CANADA

DEPARTMENT OF MINES

MINES BRANCH

HON. W. TEMPLEMAN, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;
EUGENE HAANEL, PH.D., DIRECTOR.

ANNUAL REPORT

OF THE

DIVISION OF MINERAL RESOURCES AND STATISTICS

ON THE

MINERAL PRODUCTION OF CANADA

During the Calendar Year

1909

JOHN McLEISH, B.A.

Chief of the Division of Mineral Resources and Statistics.

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Dr. EUGENE HAANEL,

Director of Mines,

Department of Mines, Ottawa.

SIR,—I beg to hand you herewith, the Annual Report of the Division of Mineral Resources and Statistics, giving revised statistical information descriptive of the mining and metallurgical production in Canada during the calendar year 1909.

A preliminary report on the mineral production during the year was sent to press, February 24, 1910, and issued within the following week; while special articles on the subjects of iron and steel, coal and coke, structural materials and clay products—included as parts of the present report—have previously been issued as separate bulletins.

Mr. C. T. Cartwright, B.Sc., who was appointed on May 9, 1910, as an assistant mining engineer in the Division, spent about two months in field work, collecting statistics and other information from producers, and has also prepared much of the material for this report.

Free use has been made of the reports published by the Provincial Bureaus of Mines, and grateful acknowledgment is made of the hearty co-operation of mine and smelter operators who have, with few exceptions, cheerfully complied with our requests, and furnished the Department 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 22, 1910.

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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 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 value of the metallic minerals produced, whether refined in Canada or not, is calculated on the basis of the average price of the metal in some recognized market. New York prices have usually been taken as the standard. In the case of lead, however, the New York price is so much higher than that of London, that the the Toronto price—about midway between these two—has been used in 1909. The value of non-metallic products is given as at the mine or point of shipment. This differs from the practice of the Ontario and Quebec Bureau 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 1909, is equivalent to 29·5 per cent of the final value of the metal. The value given to copper is 54·7 per cent of the final value; while the value given to the silver is 93·4 per cent of the final value. 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.

The calculation of the quantities of metal production exhibits an equal lack of uniformity of method. In some cases the full assay content of the ore is given as production, while in other cases smelter losses are deducted. There is, moreover, the distinction between ore raised and ore shipped.

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 almost entirely on imported iron ores; Quebec has an industry in the manufacture of aluminium, based almost altogther on imported ores; while the iron smelting industry of Ontario is to a considerable extent based on both imported ores and fuels.

In the compilation of the statistics for these reports, it will be the practice, henceforth, to show as closely as may be ascertained the metal production based on smelter recovery.

THE

MINERAL PRODUCTION OF CANADA

During the Calender Year

1909.

INTRODUCTION.

Tabulated statements of the mineral production of Canada in 1908 and 1909 will be found on pages following.

The revised statistics show the total value of the production in 1909 to be $91,831,441, as compared with a value of $85,557,101 in 1908; indicating an increase in 1909 of $6,274,340 or 7·3 per cent. The figures, however, do not quite show the relative growth of the mineral production, owing to the change in method of compiling or stating metal production adopted in 1909. The statistics of metal production in 1908 were in part based on the full metal content of ores shipped, without making allowance for smelter losses, while those for 1909 are based, as far as possible, altogether on smelter recoveries. Notwithstanding this restriction, the metal production in 1909 shows an increase of $2,382,474 over that of 1908. In the structural materials and clay products an increase is shown of $5,193,394, while in the other non-metallic products there was a decrease of $1,001,533.

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 three-fold. During the last four years the increase has been about 32 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	64,420,877	12 04
1889	14,013,113	2 96	1901	65,797,911	12 25
1890	16,763,353	3 50	1902	63,231,836	11 55
1891	18,976,616	3 92	1903	61,740,513	11 03
1892	16,623,415	3 39	1904	60,082,771	10 36
1893	20,035,082	4 04	1905	69,078,999	11 35
1894	19,931,158	3 98	1906	79,286,697	12 55
1895	20,505,917	4 05	1907	86,865,202	13 35
1896	22,474,256	4 38	1908	85,557,101	12 32
1897	28,485,023	5 49	1909	91,831,441	12 82

The Mineral Production of Canada in 1908.

Product.		1908. Quantity.	1908. Value. (d)	Per cent of total.
METALLIC.			$	%
Antimony, ore	Tons.*	148a	5,443a	
Antimony, refined	Lbs.			
Cobalt (c)	"		113,423	0·13
Copper	"	63,702,873	8,413,876	9·83
Gold	Ozs.	476,112	9,842,105	11·50
Pig iron from Canadian ore (b)	Tons.	99,420	1,664,302	1·95
Iron ore (a)	"			
Lead	Lbs.	43,195,733	1,814,221	2·12
Nickel	"	19,143,111	8,231,538	9·62
Silver	Ozs.	22,106,233	11,686,239	13·66
Zinc ore	Tons.	452	3,215	
Total value of metallic			41,774,362	48·83
NON-METALLIC.				
Arsenic	Tons.		58,566	
Asbestos	"	66,548	2,555,361	2·98
Asbestic	"	24,225	17,974	
Calcium carbide	"	6,864	417,150	0·49
Chromite	"	7,225	82,008	
Coal	"	10,886,311	25,194,573	29·45
Corundum	"	1,089	100,398	0·12
Feldspar	"	7,877	21,099	
Graphite	"	251	5,565	
Graphite, artificial	"	214		
Grindstones	"	3,843	48,128	
Gypsum	"	340,964	575,701	0·67
Limestone used as flux	"	418,661	289,705	0·34
Magnesite	"	120	840	
Mica	"	436	139,871	0·16
Mineral pigments :—				
Barytes	"	4,312	19,021	
Ochres	"	4,746	30,440	
Mineral water			151,953	0·18
Natural gas			1,012,660	1·18
Peat	Tons.	60	180	
Petroleum	Bls.	527,987	747,102	0·87
Phosphate	Tons.	1,596	14,794	
Pyrites	"	47,336	224,824	0·26
Quartz	"	44,741	52,830	
Salt	"	79,975	378,798	0·44
Talc	"	1,016	3,048	
Tripolite	"	30	195	
Total			32,142,784	37·57

* Short tons throughout. (a) Exports. (b) Only the quantity and value of pig iron attributed to Canadian ore are here given. The total production of pig iron in Canadian furnaces in 1907 was 651,962 tons, valued at $9,125,226, and in 1908, 630,835 tons, valued at $8,111,194. (c) Value received by shippers of silver-cobalt ores for cobalt content. (d) The metals copper, lead, nickel, and silver are valued at the final average value of those metals in the New York metal market, namely, for 1907 : copper 20·004 cents, lead 5·325 cents, nickel 45 cents per pound ; silver 65·327 cents per ounce. For 1908 the average values were : copper 13·208 cents, lead 4·200 cents, nickel 43 cents per pound ; and silver 52·864 cents per ounce. The other metallic, and the non-metallic products are valued at their shipping values.

The Mineral Production of Canada in 1908—*Concluded.*

Product.		1908. Quantity.	1908. Value.	Per cent of total.
Structural Material and Clay Products.			$	%
Cement, natural	Bls.	1,044	815	
Cement, Portland	"	2,665,289	3,709,139	4·34
Clay products :—				
Bricks, common	No.	353,261,268	2,611,554	3·05
" pressed	"	53,480,764	517,180	0·60
" paving	"	3,719,961	59,456	
" moulded and ornamental	"		18,535	
Fireclay, and fireclay products			110,302	0·13
Fireproofing and architectural terra-cotta, etc.			170,211	0·20
Pottery			200,541	0·23
Sewer-pipe			514,362	0·60
Tiles, drain		20,100,261	298,561	0·35
Lime	Bus.	3,601,468	712,947	0·83
Sand-lime brick	No.	17,288,260	152,856	0·18
Sand and gravels (*a*)	Tons.	298,954	161,387	0·19
Slate	Squares.	2,950	13,496	
Stone :—				
Building stone			1,800,000	2·10
Flagstones	Sq. yds.	6,800	6,293	
Granite	Tons.		282,320	0·33
Total Structural Material and Clay Products			11,339,955	13·25
Estimated for mineral products not reported			300,000	0·35
Grand Total			85,557,101	100·00

The Mineral Production of Canada in 1909.

Product.		1909. Quantity.	1909. Value (b).	Per cent of total.
METALLIC.			$	%
Antimony, ore	Tons.*	35	1,575	....
Antimony, refined	Lbs.	61,207	4,285	....
Cobalt (k)	"	.....	94,609	0·10
Copper (c)	"	52,493,863	6,814,754	7·42
Gold	Ozs.	453,865	9,382,230	10·22
Pig iron from Canadian ore (d)	Tons.	149,444	2,222,215	2·42
Iron ore (a)	"	21,956	61,954	....
Lead (e)	Lbs.	45,857,424	1,692,139	1·84
Nickel (f)	"	26,282,991	9,461,877	10·30
Silver (g)	Ozs.	27,529,473	14,178,504	15·44
Zinc ore	Tons.	18,371	242,699	0·26
Total value of metallic		.....	44,156,841	48·08
NON-METALLIC.				
Arsenic	Tons.	.....	67,446	....
Asbestos	"	63,349	2,284,587	2·49
Asbestic	"	23,951	17,188	....
Chromite	"	2,470	26,604	....
Coal	"	10,501,475	24,781,236	26·99
Corundum	"	1,491	162,492	0·18
Feldspar	"	12,783	40,383	....
Graphite	"	864	47,800	....
Graphite, artificial	"	257	.....	....
Grindstones	"	4,275	54,664	....
Gypsum	"	473,129	809,632	0·88
Magnesite	"	330	2,508	....
Mica	"	369	147,782	0·16
Mineral pigments :—				
Barytes	"	179	1,120	....
Ochres	"	3,940	28,093	....
Mineral water		.....	175,173	0·19
Natural gas (h)		.....	1,207,029	1·31
Peat	Tons.	60	240	....
Petroleum (i)	Bls.	420,755	559,604	0·61
Phosphate	Tons.	998	8,054	....
Pyrites	"	64,644	222,812	0·24
Quartz	"	56,924	71,285	....
Salt	"	84,037	415,219	0·45
Talc	"	4,350	10,300	....
Total		.....	31,141,251	33·91

*Short tons throughout.

(a) Exports.

(b) The metals, copper, lead, nickel, and silver are for statistical and comparative purposes valued at the final average value of the refined metal. Pig iron is valued at the furnace, and non-metallic products at the mine or point of shipment.

(c) Copper content of smelter products and estimated recoveries from ores exported, at 12·982 cents per pound.

(d) The total production of pig iron in Canada in 1909 was 757,162 tons valued at $9,581,864, of which it is estimated 607,718 tons valued at $7,359,649 should be credited to imported ores.

(e) Refined lead and lead contained in base bullion exported at 3·690 cents per pound, the average price for the year in Toronto.

(f) Nickel content of matte produced at 36 cents per pound (the average minimum quotation for nickel in New York less 10 per cent). The value of the nickel contained in matte was, as returned by the operators, $2,810,748 or an average per pound of 10·7 cents.

(g) Estimated recoverable silver at 51·503 cents per ounce.

(h) Gross returns for sale of gas.

(i) Quantity on which bounty was paid and valued at $1 33 per barrel.

(k) Value received by shippers of silver cobalt ores for cobalt content.

The Mineral Production of Canada in 1909—*Concluded.*

Product.		1909. Quantity.	1909. Value.	Per cent of total.
Structural Material and Clay Products.			$	%
Cement, Portland	Bls.	4,067,709	5,345,802	5·82
Clay products:—				
Bricks, common	No.	539,228,708	4,212,424	4·59
" pressed	"	57,264,656	630,677	0·69
" paving	"	3,759,803	67,408	.....
" moulded and ornamental	"	.....	8,866	.....
Fireclay, and fireclay products		.....	78,132	.....
Fireproofing and architectural terra-cotta, etc		.....	113,886	0·12
Pottery		.....	285,285	0·31
Sewer pipe		.....	645,722	0·70
Tiles, drain		27,571,097	408,440	0·44
Lime	Bus.	5,592,924	1,132,756	1·23
Sand-lime brick	No.	27,052,864	201,650	0·22
Sand and gravels (*a*)	Tons.	481,584	256,166	0·28
Slate	Squares.	4,000	19,000	.....
Stone:—				
Granite		.....	454,824	0·50
Limestone		.....	2,139,691	2·33
Marble		.....	158,441	0·17
Sandstone		.....	374,179	0·41
Total structural and clays		.....	16,533,349	18·01
Grand total		.....	91,831,441	100·00

Metalliferous products are credited with about 48 per cent of the total production in 1909. The total quantity of ore smelted in Canadian furnaces was larger than during the previous year, and there was an increased production of nearly all the metals, the principal exception being copper.

The prices of the metals remained fairly constant throughout the year, and the averages differed but slightly from those of 1908.

A comparison of New York average monthly prices is shown herewith.

Average Monthly Prices of Metals, 1906-9.

——	1906.	1907.	1908.	1909.
	Cts.	Cts.	Cts.	Cts.
Copper	19·278	20·004	13·208	12·982
Lead	5·657	5·325	4·200	4·273
Nickel	41·64	45·000	43·000	40·000
Silver	66·791	65·327	52·864	51·503
Spelter	6·198	5·962	4·720	5·503
Tin	39·819	38·166	29·465	29·725

The metal mining industries of Ontario were particularly active during 1909, there being a very important increase in the production of nickel and copper at Sudbury, and in the silver production from Cobalt. The iron mining and smelting industries of eastern Canada also made good progress during the year, showing the largest production on record. In the west, in British Columbia there was a falling off in ore shipments, owing to the closing down of a number of important mines with a resulting falling off in production of gold, silver, and copper; the placer gold recovery in this Province was also considerably less than in 1908. On the other hand, there was an increased production of lead and an important production of zinc ore in 1909. The Yukon gold production was again increased.

In the non-metallic class of products there was a falling off in the shipments of asbestos, chromite, coal, and petroleum, and substantial increases in the production of feldspar, gypsum, natural gas, pyrites, salt, and talc. Exclusive of the structural materials and clay products, the net result was a falling off in production of over 3 per cent. The production of cement, clay products, stone lime, etc., was greatly increased in 1909, the aggregate of this class showing an advance of over 45 per cent.

EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for refining and manufacturing in the United States and other countries, while considerable quantities of manufactured mine products are imported for Canadian 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 1908 and 1909 are shown in the first table, the total value being a little under $40,000,000 in 1908, and nearly $43,000,000 in 1909.

The second table shows the exports during the fiscal years classified according to destinations. It will be seen that during the fiscal years 1908-9, the United States took 90 per cent of the whole and Great Britain about 9 per cent, the balance being distributed among about 22 other countries.

Exports of the Products of the Mine—Calendar Years 1908 and 1909.

	1908		1909	
	Quantity.	Value.	Quantity.	Value.
		$		$
Arsenic ... Lbs.	1,913,732	43,493	3,111,249	119,673
Asbestos ... Tons	61,210	1,842,763	56,971	1,729,857
Barytes ... Cwt.	3,509	13,690	...	...
Chromite ... Tons	4,571	56,864	1,794	20,858
Coal ... "	1,729,833	4,661,377	1,588,099	4,456,342
Feldspar ...	9,524	34,045	10,834	35,234
Gold ...	...	7,740,918	...	5,629,549
Gypsum ... Tons	280,091	324,574	315,201	372,286
Copper, fine, in ore, etc ... Lbs.	51,136,371	5,934,559	54,447,750	5,832,246
Lead, in ore, etc ... "	4,511,931	153,394	6,226,068	132,578
" in pig ... "	13,942,663	469,060	11,301,960	361,064
Nickel, in ore, etc ... "	19,419,893	1,866,624	25,616,398	2,676,483
Platinum in ore, concentrates ... Ozs.	43	937	466	2,118
Silver in ore, etc ... "	20,884,451	12,403,482	31,126,504	15,719,909
Mica ... Lbs.	580,195	198,839	717,066	256,834
Mineral pigments ... "	249,635	4,850	1,316,514	7,956
Mineral water ... Gals.	8,953	3,659	60,562	7,433
Oil, refined ... "	296	71	7,768	934
Ores—				
Antimony ... Tons	148	5,443	4	120
Iron ... "	4,334	72,260	21,956	61,954
Manganese ... "	...	...	3	434
Other ores ... "	13,910	509,779	11,939	625,142
Phosphate ... "	1	30	895	15,735
Plumbago ... Cwt.	7,706	10,158	20,070	52,438
Pyrites ... Tons	17,283	96,600	35,798	156,644
Salt ... Lbs.	529,229	3,840	276,765	2,488
Sand and gravel ... Tons	298,954	161,387	481,584	256,166
Slate ... "	10,709	2,539	134	612
Stone, ornamental ... "	1,314	28,777	1,027	8,606
" building ... "	4,009	14,034	26,672	15,481
" for mfg. of grindstones ... "	661	5,991	125	1,685
Other products of the mine ...	...	176,007	...	109,350
Manufactures—				
Bricks ... M.	2,344	9,047	365	2,255
Aluminium in bars, etc ... Lbs.	1,713,800	399,785	6,134,500	918,195
" manufactured ...	...	1,727	...	3,453
Cement ...	...	34,591	...	113,362
Clay, manufactures of ...	...	92	...	979
Coke ... Tons	58,708	248,759	74,067	329,051
Grindstones manufactured ...	...	13,730	...	13,942
Gypsum, ground ...	...	9,765	...	2,787
Iron and steel—				
Stoves ... No.	651	8,258	744	10,330
Castings, N.E.S ...	...	28,062	...	25,038
Pig iron ... Tons	290	10,614	5,063	186,778
Machinery (Linotype) ...	...	126,590	...	43,686
" N.E.S. ...	...	285,257	...	421,707
Sewing machines ... No.	9,697	109,002	12,759	147,402
Typewriters ... "	3,720	169,939	3,749	238,167
Hardware, tools, etc ...	...	57,631	...	52,207
" N.E.S. ...	...	59,304	...	35,507
Scrap iron and steel ... Cwt.	92,566	73,807	410,506	305,256
Steel and manufactures of ...	...	1,169,674	...	1,132,678
Lime ...	...	43,316	...	48,821
Metals, N.O.P ...	...	65,360	...	134,062
Plumbago, manufactures of ...	...	876	...	864
Stone, ornamental ...	...	13,748	...	33,097
" building ...	...	1,446	...	501
		39,780,424		42,868,334

Exports showing Destination of Mine Products during the Fiscal Years 1907-8 and 1908-9.

Destination.	1907-8 Value.	1908-9 Value.	Destination.	1907-8 Value.	1908-9 Value.
	$	$		$	$
United States	35,219,840	31,260,862	British Possessions (all other)	25	4,779
Great Britain	1,560,842	2,986,967	Bolivia		4,016
Hong Kong	183,017	602,347	Italy	22,055	2,773
China	419,576	595,683	Argentina	8,445	1,735
Newfoundland	421,995	501,559	British Africa	28,039	310
Germany	33,748	337,316	British Guiana		77
Belgium	627,506	209,640	Austria-Hungary	1,500	
Japan	207,872	180,679	Holland	5,253	
Australia	58,560	179,276	Spain	393	
Mexico	70,941	170,797	Cape Verde islands	12,792	
France	60,886	67,921	Philippines	7,550	
Bermuda	72,686	41,426	Egypt	6,717	
West Indies	28,857	31,838	Russia	3,985	
St. Pierre	28,321	27,508	Chili	1,250	
New Zealand	22,793	19,441	Switzerland	385	
Peru		12,328			
Cuba	61,304	11,428			
Dutch East Indies		6,993	Total	39,177,133	37,257,699

IMPORTS.

Minerals and Mineral Products, Fiscal Year 1908-9.

