,440	1902	4,087	33,802
1888	2,483	20,720	1903	2,881	28,493
1889	2,590	24,585	1904	13,455	117,468
1890	1,933	12,500	1905	25,515	168,122
1891	589	9,744	1906	21,934	194,897
1892	621	5,075	1907 (9 months)	8,495	88,144
1893	1,489	14,108	1908	13,790	139,105
1894	2,220	18,320			

The annual production of building brick in Ontario, ascertained by the Bureau of Mines, is shown in the following table. The figures show the total quantity and value of the brick made as distinguished from the sales.

Building Brick made in Ontario since 1898.

(From the reports of the Ontario Bureau of Mines.)

	Common Brick.			Pressed Brick.		
	M.	Value.	Average per M.	M.	Value.	Average per M.
		$	$ cts.		$	$ cts.
1898	170,000	914,000	5 376	8,970	100,344	11 187
1899	233,898	1,313,750	5 617	10,808	105,000	9 715
1900	240,430	1,379,590	5 738	11,562	114,419	9 896
1901	259,265	1,530,460	5 903	12,846	104,394	8 127
1902	220,500	1,411,000	6 399	19,755	144,171	7 298
1903	230,000	1,561,700	6 790	23,703	218,550	9 220
1904	200,000	1,430,000	7 150	26,857	226,750	8 443
1905	250,000	1,937,500	7 750	26,000	234,000	9 000
1906	300,000	2,157,000	7 190	39,860	337,795	8 475
1907	273,882	2,109,978	7 704	69,763	648,683	9 298
1908	222,361	1,575,875	7 087	56,167	485,819	8 649

Paving Brick: Statistics of the production of paving brick have been recorded since 1897; the average price per thousand has varied from $8 to $20.

In 1908 the number of paving brick sold was 3,719,961 valued at $59,456; while during the fiscal year ending March of 1908 there were imported 5,340,000 brick valued at $61,346, or an average per M. of $11.49.

Paving brick are all made in the Province of Ontario.

Statistics of production and imports are shown in the two tables following:—

Annual Production of Paving Brick (a).

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
		$	$ cts.			$	$ cts.
1897	4,568	45,670	10 00	1903	3,789	45,288	11 95
1898				1904	4,436	55,450	12 50
1899	5,360	42,550	8 03	1905	4,500	54,000	12 00
1900	2,710	26,950	9 94	1906	3,000	45,000	15 00
1901	3,689	37,000	10 03	1907	3,618	72,354	20 00
1902	4,211	42,000	9 97	1908	3,720	59,456	15 98

(a) Figures previous to 1907 compiled from Ontario Bureau of Mines.

Imports of Paving Brick.*

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
		$	$ cts.			$	$ cts.
1895	275	5,006	18 20	1902	1,030	16,788	16 30
1896	918	10,132	11 04	1903	1,337	18,811	14 07
1897	52	719	13 83	1904	1,986	29,753	14 98
1898	367	2,337	6 37	1905	2,350	32,578	13 86
1899	1,583	23,648	14 94	1906	4,104	46,008	11 21
1900	2,175	35,644	16 39	1907 (9 mos)	2,182	23,256	10 66
1901	900	10,414	11 57	1908	5,340	61,346	11 49

* Duty 20 per cent.

Fireclay and Firebrick: Firebrick are made from native clays at Westville, N.S., by the Intercolonial Coal Mining Company; at Moosejaw, Sask., by the Moosejaw Fire Brick and Pottery Co.; and at Clayburn, near Vancouver, B.C., by the Vancouver Fireclay Co., Ltd.

Fireclay obtained from the Wellington colliery at Comox, Vancouver island, is shipped to Victoria and used by the B. C. Pottery Co. in the manufacture of firebrick and other fireclay products. This firm also manufactures sewer pipe, drain tile, flowerpots, etc. The Wellington Colliery Co. produced and shipped 4,949 tons of fireclay during 1908.

Firebrick and fireclay shapes are also manufactured at Montreal, and at St. Johns, Que., but from imported fireclays.

The total value of the production of fireclay products in 1908 was returned as $110,302, comprising 2,415,871 firebrick valued at $70,429, or an average of $29.16 per M.: fireclay sold, 1,984 tons valued at $8,121, and other fireclay products valued at $31,752.