Products.	Value.	Products.	Value.
	$		$
Alumina	99,491	Litharge	43,597
Alum	30,630	Lithographic stone	8,813
Aluminium	197,123	Manganese, oxide of	6,561
Antimony	28,482	Magnesia	9,684
" salts	3,651	Marble and mfs. of	200,928
Arsenic	14,575	Mercury	46,217
Asbestos	180,598	Metallic alloys—	
Asphaltum	337,289	Babbet metal	46,581
Bells and gongs	90,706	Brass and mfs. of	1,507,711
Bismuth	1,133	Britannia metal	47,887
Blanc fixe and satin white	12,125	German silver, nickel and nickel silver	99,333
Blast furnace slag	48,773	Type metal	8,459
Borax	87,383	Mineral and bituminous substances	52,052
Bricks and tiles	464,576	Mineral and metallic pigments	941,797
" fire	350,457	Mineral water including aerated water	159,221
Burrstones	1,141	Nickel anodes	14,930
Cement	481,875	Ores of metals, N. O. P.	2,606,042
Chalk, etc	105,741	Paraffine wax	12,795
Clays	190,235	" candles	14,806
Coal	27,185,469	Petroleum and products of	3,058,387
Coal tar and coal pitch	198,083	Phosphate (fertilizer)	36,465
Coke	1,136,624	Platinum and mfs. of	47,371
Copper and mfs. of	2,469,646	Precious stones	1,371,971
Cryolite	7,610	Pumice	8,192
Crucibles, clay or plumbago	37,213	Salt	460,321
Chloride of lime	67,783	Saltpetre	96,718
Earthenware	1,716,887	Sand and gravels	136,011
Electric carbons	100,312	Slate and mfs. of	124,065
Emery	73,631	Stone and mfs. of	422,925
Flint, quartz, etc	60,528	Sulphate of copper	93,087
Fullers earth	5,058	" iron	6,579
Fossils	543	Sulphur and phosphorus	429,653
Gold and silver, mfs. of	1,559,577	Sulphuric acid	3,298
Graphite and mfs. of	39,335	Tin and mfs. of	2,988,120
Gypsum and plaster of Paris	105,882	Tufa, calcareous	206
Iron and steel—		Whiting	45,314
Pig iron	873,932	Zinc and mfs. of	470,944
Ferro-silicon etc.	388,024		
All other iron and steel	31,821,441		
Kainite	7,993		
Lead and mfs. of	410,433	Total	86,725,592
Lime	106,263		

It will be observed also in the first table, that the metals and the metal products constitute over 80 per cent, and coal alone, over 11 per cent of the total exports.

Attention has frequently been drawn to the fact that not only is a very large portion of Canada's mineral production exported, but that on the other hand refined or semi-manufactured products of a similar class are re-imported for domestic consumption, and this condition is true not only of our metallic products, but also, to a very large extent, of non-metallic products.

The lead smelter and refinery at Trail has, of course, provided a market for Western Canadian lead ores, and furnished a source of supply of pig lead for domestic consumption.

Our copper production is altogether, and our gold and silver very largely, exported; while in the import table it is shown that we import copper and brass to a value of about $4,000,000, manufactures of gold and silver, $1,559,577, and zinc, 470,944.

Amongst the non-metallic class, the production of asbestos, graphite, gypsum, mica, corundum, feldspar, etc., is largely exported either for refining or for consumption abroad.

Statistics of imports of minerals and mineral products during the fiscal years 1908-9 are shown in the next table. The total value of the imports during the year was $86,725,592, a considerable falling off from the previous year, when the imports were $124,388,109. Of the imports in 1909, a little over 40 per cent was made up of iron and steel products; 15 per cent of other non-metallic products, and about 33 per cent of coal and coke.

PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1908 and 1909 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 the past three years. It will be observed that the largest production during each of the last three years has been from the Province of Ontario, British Columbia occupying second place. These two Provinces together contributed about 65 per cent of the total in 1909.

The last table shows the total mineral production by provinces for the years 1899 to 1909 inclusive.

Mineral Production by Provinces, 1907, 1908, and 1909.

Province.	1907.		1908.		1909.	
	Value of Production.	Per cent of total.	Value of Production.	Per cent of total.	Value of Production.	Per cent of total.
	$	%	$	%	$	%
Nova Scotia	14,532,040	16·73	14,487,108	16·93	12,504,810	13·62
New Brunswick	664,467	0·77	579,816	0·68	657,035	0·71
Quebec	6,205,553	7·14	6,372,949	7·45	7,086,265	7·72
Ontario	30,381,638	34·98	30,623,812	35·79	37,374,577	40·70
Manitoba	898,775	1·03	584,374	0·68	1,193,377	1·30
Saskatchewan	533,251	0·61	413,212	0·48	456,246	0·50
Alberta	4,657,524	5·36	5,122,505	5·99	6,047,447	6·58
British Columbia	25,656,056	29·54	23,704,035	27·71	22,479,006	24·48
North West Territories	3,335,898	3·84	3,669,290	4·29	4,032,678	4·39
Dominion	86,865,202	100·00	85,557,101	100·00	91,831,441	100·00

Mineral Production of Nova Scotia, 1908 and 1909.

Product.		1908.		1909.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Gold	Ozs.	11,842	244,799	10,193	210,711
Pig iron from Canadian ore (b)	Tons.	3,280	60,923	10,452	104,520
Coal	"	6,652,539	13,364,476	5,652,089	11,354,643
Grindstones	"	473	4,803	312	3,204
Gypsum	"	234,455	230,433	345,682	364,379
Limestone (used as flux)	"	301,180	212,362	.....	*
Barytes	"	4,312	19,021	179	1,120
Tripolite	"	30	195	.....	.....
Clay products		.....	117,833	.....	188,185
Stone		(a)	(a)	.....	189,604
Lime	Bus.	51,068	16,102	57,730	16,729
Other products (a)		.....	216,161	.....	71,715
Total		.....	14,487,108	.....	12,504,810

(a) Includes in 1908 antimony, copper, arsenic, cement, and stone; in 1909 antimony, arsenic, and cement. (b) The total production of pig iron in Nova Scotia in 1908 was 352,642 tons valued at $3,554,540, and in 1909, 345,380 tons valued at $3,453,800.

*In stone.

Mineral Production of New Brunswick, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Coal.....Tons.	60,000	135,000	49,029	98,496
Grindstones..... "	3,370	43,325	3,963	51,460
Gypsum..... "	81,620	191,312	98,716	226,975
Mineral water.....	.....	14,894	.....	14,003
Clay products.....	.....	75,513	.....	65,570
Lime.....Bus.	.....	34,262	697,466	154,151
Stone.....	(a)	(a)	.....	42,180
Other products (a).....	.....	85,510	.....	4,200
Total.....	.....	579,816	.....	657,035

(a) Includes in 1908, graphite, stone, etc.

Mineral Production of Quebec, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Gold.....Ozs.	.....	.....	193	3,990
Copper.....Lbs.	1,282,024	169,330	1,088,212	141,272
Pig iron from Canadian ore (b).....Tons.	5,229	133,492	3,960	104,289
Silver.....Ozs.	13,299	7,030	13,233	6,815
Asbestos and asbestic.....Tons.	90,773	2,573,335	87,300	2,301,773
Chromite..... "	7,225	82,008	2,470	26,608
Feldspar..... "	.....	.....	97	1,712
Magnesite..... "	120	840	330	2,503
Mica..... "	148	82,613	.....	93,290
Ochres..... "	4,746	30,440	3,940	28,096
Mineral water..... "	.....	75,533	.....	68,565
Phosphate..... "	598	5,900	525	4,804
Pyrites..... "	26,598	159,588	35,300	130,009
Graphite..... "	(a)	(a)	134	10,178
Cement..... Bls.	704,492	984,350	1,011,194	1,314,550
Clay products.....	.....	893,717	.....	1,153,830
Lime..... Bus.	857,700	201,357	1,281,827	315,632
Slate.....Squares	.....	13,496	4,000	19,000
Stone.....	.....	(a)	.....	1,359,349
Other products (a).....	.....	959,920	.....	.....
Total.....	.....	6,372,949	.....	7,086,265

(a) Includes in 1908, graphite, limestone (flux), building stone, calcium carbide, and granite.
(b) The total production of pig iron in Quebec in 1908 was 6,709 tons valued at $171,383; in 1909, 4,770 tons valued at $125,623.
There was also in this Province an important production of aluminium from imported ores.

Mineral Production of Ontario, 1908 and 1909.

Product.		1908.		1909.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Copper	Lbs.	15,005,171	1,981,883	15,746,699	2,044,237
Gold	Ozs.	3,212	66,389	1,569	32,425
Pig iron from Canadian ore (b)	Tons.	90,911	1,469,887	135,032	2,013,406
Iron ore (exports)	"			21,956	61,954
Nickel	Lbs.	19,143,111	8,231,538	26,282,991	9,461,877
Cobalt			113,423		94,609
Silver	Ozs.	19,398,545	10,254,847	24,822,099	12,784,126
Zinc ore	Tons.	452	3,215	895	8,950
Arsenic, white and arsenical ore	"		42,566		64,100
Calcium carbide	"	2,364	147,150		
Corundum	"	1,089	100,398	1,491	162,492
Feldspar	"	7,877	21,099	12,686	38,664
Graphite	"	210	5,040	730	37,624
Gypsum	"	10,380	42,456	11,731	48,278
Limestone (as flux)	"	114,837	75,966	(c)	(c)
Mica	"	288	57,258		54,484
Mineral water			61,526		92,610
Natural gas			949,297		1,145,307
Peat	Tons.	(a)	(a)	60	240
Petroleum	Bls.	527,987	747,102	420,755	559,604
Phosphate	Tons.	998	8,894	473	3,254
Pyrites	"	20,738	65,236	29,344	92,812
Quartz	"	44,741	52,530	56,924	71,285
Salt	"	79,975	378,798	84,037	415,219
Talc	"	1,016	3,048	4,350	10,300
Cement	Bls.	1,519,930	1,910,630	2,462,027	3,084,218
Clay products			2,461,416		3,425,841
Lime	Bus.	2,087,731	358,507	2,619,553	434,147
Stone			693,850		748,639
Other products (a)			319,563		383,875
Total			30,623,812		37,374,577

(a) Includes in 1908 sand-lime brick, sand and gravel (exports), peat, etc.; in 1909, sand-lime brick and sand and gravel (exports). (b) The total production of pig iron in Ontario in 1908 was 271,484 tons valued at $4,385,271; in 1909, 407,012 tons valued at $6,002,441. (c) Included in stone.

Mineral Production in Manitoba, 1908 and 1909.

Product.		1908.		1909.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Gypsum	Tons.	14,500	111,500	17,000	170,000
Clay products			265,091		559,008
Lime	Bus.	138,786	24,192	423,954	69,670
Cement	Bls.	11,234	16,851	8,600	8,600
Sand-lime brick	No.	2,645,000	21,740	6,400,000	54,200
Other products (c)			145,000		331,899
Total			584,374		1,193,377

(c) Includes building stone etc.

Mineral Production in Saskatchewan, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Coal ..... Tons.	150,566	253,790	192,125	296,339
Brick..... No.	8,262,996	87,566	14,416,770	144,316
Other products (a).....	.....	71,856	.....	15,591
Total.....	.....	413,212	.....	456,246

(a) Includes in 1908, sand-lime brick, etc.; in 1909, sand-lime brick, fireclay, etc.

Mineral Production in Alberta, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Gold..... Ozs.	50	1,037	25	525
Coal..... Tons.	1,685,661	4,127,311	1,994,741	4,838,109
Natural gas	.....	63,363	.....	61,722
Clay products.....	.....	240,384	.....	442,486
Other products (a).....	.....	690,410	.....	637,255
Total.....	.....	5,122,505	.....	6,047,447

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

Mineral Production in British Columbia, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Copper..... Lbs.	(a) 47,274,614	6,244,031	(b) 35,658,952	4,629,245
Gold..... Ozs.	286,858	5,929,880	250,320	5,174,579
Lead ..... Lbs.	43,195,733	1,814,221	45,857,424	1,692,139
Silver..... Ozs.	2,631,389	1,391,058	2,649,141	1,364,387
Zinc ore.....	.....	.....	17,476	233,749
Coal ..... Tons.	2,333,708	7,292,838	2,606,127	8,144,147
Clay products.....	.....	344,446	.....	470,402
Lime ..... Bus.	176,435	44,027	231,269	75,076
Stone.....	.....	.....	.....	365,081
Other products.....	.....	(c) 643,534	.....	(d) 330,201
Total.....	.....	23,704,035	.....	22,479,006

(a) Copper content of ores shipped. (b) Smelter recoveries of copper. (c) Includes cement, stone, sand-lime brick, etc. (d) Includes cement, sand-lime brick, and small value in refined antimony.

Mineral Production in Yukon, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Copper..... Lbs.	112,264	14,828	.....	.....
Gold..... Ozs.	174,150	3,600,000	191,565	3,960,000
Silver..... "	63,000	33,304	45,000	23,176
Coal..... Tons.	3,847	21,158	7,364	49,502
Total	.....	3,669,290	.....	4,032,678

MINERAL PRODUCTION BY PROVINCES, 1899–1909

—	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	Alberta.	Saskatchewan.	Yukon.	British Columbia.	Total.
	$	$	$	$	$	$	$	$	$	$
1899	6,817,274	420,227	2,585,635	9,819,557	17,108,707				12,482,605	49,234,005
1900	9,298,479	439,060	3,292,383	11,258,099	23,452,330				16,680,526	64,420,877
1901	7,770,159	467,985	3,759,984	13,970,010	19,297,940				20,531,833	65,797,911
1902	10,686,549	607,129	3,743,636	14,619,091	16,127,400				17,448,031	63,231,836
1903	11,431,914	580,495	3,585,938	14,160,033	14,082,986				17,899,147	61,740,513
1904	11,212,746	559,913	3,688,482	12,582,843	12,713,613				19,325,174	60,082,771
1905	11,507,047	559,035	4,405,975	18,833,292	11,387,642				22,386,008	69,078,999
1906	12,894,303	646,328	5,242,058	25,111,682	10,092,726				25,299,600	79,286,697
1907	14,532,040	664,647	6,205,553	30,381,638	898,775	4,657,524	533,251	3,335,898	25,656,056	86,865,202
1908	14,487,108	579,816	6,372,949	30,623,812	584,374	5,122,505	413,212	3,669,290	23,704,035	85,557,101
1909	12,504,810	657,035	7,086,265	37,374,577	1,193,377	6,047,447	456,246	4,032,678	22,479,006	91,831,441

METALLIC PRODUCTS.

SMELTER PRODUCTION.

Complete statistics of the production of copper and lead smelters, showing the ore treated, the matte, blister, base bullion or refined metals produced, etc., were collected for the first time by this Branch in 1908, and were published in the report of that year. Complete statistics have also been received, covering the year 1909, through the courtesy of the following operating companies:—

The Mond Nickel Company.. .. .. Victoria Mines, Ont.
The Canadian Copper Company .... Copper Cliff, Ont.
The Coniagas Reduction Company.. .. .. Thorold, Ont.
The Deloro Mining and Reduction Company, Deloro, Ont.
The Consolidated Mining and Smelting Company of Canada.. .. .. Trail, B.C.
[1] The Northport Smelting and Refining Company.. .. .. Northport, Wash., U.S.A.
The Granby Consolidated Mining, Smelting, and Power Company.. .. .. Grand Forks, B.C.
The British Columbia Copper Company, Limited.. .. .. Greenwood, B.C.
The Tyee Copper Company, Limited.. .. .. Ladysmith, B.C.
The Canadian Antimony Company.. .. .. .. St. George, N.B.

The aggregate quantity of ores and concentrates treated in these works during 1909 was 2,374,615 tons, as compared with 2,218,395 tons in 1908.

These ores may be conveniently classified as shown in the following table:—

—	1908.	1909.
Nickel-copper ores	360,180	462,336
Silver-cobalt-nickel-arsenic ores	7,182	8,384
Lead and other ores treated in lead furnaces	53,545	53,006
Copper-gold-silver ores	1,797,488	1,850,889
Total	2,218,395	2,374,615

The products obtained in Canada from the treatment of these ores include: refined lead produced at Trail, B.C., and fine gold, fine silver, copper sulphate, and antimony produced from the residues of the lead refinery; silver bullion, white arsenic, nickel oxide and cobalt oxide produced in Ontario, from the Cobalt

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

District ores; refined antimony, produced in New Brunswick. In addition to these refined products, blister copper, copper matte, nickel-copper matte, and speiss resulting from the treatment of the Cobalt ores, are produced and exported for refining outside of Canada.

The aggregate results of smelting and refining operations may be summarized as shown in the next table. Unfortunately the figures cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ores are still shipped to other smelters outside of Canada, for smelting.

It should also be explained that the figures include the results of the treatment of a small quantity of imported ores.

Smelter and Refinery Production in Canada, 1908 and 1909.

		1908.		1909.	
		Refined Products.	Metals contained in matte, blister, base bullion, and speiss.	Refined Products.	Metals contained in matte, blister, base bullion, and speiss.
Antimony	Lbs.	.....	.....	61,207	.....
Gold	Ozs.	15,436	203,300	18,241	200,129
Silver	"	11,168,689	3,271,899	14,242,545	4,845,920
Lead	Lbs.	36,549,274	1,116,792	41,883,614	3,973,810
Copper	"	.....	51,965,289	.....	53,328,583
Copper sulphate	"	203,379	.....	51,405	.....
Nickel	"	.....	19,506,251	.....	27,041,957
Cobalt	"	.....	692,170	.....	1,321,085
White arsenic	"	1,431,052	.....	2,258,087	.....
Arsenic	"	.....	436,787	.....	1,074,516

Smelter products exported for refining were: blister copper carrying gold and silver values, 14,239 tons in 1909, as compared with 15,418 tons in 1908; copper matte carrying gold and silver values, 11,597 tons in 1909, as against 7,649 tons in 1908; Bessemer nickel-copper matte carrying small gold and silver values, as well as metals of the platinum group, 25,845 tons in 1909, and 21,210 tons in 1908; lead bullion carrying gold and silver values, 2,010 tons in 1909. Speiss resulting from the treatment of the Cobalt ores, carrying silver, cobalt, nickel, and arsenic values, was in 1909, 2,660 tons, as compared with 1,326 tons in 1908; this is partly exported and partly held for future treatment.

Nickel-Copper Ores.—The smelters of the Canadian Copper Company at Copper Cliff, and the Mond Nickel Company 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, con-

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

taining 7,503 tons of copper and 9,572 tons of nickel. In 1909 the quantity of ore mined was 451,892 tons, while the quantity smelted was 462,336 tons. The quantity of Bessemer matte produced was 25,845 tons, containing 7,873 tons copper and 13,141 tons of nickel.

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

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

Calendar Year.	Ore Mined.	Ore Smelted.	Matte Shipped.	Value of Matte.	Nickel content of Matte.	Copper content 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
1909	451,892	462,336	25,845	3,913,012	13,141	7,873

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 Company 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 this an important feature of its operations. The Deloro Mining and Reduction oxide have also been recovered at this plant, and the Company expects to make 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 Cobalt District silver ores, but also the auriferous arsenical pyrites of Hastings county.

This Company also proposes to recover nickel and cobalt as oxide. The treatment of these ores in Ontario in 1908 and 1909 gave the following results:—

—		1908.	1909.
Ore treated	Tons.	7,182	8,384
Products recovered: [1]			
Silver produced [2]	Ozs.	9,212,650	12,239,542
White arsenic	Lbs.	1,431,052	2,258,087
Speiss or residues	Tons.	1,326	2,660
Metallic contents of speiss:			
Silver	Ozs.	2,612,344	4,103,251
Nickel	Lbs.	363,140	758,966
Cobalt	"	692,170	1,321,083
Arsenic	"	436,787	1,074,516

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

Lead Ores.—There was but one lead smelting plant in operation in Canada in 1909, viz., that at Trail, B.C., operated by the Consolidated Mining and Smelting Company of Canada, Limited. This smelter is supplemented by a lead refinery employing the Betts Electrolytic Process and having a capacity of 100 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 customs 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 is recovered, though not regularly, and bearing metal is manufactured.