In 1907 the total production as returned was valued at $131,322, made up of 4,323,179 firebrick valued at $113,322, or an average of $26.21 per M.; and other fireclay shapes to the value of $18,000.

Sewer Pipe and Drain Tile: The total value of the sales of sewer pipe in 1908 was $514,362; as compared with a value of $667,100 in 1907, and a value of $530,045 in 1906.

The imports of drain pipe and sewer pipe, etc., during the twelve months ending March 1908, were valued at $125,747. Of this amount $104,128 worth were imported from the United States, and $21,619 from Great Britain.

Following is a list of firms manufacturing sewer pipe:—

Standard Drain Pipe Co. of St. Johns -	New Glasgow, N. S. St. Johns, Que.
Ontario Sewer Pipe Co. - - -	Toronto, Ont.
Dominion Sewer Pipe Co. - -	"
Hamilton & Toronto Sewer Pipe Co., Ltd. -	Hamilton, Ont.
B. C. Pottery Co. - - -	Victoria, B.C.

The sales of drain tile in 1908, as reported to this Branch, were 20,100,261 valued at $293,561, an average of $14.85 per M. The Ontario Bureau of Mines, however, reports the total quantity made in that Province as 24,800,000 valued at $338,658, or an average value of $13.66 per M. The imports of unglazed drain tile are comparatively small, being valued at only $2,080 during the fiscal year 1908.

Statistics of the production of sewer pipe and of the imports of drain tile and sewer pipe are shown in the next two tables :—

Production of Sewer pipe, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1888	266,320	1895	257,045	1902	301,965
1889	Not available.	1896	153,875	1903	317,970
1890	348,000	1897	164,250	1904	440,894
1891	227,300	1898	181,717	1905	382,000
1892	367,660	1899	161,546	1906	530,045
1893	350,000	1900	231,525	1907	667,100
1894	250,325	1901	248,115	1908	514,362

Imports of Drain Tile and Sewer Pipe.

Fiscal Year.	Drain Tile (*a*).	Sewer Pipe (*b*).	Fiscal Year.	Drain Tile (*a*).	Sewer Pipe (*b*).
	$	$		$	$
1880		33,796	1895	695	20,358
1881		37,368	1896	339	18,957
1882		70,061	1897	416	33,870
1883		70,699	1898	157	29,454
1884	5,585	66,170	1899	1,827	32,071
1885	2,911	66,678	1900	1,383	37,766
1886	1,905	56,048	1901	1,264	54,819
1887	2,183	69,020	1902	269	55,261
1888	4,290	96,967	1903	252	57,100
1889	2,346	80,869	1904	1,637	53,958
1890	3,780	73,654	1905	1,229	101,166
1891	673	86,522	1906	4,727	131,353
1892	473	59,064	1907 (9 mos.)	12,106	93,458
1893	110	38,891	1908	2,080	125,747
1894	53	24,572			

(*a*) Drain tile not glazed.
(*b*) Drain pipes, sewer pipes, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

Pottery and Earthenware: The pottery produced from Canadian clays is chiefly of the poorest grades, such as flowerpots, etc. There are several manufacturers of pottery of the more expensive grades, of which a number are located at St. Johns and Iberville, Que., but these use imported clays.

Statistics of the production of pottery and of the imports of earthenware are shown in the following tables. Details of the imports of earthenware for 1907

and 1908 were given on page 273. The total value of the imports in 1908 was $2,190,784. The annual importation of earthenware and chinaware during the past nine years has varied from $1,000,000 to $2,000,000.

Annual Production of Pottery.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1888	27,750	1895	151,588	1902	200,000
1889	Not available.	1896	163,427	1903	200,000
1890	195,242	1897	129,629	1904	140,000
1891	258,844	1898	214,675	1905	120,000
1892	265,811	1899	185,000	1906	150,000
1893	213,186	1900	200,000	1907	253,809
1894	162,144	1901	200,000	1908	200,541

Imports of Earthenware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1880	322,333	1890	695,206	1900	959,526
1881	439,029	1891	634,907	1901	1,114,677
1882	646,734	1892	748,810	1902	1,275,093
1883	657,886	1893	709,737	1903	1,406,610
1884	544,586	1894	695,514	1904	1,611,356
1885	511,853	1895	547,935	1905	1,636,214
1886	599,269	1896	575,493	1906	1,692,359
1887	750,691	1897	595,822	1907 (9 mos.)	1,422,880
1888	697,082	1898	675,874	1908	2,190,784
1889	697,949	1899	916,727		

LIME.