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	9,993	1,263,809	143,135
1907	26,607,461	10,395	1,631,422	97,751
1908	36,549,274	15,346	1,956,039	203,379
1909	41,883,614	18,241	2,003,003	51,405

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 constituent value, are smelted in the Trail copper furnace of the Consolidated Mining and Smelting Company, 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 for treatment, while the local smelters are receiving some foreign ores. The Crofton smelter, which was not in operation during 1908 or 1909, is owned by the Britannia Copper Syndicate, Limited. The Boundary Falls smelter, also, was out of commission throughout 1909.

The aggregate production of these smelters in 1908 and 1909, including the foreign ores treated, was as follows:—

—		1908.	1909.
Ore smelted	Tons.	1,797,488	1,850,889
Smelter products:			
Matte	"	7,649	11,597
Blister	"	15,418	14,239
Metallic content of matte and blister:			
Gold	Ozs.	202,959	198,898
Silver	"	631,484	612,164
Copper	Lbs.	36,960,118	37,581,884

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)	157,649	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
1910	487,125	137,614	2,162,406	42,368,816	5,974,959
Production from 1894 to June, 1910.	2,458,684	952,056	16,999,873	220,872,555	43,453,814

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, and Power Company. 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 total production of metals, shown in the next table, are as published in the Annual Report of the Company for the year ending June 30, 1910.

Ore Smelted and Metals Recovered at Granby Smelter.

Year ending June 30.	All Material Smelted.				Metals Produced.		
	Granby ore.	Foreign.		Total.	Gold.	Silver.	Copper.
		Ore.	Matte.				
	Tons.	Tons.	Tons.	Tons.	Ozs.	Ozs.	Lbs.
1901.	169,087	7,832	... .	176,919	8,871	34,990	5,435,955
1902.....	293,645	4,454	3,001	301,100	30,786	274,511	10,836,851
1903.	289,583	7,691	6,223	303,497	35,121	277,574	12,551,758
1904.....	516,059	33,182	4,290	556,531	54,493	275,935	16,020,986
1905	550,738	39,382	.. ..	590,120	42,980	215,449	14,224,692
1906.....	796,188	36,158	.....	832,346	50,020	316,947	19,939,004
1907.....	649,022	16,893	.....	665,915	32,738	201,337	16,410,576
1908....	858,432	24,179	.....	882,611	40,068	300,204	21,092,288
1909.....	964,789	19,944	.....	984,733	45,760	335,520	21,901,528
1910.....	1,175,548	21,829	.....	1,197,377	48,752	356,746	22,754,899
Total.....	6,263,091	214,544	13,514	6,491,149	389,589	2,589,213	161,168,537

Greenwood Smelter.—At this plant, owned by the British Columbia Copper Company, there are three large furnaces, each having a smelting capacity of from 650 to 750 tons per day.

In the Annual Report of the Company for the year ending November 30, 1909, the General Manager, Mr. J. E. McAllister, refers to the smelting operations as follows:—

'Operations at the Reduction Works are under the superintendence of Mr. E. G. Warren, and various improvements have been added to the plant, chief among which is the additional storage bin capacity for 1,000 tons of coke. The three blast furnaces (48" × 240" at the tuyeres) were in operation for 623 furnace days, the failure of the coke supply causing a loss of approximately 290 furnace days.

The average tonnage handled, exclusive of coke, during the period of operation, was 599·2 tons per furnace each twenty-four hours, making a total of:—

	Tons.
B.C. Copper Co.'s ores	362,423
Customs ores	6,964
Converter slag	3,949
	373,336

Included in the item of converter slag is an amount of 1,588 tons of custom ore and clay used in converter linings. From the above material handled, blister copper to the amount of 6,366,318 pounds has been recovered, containing:—

Fine copper	6,325,000 lbs.
Gold	18,244 ozs.
Silver	64,234 ozs.

Operating Costs.—A comparison of figures with those of the year 1908 is as follows:—

	1909.	1908.
Yield of copper per ton of B.C.C. Co.'s ores	17·7 lbs.	17·8 lbs.
Yield of gold and silver per ton, B.C.C. Co.'s ores	$1.03	$0.985
Average price realized for copper	13·08 cents.	13·604 cents.
Cost of producing, refining, and marketing per pound of fine copper, after crediting expenditure with gold and silver values	9·829 cents.	9·996 cents.
Cost per ton of ore handled, including all charges from ore in place to sale of the contained metals	$2.683	$2.632

The Ladysmith Smelter.—This smelter is owned and operated by the Tyee Copper Company, and was the only one in operation on the coast during 1908 and 1909. Both domestic and imported ores are treated, but the Company has not published details of its smelter operations during the past year.

COPPER.

The total production of copper in Canada in 1909, estimated on the basis of smelter recovery from ores treated, was 52,493,863 pounds, which, at the average price of copper for the year in New York—12·982 cents per pound—would be worth $6,814,754.

The copper production in 1908, compiled on a similar basis, was estimated at about 52,928,386 pounds, showing a slight falling off in production in 1909. The average New York price for copper in 1908 was 13·208 cents, the falling off in price in 1909 being 0·226 cents or 1·7 per cent.

In the Province of British Columbia the copper production is mainly derived from ores carrying a very low content of copper metal. In the smelting of these ores the copper losses in slag are quite considerable, reaching as high in some cases as 25 per cent or more of the copper content of the ore. With ores of this character there is, therefore, a wide difference between the copper content of ore shipped from the mine and the copper metal recovered by the smelters.

The statistics of copper production for the years previous to 1909, as given in Tables 1 and 2, include for British Columbia a record of the copper production in that Province as collected by the Provincial Bureau of Mines. These are compiled on the basis of the total metal content of the ores sent to smelters for which smelter returns were received during the year, and these show a relatively higher copper production than the figures published for the Province of Ontario, which are based on copper content of matte produced.

The independent collection of statistics of smelter production by this Branch through the courtesy of the smelter operators, has made possible the compilation and publication of statistics of production based on smelter recoveries as given above, thus providing for a more equitable comparison of the production of the several provinces and of the production of Canada with other countries.

COPPER.—TABLE 1.

Production by Provinces, 1907 to 1909.

Province.	1907.		1908.		1909.†	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		$		$		$
Quebec	1,517,990	303,659	1,282,024	169,330	1,088,212	141,272
Ontario	14,104,337	2,821,432	15,005,171	1,981,883	15,746,699	2,044,237
British Columbia	40,832,720	8,168,177	47,274,614	6,244,031	35,656,952	4,629,245
Other districts *	524,158	104,852	141,064	18,632	.....	.....
Total	56,979,205	11,398,120	63,702,873	8,413,876	52,493,863	6,814,754

* Includes Nova Scotia and Yukon.

† The apparent large decrease in British Columbia copper production in 1909, as compared with 1908, is mainly due to the different basis of compilation adopted in 1909, for explanation of which see the text. The British Columbia copper production in 1909, based on copper content of ores sent to smelters, was 45,597,245 pounds (see Tables 8 and 9).

With the exception of the production of a small quantity of copper sulphate produced at Trail, B.C., the copper production of Canada is practically all exported. The exports of copper in ore, matte, regulus, etc., from Canada during the calendar year 1909 are reported by the Customs Department as 54,447,750 pounds, of which, 50,775,802 pounds were exported to the United States, and 3,671,933 pounds to Great Britain.

The exports in 1908 were recorded as 51,136,371 pounds. These figures agree fairly closely with the statistics of smelter recovery.

Prices: The average monthly prices in cents per pound of electrolytic copper in New York, and in £ sterling per long ton of standard copper in London, are shown for a period of five years in the accompanying table.

Monthly Average Prices of Electrolytic Copper in New York.

Months.	1905.	1906.	1907.	1908.	1909.
	Cts.	Cts.	Cts.	Cts.	Cts.
January	15·008	18·310	24·404	13·726	13·893
February	15·011	17·869	24·869	12·905	12·949
March	15·125	18·361	25·065	12·704	12·387
April	14·920	18·375	24·224	12·743	12·563
May	14·627	18·475	24·048	12·598	12·893
June	14·673	18·442	22·665	12 675	13·214
July	14·888	18·190	21·130	12·702	12·880
August	15·664	18·380	18·356	13·462	13·007
September	15·965	19·033	15·565	13·388	12·870
October	16·279	21·203	13·169	13·354	12 700
November	16·599	21 833	13·391	14·130	13·125
December	18·328	22·885	13·163	14·111	13·298
Yearly Average	15 590	19·278	20·004	13·208	12·982

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.	1905.	1906.	1907.	1908.	1909.
	£	£	£	£	£
January	68·262	78·869	106·739	62·386	57·688
February	67·963	78·147	107·356	58·786	61·197
March	68·174	81·111	106·594	58·761	56·231
April	67·017	84·793	98·625	58·331	57·363
May	64·875	84·867	102·375	57·387	59·338
June	65·881	83·994	97·272	57·842	59·627
July	66·887	81·167	95·010	57·989	58·556
August	69·830	83·864	79·679	60·500	59·393
September	69·667	87·831	68·375	60·338	59·021
October	71·406	97·269	60·717	60·139	57·551
November	74·727	100·270	61·226	63·417	58·917
December	78·993	105·226	60·113	62·943	59·906
Yearly Average	69·465	87·282	87·007	59·902	58·732

The price of copper during 1909 varied but slightly; the highest being about 14⅞ cents in January, and the lowest 12¼ in April.

Statistics showing the annual copper production in Canada since 1886 are given in Table 2, which 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	8,109,856	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
1909*	52,493,863			6,814,754			12·982

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

Statistics of the 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 1909 to 16,330,480 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	1898	11,572,381	840,243
1886		249,259	1899	11,371,766	1,199,908
1887		137,966	1900	23,631,523	1,741,885
1888		257,260	1901	32,488,872	3,404,908
1889		168,457	1902	26,094,498	2,476,516
1890		398,497	1903	38,364,676	3,873,827
1891		348,104	1904	38,553,282	4,216,214
1892		277,632	1905	40,740,861	5,443,873
1893	4,792,201	269,160	1906	42,398,538	7,303,366
1894	1,625,389	91,917	1907	54,688,450	8,749,609
1895	3,742,352	236,965	1908	51,136,371	5,934,559
1896	5,462,052	281,070	1909	54,447,750	5,832,246
1897	14,022,610	850,336			

COPPER.—TABLE 4.

Imports of Pig, 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	1909	2,732,300	383,441
1909	Copper, old and scrap or in blocks.....Duty free.			127,800	12,949
	Copper in pigs or ingots..... "			2,604,500	370,492
	Total 1909			2,732,300	383,441

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		$			$
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1889		168,457	1902	26,094,498	2,476,516
1890		398,497	1903	38,364,676	3,873,827
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1892		277,632	1905	40,740,861	5,443,873
1893	4,792,201	269,160	1906	42,398,538	7,303,366
1894	1,625,389	91,917	1907	54,688,450	8,749,609
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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
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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	1909	2,732,300	383,441
1909 { Copper, old and scrap or in blocks			Duty free.	127,800	12,949
1909 { Copper in pigs or ingots			"	2,604,500	370,492
			Total 1909	2,732,300	383,441

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	1909	2,086,205

		Duty.	Lbs.	Value.
				$
1909.	Copper in bars and rods, in coils, or otherwise, in lengths not less than 6 feet, unmanufactured	Free.	10,978,000	1,522,600
	Copper, in strips, sheets or plates, not planished or coated, etc	"	2,285,400	372,299
	Copper tubing in lengths not less than 6 feet, and not polished, bent or otherwise manufactured	"	334,780	71,587
	Copper rollers, for use in calico printing	"		1,126
	Copper and manufactures of :—			
	Nails, tacks, rivets, and burrs or washers	30 %		2,085
	Wire, plain, tinned or plated	15 "		36,885
	Wire cloth, etc	25 "		5,882
	All other manufactures of, N.O.P	30 "		73,641
	Total		13,598,180	2,086,205

Nova Scotia.

No copper was produced during the year, but the Lake Copper Company is reported to have 1,200 tons of ore on the dumps at Lochaber from development work. Development was also carried on at several other properties.

Quebec.

The copper production of Quebec in 1909 was as usual from the pyritic ores of the Eustis mines in the Eastern Townships. Mr. Denis, in his report on mining operations in the Province of Quebec, gives the total shipments of ore in 1909 as 35,100 tons.

Statistics of copper production in this Province since 1886, are shown in Table 6.

11797—3½

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	4,883,480	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	1909	1,088,212	141,272

Ontario.

There is as yet comparatively little copper production in this Province outside that obtained from the nickel-copper ores of the Sudbury district. In 1909 productive operations were carried on at the Herminia and Bruce mines, also by the Canadian Copper Company at the Crean Hill and Creighton mines, and by the Mond Nickel Company at Victoria mines.

The total production of nickel-copper ore in 1909 was 451,892 tons, while the ore charged to the smelters, consisting in part of roasted ores, was 462,336 tons. There was produced during the year 25,845 tons of Bessemer matte containing 7,873 tons of copper, and 13,141 tons of nickel, the shipping value of the matte being approximately $3,913,017. In 1908 there were 360,180 tons of ore smelted, producing 21,197 tons of matte valued at $2,930,989.

Details of the production from these ores are given somewhat more completely and in tabular form, in the article on nickel, also under smelter production, pages 25 and 26, to which reference may be made.

Statistics of the copper production of Ontario since 1886 are given in Table 7.

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	1909	15,746,699	2,044,237

British Columbia.

According to the returns received by the Mines Branch from the British Columbia smelters, the total quantity of copper contained in matte, blister, and copper sulphate produced in British Columbia smelters during 1909, including the Northport smelter in Washington State, and including an estimate of smelter recovery for the copper ores exported, was 35,658,952 pounds, after deducting the amount of copper produced from foreign ores. The 1908 production on a similar basis was 37,041,115 pounds. Returns of smelter production in this Province were not collected by this Department previous to 1908, and a complete record of statistics of production on this basis is not available.

The production of copper in this Province according to statistics collected and published by the Provincial Bureau of Mines, reached a total in 1909 of 45,597,245 pounds, a decrease of 1,677,369 pounds from 1908 or 3·5 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 pounds, or total gross contents per lot, without smelter deductions.

Statistics of the annual production since 1894, as ascertained by the Provincial Bureau of Mines, are shown in Table 8, and by districts since 1906 in Table 9. It will be seen that in 1909 the ores of the Boundary district produced about 89 per cent of the total, the Rossland mines about 8 per cent, and the Coast district less than 3 per cent.

COPPER.—TABLE 8.

British Columbia:—Copper Content of Ores Shipped.†

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
1909	45,597,245	*1,677,369	*3·6	5,918,522

† As published by British Columbia Bureau of Mines.
* Decrease.

COPPER.—TABLE 9.

British Columbia:—Production* by Districts.

—	1906.	1907.	1908.	1909.
	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar	293,269	674,887	490,873	137,651
East Kootenay	6,910			
West Kootenay—				
Nelson	216,034	434,222	53,243	186,572
Slocan	2,861			
Trail Creek	4,750,110	5,080,275	5,042,244	3,509,909
All other	1,145			
Yale—				
Boundary	32,226,782	31,521,550	40,178,521	40,603,042
Ashcroft, Kamloops	355,377	38,706	3,269	
Coast districts	5,138,000	3,033,080	1,506,464	1,160,071
	42,990,488	40,832,720	47,274,614	45,597,245

*Copper content of ores shipped.

The low grade ores of the Boundary district, in addition to being self fluxing, are remarkably uniform in character, ranging from 1 to 2 per cent in copper and from $1 to $2 in gold and silver. In this district the greater part of the production has been obtained from the properties of three of the principal companies: The Granby Consolidated Mining, Smelting, and Power Company, Limited; The British Columbia Copper Company, and the Consolidated Mining and Smelting Company of Canada, Limited. The Dominion Copper Company's properties remained idle throughout the year, pending the reorganization of the Company as the New Dominion Copper Company. This Company has since passed into the control of the British Columbia Copper Company. Each of the three first named companies is operating its own smelter, and the first two convert their matte into blister copper.

The approximate ore shipments during 1909, and the total shipments of the chief producers to the end of 1909, were as follows:—

—	1909.	Total.
Granby Consolidated Mining, Smelting, and Power Co., Ltd.	1,068,000	5,710,000
British Columbia Copper Co.	350,000	2,005,000
Dominion Copper Co.	Nil.	595,000
Consolidated Mining and Smelting Co., of Canada, Ltd., (Snowshoe)	161,000	439,000
	1,579,000	8,749,000

The Granby Company's mines at Phœnix are equipped for a daily output of about 5,000 tons. At the Company's smelter at Grand Forks, about 1,070,000 tons of ore were treated during 1909, producing 22,200,000 pounds of copper. Statistics of the smelter production of this firm will be found on pages 28 and 29.

The British Columbia Copper Company, which during the first four months was not operating, shipped during the latter part of the year about 350,000 tons of ore, the greater part of which came from the Mother Lode.

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 Dominion Copper Company's properties were idle all year. The output of the Consolidated Mining and Smelting Company's Snowshoe mine was about 161,000 tons, which went to Trail for treatment.

Next to the Boundary, 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 average tenor of the Rossland ores is shown in a table to be found under gold. The total shipments of ore in 1909 are reported as 237,656 tons from Trail Creek mining division, containing 3,509,909 pounds of copper, being an average of 0·750 per cent. The principal operating companies were:—

The Consolidated Mining and Smelting Company of Canada, Limited, operating the Centre Star group, consisting of the Centre Star, War Eagle, Idaho, Iron Mask, and other claims; from which they shipped about 180,409 tons of ore during the year.

The Le Roi Mining Company, Limited, shipped from the Le Roi and Black Bear 11,582 tons. The shipments by the Le Roi No. 2, Limited, were 29,571 tons of ore, and 835 tons of concentrates derived from 15,984 tons of ore milled. From five other mines, some 260 tons were shipped.

In the Coast district, 39,557 tons are credited with a content of 1,160,071 pounds of copper or 1·47 per cent. This ore was derived from the mines of the Tyee Copper Company, the Marble Bay mines of the Tacoma Steel Company, the Northern Texada mines, and the Britannia mines.

On Queen Charlotte islands, the Ikeda mines were operated by Awaya, Ikeda and Company for the first six months of the year; but, towards its close, were bonded to the Ikeda Mines, Limited.

Yukon District.

There were no shipments from the Whitehorse mines during 1909. High freight rates from Whitehorse to the smelters and inadequate railway facilities from the mines to Whitehorse, have restricted shipments from this camp, although development work seems to have indicated the existence of a considerable tonnage of ore.

The total ore shipments from the camp to the end of 1908 exceeded 4,700 tons. The shipments during 1907 and 1908, reported as railway shipments, are shown hereunder, the shipments to the end of 1906 being those mentioned by R. G. McConnell in his recent report.[1]

[1] Report on Whitehorse Copper Belt, Geological Survey Publication No. 1050.

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.—Gold bullion is received, assayed, and purchased at the Assay office in Vancouver, operated in connexion with this Department, the bullion being resold to the United States Mint. The total quantity of bullion thus received during the twelve months ending December 31, 1909, was 47,576·27 ounces, being the weight after melting, valued at $789,267.94 after deducting assay charges, the average fineness of the resulting bullion being 0·802 gold and 0·178 silver. A refinery is being erected at the Royal Mint at Ottawa, but at present the greater part of the Canadian gold finds its way to the United States refineries or to the United States Mint.

There is but one refinery in Canada producing fine gold; that at Trail, established in 1904 and operated by the Consolidated Mining and Smelting Company of Canada, Limited, the annual output of which in ounces of fine gold for the years 1904-9 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	8,602
1906	9,993
1907	10,395
1908	15,346
1909	18,241

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 obtained from other metalliferous ores sent to copper and lead smelters, etc., reached a total in 1909 of 453,865 fine ounces valued at $9,382,230, as compared with 476,112 fine ounces valued at $9,842,105 produced in 1908, a decrease of 22,247 ounces in quantity and $459,875 in value, or 4·67 per cent, but an increase of 48,348 ounces over 1907, which was, however, the lowest production for several years.

The production by Provinces in 1907, 1908, and 1909 is shown in Table 1 as follows:—

GOLD.—TABLE 1.

Production by Provinces, 1907, 1908, and 1909.

	1907.		1908.		1909.	
	Ozs. (fine ‡)	Value.	Ozs. (fine ‡)	Value.	Ozs. (fine‡)	Value.
		$		$		$
Nova Scotia	(b) 13,675	282,686	11,842	244,799	10,193	210,711
Quebec	.....	.....	.....	.....	193	3,990
Ontario	(b) 3,212	66,399	3,212	66,389	1,569	32,425
Alberta	(a) 33	675	50	1,037	25	525
British Columbia	(c) 236,216	4,883,020	286,858	5,929,880	250,320	5,174,579
Yukon	(a) 152,381	3,150,000	174,150	3,600,000	191,565	3,960,000
Totals	405,517	8,382,780	476,112	9,842,105	453,865	9,382,230

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

(a) Placer gold.

(b) Gold from vein mining.

(c) As follows:	1907.	1908.	1909.
gold from placer mining	$828,000	$647,000	$477,000
" vein "	4,055,020	5,282,880	4,697,579
	$4,883,020	$5,929,880	5,174,579

The exact value of fine gold is $\frac{20.67}{387}$ dollars per ounce, equivalent to $20.671834. (United States Standard).

In most cases, statistics of gold production are stated crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by $\frac{387}{8000}$ or 0·048375.

Of the total production in 1909 about $4,437,525 or 47·3 per cent is to be attributed to alluvial workings, $572,619 or 6·1 per cent derived from stamp milling, and $4,371,914 or 46·6 per cent obtained from ores sent to the smelters. The decrease for 1909 is due to a general decrease in the production of the several provinces, the Yukon district only, showing an increased output. Statistics of the annual gold production of Canada since 1858 are shown in Table 2.

GOLD.—TABLE 2.

Annual Production in Canada, 1858-1909.

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	1909	453,865	9,382,230
1883	53,853	1,113,246			
1884	51,202	1,058,439		13,431,758	277,659,153

‡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 output reached $4,186,011. The discovery in 1896 of the rich placer deposits of the Yukon, however, caused a rapid increase in the production for the next four years, a record 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 did each succeeding year until 1908. Although the 1909 production is less than that of 1908, it is higher than that of 1907 and it may be that the tide has again turned.

Nova Scotia.

The gold production of Nova Scotia, which is derived almost entirely from quartz ores, was 10,193 fine ounces valued at $210,711.

The principal operators in 1909, were:—

The New England Mining Company.. ..Goldboro, N.S.
Edgar Silver et.al. (Goldfinch property)..Lower Seal Harbour.
Sydney Gold Mining Company.. .. ..Country Harbour Narrows.
McDonald and Copeland.. .. ..Forest Hill.
Geo. A. Hirschfield.. .. ..Goldenville.
Eagle Mining Syndicate.. .. ..Salmon River.

M. J. O'Brien.................. Harrigan Cove, Moose River, and Renfrew.
Dominion Mining Company.......... Tangier.
Caribou Gold Mines.............. Caribou.
Canadian Consolidated Mines Company .. Moose River.
Oldham Stirling Gold Company........ Oldham.
Oldham Mining Company........... "
Petpeswick Mining Company.......... Lake Catcha.
Chester Basin Gold Syndicate........ Gold River.
Uniac Mines and Power Company....... "
Ophir Gold Mining Company.......... Brookfield.
Ponhook Mining Company............ Molega Barrens.
Eagle Mining Company............. Renfrew.
Great Bras d'Or Mining Company....... Middle River.

Statistics of the annual production since 1862 are shown in Table 3, and of the tons of ore treated and yield per ton in Table 4. The production of gold by districts during the twelve months ending September 30, 1909, as collected and published by the Provincial Mines Department, is shown in Table 5, while the total production from 1862 to 1909, by districts, according to the same authority, is shown in Table 6.

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	1909	10,193	210,711
1885	20,945	432,971			
1886	22,038	455,564		868,025	17,943,753

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	1909	56,790	3·71

GOLD.—TABLE 5.

Nova Scotia:—District Details, Year ending September 30, 1909.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield per ton.		
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.
Stormont	42,617	6,185	15	0		2	21
Wagamatcook	1,783	708	0	0		7	22
Caribou	1,055	284	6	0		5	9
Caribou (Moose River)	9,479	1,079	6	0		2	7
Uniacke	90	41	17	23		9	7
Gold River	891	401	4	0		9	0
Tangier	180	63	0	0		7	0
Oldham	1,373	3,017	14	0	2	3	23
Brookfield	155	24	0	16		3	2
Ecum Secum	30	4	13	0		3	2
Molega Barrens	1,021	615	14	5		12	1
Montague	(Mortared)	1	15	15			
Renfrew	180	45	0	0		5	0
Salmon River	143	97	0	0		13	13
Sherbrooke	61	28	6	2		9	7
Total	59,058	12,597	12	13		4	6

GOLD.—TABLE 6.

Nova Scotia:—Production of Gold from 1862 to 1909.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold.			Value at $19 per oz.
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.	$
*Caribou and Moose River..	213,642	57,279	8	22	.....	5	9	1,088,310
Montague.....	29,178	41,987	15	5	1	8	18	797,767
Oldham.....	56,410	64,000	12	21	1	2	17	1,216,012
Renfrew.....	53,084	45,174	7	19	.....	1	.....	858,313
Sherbrooke.....	299,992	153,002	1	4	.....	10	5	2,907,039
Stormont.....	478,263	113,053	.....	17	.....	4	18	2,148,008
Tangier.....	51,945	24,447	11	19	.....	9	10	464,504
†Uniacke.....	63,269	43,946	1	17	.....	13	21	834,976
Waverley.....	155,520	69,980	10	16	.....	9	.....	1,329,630
‖Brookfield.....	93,437	38,685	19	14	.....	8	7	735,034
‡Salmon River.....	118,583	41,796	10	20	.....	7	1	794,135
‖Whiteburn.....	6,907	9,800	...	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.....	21,917	19,909	5	12	.....	18	4	378,276
Other districts.....	141,233	74,139	13	2	.....	10	12	1,408,653
	1,936,523	885,847	1	23	.....	9	4	16,831,095
Not included in above; gold extracted from 1905	527	1,232	16	23	2	6	19	23,424
or contained in stibnite ore shipped from 1906	783	1,031	13	11	1	6	8	19,602
West Gore, as per 1907	1,403	1,319	18	12	.....	18	19	25,078
returns. 1908	133	179	5	0	1	6	23	3,406
1909	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	1,939,369	889,610	15	21	.....	.....	.....	16,902,605

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

The following notes with respect to operations during 1909 at the principal mines are taken from the report of the Provincial Department of Mines.

New England Mining Company, operating at Goldboro, Guysboro county.

During the year ending Sept. 30, 41,425 tons of ore crushed yielded 5,024 ounces of gold valued at $95,456, this recovery being 82·6 per cent by stamp amalgamation and 17·4 per cent by bromo cyanide extraction from 1,171·5 tons of concentrates, and being a total yield of $2.30 from each ton of ore crushed. Compared with the previous year the production shows an increase of 3,425 tons crushed, 938 ounces of gold recovered, and 24 cents a ton yield.

Consolidated Mines Company of Canada, Limited, Moose River, Halifax county.

From 6,344 tons of ore crushed 539 ounces of gold were recovered.

Oldham Sterling Gold Company, Oldham, Halifax county.

From 940 tons of ore mined and crushed 2,710 ounces of gold were recovered, being an average recovery of 2·88 ounces from each ton of ore crushed. Compared with the production for the year ending September 30, 1908, this produc-

tion shows an increase of 414 tons crushed, 326 ounces of gold recovered, and a decrease of 1·65 ounces in the yield per ton.

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

From 1,783 tons of ore mined and crushed, 708 ounces of gold were recovered.

Quebec.

The production of gold reported from this Province since 1903 has been almost entirely from the pyritous ores mined at Capelton and Eustis in the Eastern Townships. Very little gold has been obtained from the alluvial deposits of the St. Francis, Chaudière, and Gilbert rivers since 1894, when the output was returned as $29,106.

GOLD.—TABLE 7.

Quebec:—Annual Production.

Calendar Year.	Ozs. (fine*)	Value.	Calendar Year.	Ozs. (fine*)	Value.
		$			$
1877	583	12,057	1894	1,412	29,106
1878	868	17,937	1895	62	1,281
1879	1,160	23,972	1896	145	3,000
1880	1,605	33,174	1897	44	900
1881	2,741	56,661	1898	295	6,089
1882	827	17,093	1899	238	4,916
1883	860	17,787	1900	Nil	Nil
1884	422	8,720	1901	145	3,000
1885	103	2,120	1902	391	8,073
1886	193	3,981	1903	180	3,712
1887	78	1,604	1904	140	2,900
1888	181	3,740	1905	191	3,940
1889	58	1,207	1906	165	3,412
1890	65	1,350	1907	Nil	Nil
1891	87	1,800	1908	Nil	Nil
1892	628	12,987	1909	193	3,990
1893	759	15,696		14,819	306,295

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

Ontario.

The chief producers in 1909 were:—

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

The Big Dipper Mining and Milling Company, Big Dipper mine, Barrie township, Frontenac county.

The Larder Lake district has not as yet become a producer of bullion. The new gold district of Porcupine, situated in the townships of Whitney and Tisdale near Porcupine lake, attracted considerable attention towards the close of the year owing to the discovery of large outcroppings of quartz with spectacular showings of gold.

Statistics of production of gold in Ontario since 1887 are shown in Table 8, following:—

GOLD.—TABLE 8.

Ontario:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		$			$
1887	327	6,760	1900	14,391	297,495
1888	Nil.	Nil.	1901	11,844	244,837
1889	"	"	1902	11,118	229,828
1890	"	"	1903	9,076	188,036
1891	97	2,000	1904	1,935	40,000
1892	344	7,118	1905	4,402	91,000
1893	708	14,637	1906	3,202	66,193
1894	1,917	39,624	1907	3,212	66,399
1895	3,015	62,320	1908	3,212	66,389
1896	5,563	115,000	1909	1,569	32,425
1897	9,157	189,294			
1898	12,863	265,889		118,366	2,446,835
1899	20,394	421,591			

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

Alberta.

The value of gold derived from the placer deposits of the Saskatchewan river and purchased by banks at Edmonton, was in 1908 about $1,037, and in 1909, $525. This is the only record of production during these years.

Statistics of the production of gold from the Saskatchewan river since 1887 are shown in Table 9.

GOLD.—TABLE 9.

Alberta:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		$			$
1887	102	2,100	1900	242	5,000
1888	58	1,200	1901	726	15,000
1889	967	20,000	1902	484	10,000
1890	193	4,000	1903	48	1,000
1891	266	5,500	1904	24	500
1892	508	10,506	1905	121	2,500
1893	466	9,640	1906	39	800
1894	726	15,000	1907	33	675
1895	2,419	50,000	1908	50	1,037
1896	2,661	55,000	1909	25	525
1897	2,419	50,000			
1898	1,209	25,000		14,512	299,983
1899	726	15,000			

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

British Columbia.

The gold production of British Columbia in 1909, as reported to the Department, amounted to $5,174,579, comprising placer gold, $477,000; bullion from milling ores, $329,655; smelter recoveries, $4,367,924. The placer production is as published by the Provincial Mining Bureau. The statistics for lode gold represent as closely as could be ascertained the actual gold recovery, based on smelter recoveries and bullion shipments. This production is slightly less than that published by the Provincial Bureau of Mines, which for lode gold is based on gold content of ores shipped to smelters, etc. According to this authority the production for 1909 was $5,401,090, as compared with $5,929,880 in 1908, a decrease of $528,790 or 11·2 per cent.

The greatest decrease was in the Rossland camp, largely due to the fact that the Le Roi mine, formerly the premier mine of the camp, was closed down for nearly half the year. With the exception of the lode mining in Nelson, Grand Forks, and the Coast divisions, there was an almost universal decrease in the gold production for the year.

Of the 1909 production 9·2 per cent was from alluvial workings, 6·4 per cent from free milling ores, and 84·4 per cent fro mores sent to the smelters.

Statistics of the production by districts in 1909, as published by the Provincial Department of Mines, are given in Table 10, while the total annual production since 1858 is given in Table 11.

GOLD.—TABLE 10.

British Columbia:—Products by Districts, 1909.[1]

Districts.	Gold: Placer.		Gold: Lode.	
	Ozs.	Value.	Ozs.	Value.
		$		$
Cariboo:—				
Cariboo	11,000	220,000		
Quesnel	600	12,000		
Omineca	750	15,000		
Cassiar:—				
Atlin:—	10,000	200,000		
All other divisions	450	9,000	261	5,395
East Kootenay:—				
Fort Steele	150	3,000		
Other divisions				
West Kootenay:—				
Ainsworth			162	3,349
Nelson	50	1,000.	21,909	452,859
Slocan and Slocan City			95	1,964
Trail Creek			115,153	2,380,213
All other divisions	100	2,000	732	15,130
Lillooet	500	10,000	323	6,676
Yale:—				
Grand Forks	50	1,000	93,229	1,927,043
Similkameen, etc.	50	1,000		
Yale, etc	100	2,000		
Coast, and all other divisions	50	1,000	6,360	131,461
Totals	23,850	477,000	238,224	4,924,090

[1] From the Annual Report of the Minister of Mines, for British Columbia.

GOLD.—TABLE 11.

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	3,735,850	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	1909	250,320	5,174,579
1883	38,422	794,252			
1884	35,612	736,165		6,042,654	124,912,787

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

The placer and hydraulic mining situation shows little change from 1908. There was a slight decrease in production in the Atlin district, from $203,000 to $200,000, but the producers were practically the same as in 1908, two of the most important operators, the Atlin Consolidated Mining Company and the Pine Creek Power Company, not producing.

In the Stikine division, the Berry Creek Company was idle. The Cariboo division fell off nearly 30 per cent in its production.

Two or three large hydraulic companies were busy with construction work, and are not likely to become producers before 1911.

Of the lode gold production, 48·3 per cent was derived from Rossland camp in 1909, as compared with 55·7 per cent in 1908. The principal companies carrying on active operations during 1909 were as follows:—

The Consolidated Mining and Smelting Company of Canada, Limited, with total shipments of 180,409 tons.

The Le Roi Mining Company, Limited, shipping 11,582 tons.

The Le Roi No. 2, Limited, shipping 29,571 tons of first-class ore and 835 tons of concentrates, which were produced from the milling of 15,984 tons of second-class ore.

Several of the smaller properties of the camp also shipped during the year.

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

Ore Shipments, total metallic content, and average metallic content per ton from Rossland mines, as determined from smelter returns.[1]

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
1909.....	237,656	115,653	0·487	80,026	0·336	3,509,909	0·750	2,874,956	12 10

[1] From the Annual Report of the Minister of Mines for British Columbia.

The Boundary district comes next in gold production and is credited with $1,927,043 in 1909, an increase of nearly 2 per cent over 1908. The output is mainly due to the small gold content of the large tonnage of copper ores mined in this district. These ores will average in gold, only from 0·04 to 0·05 ounces per ton, but nearly 1,500,000 tons were mined in 1909. Included in this district is the Osoyoos Mining division, in which is situated the Nickel Plate mine at Hedley. This property and its mill are now being operated by the Hedley Gold Mining Company, and the New Daly Reduction Company. Extensive alterations have been made to their 40 stamp mill, including the installation of a slimes process involving regrinding and filterpressing.

Nelson Mining division has had a season of prosperity and witnessed extensive development in the Sheep Creek camp, where the ore is treated in stamp mills, producing bullion and concentrates. The production reached nearly half a million in gold in 1909 and the proven ore-bearing area is being steadily widened. The chief producing mines of the year were the Nugget, Yankee Girl, Mother Lode, and Kootenay Belle in the Sheep Creek camp; while in other parts of the district the Silver King, Granite-Poorman, and Arlington show increases in their production. There was also an increased gold production in the Coast district due to a renewal of mining on Texada island.

Yukon.

The production of the Yukon in 1909 was $3,960,000, as compared with $3,600,000 in 1908, an increase of $360,000 or 10 per cent. The statitics 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 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 purpose 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 experienc of the United States assay offices, has been about $16.50 per ounce. At the Canadian assay office at Vancouver, B.C., there was deposited during the twelve months ending December 31, 1909, 5,003·12 ounces from the Yukon, valued, after all charges had been deducted, at $83,870.84, showing an average value of $16.75 per ounce.

The production of crude gold in the Yukon during the past four years, as ascertained by the Department of the Interior, and upon which a 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.	1909.
	Ozs.	Ozs.	Ozs.	Ozs.
January	3,732·94	7,308·95	2,464·00	69·50
February	11,693·99	213·00	47·30	115·33
March	10·30	66·80	16·65	848·39
April	784·77	202·80	947·00	3·75
May	64,060·66	35,736·62	6,851·96	117·33
June	57,578·27	31,402·14	51,530·90	62,254·92
July	49,012·36	26,793·50	35,291·11	52,123·43
August	54,947·07	22,392·10	37,930·99	47,440·83
September	53,487·08	33,119·51	39,654·27	44,466·20
October	51,799·53	35,589·70	37,028·98	26,572·23
November	131·81	200·30	1,989·39	4,858·69
December	3,352·83	52·80	5,491·76	892·75
	350,391·61	193,078·22	219,244·31	239,766·35

In 1909 the production is estimated at $3,960,000 in gold, representing 191,565 fine ounces of metal and 45,000 fine ounces of silver valued at $23,176, being at the average price for fine silver for the year, making a total valuation of the Yukon output of $3,983,176. In 1908 the production was estimated at $3,600,000, representing 174,150 fine ounces of metal and 41,000 fine ounces of silver valued at $21,674, making a total valuation of $3,621,674.

Statistics of the annual production of gold in the district since 1885 are shown in Table 12.

GOLD.--TABLE 12.

Annual Production in Yukon.

Calendar Year.	Ozs. (fine‡).	Value.	Calendar Year.	Ozs. (fine‡).	Value.
		$			$
1885 } 1886 }	4,387	100,000	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	1909	191,565	3,960,000
1897	120,937	2,500,000		6,373,382	131,749,500
1898	483,750	10,000,000			

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

Since 1898, a royalty to the extent of $3,696,894 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.[1]

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
1909	3,260,282	.....	3,260,282	81,507

‡ From the Report of the Mines Branch of the Department of the Interior, 1909.

IRON AND STEEL.

INTRODUCTORY.

The iron and steel industry in Canada in 1909 shows a very satisfactory and steady growth as compared with previous years.

There was a larger production of iron ore than in 1908; an increased output of pig iron from Canadian blast furnaces and a larger production of steel ingots and castings; while the imports of pig iron and of iron and steel goods more or less highly manufactured were greatly diminished.

Although iron ores are of wide occurrence throughout Canada, being found practically in every province, the development of these resources has not kept pace with the growth of our iron metallurgical industries.

About 17 per cent only of the iron ore used in Canadian furnaces during 1909 was of domestic origin. Much of the coke and limestone was also imported, so that our iron industries are now, and have been for a number of years, largely dependent on imported raw materials.

The total production of iron ore in Canada to the end of 1909 has probably only slightly exceeded 5,000,000 tons, while our present rate of production varies from 300,000 to 400,000 tons per annum.