The quantity of lime produced in Canada and sold during 1908, as per returns received, was 3,601,468 bushels, valued at $712,947, or an average of 20 cents per bushel; as compared with 4,755,316 bushels valued at $974,595, also an average price of 20 cents in 1907. These statistics, though fairly complete, do not include any estimates for one or two firms not reporting, and are, therefore, slightly underestimated.

The production or sales by provinces during 1907 and 1908 are shown in the following table.

A small quantity of lime is annually made in Prince Edward Island, but mostly from stone brought over from Nova Scotia, and the figures have been included with the statistics for that Province.

Lime Production by Provinces, 1907 and 1908.

Province.	1907.			1908.		
	Bushels.	Value.	Average per Bushel.	Bushels.	Value.	Average per Bushel.
		$	cts.		$	cts.
Nova Scotia	45,000	16,000	35	51,068	16,102	32
New Brunswick	554,330	124,786	23	155,748	34,262	22
Quebec	1,053,856	262,990	25	857,700	201,357	23
Ontario	2,333,879	393,474	17	2,087,731	358,507	17
Manitoba	431,548	84,793	20	138,786	24,192	17
Saskatchewan	3,700	1,480	40			
Alberta	173,040	41,225	24	135,000	34,500	26
British Columbia	159,963	49,847	31	176,435	44,027	25
	4,755,316	974,595	20	3,601,468	712,947	20

It will be noted that there has been a decreased production in every province. The average price per bushel varied in 1908 from 17 cents in Ontario to 32 cents in Nova Scotia. In 1907 the lowest average price per bushel was also 17 cents, in Ontario, and the highest 40 cents, in Saskatchewan.

The production by provinces in 1906 was as follows :—

—	Bushels.	Value.	Average Price.
		$	cts.
Nova Scotia	50,000	13,600	27
New Brunswick	405,450	94,290	23
Quebec	923,563	201,816	22
Ontario	2,885,000	496,785	17
Manitoba	620,201	119,792	19
Alberta	240,000	56,200	23
British Columbia	106,192	26,694	25
	5,230,406	1,009,177	19

The production of lime given for Ontario in 1906 is as published by the Ontario Bureau of Mines. The figures for all other provinces are from direct returns collected by this department.

The Province of Ontario has contributed about 50 per cent of the total value of the production in 1908, as compared with 40 per cent in 1907, and 49 per cent in 1906.

Statistics of the quantity of lime made each year since 1896 in this Province have been ascertained by the provincial Bureau of Mines, and are as follows :—

Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines).

Calendar Year.	Bushels.	Value.	Cents per Bushel.	Calendar Year.	Bushels.	Value.	Cents per Bushel.
		$				$	
1896	1,880,000	222,000	12	1903	3,400,000	520,000	15
1897				1904	2,600,000	406,800	16
1898	2,620,000	308,000	12	1905	3,100,000	424,700	14
1899	4,342,500	535,000	12	1906	2,885,000	496,785	17
1900	3,893,000	544,000	14	1907	2,650,000	418,700	16
1901	4,100,000	550,000	13	1908	2,442,331	448,596	18
1902	4,300,000	617,000	14				

Exports and Imports: The value of the lime exported in 1908 was $43,316; while the imports during the fiscal year 1908 were 129,379 barrels valued at $99,611. Statistics of exports and imports are given in the next two tables:—

Imports of Lime.