There were shipped from Newfoundland in 1909 about 1,110,049 tons of ore, of which about 697,068 tons were sent to Canada for use at Sydney. Since 1896, or during the past fourteen years, we have imported 7,521,086 tons of iron ore, chiefly from Newfoundland and the south shore of Lake Superior. As against this we have exported during the same period about 1,556,996 tons, chiefly to the United States.

Developments are in progress, however, which may in the near future furnish a much larger supply of domestic ore. Active operations are in progress at Torbrook, N.S., and extensive preparations being made to ship from the large magnetite deposits near Bathurst, N.B. The Moose Mountain mine, north of Sudbury, of which much has been expected, shipped an important tonnage during 1909, and development work is being continued. Operations have been started on a deposit twenty-four miles east of Port Arthur, the first in this district, and some initial shipments made. A magnetometric survey was made of the old Bristol mine, Pontiac county, Quebec, by an officer of the Mines Branch, resulting in the discovery of the probable existence of a considerable ore body apparently not previously known.

The production of pig iron and steel is still 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 2,735 tons. Of the sixteen, twelve have a daily capacity of 100 tons or over. The production of pig iron and steel in 1909 was the highest year's production yet turned out by Canadian furnaces. The bounty which has been paid on iron and steel production ceases at the end of 1910, although provision is still made for the payment of bounty on pig iron produced by electric process to the end of 1912.

The difficulties which had arisen between the Dominion Coal Company and the Dominion Iron and Steel Company, respecting the supply of coal to the latter, and which had to a considerable extent interfered with the Steel Company's output, were satisfactorily settled in the early part of the year, enabling the Steel Company to bring its production again up to normal and provide extensions of its plant, which will include an additional furnace, new coke ovens, and a finishing mill. Towards the close of the year, negotiations were in progress looking to the amalgamation of the two companies, which have since been successfully concluded. A new steel plant was being built at Londonderry, while various additions and extensions to plants were being made in Ontario.

The Algoma Steel Company has made arrangements for the construction of an additional blast furnace of 400 tons capacity, and the erection of a merchant mill for the manufacture of structural steel. Arrangements were also being made for the construction of by-product coke ovens sufficient to supply the steel plant with all the coke it will need.

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, 1907-8-9.

Material.	1907.	1908.	1909.
	Short Tons.	Short Tons.	Short Tons.
Iron ore shipped	312,856	238,082	268,043
Canadian iron ore charged to furnaces	244,104	209,266	257,502
Imported " "	1,117,260	1,051,445	1,235,000
Pig iron made	651,962	630,835	757,162
Steel ingots and castings made	706,982	588,763	754,719
Finished rolled iron and steel products made (a)	672,200	566,099	.....
Canadian coke charged to iron furnaces	521,068	492,076	412,016
Imported " "	327,082	325,670	507,255
Pig iron imported	(b) 150,157	(c) 212,290	(c) 58,591
Iron and steel goods imported	(b) 632,868	(c) 866,710	(c) 487,003

(a) Statistics collected and published by American Iron and Steel Association.
(b) Nine months ending March, 1907.
(c) Twelve months ending March.

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 shipments of iron ore from mines in Canada in 1909 were 268,043 tons, valued at $659,316 at the shipping point; as compared with 238,082 tons, valued at $568,189, in 1908, and 312,856 tons, valued at $666,941, in 1907. By provinces, the production during the past three years was as follows:—

IRON.—TABLE 1.

Production of Iron Ore by Provinces, 1907-8-9.

Provinces.	1907.		1908.		1909.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
Nova Scotia	89,839	137,161	11,802	17,620	.....	.....
Quebec	12,748	34,956	10,103	22,094	4,150	5,508
Ontario	207,769	488,324	216,177	528,475	263,893	653,808
British Columbia	2,500	6,500	.....	.....	.....	.....
	312,856	666,941	238,082	568,189	268,043	659,316

The production during 1908 and 1909, classified as magnetite, hematites (including brown ores), carbonates, and bog ores, was as follows:—

IRON.—TABLE 2.

Classified Production of Iron Ore, 1908-9.

Character of Ore.	1908.			1909.		
	Short Tons.	Value.	Per Ton.	Short Tons.	Value.	Per Ton.
		$	$ cts.		$	$ cts.
Magnetite	49,946	124,534	2 49	74,240	162,280	2 19
Hematite	173,164	416,127	2 40	190,473	492,348	2 58
Carbonate	4,869	5,434	1 12	.....	.....	.....
Bog	10,103	22,094	2 19	3,330	4,688	1 41
	238,082	568,189	2 39	268,043	659,316	2 46

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

IRON.—TABLE 3.

Production of Iron Ore by Provinces, 1886-1909.

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
1909		4,150	263,893		268,043

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	29,889	1884	54,885
1880	51,193	1885	48,129

Nova Scotia.—No iron ore is reported as shipped from mines in this Province during 1909. The furnaces at Sydney and North Sydney received their supplies of ore from Newfoundland chiefly, while the Londonderry furnace, which is usually run on local ores, was out of commission throughout the year.

The Canada Iron Corporation, Limited, continued to develop their properties at Torbrook, and a quantity of ore was taken out, although none was shipped.

A railway spur is being built from the mines to connect with the Halifax and Southwestern Railway track at Nictaux, and ore shipments are to be made from Port Wade, at which place large ore pockets are to be constructed. The same Company has acquired the iron deposits at Austin brook, near Bathurst, New Brunswick. A railway has been constructed connecting the ore deposits with the Intercolonial railway and shipping piers built at Newcastle.

Quebec.—The production of bog ores in this Province is growing less year by year. During 1909, only 3,330 tons were shipped to furnaces, in addition to which a small tonnage of iron sands was shipped for experimental purposes.

A magnetometric survey was made of the Bristol mine, Pontiac county, by Mr. E. Lindeman of the Mines Branch, and a special bulletin has been published giving the results thereof. No shipments have been made from this mine since 1897, but between 1889 and 1897, inclusive, according to returns made to this Department, the mine shipped 29,815 tons. Mr. Lindeman sums up the results of his investigations as follows:—

'The magnetite occurs in parallel beds and lenticular-shaped bodies along the stratification of hornblendic and micaceous schists. The association of the magnetite and these gangue minerals seems to be very intimate; and in places, complete gradations exist between masses of magnetite and these rocks. Numerous intrusions of granite in the iron-bearing strata seem also to have had an important bearing on the horizontal extent of the deposits as well as on their depth, cutting them into irregular masses, and rendering their extent in depth uncertain. To judge from the irregular magnetic curves, and the numerous exposures of granite, this state of affairs seems to exist round Shaft No. 1.

'It is manifest that the unprofitable mining operations carried on some years ago were largely due to the irregularities of these ore bodies; to primitive methods of working; and to the long railway haul from the mine to Pennsylvania, U.S.A., where the ore is reported to have been shipped.

'On the other hand, the present investigation indicates that lot 22, and the east part of lot 21, contain some promising deposits. The most important of these is that on lot 22; the approximate area of which has been estimated at 90,000 square feet. As this deposit is practically all covered by a heavy loam, and taking into consideration the intimate association of the magnetite with the schistose rocks in other parts of the field, it is evident that no definite statement can be made with regard to the tonnage of iron ore in this deposit; but as far as it is now possible to judge from the strong, even, magnetic attraction, there is every reason to conclude that the deposit is of considerable magnitude. In order to ascertain the precise character and quantity of these ore reserves, systematic development in the form of diamond drilling will be necessary.'

Ontario.—This Province shows a considerably increased tonnage in iron ore shipments in 1909, due chiefly to a larger output from the Helen mine. There were five shipping mines, as compared with four during 1908.

No shipments were made by the Wilbur, in Lanark county, but the Atikokan mines, west of Port Arthur, were reopened; while the Dominion Bessemer

Ore Company, of Philadelphia, opened up an iron property about twenty-three miles east of Port Arthur, on Thunder bay, and shipped a quantity of ore in two grades, No. 1 running 52 per cent iron, and No. 2, 40 per cent. It is intended to equip the property with crushers and jigs, in order to prepare the ore for market and raise the percentage of metallic iron content.

From the Helen mine at Michipicoten, shipments were made to Hamilton and Sault Ste. Marie, exclusively, no ore being sent to the United States during 1909. The plant at the mine is now entirely electrically driven, taking about 400 horse-power. The Moose Mountain mine, in Hutton township, shipped chiefly to the United States, although one shipment each was made respectively to Sydney, N.S, and Hamilton, Ont. Shipments were also made from the Mayo mine in Hastings county, operated by the Canada Iron Corporation, Limited, under lease, the ore being shipped to Midland and Radnor.

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

Canada Iron Corporation, Limited, Mark Fisher Bldg., Montreal.

E. H. Duval, Lévis, Que. (Guay P.O.).

H. C. Bosse, 92 St. Peter street, Quebec, Que.

Dominion Bessemer Ore Company, Limited, 472 Bullitt Bldg., Philadelphia, Pa.

The Lake Superior Power Company, Sault Ste. Marie, Ont.

Atikokan Iron Company, Limited, Port Arthur, Ont,

Moose Mountain Limited, Sellwood, Ont.

IMPORTS AND EXPORTS.

During the past fourteen 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 should hardly be looked upon as a foreign source, though for purposes of commerce it has to be so considered.

The total consumption of iron ore in Canadian furnaces in 1909 was 1,492,502 short tons, made up of 257,502 tons of Canadian ore and 1,235,000 tons of imported ore. The Canadian production was, therefore, only about 17 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, and more recently the Moose Mountain mine in Hutton township, 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, 1893-1909.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1893	2,419	7,590	1902*	428,901	1,065,019
1894		21,294	1903*	368,233	922,571
1895	1,571	3,909	1904*	168,828	401,738
1896	1,033	1,911	1905*	168,289	407,881
1897	403	811	1906	74,778	149,177
1898	182	278	1907	25,901	45,907
1899	4,145	9,538	1908	(a)	
1900	5,527	13,511	1909	21,956	61,954
1901*	306,199	762,283			

* 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, 1879-1909.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		$			$
1879	3,562	7,530	1895	2,315	5,743
1880	30,524	76,474	1896	14	35
1881	44,677	114,850	1897	1,320	2 492
1882	43,835	135,463	1898	360	402
1883	44,914	138,775	1899	1,849	4,968
1884	25,308	66,549	1900	4,327	7,689
1885	54,367	132,074	1901*	58,401	150,657
1886	7,542	23,039	1902*	525,983	1,303,901
1887	23,345	71,934	1903*	293,510	733,230
1888	13,544	39,945	1904*	233,850	579,883
1889	24,752	60,289	1905*	224,908	540,909
1890	13,811	31,376	1906*	148,040	345,540
1891	14,648	32,582	1907†	34,191	65,367
1892	7,707	36,935	1908	26,310	46,686
1893	7,811	26,114	1909	3,933	71,663
1894	1,859	9,026			

* 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, 1893-1909.*

Year ending June 30.	Short Tons.	Value.	Year ending June 30.	Short Tons.	Value.
		$			$
1893	7,706	17,186	1902	309,527	685,540
1894	301	756	1903	144,725	320,263
1895	2,681	10,114	1904	126,995	283,765
1896	39	142	1905	120,241	245,623
1897	2,535	5,243	1906	113,809	220,112
1898	1,313	2,904	1907	34,731	52,765
1899	2,585	5,120	1908	32,124	55,617
1900	4,477	5,550	1909	3,490	12,660
1901	34,453	76,159			

* 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 1909 was 757,162 short tons (676,038 long tons), valued at the furnace at $9,581,864; as compared with 630,835 short tons (563,246 long tons), valued at $8,111,194, in 1908. An increased production is, therefore, shown of 126,327 tons, or about 20 per cent, and this despite the fact that the Londonderry furnace was out of commission during the whole year. These figures do not include the output from electric furnaces, making ferro-products, which are situated at Welland and Sault Ste. Marie, Ont., and Buckingham, Que.

Of the total output of pig iron during 1909, 17,003 tons, valued at $371,368, or $21.84 per ton, were made with charcoal as fuel, and 740,159 tons, valued at $9,210,496, or $12.44 per ton, with coke. The amount of charcoal iron made in 1908 was 6,709 tons, and iron made with coke, 624,126 tons.

The classification of the production in 1909, according to the purpose for which it was intended, was as follows: Bessemer, 222,931 tons; basic, 400,921 tons; foundry, including miscellaneous, 116,307 tons.

The American Iron and Steel Association reported the production of Bessemer pig iron in 1908 as 126,348 short tons, as against 173,499 tons in 1907; and the production of basic pig iron in 1908 as 375,659 short tons, as against 382,208 tons in 1907.

The total production of pig iron in 1908 and 1909 is shown by provinces in the following table, the average value per ton being also indicated. In the case of Nova Scotia, a large proportion of the pig iron is directly converted to steel. A nominal value is placed upon this, and does not necessarily represent a market value. The Quebec production is entirely charcoal iron, which has for many years commanded a high price.

IRON.—TABLE 7.

Production of Pig Iron by Provinces, 1908-9.

Provinces.	1908.			1909.			Percentage increase or decrease in quantity.
	Tons.	Value.	Value per ton.	Tons.	Value.	Value per ton.	
		$	$		$	$	%
Nova Scotia.....	352,642	3,554,540	10 08	345,380	3,453,800	10 00	2·1
Quebec.....	6,709	171,383	25 55	4,770	125,623	26 34	28·9
Ontario.....	271,484	4,385,271	16 15	407,012	6,002,441	14 75	49·9
Total.....	630,835	8,111,194	12 86	757,162	9,581,864	12 65	20·0

The increased production in 1909 has been due to the greater activity of the Ontario furnaces, there having been a decreased production in both Nova Scotia and Quebec. For the first time since 1891 the Ontario production has exceeded that of Nova Scotia. The proportions of the whole contributed by the several provinces were, in 1909: Nova Scotia, 45·6 per cent; Ontario, 53·8 per cent, and Quebec about 0·6 per cent. In 1908 the proportions were: Nova Scotia, 56 per cent; Ontario, 43 per cent, and Quebec about 1 per cent. During the past five years the production has exceeded 500,000 tons annually; while from 1898 to 1904 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, 1887-1909.

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	337,901
1892.....	40,049	583,556	.....	.....	2,394	53,865	42,443	673,421
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.....	366,456	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
1909.....	345,380	3,453,800	407,012	6,002,441	4,770	125,623	757,162	9,581,864

Pig Iron Prices.—The selling prices of pig iron in Toronto and Montreal, according to quotations published in trade journals, showed comparatively little variation during the year. In Toronto, the quotation was practically constant at from $19.50 to $20 throughout the year. In Montreal, prices ranged from $18.50 to $20.50 for Midland or Hamilton pig iron.

In Pittsburgh, Pa., Bessemer iron was quoted at $16.50 in January, falling to $14.50 in May, and gradually increasing to $19 in December. Basic iron in the same market was quoted at $15.50 in January, falling to $14 in May, and increasing to $17 in December.

The quantities of iron ore, coke, charcoal, limestone, etc., consumed in blast furnaces in 1908 and 1909, are shown as follows:—

IRON.—TABLE 9.

Ore, Fuel, and Flux charged to Blast Furnaces, in years 1908-9.

	1908.			1909.		
	Quantity.	Value.	Canadian and Imported.	Quantity.	Value.	Canadian and Imported.
		$	%		$	%
Canadian iron ore and mill cinder..... tons.	209,266	741,491	17	257,502	892,947	17
Imported iron ore.. ..... "	1,051,445	2,432,484	83	1,235,000	2,989,512	83
Canadian coke..... "	492,076	1,604,411	60	412,016	1,339,032	45
*Imported coke .. .... "	325,670	1,525,711	40	507,255	2,214,578	55
Charcoal .....bushels.	1,121,990	85,738	....	1,779,258	170,050	.....
Canadian limestone..... tons.	418,661	289,705	87	428,140	328,091	81
Imported " .... "	64,404	53,436	13	97,936	83,091	19

* 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 1909 about 83 per cent of the ore charged, 55 per cent of the coke, and 19 per cent of the limestone were imported. This condition, of course, is due to questions of cost and transportation affecting each furnace. Just as the Newfoundland ore can be more cheaply and certainly laid down in Sydney, so also American coke can be delivered at Ontario furnaces more cheaply than Nova Scotia coke. In Ontario the coke fuel is all imported, and in the case of the furnaces at Sault Ste. Marie and Port Arthur the flux is imported. Of the ore used in this Province in 1909, about 44 per cent was imported, as compared with 65 per cent in 1908. The development of new ore bodies in this Province may possibly, in the near future, provide a domestic supply of ore, but for fuel Ontario will probably be dependent for some time upon United States sources.

According to returns made to the Department of Trade and Commerce in connexion with claims for bounty, 126,298 tons only of the total pig iron production in Canada in 1909 were credited to Canadian ore, and 607,718 tons to imported ore, and bounty paid upon it as such. No bounty is paid on the iron credited to the mill cinder, scale, etc., so that the above figures do not represent the total output of the furnaces.

Statistics of 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.	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	103,871	.....	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	361,016	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	2,322,630	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	243,382	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
1909	257,502	1,235,000	1,779,258	412,016	507,255	526,076

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

Of sixteen completed furnaces, fifteen were in blast in 1909, for varying periods of time. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron and Steel Company, Sydney, C.B.: four completed furnaces of 280 tons capacity each per day; two operated throughout 1909, one for 168 days, and the fourth for 203 days.

Nova Scotia Steel and Coal Company, Limited, New Glasgow, N.S.: one furnace at Sydney Mines, C.B., of 200 tons capacity; operated throughout 1909.

Londonderry Iron and Mining Company, Limited, Londonderry, N.S.: one furnace of 100 tons capacity; idle throughout the year.

Canada Iron Corporation, Limited, Montreal, Que.: two small furnaces of seven and eight tons capacity, at Drummondville, Que., operated 3½ days; one furnace of 25 tons daily capacity, at Radnor Forges, Que., operated seven months during 1909; one furnace of 125 tons, at Midland, Ont., operated all year.

Standard Chemical Company of Toronto, Deseronto, Ont.: one furnace with a daily capacity of 50 tons; operated six months during 1909.

Hamilton Steel and Iron Company, Hamilton, Ont.: two furnaces: one of 200 tons capacity, operated throughout 1909; a second furnace of 300 tons capacity, operated 276 days in 1909.

Algoma Steel Company, Limited, Sault Ste. Marie, Ont.: two furnaces at Steelton, near Sault Ste. Marie, of 250 tons capacity each; operated throughout the year.

The Atikokan Iron Company, Limited, Port Arthur, Ont.: one furnace of 100 tons capacity; operated for 4½ months during 1909.

The total daily capacity of the sixteen furnaces is about 2,735 tons.

The number of men employed in 1909 was reported as 1,486, and the wages paid, $879,429. Of the sixteen completed furnaces, eleven were in blast and five idle on December 31, 1909.

Very little pig iron has been exported from Canada. The quantities exported during the past two years were, as shown in Table 17: 5,063 tons, valued at $186,778, in 1909; and 290 tons, valued at $10,614, in 1908. The figures for 1909 include ferro-silicon and other similar iron alloys. Considerable quantities of pig iron are, however, imported. During the calendar year 1909 the imports of ordinary pig iron were 147,925 tons, valued at $1,798,172, and of charcoal pig, 413 tons, valued at $5,727, or a total of 148,338 tons, valued at $1,803,919. During the calendar year 1908 the imports were 58,365 tons, valued at $790,433: comprising ordinary pig, 57,343 tons, valued at $771,615, and charcoal iron, 1,022 tons, valued at $18,818.

The annual imports of these two classes of pig iron since 1880 are shown in the following table, the statistics being given for the fiscal year. The duty or general tariff 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
1909	57,669	857,357	922	16,575	58,591	873,932
1910	158,910	2,118,445	596	8,690	159,506	2,127,135

* 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.'

IRON.—TABLE 11a.

Annual Exports of Pig Iron, 1896-1909.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1896	2,187	55,448	1903	4,400	78,382
1897	3,099	81,381	1904	21,016	200,363
1898	1,278	32,645	1905	866	22,284
1899	6,981	149,190	1906	305	7,429
1900	3,513	88,052	1907	439	13,504
1901	57,650	593,739	1908	290	10,614
1902	75,195	778,619	1909	5,063	186,778

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 1906 to 1909: metric tons.

—	1906.	1907.	1908.	1909.
United States	25,713,556	26,195,340	16,191,907	26,209,677
Germany	12,292,819	12,875,159	11,805,321	12,625,575
United Kingdom	10,347,385	10,276,689	9,202,280	9,819,469
France	3,314,162	3,590,235	3,400,771	3,544,638
Russia	2,691,606	2,820,604	2,800,653	2,871,332
Austria-Hungary	1,687,581	1,872,684	1,518,549	**
Belgium	1,375,775	1,406,980	1,270,050	1,632,350
Canada	542,875	591,456	572,290	686,893
Sweden	604,789	615,778	567,821	443,000
Spain	379,241	355,240	403,554	**
Italy	135,296	112,232	112,924	207,800
China	*34,305	*36,306	66,409	74,000
Japan	42,679	51,943	45,396	**
Australasia	.....	29,902	30,393	**

* Exports. ** Not available.

FERRO-PRODUCTS.

These are made in small quantities in electric furnaces at Welland, and Sault Ste. Marie, Ont., and at Buckingham, Que.

At Buckingham the Electric Reduction Company, Limited, has for a number of years been making ferro-chrome, ferro-silicon, ferro-phosphorus, and other products, though for the past year or more the Company's operations, it is understood, have been restricted to the manufacture of phosphorus. The Electro Metals Company at Welland, Ont., 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. The Algoma Steel Company, at Sault Ste. Marie, makes ferro-silicon for its own consumption. Although complete returns of production were not received, the output was probably somewhat under 5,000 tons, and valued at about $55 per ton.

The imports of ferro-silicon, ferro-manganese, etc., during the calendar year 1909, were 17,699 tons, valued at $411,536, an average of $23.25 per ton. The imports since 1887 are shown in Table 13, the figures of the table being for the fiscal year.

IRON.—TABLE 13.

Imports of Ferro-Manganese, Etc., 1887-1909.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		$			$
*1887	123	1,435	†1899	1,160	22,539
*1888	1,883	29,812	†1900	1,149	39,064
*1889	5,868	72,108	†1901	1,512	38,954
*1890	696	18,895	†1902	6,513	150,977
*1891	2,707	40,711	†1903	6,350	162,710
*1892	1,311	23,930	†1904	2,975	75,554
*1893	529	15,858	†1905	12,935	246,815
*1894	284	9,885	†1906	15,023	462,739
†1895	164	5,408	†1907 (9 months)	16,414	610,875
†1896	652	12,811	†1908	17,417	612,062
†1897	426	9,233	†1909	13,053	388,024
†1898	1,418	22,516			

* 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 of steel production received direct from the producers showed a total production of ingots and castings in 1909 of 754,719 tons, valued at $14,359,800; as compared with 588,763 tons, valued at $10,916,602, in 1908, and 706,982 tons, valued at $15,612,590, in 1907. Of the production in 1909, 535,988 tons were open-hearth ingots; 203,715 tons, Bessemer ingots; 14,013 tons, direct steel castings, and 1,003 tons of other steels. Compared with 1908, there is an increase in total production of 165,956 tons, or 28·2 per cent. The production during the past three years is shown in Table 14 below.

IRON.—TABLE 14.

Production of Steel, 1907, 1908, and 1909.

Description.	1907.		1908.		1909.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
		$		$		$
Ingots, open-hearth (basic)	459,240	9,157,703	443,442	7,684,277	535,988	9,372,615
Bessemer (acid)	225,989	4,293,791	135,557	2,535,287	203,715	3,829,012
Castings, open-hearth	20,602	2,031,380	9,051	617,126	14,013	1,043,460
Other steels	1,151	129,716	713	79,912	1,003	114,713
Total	706,982	15,612,590	588,763	10,916,602	754,719	14,359,800

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 to 1909 being as shown in Table 14.

IRON.—TABLE 15.

Annual Production of Steel Ingots and Castings, 1894-1909.

Calendar Year.	Short Tons.	Calendar Year.	Short Tons.	Calendar Year.	Short Tons.
1894	28,767	1900	26,406	1906	639,396
1895	19,040	1901	29,214	1907	706,982
1896	17,920	1902	203,881	1908	588,763
1897	20,608	1903	203,296	1909	754,719
1898	24,125	1904	166,381		
1899	24,640	1905	451,863		

Following is a list of firms making steel in Canada:—

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

Rolled Products, etc.—Complete statistics of the production of rolled products and manufactured steel have not been obtained. The production of steel rails, however, in 1909 was returned as 377,642 short tons; as compared with 300,935 short tons produced in 1908.

The production of finished rolled iron and steel in Canada from 1904 to 1908, as ascertained by the American Iron and Steel Association, was as follows, in long tons:—

Annual Production of Rolled Iron and Steel, 1904-8.

Products—Gross Tons.	1904.	1905.	1906.	1907.	1908.
Rails	36,216	178,885	312,877	311,461	268,692
Structural shapes and wire rods	11,195	48,850	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
Totals	180,038	385,826	571,742	600,179	496,517

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.

2. 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 1908 and 1909, as kindly furnished by the Department of Trade and Commerce, is shown in Table 16, following:—

IRON.—TABLE 16.

Bounty Paid during the Calendar Years 1908 and 1909.

Product on which Bounty was paid.	1908.		1909.	
	Tons.	Bounty.	Tons.	Bounty.
		$		$
Pig iron made from Canadian ore	101,647	213,458 34	126,298	214,705 80
" " imported ore	517,427	569,169 93	607,718	425,402 64
Total pig iron	619,074	782,628 27	734,016	640,108 44
Steel ingots	556,289	917,876 63	729,189	766,470 41
Steel wire rods	49,630	297,778 68	81,405	488,432 70
Totals	1,224,993	1,998,283 58	1,544,610	1,895,011 55

The total bounty payments during the calendar year 1909 on iron and steel were $1,895,011.55, the amount paid to the several companies and the quantities of the different products on which the bounties were paid being shown in the following tables:—

Bounties Paid on Pig Iron, manufactured in Canada, during the Twelve Months ending December, 1909.

Name of Claimant.	Tons of Canadian ore used.	Tons of foreign ore used.	Tons of pig iron made from Canadian ore.	Bounty on pig iron from Canadian ore.	Tons of pig iron from foreign ore.	Bounty on pig iron from foreign ore.	Total tons of pig iron produced.	Amount of claim.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Dominion Iron and Steel Co., Ltd.	1,742 00	577,065 00	908 27	1,544 06	277,042 95	193,930 06	277,951 22	195,474 12
Hamilton Steel and Iron Co., Ltd	121,121 14	181,131 15	68,001 34	115,602 30	88,916 55	62,241 59	156,917 89	177,843 89
Nova Scotia Steel and Coal Co., Ltd	.....	110,649 00	.....	.....	57,885 00	40,519 50	57,885 00	40,519 50
Algoma Steel Co., Ltd.	66,930 67	283,531 65	35,041 07	59,569 82	140,525 98	98,368 19	175,567 05	157,938 01
Atikokan Iron Co., Ltd.	13,452 12	.....	8,882 22	15,099 76	.....	.....	8,882 22	15,099 76
Canada Iron Corp., Ltd., (Drummondville)	60 90	.....	19 94	33 90	.....	.....	19 94	33 90
" " (Midland)	17,280 83	58,421 12	9,267 27	15,652 37	30,602 43	21,421 73	39,809 70	37,074 10
" " (Radnor)	9,884 84	1,487 81	3,939 56	6,697 22	810 42	567 28	4,749 98	7,264 50
Standard Chemical Co. of Toronto, Deseronto	622 21	23,201 73	297 88	506 37	11,934 76	8,354 29	12,232 64	8,860 66
	231,094 71	1,235,487 46	126,297 55	214,705 80	607,718 09	425,402 64	734,015 64	640,108 44

Bounties Paid on Steel Ingots during the Twelve Months ending December, 1909.

—	Tons of Canadian pig iron used.	Tons of foreign pig iron used.	Tons of other ingredients.	Tons of steel made.	Bounty paid.
Dominion Iron and Steel Co., Ltd.	279,651 44	.....	95,346 60	332,320 99	348,937 06
Hamilton Steel and Iron Co., Ltd	43,722 56	.....	40,108 49	76,847 94	80,690 36
Nova Scotia Steel and Coal Co., Ltd	52,006 42	.....	20,966 45	64,239 94	67,451 95
Algoma Steel Co., Ltd.	181,842 04	6,978 82	31,045 71	199,770 05	209,758 55
Lake Superior Iron and Steel Co., Ltd.	28,466 77	54 50	26,940 74	51,740 24	54,327 26
*Ontario Iron and Steel Co., Ltd	3,222 17	.....	2,883 07	4,270 21	5,305 23
	588,911 40	7,033 32	217,291 06	729,189 37	766,470 41

* Includes a small quantity produced in 1908.

During the year bounty to the amount of $488,432.70 was paid the Dominion Iron and Steel Co., Ltd., for 81,405·42 tons of wire rods made.

Total Bounty paid to each Company during the past three Fiscal years.

Corporations.	1907.	1908.	1909.
	$ cts.	$ cts.	$ cts.
Algoma Steel Co., Ltd	348,292 48	534,025 50	367,696 56
Atikokan Iron Company, Ltd	.....	17,210 46	15,099 76
* Canada Iron Furnace Co., Ltd	28,793 35	51,213 12	44,372 50
* John McDougall and Co.	2,062 58	5,368 12	
† Deseronto Iron Co., Ltd	2,598 75	7,299 30	3,860 66
Dominion Iron and Steel Co., Ltd	669,042 56	1,228,915 39	1,032,843 88
Electric Reduction Co., Ltd	235 20	.....	.....
Hamilton Steel and Iron Co., Ltd	125,678 25	222,490 31	258,534 25
Londonderry Iron and Mining Co., Ltd	28,505 79	37,441 52	.....
Lake Superior Iron and Steel Co.	.....	17,500 60	54,327 26
Montreal Rolling Mills Co.	881 19	.....	.....
Nova Scotia Steel and Coal Co., Ltd	93,710 89	181,436 26	107,971 45
Ontario Iron and Steel Co.	.....	251 77	5,305 23
	1,299,801 04	2,302,152 35	1,895,011 55

* Amalgamated in 1909 to form Canada Iron Corporation, Ltd.
† In 1909 worked by the Standard Chemical Co. of Toronto.

Total Bounties on Iron and Steel paid by the Government of Canada since 1896.

Year ended.	Pig Iron.	Puddled iron bars.	Steel.	Manufactures of Steel.
	$	$	$	$
June 30, 1896	104,105	5,611	59,499	
" 1897	66,509	3,019	17,366	
" 1898	165,654	7,706	67,454	
" 1899	187,954	17,511	74,644	
" 1900	238,296	10,121	64,360	
" 1901	351,259	16,703	100,058	
" 1902	693,108	20,550	77,431	
" 1903	666,001	6,702	729,102	
" 1904	533,982	11,669	347,990	15,321
" 1905	624,667	7,895	676,318	231,324
" 1906	687,632	5,875	941,000	369,832
March 31, 1907 (9 months)	385,231	312	575,259	338,999
" 1908	863,817	.....	1,092,201	347,135
" 1909	693,423	.....	838,100	333,091
Totals	6,261,638	113,674	5,660,782	1,635,702

EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.

The value of the exports of iron and steel products from Canada in 1909 was $2,598,756, as compared with a value of $2,098,138 in 1908. Details are shown in Table 17 following:—

IRON.—TABLE 17.

Exports of Iron and Steel goods, the product of Canada, during the Calendar Years 1908 and 1909.

	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Stoves..... No.	651	8,258	774	10,330
Castings, N.E.S..... $	.....	28,062	.....	25,038
Pig iron..... Tons.	290	10,614	5,063	186,778
Machinery (linotype machines).....	.....	126,590	.....	43,686
" N.E.S.....	.....	285,257	.....	421,707
Sewing machines..... No.	9,697	109,002	12,759	147,402
Typewriters..... "	3,720	169,939	3,749	238,167
Scrap iron and steel..... Cwt.	92,566	73,807	410,506	305,256
Hardware, tools, etc..... $	.....	57,631	.....	52,207
" N.E.S..... "	.....	59,304	.....	35,507
Steel and manufactures of..... "	.....	1,169,674	.....	1,132,678
Totals.....	.....	2,098,138	.....	2,598,756

Nearly 44 per cent of the total exports in 1909 are entered as steel and its manufactures. The export of these products has grown very rapidly during the past few years, having increased from a value of $477,766 in 1907 to a value of $1,132,678 in 1909.

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, 1909, was $40,393,431; as compared with $61,819,698 during the previous fiscal year.

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 can, however, be arrived at by selecting those items for which the weights are given. This has been done, and the results are given in Table 18.

The imports of these selected items showed a total tonnage in 1909 of 545,594; as compared with 1,079,000 tons in 1908, and 783,025 tons during the nine months ending March, 1907. The statistics for 1909 show a falling off in imports in all classes of iron and steel goods.

IRON.—TABLE 18.

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

Material.	Twelve months ending March, 1908.	Twelve months ending March, 1909.
	Tons.	Tons.
Pig iron	212,290	58,591
Ferro-products and chrome steel	17,661	13,206
Ingots, blooms, billets, puddled bars, etc	21,222	8,887
Scrap and scrap steel	69,213	26,212
Plates and sheets	126,172	101,317
Bars, rods, hoops, bands, etc	98,631	69,818
Structural iron and steel	373,871	162,735
Rails and connexions	52,706	32,543
Pipe and fittings	25,090	18,309
Nails and spikes	2,741	1,432
Wire	57,046	39,452
Forgings, castings, and manufactures	22,357	13,092
Total	1,079,000	545,594

IRON.—TABLE 19.

Imports of Iron and Steel Goods subject to Duty.

Material.		Twelve Months ending March, 1908.		Twelve Months ending March, 1909.	
		Quantity.	Value.	Quantity.	Value.
Agricultural implements, N.O.P., viz.:—			$		$
Binding attachments	$	.....	639	.....	1,294
Cultivators and weeders	No	5,491	44,983	3,911	26,389
Drills, seed	"	2,887	87,334	3,579	123,542
Farm, road, or field rollers	"	123	18,052	52	14,044
Forks, pronged	"	11,466	6,548	5,822	4,142
Harrows	"	3,446	50,988	3,853	61,220
Harvesters, self-binding	"	880	85,662	1,206	129,775
Hay loaders	"	562	26,432	370	19,926
Hay tedders	"	44	1,374	.....	1,174
Hoes	"	4,436	1,034	3,698	1,145
Horse rakes	"	1,117	28,474	591	18,260
Knives, hay or straw	"	1,729	1,207	6,261	2,428
Knives, edging	"	180	223	1,102	241
Lawn mowers	"	2,305	12,884	4,680	17,920
Manure spreaders	"	800	73,407	196	19.827
Mowing machines	"	1,673	47,668	1,731	61,599
Ploughs	"	16,551	438,129	13,192	462,184
Post hole diggers	"	1,589	1,019	762	804
Potato diggers	"	1,044	41,179	717	25,468
Rakes, N.O.P.	"	11,967	3,350	13,922	2,249
Reapers	"	531	25,688	297	17,009
Scythes	Doz.	2,441	12,951	2,493	11,624
Sickles or reaping hooks	"	222	463	1,190	546
Snaths	"	4	17	6	35
Spades and shovels of iron or steel, N.O.P.	"	6,469	29,877	5,005	21,219
Spade and shovel blanks, and iron or steel cut to shape for the same	"	3,720	5,788	1,902	2,521
Parts of agricultural implements paying 12½ per cent and 17½ per cent	$	.....	314,193	.....	252,414
" " " 12½, 17½, and 20 per cent	"	.....	314,598	.....	260,959
All other agricultural implements, N.O.P.	"	.....	75,259	.....	50,862
Anvils and vises	"	.....	70,537	.....	45,033
Cart or wagon skeins or boxes	Lbs.	277,945	7,035	12,919	314
Springs N.O.P. and parts thereof, of iron or steel, for railway, tramway, or other vehicles	Cwt.	48,471	128,001	3,105	16,831

Imports of Iron and Steel Goods subject to duty.

Material.		Twelve months ending March, 1908.		Twelve months ending March, 1909.	
		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	39,153	100,731
Bar iron or steel, rolled, whether in coils, bundles, rods or bars, comprising rounds, ovals, squares, and flats, N.O.P	"	1,497,690	2,580,823	785,981	1,223,995
Butts and hinges N.O.P	$	.....	65,773	.....	38,246
Canada plates, Russia iron, terne plate, and rolled sheets of iron and steel coated with zinc, spelter or other metal, of all widths or thicknesses, N.O.P	Cwt.	79,722	262,134	74,860	233,753
Castings, iron or steel, N.O.P	$	.....	593,672	.....	328,368
Cast iron pipe of every description	Cwt.	431,034	598,358	320,275	370,085
Cast scrap iron	Tons	26,371	458,489	15,190	202,842
Chains, coil chains, chain links, and chain shackles of iron or steel of $\frac{5}{16}$" diameter, and over	Cwt.	81,991	281,304	45,386	131,324
Chains, N.O.P	$	.....	52,864	.....	34,221
Tacks, shoe	Lbs.	16,735	1,033	23,322	1,929
Nails, brads, spikes, and tacks of all kinds, N.O.P	"	269,331	16,346	335,638	22,678
Engines, etc.:—					
Locomotives for railways	No.	195	1,233,089	113	384,086
Motor cars for railways and tramways	"	11	12,002	2	3,900
Engines, fire	"	28	19,380	17	13,411
" gasoline	"	3,230	693,153	4,076	714,574
" steam	"	659	422,585	380	234,224
Boilers, steam	"	517	274,158	372	114,975
" N.O.P.	"	1,197	67,161	287	39,144
Fire extinguishing machines, including sprinklers for fire protection	$	.....	51,014	.....	78,690
Fittings, iron or steel, for iron or steel pipe of every description	Lbs.	7,077,317	499,050	4,590,270	282,552
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	3	80
Ferro-silicon, spiegeleisen, and ferro-manganese	"	17,417	612,062	13,053	388,024
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.	3,021,923	149,219	2,270,838	96,388
Hardware, viz.: builders, cabinet-makers, upholsterers, harness-makers, saddlers and carriage hardware, including curry-combs, N.O.P	$	.....	578,090	.....	365,230
Horse, mule, and ox shoes	"	.....	10,212	.....	5,880
Iron or steel billets, weighing not less than 60 pounds per lineal yard	Cwt.	297,329	416,163	78,797	95,350

Imports of Iron and Steel Goods subject to Duty

Material.		Twelve months ending March, 1908.		Twelve months ending March, 1909.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Iron or steel 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	Cwt.	94,441	135,177	74,305	53,135
" 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.	244,992	645,608	69,636	176,613
Iron in pig	"	210,053	3,448,125	57,669	857,357
" charcoal	"	2,237	45,475	922	16,575
Locks of all kinds	$	.....	336,405	.....	222,000
Machines, machinery, etc. :—					
Automobiles and motor vehicles of all kinds	No.	674	912,371	533	585,097
" " " parts of	$	.....	136,858	.....	127,143
Fanning mills	No.	1,648	23,051	1,160	12,813
Grain crushers	"	113	2,801	12	263
Windmills and complete parts thereof	"	708	36,171	754	38,284
Ore crushers and rock crushers, stamp mills, cornish and belted rolls, rock drills, air compressors, cranes, derricks, and percussion coal cutters	$	.....	178,951	.....	176,014
Portable machines :—					
Fodder or feed cutters	No.	203	2,302	187	1,740
Horse-powers for farm purposes	"	25	2,321	20	958
Portable engines with boilers in combination and traction engines for farm purposes	"	700	1,033,868	602	794,854
Portable sawmills and planing mills	"	21	23,352	20	18,759
Steam shovels	"	14	71,052	29	152,027
Threshing machine separators	"	649	386,583	624	362,083
" " " parts of, including wind-stackers, baggers, weighers, and self-feeders for same, and finished parts thereof for repairs, when imported separately	$	.....	266,427	.....	239,118
All other portable machines, N.O.P., and parts	"	.....	96,254	.....	19,891
Sewing machines	No.	16,065	268,198	11,823	207,295
" " parts of	$	.....	96,745	.....	52,044
Slot machines	No.	784	22,569	248	7,832