Fiscal Year.	Barrels.	Value.	Fiscal Year.	Barrels.	Value.
		$			$
1880	6,100	6,013	1895	12,008	5,743
1881	5,796	4,177	1896	10,239	7,331
1882	5,064	5,365	1897	16,108	10,529
1883	7,623	9,224	1898	12,850	9,002
1884	16,804	11,200	1899	15,720	11,124
1885	12,072	11,503	1900	12,865	11,211
1886	11,021	9,347	1901	19,657	14,534
1887	10,835	8,524	1902	24,602	17,584
1888	10,142	7,537	1903	31,108	22,470
1889	13,079	9,363	1904	54,359	39,639
1890	8,149	5,360	1905	98,676	71,588
1891	6,259	4,273	1906	134,334	93,630
1892	6,132	4,241	1907 (9 mos.)	88,919	67,573
1893	6,879	4,917	1908...Duty, 20%...	129,379	99,611
1894	6,766	4,907			

Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1891	119,853	1897	53,177	1903	131,412
1892	121,535	1898	49,594	1904	73,838
1893	86,623	1899	73,565	1905	85,723
1894	83,670	1900	80,852	1906	57,072
1895	71,697	1901	99,194	1907	55,903
1896	70,820	1902	116,009	1908	43,316

SAND-LIME BRICK.

Under the heading of clay products the production of clay building brick has already been recorded. For structural purposes, however, there is a rapidly growing use of building brick of other classes, including cement brick, and sand-lime or silica brick. Owing to the ease with which cement brick may be made, no attempt has been made to obtain complete statistics of their production. Returns have, however, been requested from the manufacturers of sand-lime brick.

According to returns received the production in 1908 was 17,288,260, valued at $152,856; as compared with 16,492,971, valued at $167,795, in 1907.

SANDS AND GRAVELS.

No statistics are available as to the production of sand and gravel, but the trade returns of the Customs Department show an export and an import of these materials for a number of years, of which a record is given in the accompanying table:—

Annual Exports of Sand and Gravel.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1893	329,116	121,795	1901	197,302	117,465
1894	324,656	86,940	1902	159,793	119,120
1895	277,162	118,359	1903	355,792	124,006
1896	224,769	80,110	1904	399,809	129,803
1897	152,963	76,729	1905	306,935	152,805
1898	165,954	90,498	1906	336,550	139,712
1899	242,450	101,640	1907	298,095	119,853
1900	197,558	101,666	1908	298,954	161,387

Annual Imports of Sand and Gravel.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		$			$
1893	26,065	31,739	1901	35,749	42,891
1894	41,573	33,506	1902	47,381	58,668
1895	19,609	24,779	1903	91,518	95,647
1896	18,953	24,604	1904	110,634	107,547
1897	21,308	25,222	1905	85,339	92,722
1898	32,148	43,287	1906	116,500	173,727
1899	30,288	42,209	1907 (9 mos.)	171,700	177,412
1900	35,713	41,280	1908	266,704	223,043

SLATE.

The New Rockland slate quarries of Richmond county, Que., have been operated for a number of years under lease by Messrs. Fraser and Davies, and have been the only source of production recorded. The Pacific Slate Co. of Victoria is reported to have begun the shipment of slate from Jarvis inlet, 80 miles north of Victoria, B.C., but no returns of production from this source were received. The production of slate in 1908 was valued at $13,496, and in 1907 at $20,056.

In 1908 slate was exported to the value of $2,539.

The imports of slate during the last two fiscal years were as follows :—

Imports of Slate during fiscal years 1907 and 1908.

Slate and Manufactures of	9 months ending March, 1907.	12 months ending March, 1908.
Roofing slate	$51,826	$72,588
School writing slate	17,559	26,834
Slate pencils	2,505	3,898
Slate of all kinds and manufactures of	23,630	27,749
	95,520	131,069

Statistics of annual production, exports, and imports are shown in the three following tables :—

Annual Production of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886	5,345	$64,675	1898	.....	$40,791
1887	7,357	89,000	1899	.....	33,406
1888	5,314	90,689	1900	.....	12,100
1889	6,935	119,160	1901	715	9,980
1890	6,368	100,250	1902	.....	19,200
1891	5,000	65,000	1903	5,510	22,040
1892	5,180	69,070	1904	5,277	23,247
1893	7,112	90,825	1905	.....	21,568
1894	.....	75,550	1906	.....	24,446
1895	.....	58,900	1907	4,335	20,056
1896	.....	53,370	1908	2,950	13,496
1897	.....	42,800			

Exports of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1884	539	6,845	1894	187	3,610
1885	346	5,274	1895	36	574
1886	34	495	1896	301	8,913
1887	27	373	1897	Nil.	Nil.
1888	22	475	1898	Nil.	Nil.
1889	26	3,303	1899	Nil.	Nil.
1890	12	153	1900	Nil.	Nil.
1891	15	195	1901	16,750	10,000
1892	87	2,038	1902 to 1907	Nil.	Nil.
1893	178	3,168	1908	.....	2,539

Imports of Slate.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1880	21,431	1890	22,871	1900	53,707
1881	22,184	1891	46,104	1901	72,187
1882	24,543	1892	50,441	1902	72,601
1883	24,968	1893	51,179	1903	84,437
1884	28,816	1894	29,267	1904	86,057
1885	28,169	1895	19,471	1905	93,228
1886	27,852	1896	24,176	1906	112,941
1887	27,845	1897	21,615	1907 (9 mos)	95,520
1888	23,151	1898	24,907	1908	131,069
1889	41,370	1899	33,100		

STONE.

Under this heading is included the production of building and ornamental stone, flagstone and paving stone, rubble, riprap, and crushed stone. The kinds of stone quarried may be classified as granite, sandstone, limestone, and marble.

With respect to granite, returns have been received from nearly all the known operators, and the production in 1908 was reported as valued at $282,320; as compared with $194,712 in 1907.

For sandstone, limestone, and marble, complete statistics have not been received. The value of the production of building and crushed stone in the Province of Ontario in 1908, as ascertained by the Ontario Bureau of Mines, was $530,041; as compared with a value of $675,000 in 1907.

A rough estimate of the production of building and other stone, not including granite, in Canada, in 1908, would place the total value at about $1,800,000.

The production of stone in 1907 and 1908 may be summed up as follows:—

Production of Stone, 1907 and 1908.

Stone.	1907.	1908.
	$	$
Building and crushed stone etc.	1,830,000	1,800,000
Flagstone	2,550	6,293
Granite	194,712	282,320
Total	2,027,262	2,088,613

Exports and Imports :—The exports of stone are classified simply as wrought and unwrought; the total value of the exports in 1908 was $58,005, and in 1907 only $7,320.

The annual exports since 1890 are shown in the accompanying table :—

Exports of Stone and Marble, Wrought and Unwrought.

Calendar Year.	Wrought.	Unwrought.	Calendar Year.	Wrought.	Unwrought.
	$	$		$	$
1890	21,725	43,611	1900	5,933	115,711
1891	13,398	46,162	1901	5,917	157,739
1892	7,698	47,424	1902	8,632	124,829
1893	9,102	12,532	1903	7,684	46,295
1894	22,576	34,130	1904	4,760	17,802
1895	8,587	51,616	1905	3,545	13,089
1896	4,934	32,897	1906	23,097	4,675
1897	9,415	42,034	1907	4,233	3,087
1898	2,526	65,370	1908	15,194	42,811
1899	5,092	101,931			

The imports are classified as building stone of all kinds, except marble, manufactures of granite and other stone; and marble and its manufactures. The total value of the imports of stone in 1908 was $651,525, as compared with a value of $450,594 in 1907 (9 months).

Details of imports in 1907 and 1908 are shown in the next table :—

Imports of Stone, Fiscal Years 1907 and 1908.

——	1907 (9 months.)		1908.	
	Tons.	Value.	Tons.	Value.
		$		$
Building stone, rough (1)	14,374	58,398	19,344	80,950
" dressed (2)	12,353	78,967	17,166	90,740
Granite, sawn only	5,128	31,931	1,019	5,450
" mfgs. of		69,673		119,381
Paving blocks		15,028		32,566
Manufactures of stone, N.O.P		20,147		34,851
Marble and mfgs. of—				
Marble, sawn only		81,715		155,668
" rough, not hammered or chiselled		6,435		5,319
" manufactures of, N.O.P		88,300		126,600
		450,594		651,525

(1) Flagstones, granite, rough freestone, sandstone and all building stone not hammered or chiselled.
(2) Flagstone and all other building stone, sawn or dressed.

Statistics showing the annual imports of building stone, manufactures of granite, etc., marble, and flagstone are shown in the following table :—

Annual Imports of Stone.