Machines, typewriting	No.	7,058	546,068	6,050	446,851
" type-casting and type-setting, and parts thereof, adapted for use in printing offices	"	109	241,445	20	123,446
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	266	88,493
Machines for carding, spinning, weaving, or knitting, imported by manufacturers for such purposes	$	.....	707,949	.....	823,698
Lithographic presses and type-making accessories for same	"	.....	38,331	.....	27,131
Printing presses	"	.....	257,522	.....	160,600
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	"	.....	8,005,310	.....	5,516,890
Malleable iron castings and iron or steel casting, N.O.P	Cwt.	12,788	53,561	7,797	34,001
Nails and spikes, composition and sheathing nails	Lbs.	17,603	2,862	74,485	4,991
Nails and spikes, cut (ordinary builders)	Cwt.	4,124	10,359	2,897	6,785
Railway spikes	"	29,850	59,665	18,902	34,260
Nails, wire of all kinds, N.O.P	"	7,870	27,017	6,088	25,160
Pumps, hand, N.O.P	No.	14,566	80,299	11,951	54,216
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.	49,187	1,278,084	29,547	797,479
Railway fish-plates	"	1,225	55,193	1,784	67,045
Railway tie-plates	"	859	40,046	333	15,147
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.	660,869	1,064,890	383,529	553,702
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 pounds per lineal yard, not being square, flat, oval or round shapes, and not being railway bars or rails	"	1,474,074	2,202,516	1,050,541	1,444,741
Rolled iron or steel hoop, band, scroll or strip, 12" or less in width, No. 13 gauge and thicker, N.O.P	"	52,735	99,977	34,969	59,501
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	"	105,568	285,670	86,283	204,169
Rolled iron or steel sheets or plates, sheared or unsheared, and skelp iron or steel, sheared or rolled grooves, N.O.P	"	317,512	539,220	156,910	242,690
Rolled iron or steel plates not less than 30" in width and not less than ¼" in thickness, N.O.P	"	419,733	666,288	335,447	453,205
Rolled iron or steel sheets and strips, polished or not, No. 14 gauge and thinner, N.O.P	"	230,839	581,624	204,522	498,705
Rolls of chilled iron or steel	"	1,998	6,930	1,547	5,056
Sad or smoothing hatters' and tailors' irons	$	.....	7,706	.....	5,836
Safes, doors for safes and vaults	"	.....	147,004	.....	92,491
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.	200,357	41,141	100,391	19,219
Scales, balances, weighing beams, and strength-testing machines of all kinds	$	.....	195,464	.....	174,738

Imports of Iron and Steel Goods subject to Duty

Material.		Twelve months ending March, 1908.		Twelve months ending March, 1909.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Shafting, round, steel, in bars not exceeding 2½" diameter	Cwt.	43,387	89,428	28,322	53,747
Sheets, flat, of galvanized iron or steel	"	153,069	484,585	128,002	388,885
Sheets, iron or steel, corrugated, galvanized	"	2,812	9,456	1,328	3,891
Sheets, iron or steel, corrugated, not galvanized	"	522	2,084	244	753
Skates of all kinds, roller or other, and parts thereof	Pairs.	114,340	94,616	92,005	49,164
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.	704,709	1,201,942	685,341	925,417
Steel billets, N.O.P	"	32,681	48,672	24,638	31,869
Stoves of all kinds, for coal, wood, oil, spirits, or gas	$	.....	469,881	.....	355,786
Stove urns of metal, and dovetails, chaplets, and hinge tubes of tin for use in the manufacture of stoves	"	.....	16,267	.....	14,753
Switches, frogs, crossings, and intersections for railways	Cwt.	28,692	143,781	17,582	74,527
Tubing:—					
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4" diameter, N.O.P.	$	.....	371,795	.....	245,238
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4" and less in diameter, N.O.P.	"	.....	321,982	.....	212,283
Seamless steel tubing, valued at not less than 3½ cents per lb	Cwt.	5,331	29,942	4,102	24,237
Rolled or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements	$	.....	7,884	.....	4,636
Iron or steel pipe or tubing, plain or galvanized, riveted, corrugated or otherwise specially manufactured, including lockjoint pipe, N.O.P.	"	.....	221,140	.....	167,803
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	.....	16,850
Ware—Agate, granite, or enamelled iron or steel ware	"	.....	113,407	.....	122,418
Ware—Iron or steel hollow ware, plain black or coated, N.O.P., and nickel and aluminium kitchen or household hollow ware	"	.....	34,217	.....	20,908
Wire bale ties	Bundles of 250 ties	629	685	4,541	5,635
Wire bound wooden pipe, N.O.P.		.....	29	.....	.....

Wire cloth or woven wire and netting of iron or steel	Lbs.	1,559,650	85,769	1,376,974	74,422
Wire, crucible cast steel, valued at not less than 6 cents per lb	"	146,064	23,689	77,410	14,964
Wire screens, doors, and windows	$	.....	7,377	.....	5,864
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.	1,969,592	57,924	1,363,438	45,513
Wire, single or several, covered with cotton, linen, silk, rubber, or other material, including cable so covered	"	2,237,772	442,416	1,674,448	277,662
Wire of iron and steel all kinds, N.O.P	"	11,099,983	310,090	4,723,315	136,628
Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire, and wire cables, N.O.P	"	5,503,924	408,945	3,146,825	225,675
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.	48,555	199,218	23,962	88,248
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	"	656,501	506,698	220,444	140,875
Penknives, jack-knives, and pocket knives of all kinds	$	.....	131,597	.....	102,973
Knives and forks of steel, plated or not, N.O.P	$	.....	318,820	.....	167,175
All other cutlery, N.O.P	"	.....	496,726	.....	357,603
Guns, rifles including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other firearms	"	.....	630,449	.....	446,911
Bayonets, swords, fencing foils, and masks	"	.....	4,583	.....	7,680
Needles of any material or kind, N.O.P	"	.....	95,343	.....	69,460
Steel, chrome steel	Cwt.	4,871	21,785	3,057	13,947
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		269,118	415,686	265,356	370,650
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	17,089	25,022
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 pound	"	74,796	494,585	41,848	268,662
Steel balls adapted for use in bearings of machinery and vehicles	$	.....	13,718		11,474
Steel wool	Cwt.	387	1,584	208	2,025
Tools and implements—					
Adzes, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs and track tools, picks, mattocks and eyes or poles for the same	$	.....	76,797	.....	47,575
Axes	Doz.	5,730	35,383	4,392	26,597
Saws	$	.....	181,750	.....	73,058
Files and rasps, N.O.P	"	.....	87,046	.....	76,581
Tools, hand or machine, of all kinds, N.O.P	"	.....	1,017,391	.....	682,014
Knife blades or blanks, and table forks of iron and steel, in the rough, not handled, filed, ground or otherwise manufactured	"	.....	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	"	.....	3,980,631	.....	3,324,920
Totals		.....	51,485,456	.....	33,083,397

Imports of Iron and Steel Goods free of Duty.

Material.		Twelve months ending March, 1908.		Twelve months ending March, 1909.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Anchors for vessels	Cwt.	7,067	24,488	5,914	22,528
Chain, malleable sprocket or link belting	$	.....	185,416	.....	153,893
Cream separators, and steel bowls for	"	.....	448,569	.....	547,990
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	"	.....	136,476	.....	212,172
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	.....	23,229
Iron or steel rods not less than $\frac{5}{16}$" diameter for manufacturing of chain	Cwt.	.....	.....	10,740	14,510
Iron or steel, rolled round wire rods, in the coil, not over $\frac{3}{8}$" diameter, when imported by wire manufacturers for use in making wire in the coil in their own factories	"	197,247	295,122	406,241	538,378
Boiler plate of iron or steel not less than 30" width, and not less than $\frac{1}{4}$" thickness, for use exclusively in the manufacture of boilers	"	262,819	460,423	160,273	244,476
Flat galvanized iron or steel sheets	"	281,850	942,880	221,224	697,466
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	39,000	264,739
Rolled iron or steel sheets in strips, polished or not, 14 gauge and thinner, N.O.P.	"	376,944	960,765	292,219	647,232
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.	"	22,230	47,878	11,775	20,059
Iron tubing for manufacture of extension rods for windows	$	.....	.....	.....	3,441
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	Cwt.	173,520	302,351	162,532	257,783
Locomotive and car wheel tires of steel in the rough	"	148,525	341,727	105,882	274,722
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	"	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	$		1,060,945		520,787	
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		13,410	
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	"		415,930		269,407	
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	"		165,638		61,380	
Briquette making machines	"		10,130		702	
Newspaper printing presses, of not less value by retail than $1,500 each, of a class or kind not made in Canada	No.	90	361,278	60	172,384	85
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	$		5,678		4,938	
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	"		15,148		14,720	
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	"		25,804		12,317	
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.	69,851	207,966	60,183	144,288	
Steel balls adapted for use on bearings on machinery, and vehicles	$		4,409		2,326	
Steel, rolled, for saws and straw cutters not tempered, or ground, nor further manufactured than cut to shape without indented edges	Cwt.	18,115	158,379	12,097	96,305	
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	"	188	871	28	109	
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	"	9,294	24,202	6,421	15,565	
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	"	11,433	49,779	12,033	50,726	

Imports of Iron and Steel Goods free of Duty.

Material.		Twelve months ending March, 1908.		Twelve months ending March, 1909.	
		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	"	208	1,228	.....	5
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	"	3,765	24,631	4,094	26,495
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	"	1,520	4,245	1,631	4,385
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	"	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.	969	706	906	774
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	18,520	39,002
Steel seamless tubing valued at not less than 3½ cents per pound	"	1,000	10,465	330	2,233
Steel or iron tubes, rolled, not joined or welded, not more than 1⅞″ diameter, N.O.P.	$	.....	10,423	.....	7,181
Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine boilers	"	.....	655,203	.....	415,068
Barbed fencing wire of iron or steel	Cwt.	241,520	572,766	231,627	567,236
Wire, crucible cast steel, valued at not less than 6 cents per lb.	Lbs.	14,340	2,765	10,588	1,830
Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge	Cwt.	608,039	1,341,416	399,506	858,129
Wire, steel, valued at not less than 2¾ cents per pound when imported by manufacturers of rope for use exclusively in the manufacture of rope	"	35,460	142,467	22,120	85,714
Totals		.....	10,334,242	.....	7,310,034

LEAD.

The production of lead in Canada in 1909 was entirely from British Columbia mines.

Hitherto the statistics given have been those collected and published by the Provincial Mineralogist for that Province. The figures given for 1909 are, however, based on direct smelter returns, and the quantities represent the amount of lead exported in base bullion or refined in Canada, and shipped as pig lead or manufactured products, and thus represent the actual recovery.

The production for 1909 shows an increase over 1908, the total amount being 45,857,424 pounds, against 43,195,733 for the previous year.

In valuing the lead production for 1909, the average price per pound at Toronto has been used in place of the average price at New York. The price at Toronto is lower than that at New York and higher than that at London, and is probably a more equitable valuation to place upon the Canadian production. The New York market is practically closed to Canadian lead by high tariff, and to the London market price must be added the freight, etc., to reach the Canadian market.

Statistics showing the lead production since 1887 are given in the following table:—

LEAD.—TABLE 1.

Annual Production.

Calendar Year.	Lbs.	Price per Lb.	Value.	Calendar Year.	Lbs.	Price per Lb.	Value.
		Cts.	$			Cts.	$
1887.....	204,800	4·500	9,216	1899.....	21,862,436	4·470	977,250
1888.....	674,500	4·420	29,812	1900.....	63,169,821	4·370	2,760,521
1889.....	165,100	3·930	6,488	1901.....	51,900,958	4·334	2,249,387
1890.....	105,000	4·480	4,704	1902.....	22,956,381	4·069	934,095
1891.....	88,665	4·350	3,857	1903.....	18,139,283	4·237	768,562
1892.....	808,420	4·090	33,064	1904..	37,531,244	4·309	1,617,221
1893.....	2,135,023	3·730	79,636	1905	56,864,915	4·707	2,676,632
1894.....	5,703,222	3·290	187,636	1906	54,608,217	5·657	3,089,187
1895.....	16,461,794	3·230	531,716	1907.....	47,738,703	5·325	2,542,086
1896.....	24,199,977	2·980	721,159	1908.	43,195,733	4·200	1,814,221
1897.....	39,018,219	3·580	1,396,853	1909.....	45,857,424	3·690	1,692,139
1898.....	31,915,319	3·780	1,206,399				

Previous to 1904, lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces and exported in the form of base bullion, to be refined abroad. A lead refinery employing the Bett's Electrolytic process is now operated at Trail, B.C., in connexion with the smelter there, and has witnessed frequent enlargements, until it is now treating the base bullion produced from

the treatment of practically all the British Columbia lead ores, by the Trail smelter. Pig lead, fine gold, fine silver, refined antimony, copper sulphate, and babbitt metal, are produced at the refinery, and lead pipe also is manufactured there.

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
1909	41,883,614

The refined lead finds a market in Canada, the United States, and the Orient. Of that in Canada, a great part is consumed in the manufacture of white lead, for which the Trail product is especially valuable on account of its purity. The Carter White Lead Company of Canada, with works at Montreal, uses Trail lead exclusively.

Prices.—The average price of lead in the New York market during 1907 was 5·325 cents per pound; in 1908 it fell to 4·200 cents, a decrease of 1·125 cents or 21·1 per cent, and in 1909 it rose to 4·273 cents, an increase of 0·073 cents or 1·7 per cent.

In British Columbia, payments for the lead in ores purchased by the smelters are made on the basis of the London market price, since it is on that basis that bounty payments are made, and in competition with that market that the products are sold.

The price of lead in London averages from ½ to 2 cents per pound lower than in New York.

The average price for soft lead in 1909 was £13 1s 8d (equivalent to 2·803 cents per pound) per long ton, as compared with £13 10s 5d (2·897 cents per pound) in 1908, and £19 1s 10d (4·090 cents per pound) in 1907.

In Toronto and Montreal lead is sold at a price intermediate between the New York and London values, the average price per pound in Toronto in 1909 being quoted as 3·690 cents per pound, as compared with 3·894 cents per pound in 1908 and 5·429 cents per pound in 1907.

The monthly and yearly average prices of lead in New York, London, and Toronto for the past ten years are given in the following tables:—

Average Monthly Prices of Lead in New York—in cents per pound.

Month.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
January	4·68	4·35	4·000	4·075	4·347	4·552	5·600	6·000	3·691	4·175
February	4·68	4·35	4.075	4·075	4·375	4·450	5·464	6·000	3·725	4·018
March	4·68	4·35	4·075	4·442	4·475	4·470	5·350	6·000	3·838	3·986
April	4·68	4·35	4·075	4·567	4·475	4·500	5·404	6·000	3·993	4·168
May	4·18	4·35	4·075	4·325	4·423	4·500	5·685	6·000	4·253	4·287
June	3·90	4·35	4·075	4.210	4·196	4·500	5·750	5·760	4·466	4·350
July	4·03	4·35	4·075	4·075	4·192	4·524	5·750	5·288	4·447	4·321
August	4·25	4·35	4·075	4·075	4·111	4·665	5·750	5·250	4·580	4·363
September	4·35	4·35	4·075	4·243	4·200	4·850	5·750	4·813	4·515	4·342
October	4·35	4·35	4·075	4·375	4·200	4·850	5·750	4·750	4·351	4·341
November	4·58	4·35	4·075	4·218	4·200	5·200	5·750	4·376	4·330	4·370
December	4·35	4·15	4·075	4·162	4·600	5·422	5·900	3·658	4·213	4·560
Average	4·37	4·33	4·069	4·237	4·309	4·707	5·657	5·325	4·200	4·273

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 1900 to 1909, as follows:—

Average Monthly Prices of Lead in London—£ per long ton.

Month.	1900.			1901.			1902.			1903.			1904.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	16	5	11	15	18	6	10	11	4	11	6	1	11	11	2
February	16	10	10	14	13	4	11	12	4	11	14	2	11	11	10
March	16	12	3	13	7	7	11	10	2	13	4	6	12	—	9
April	16	14	8	12	8	5	11	11	11	12	8	1	12	5	1
May	16	18	—	12	5	6	11	12	—	11	16	—	11	15	11
June	17	4	6	12	6	10	11	5	5	11	8	9	11	10	5
July	17	10	8	12	3	—	11	4	8	11	7	8	11	13	4
August	17	12	8	11	13	10	11	2	5	11	2	11	11	14	9
September	17	13	4	11	19	1	10	17	10	11	3	4	11	15	9
October	17	11	11	11	12	—	10	14	11	11	2	2	12	3	9
November	17	4	7	11	5	4	10	14	4	11	2	2	12	17	10
December	16	4	8	10	10	8	10	15	1	11	3	7	12	15	6
Yearly average	16	19	9	12	10	5	11	5	3	11	11	7	11	19	8

Month.	1905.			1906.			1907.			1908.			1909.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	12	17	6	16	17	6	19	16	8	14	10	6	13	3	6
February	12	9	3	16	0	4	19	11	6	14	5	6	13	5	5
March	12	5	11	15	17	9	19	14	7	14	1	4	13	8	8½
April	12	13	2	15	16	6	19	16	4	13	13	10	13	7	—
May	12	15	3	16	13	6	19	17	7	13	2	7	13	5	3
June	13	—	—	16	15	6	20	6	—	12	15	7	13	2	4
July	13	12	2	16	11	7	20	8	2	12	19	6	12	13	3
August	13	19	2	17	1	3	19	5	3	13	9	10½	12	10	6
September	13	19	—	18	4	4	19	17	6	13	3	6	12	15	3
October	14	13	7	19	7	9	18	13	—	13	7	3	13	4	4
November	15	6	9	19	5	6	17	4	11	13	12	2	13	1	4½
December	17	1	—	19	12	6	14	9	4	13	3	6	13	2	11½
Yearly average	13	14	5	17	7	—	19	1	10	13	10	5	13	1	8

Price of Pig Lead at Toronto—cents per pound on the first market day of each month.

Month.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
January	4·875	4·875	3·625	3·500	3·300	3·600	4·800	5·400	4·250	3·750
February	4·875	4·875	3·625	3·500	3·300	3·800	4·800	5·400	4·500	3·800
March	4·875	4·875	3·625	3·500	3·300	3·550	4·800	5·875	4·125	3·750
April	5·625	4·875	3·625	3·500	3·300	3·625	4·400	5·550	4·000	3·750
May	5·125	4·375	3·625	3·500	3·300	3·800	4·400	5·550	4·000	3·750
June	5·125	4·375	3·625	3·500	3·250	3·800	4·400	5·450	3·750	3·650
July	5·125	4·375	3·625	3·500	3·250	3·800	4·500	5·550	3·600	3·650
August	5·125	4·375	3·625	3·500	3·250	4·000	4·350	5·500	3·600	3·600
September	5·125	4·375	3·500	3·500	3·250	4·000	4·600	5·250	3·600	3·600
October	5·125	4·125	3·250	3·500	3·500	4·000	4·950	5·500	3·750	3·650
November	5·125	4·250	3·500	3·375	3·500	4·100	5·500	5·500	3·750	3·650
December	4·875	4·125	3·500	3·300	3·600	4·100	5·250	4·625	3·800	3·700
Average	5·083	4·489	3·562	3·473	3·342	3·848	4·727	5·429	3·894	3·690

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 pounds, 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.