Fiscal Year.	Building Stone.		Manufactures of Granite, etc.	Marble.	Flagstones.	Total Value.
	Rough.	Dressed.				
	$	$	$	$	$	$
1880	32,824	3,146	29,408	63,015	.....	128,393
1881	7,823	50,326	36,877	85,977	241	181,244
1882	32,848	775	37,267	109,505	848	181,243
1883	33,429	1,632	45,636	128,520	99	209,316
1884	46,232	4,856	45,290	108,771	1,158	206,307
1885	28,433	2,058	39,867	102,835	1,756	174,949
1886	36,776	4,899	41,984	117,752	9,443	210,854
1887	47,819	6,549	41,829	104,250	10,966	211,413
1888	84,263	2,110	47,487	94,681	21,077	249,618
1889	89,723	10,591	61,341	118,421	15,451	295,527
1890	126,456	5,699	84,396	99,353	48,995	364,899
1891	151,119	19,771	61,051	107,661	36,348	372,950
1892	85,169	10,381	39,479	106,268	15,048	256,345
1893	47,609	8,901	49,323	96,177	8,500	210,510
1894	48,097	4,811	49,510	94,657	2,429	199,504
1895	37,732	6,550	51,050	83,422	84	178,838
1896	42,737	11,393	51,499	90,065	Nil	195,694
1897	27,442	11,272	34,026	77,150	227	150,117
1898	25,322	3,173	41,240	95,894	1,540	167,129
1899	43,494	4,546	60,148	101,879	Nil	210,067
1900	63,376	1,157	57,039	94,017	63	215,652
1901	45,039	1,039	66,639	96,159	116	208,992
1902	69,972	29,102	72,397	130,424	1,231	303,126
1903	71,202	16,664	78,629	153,481	Nil	319,976
1904	59,864	33,914	141,165	181,511	Nil	416,454
1905	49,004	53,813	150,160	145,466	Nil	398,443
1906	66,994	65,134	178,435	189,589	Nil	500,152
1907	58,398	78,967	136,779	176,450	Nil	450,594
1908	80,950	90,740	192,248	287,587	Nil	651,525

Marble :—In the Province of Quebec, marble is being quarried in Missisquoi county, at Philipsburg, by the Missisquoi Marble Co., Ltd., of Montreal. This Company was organized in 1907 and took over the quarry and plant formerly owned by the Philipsburg Railway and Quarry Co. About six well defined varieties of marble are obtained, comprising light, dark, and green grey, and various cream coloured varieties. The quarry is provided with channelling machines, steam drills, and derricks ; while the mill and finishing shops contain gang saws, planer, lathe, polishing machines, pneumatic tools, etc. The marble is in considerable demand as a decorative stone, and has been used in a number of buildings in the larger cities of Canada, besides finding an important market in the United States.

In Ontario, marble quarries have been opened up in Dungannon and Faraday townships, Hastings county, by the Ontario Marble Quarries, Limited. Marble quarries are also being opened up in Lanark county by the North Lanark Marble and Granite Quarries, Ltd. In British Columbia three marble quarries have been

operated, one opposite Kaslo, worked by W. G. Gillett of Nelson; the Canadian Marble and Granite Company's quarry, eight miles from Lardo, and the quarry of the Nootka Marble Quarries, Ltd., on Nootka sound, west coast of Vancouver island. The last mentioned Company did not commence shipments until December, 1908.

The last two quarries have been described in the Report of the Minister of Mines for British Columbia for 1908.

"The Canadian Marble & Granite Company's Kootenay marble quarry is situated on the Canadian Pacific Railway Company's Lardo-Trout Lake branch, about eight miles from Lardo, which is near the head of Kootenay lake. The marble lies at an angle of about 45 degrees, pitching towards the railway, which passes immediately in front of the quarry. It is estimated that the deposit of marble is approximately 700 feet in thickness. The top layer is about 50 feet thick, of a light-coloured, crystalline marble similar to the Georgia 'Cherokee' marble. Then there are about 10 feet, also crystalline, like the Georgia 'Dark Creole'. Next follow six feet of light blue, and then two feet similar in appearance to Italian statuary marble. Other layers include various shades of blue marble, from light to very dark.

"The marble is described as being somewhat harder than the average Vermont marble, but it takes a better polish, and retains it. The deposit is large, free from flaws and cracks, and so unbroken that blocks can be taken out in size up to any dimensions that it is practicable to get machinery to lift the blocks with. The quarry has been worked about two years by the Canadian Marble and Granite Company.

"The marble is shipped from the quarry in what is known to the trade as 'gang-saw blocks', to either Nelson, B.C., or Edmonton, Alberta, in which cities the Company operates marble works, and is there worked up for monumental or building purposes, both interior and exterior, as required. The finished building material has been used for fronts or trimmings of buildings at Nelson, Lethbridge, Calgary, Edmonton, Strathcona, Regina, and other cities; while for lavatory and other interior fittings, tiles, etc., it has also been in good demand.

"Nine men were employed all last summer at the quarry, and when the works at Nelson are running in full order some 50 men are employed. The value of the material sent out last year was about $50,000, and the indications are that there will be a substantial increase over that output in 1909".

The Nootka Marble Quarries Company has been for the past two years opening up a quarry on the beach at Nootka sound. The development already done has demonstrated that there is a deposit of solid marble of good commercial quality from which stone can be quarried in blocks as large as the appliances used can handle. A blue-grey marble with white and whitish markings is being produced, which is free from flaws and suitable for monumental work or for being sawed up for purposes of interior decoration or utilities.

"The Company, besides opening out its quarry, has built a suitable and efficient dock at which the coasting steamers can land, and has erected a marble

dressing plant consisting of 2 marble cutting gang saws, a marble lathe, polisher, etc., all suitably housed and provided with the required steam power, while the necessary accommodations for the men employed have also been erected. The plant only came into operation about the first of December, 1908, so that by the end of the year the actual product was only of nominal value and consisted more particularly of samples showing what the product would be. These samples, however, have served their purpose, and the Company is in receipt of sufficient orders for the product at good prices to necessitate the immediate doubling of the dressing plant, and this is now being done".

Only incomplete statistics of the marble production in 1908 were received, but the total value of the finished stone would probably be not less than $125,000. The value of the imports of marble and its manufactures in 1908 was $287,587. There has been no record of any marble production between the years 1897 and 1906 inclusive, but during the previous ten years there was a small annual production as shown in the accompanying table.

Annual Production of Marble.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1886	501	9,900	1892	340	3,600
1887	242	6,224	1893	590	5,100
1888	191	3,100	1894	Nil.	Nil.
1889	83	980	1895	200	2,000
1890	780	10,776	1896	224	2,405
1891	240	1,752	1897 to 1906 inclusive	Nil.	Nil.

Granite:—The total value of the production of granite in 1908 was $282,320; as compared with a value of $194,712 in 1907. The production is used chiefly for building, paving, and monumental work.

The production was obtained from practically the same sources as have been worked for a number of years.

Statistics of the production since 1886 are shown as follows:—

Annual Production of Granite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1886	6,662	63,309	1898	23,897	81,073
1887	21,217	142,506	1899	13,418	90,542
1888	21,352	147,305	1900		80,000
1889	10,197	79,624	1901		155,000
1890	13,307	65,985	1902		210,000
1891	13,637	70,056	1903		200,000
1892	24,302	89,326	1904		150,000
1893	22,521	94,393	1905		226,305
1894	16,392	109,936	1906		278,419
1895	19,238	84,838	1907	151,136	194,712
1896	18,717	106,709	1908		282,320
1897	10,345	61,934			

Flagstone:—A small quantity of flagstone is annually quarried at Bishops Crossing, Que., and sold in Sherbrooke, Iberville, St. Johns, and St. Hyacinthe. The production in 1907 was valued at $2,550, and in 1908 at $6,293.

The annual production since 1886 is shown in the following table:—

Annual Production of Flagstone.

Calendar Year.	Quantity.	Value.	Calendar Year.	Quantity.	Value.
	Sq. ft.	$		Sq. ft.	$
1886	70,000	7,875	1898		4,250
1887	116,000	11,600	1899		7,600
1888	64,800	3,580	1900		5,250
1889	14,000	1,400	1901		4,575
1890	17,865	1,643	1902	87,300	7,760
1891	27,306	2,721	1903	79,200	6,688
1892	13,700	1,869	1904	75,600	6,720
1893	40,500	3,487	1905	81,000	7,650
1894	152,700	5,298	1906	59,400	5,280
1895	80,005	6,687	1907	27,000	2,550
1896		6,710	1908	61,200	6,293
1897		7,190			