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 1910.

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	" 31, 1910	340,542
" 30, 1904	195,627		
" 30, 1905	330,645	Total	1,471,819

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 1909, was 17,528,028 pounds valued at $493,642, as compared with 18,454,594 pounds valued at $622,454 in 1908.

Details of exports 1907 to 1909 are as follows:—

Exports of Lead 1907, 1908, and 1909.

	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
1909				
To United States	6,096,852	126,478	280	8
To other countries	129,216	6,100	11,301,680	361,056
Totals	6,226,068	132,578	11,301,960	361,064

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	1892		2,509
1874		127	1893		3,099
1875		7,510	1894	5,792,700	144,509
1876		66	1895	23,075,892	435,071
1877		720	1896	26,480,320	462,095
1878			1897	43,802,697	925,144
1879		230	1898	37,375,678	885,485
1880			1899	15,799,518	466,950
1881			1900	57,642,029	1,917,690
1882		32	1901	45,590,995	1,804,687
1883		5	1902	17,761,484	457,170
1884		36	1903	18,624,303	426,466
1885			1904	25,868,823	559,461
1886			1905	41,657,403	1,016,541
1887		724	1906	21,436,022	736,007
1888		18	1907	25,591,883	1,029,898
1889		18	1908	18,454,594	622,454
1890			1909	17,528,028	493,642
1891		5,000			

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 1908 and 1909, and calendar year 1909, were as follows:—

	1908 (Fiscal).		1909 (Fiscal).		1909 (Calendar).	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
Old, scrap, pig, and block	3,196	284,604	2,506	151,173	5,649	184,572
Bars and sheets	862	76,186	688	46,093	671	44,073
Pipe	125	11,783	157	8,844	71	4,884
Shot and bullets	11	1,221	5	482	5	489
Manufactures of lead	.....	112,287	.....	94,506	.....	102,370
Tea lead	1,081	118,635	1,168	109,335	1,113	116,461
Litharge	952	90,785	606	43,597	852	58,100
Total	6,227	694,501	5,130	454,030	7,822	454,030
Metallic lead contained in imported lead pigments	3,111	.....	1,874	.....	1,514	.....
	9,338	.....	7,004	.....	9,336	.....

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
1909	50,110	151,173	13,754	46,093	63,864	197,266

* 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	1909	213,167

Note—In this table the following items are included under the heading of manufactures, viz., pipe, shot and bullets, tea-lead and manufactures N.O.P.

LEAD.—TABLE 5.

Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		$			$			$
1880	3,041	14,334	1890	9,453	31,401	1900	9,139	29,176
1881	6,126	22,129	1891	7,979	27,613	1901	11,132	51,944
1882	4,900	16,651	1892	10,384	34,343	1902	13,002	47,021
1883	1,532	6,173	1893	7,685	24,401	1903	13,921	47,761
1884	5,235	18,132	1894	38,547	28,685	1904	9,894	32,633
1885	4,990	16,156	1895	11,955	32,953	1905	17,865	57,736
1886	4,928	16,003	1896	10,710	32,817	1906	10,165	39,836
1887	6,397	21,865	1897	12,028	34,538	1907	11,311	49,183
1888	7,010	23,808	1898	11,446	32,904	1908 Duty free	19,052	90,785
1889	8,089	31,082	1899	9,530	32 518	1909	12,117	43,597

The production of refined lead, as already shown, was, in 1909, 20,942 tons; while the exports of pig lead were 5,859 tons, leaving 15,283 tons as the consumption of Canadian lead. The imports of lead during the calendar year 1909 are shown above to have been 9,336 tons, not including certain manufactures of lead valued at $102,370, so that the total consumption of lead in 1909 probably exceeded 25,000 tons.

The imports of white and red lead and orange mineral in 1909 amounted to 3,936,608 pounds, valued at $153,913. In 1903 the imports were 19,208,786 pounds, the falling off being due to the establishment of corroding works at Montreal. Detailed statistics of imports of lead pigments in 1908 and 1909 are as follows, the statistics of imports since 1885 being shown in Table 6.

Imports of White and Red Lead in 1908 and 1909.

——	1908 (Fiscal Year).		1909 (Fiscal Year).		1909 (Calendar Year)	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Lead, white dry	6,115,739	$ 328,768	2,972,431	$114,433	2,690,575	$95,894
Lead, white ground in oil	513,179	28,443	481,317	21,810	730,001	32,678
Lead, red, dry and orange mineral	1,201,942	63,326	1,233,668	59,015	516,032	25,341
	7,830,860	420,537	4,687,416	195,258	3,936,608	153,913

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	1898	12,682,808	448,659
1886	6,703,077	213,258	1899	14,507,945	514,842
1887	6,998,820	233,725	1900	14,679,920	634,492
1888	6,361,334	216,654	1901	10,241,601	461,368
1889	7,066,465	267,236	1902	15,584,164	603,582
1890	10,859,672	381,959	1903	19,208,786	758,371
1891	8,560,615	337,407	1904	16,925,585	662,098
1892	10,288,766	351,686	1905	17,376,588	638,381
1893	10,865,183	364,680	1906	10,412,891	417,444
1894	10,958,170	353,053	1907 (9 months)	5,956,626	290,629
1895	8,780,052	282,353	1908	7,830,860	420,537
1896	11,711,496	367,569	1909	4,687,416	195,258
1897	10,310,463	347,539			

Nova Scotia.

Two companies have been engaged during the year in prospecting and doing development work for argentiferous galena, namely, The King Edward Exploration, Smelting, Refining, and Milling Company of Cape Breton, Limited, at rear of Boisdale, county of Cape Breton, and Bessie Dunbrack et al. near Musquodoboit in the county of Halifax. With regard to the former it is stated that the de-

posit so far opened in this shaft is from 2 to 7 feet in width, and in places shows much galena. The deposit is at the contact of the Carboniferous limestone with the conglomerate at the Musquodoboit property. At the present time work is being confined to a shaft 100 feet in depth sunk during the year on a pegmatite dike 3 to 7 feet in width, the course of which is nearly north and south, and dipping to the east at an angle of from 60 to 70 degrees. The dike, in addition to galena, carries chalcopyrite and malachite.

Ontario.

There was no production of lead reported from Ontario in 1909. The Canadian Lead Mining and Smelting Company, Limited, have not as yet done any work on their proposed smelter at Kingston.

British Columbia.

As already stated all the production in 1909 was from British Columbia mines, and there was a distinct increase over the previous year as shown by Table 7, following:—

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	1899....	21,862,436	977,250	4·470
1888.....	674,500	29,813	4·42	1900....	63,158,621	2,760,031	4·370
1889.....	165,100	6,488	3·93	1901....	51,582,906	2,235,603	4·334
1890.....	Nil.	.....	.....	1902....	22,536,381	917,005	4·069
1891.....	"	.....	.....	1903....	18,089,283	766,443	4·237
1892.....	808,420	33,064	4·09	1904....	36,646,244	1,579,086	4·309
1893.....	2,131,092	79,490	3·73	1905....	56,580,703	2,663,254	4·707
1894.....	5,703,222	187,636	3·29	1906....	52,408,217	2,964,733	5·657
1895.....	16,461,794	531,716	3·23	1907....	47,738,703	2,542,086	5·325
1896.....	24,199,977	721,159	2·98	1908....	43,195,733	1,814,221	4·200
1897.....	38,841,135	1,390,513	3·58	1909....	45,857,424	1,692,139	3.690
1898.....	31,693,559	1,198,017	3·780				

LEAD.—TABLE 8.

British Columbia:—Production by Districts.[1]

—-	1905.	1906.	1907.	1908.	1909.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar	5,500	.....	.....	.....	.....
East Kootenay—					
Fort Steele	48,248,828	44,487,481	37,526,194	30,204,788	27,004,528
Other districts	149,584	167,691	73,842	358,270	18,724
West Kootenay—					
Ainsworth	1,002,114	3,173,353	3,654,775	4,790,216	10,298,343
Nelson	1,368,388	1,034,553	1,582,113	345,424	1,097,069
Slocan	5,399,330	2,975,674	4,305,826	6,572,268	4,976,199
Other districts	339,883	469,000	570,534	903,552	979,916
Yale	67,076	100,465	25,419	21,215	21,567
	56,580,703	52,408,217	47,738,703	43,195,733	44,396,346

[1] From the Report of the Minister of Mines, B.C., 1909.

The increase in production was largely due to the operation of the Blue Bell mine in Ainsworth district, West Kootenay, which, next to the St. Eugene, was the most important producer of lead for the year. The renewal of and increase in the bounty had a noticeable effect in aiding the lower grade mines and removing the uncertainty with which the prospect of the continuance of the bounty on lead was regarded. In East Kootenay, the St. Eugene and the North Star produced the greater part of the ore. At the close of the year the announcement was made of the acquirement of a bond on the Sullivan mine at Kimberly by the Consolidated Mining and Smelting Company of Canada, Limited, the owners of the St. Eugene mine and the Trail smelter. This mine is one of the larger low grade properties, and has been worked with varying success in previous years, the ore being of a very complex and refractory nature.

In West Kootenay, the shippers of over 1,000 tons of ore or concentrates were the Blue Bell, Whitewater, Whitewater Deep, Van Roi, Richmond-Eureka, Silver Cup, and Emerald, the working of the Blue Bell being of special interest owing to the low grade of the ore.

In the Portland Canal district, no shipments are yet reported, but there are several mines in various stages of development, some of which may enter the list of shippers within the year.

NICKEL.

The mining and metallurgical treatment of the nickel-copper ores of the Sudbury district of Ontario has become one of the most important of Canada's metal mining industries, and special interest is attached to this industry because of the fact that these deposits at the present time supply a very large portion of the world's demand for nickel, and also because the present known available supplies of ore in the district appear to be sufficient for many years' operations. Additional interest is now lent to these ores by the discovery of the valuable properties possessed by the new alloy of nickel and copper recently introduced to commerce under the name of monel metal, of which some particulars were given in last year's report.

These nickel-copper ore deposits have already been the subject of special reports by the Geological Survey at Ottawa, and the Ontario Bureau of Mines at Toronto,[1] to which reference may be made for comprehensive descriptions of the geology of the district.

The production of ore and its reduction to a bessemer matte was carried on during 1909 to a greater extent than in any previous year. There were mined during the year 451,892 tons of ore, much of which is subjected to open air heap roasting before being smelted. There were smelted 462,336 tons, from which were produced 25,845 tons of Bessemer matte, carrying approximately 13,141 tons of nickel and 7,873 tons of copper. The net value of the matte was returned as $3,913,017. The matte, which is shipped to the United States and Great Britain for refining, carries from 77 to 82 per cent of the combined metals, having averaged for the past year 50·9 per cent in nickel and 30·5 per cent in copper.

For the production of monel metal a special matte is produced with contents of 22 per cent copper and 58 per cent nickel. There were about 2,800 tons of this matte produced during the past year, which is included in the total given above. Monel metal is produced from this special matte without the intermediate refining of either the nickel or copper.

Compared with 1908, there was an increase in matte production in 1909 of 4,648 tons or 21·9 per cent, and the increase in total nickel content of matte was 3,569 tons or 37·3 per cent. The total copper content of matte was 7,873 tons, an increase of 370 tons or 4·9 per cent over the previous year.

The following were the aggregate results of the operations on the nickel-copper deposits of Ontario during the past four years:—

[1] No. 873. Report on Nickel and Copper Deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey of Canada, 1901.

The Sudbury Nickel Region, by A. P. Coleman, Bureau of Mines, Vol. XIV, part III, 1904.

	1906. Tons of 2,000 lbs.	1907. Tons of 2,000 lbs.	1908. Tons of 2,000 lbs.	1909. Tons of 2,000 lbs.
Ore mined	343,814	351,916	409,551	451,892
Ore smelted	340,059	359,076	360,180	462,336
Bessemer matte produced	20,364	22,041	21,197	25,845
" " shipped	20,310	22,025	21,210	.....
Copper content of matte shipped	5,265	6,996	7,503	7,873
Nickel " "	10,745	10,595	9,572	13,141
Spot value of matte shipped	$4,628,011	$3,289,382	$2,930,989	$3,913,017
Wages paid	1,117,420	1,278,694	1,286,265	1,234,904
Men employed	1,417	1,660	1,690	1,573

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.	1909. Lbs.
To Great Britain	2,716,892	2,518,338	2,554,486	3,843,763
To United States	17,936,953	16,857,997	16,865,407	21,772,635
	20,653,845	19,376,335	19,419,893	25,616,398

The above figures of production do not include the nickel content of the silver-cobalt ores from the Cobalt district, of which it is difficult to obtain complete statistics. The shippers of silver-cobalt ores receive no return for the nickel content, although this metal forms an important constituent of the ore and is possibly, to some extent, saved by the refiners. Preparations have been made by the Coniagas Reduction Company at Thorold, and the Deloro Mining and Reduction Company at Deloro, for the recovery of nickel oxide, but up to the end of 1909 operations had not passed the experimental stage.

The price of refined nickel in New York during 1909 was quoted at from 40 to 50 cents per pound, the quotations in December being 'large lots, contract business 40 to 45 cents per pound, retail spot from 50 cents for 2,000 pound lots up to 55 cents for 500 pound lots. The price for electrolytic is 5 cents higher.' 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.

Statistics of the quantities of nickel contained in matte produced are shown in the following table, the values being based on the final value of the metal in a refined state.

Statistics of the quantities of ore mined and smelted, matte produced, etc., will be found in the chapter on smelter production, pages 24, and 25.

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.
		Cts.	$			Cts.	$
1889.....	*830,477	60	498,286	1900.....	7,080,227	47	3,327,707
1890.....	1,435,742	65	933,232	1901.....	9,189,047	50	4,594,523
1891.....	4,035,347	60	2,421,208	1902.....	10,693,410	47	5,025,903
1892.....	2,413,717	58	1,399,956	1903.....	12,505,510	40	5,002,204
1893	3,982,982	52	2,071,151	1904.....	10,547,883	40	4,219,153
1894.....	4,907,430	38⅛	1,870,958	1905.....	18,876,315	40	7,550,526
1895.....	3,888,525	35	1,360,984	1906.....	21,490,955	42	8,948,834
1896.	3,397,113	35	1,188,990	1907.....	21,189,793	45	9,535,407
1897...	3,997,647	35	1,399,176	1908...	19,143,111	43	8,231,538
1898.....	5,517,690	33	1,820,838	1909.....	26,282,991	36	9,461,877
1899.....	5,744,000	36	2,067,840				

*Calculated from shipments made by rail.

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

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

The Mond Nickel Company, 'Victoria Mines, Ont., and London, England.'

Reference has already been made to the occurrence of nickel as one of the minor constituents of the silver ores of the Cobalt district. The quantity of nickel contained in the ores shipped from this district has been estimated by the Ontario Bureau of Mines as follows:—

Year.	Ore shipped.	Nickel content.
	Tons.	Tons.
1904.....	158	14
1905.....	2,144	75
1906.....	5,335	160
1907.....	14,788	370
1908.....	25,624	612
1909.....	30,677	766

A large portion of these ores, particularly the high grade, is now being reduced at Copper Cliff, Thorold, and Deloro. At each of these plants silver bullion and white arsenic are being recovered. The residues or speiss resulting from these operations and carrying values in silver, cobalt, and nickel are either exported or reserved for future treatment. Cobalt oxide and nickel oxide have both been produced in small quantities at Thorold and preparations have been made for their recovery at Deloro. The residues above mentioned, produced in 1908, were reported as 1,326 tons containing 363,140 pounds of nickel; and in 1909, 2,660 tons containing 758,966 pounds of nickel.

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			1909	25,616,398	2,676,483

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			1909	46,581

The only other important producer of nickel ore outside of 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.[1]

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	108,000
1901	133,814	1905	125,289		

[1] Statistique de l'Industrie Minérale en France et en Algérie, Paris.

The nickel ore of New Caledonia carries about 6½ per cent of nickel. The actual output in 1909 is reported as not less than 120,000 tons,[1] while stocks on hand on December 31, 1909, are reported by the same authority as not less than 122,000 tons.

(1) Report of British Acting Consul at Noumea, New Caledonia, as quoted in Engineering and Mining Journal.

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.	1902	1903	1904	1905	1906	1907	1908	1909
United States of North America, and Canada	4,700	5,100	6,000	4,500	6,500	6,500	6,000	9,000
England	1,300	1,700	2,200	3,100	3,200	3,200	2,800	2,800
Germany (1)	1,600	1,600	2,000	2,700	2,800	2,600	2,600	3,100
France	1,100	1,500	1,800	2,200	1,800	1,800	1,400	1,200
Total production (2)	8,700	9,900	12,000	12,500	14,300	14,100	12,800	16,100

(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	1900	3·00	32·4
1890	4·50	48·6	1901	2·90 – 3·20	31·3 – 34·6
1891	4·50	48·6	1902	2·90 – 3.50	31·3 – 37·8
1892	4·50	48·6	1903	3·00 – 3·75	32·4 – 40·5
1893	3·80	41·0	1904	3·00 – 3·75	32·4 – 40·5
1894	3·60	38·9	1905	3·00 – 3·75	32·4 – 40·5
1895	2·60	28·1	1906	3·00 – 4·00	32·4 – 43·2
1896	2·50	27·0	1907	3·20 – 3·75	34·6 – 40·5
1897	2·50	27·0	1908	3·00 – 3·50	32·4 – 37·8
1898	2·50	27·0	1909	3·00 – 3·50	32·4 – 37·8
1899	2·50	27·0			

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

SILVER.

Owing to the rapid development of the Cobalt silver camp in Ontario during the past four 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 in 1909, including that produced as bullion and the metal estimated as recovered from ores sent to smelters or otherwise treated, was reported as 27,529,473 fine ounces, which, compared with a production of 22,106,233 ounces in 1908, shows an increase of 5,423,240 ounces or 24·5 per cent. The average value per ounce of fine silver in 1909, according to New York quotations, was 51·503 cents per ounce; as compared with an average value of 52·864 cents in 1908, a decrease of about 2·6 per cent. The total value of the silver production in 1909 was $14,178,504, an increase of $2,492,265 or 21 per cent over the value, $11,686,239, in 1908.

A comparison of the production of 1908 and 1907 shows an increase in 1908 of 9,326,434 ounces or 73 per cent in quantity, and $3,337,580 or 40 per cent in value, the average price in 1908 having decreased about 24 per cent from 1907.

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

SILVER.—TABLE 1.

Annual Production, 1887-1909.

Year.	Ozs.	Value.	Average price per oz.	Year.	Ozs.	Value.	Average price per oz.
		$	Cts.			$	Cts.
1887	355,083	347,271	98·00	1899	3,411,644	2,032,658	59·58
1888	437,232	410,998	94 00	1900	4,468,225	2,740,362	61·33
1889	383,318	358,785	93·60	1901	5,539,192	3,265,354	58·95
1890	400,687	419,118	104·60	1902	4,291,317	2,238,351	52·16
1891	414,523	409,549	98·00	1903	3,198,581	1,709,642	53·45
1892	310,651	272,130	86·00	1904	3,577,526	2,047,095	57·22
1893	.....	330,128	77·00	1905	6,000,023	3,621,133	60·35
1894	847,697	534,049	63·00	1906	8,473,379	5,659,455	66·79
1895	1,578,275	1,030,299	65·28	1907	12,779,799	8,348,659	65·33
1896	3,205,343	2,149,503	67·06	1908	22,106,233	11,686,239	52·86
1897	5,558,446	3,323,395	59·79	1909	27,529.473	14,178,504	51·50
1898	4,452,333	2,593,929	58·26				

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 four years to $14,178,504 in 1909 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 1909 the proportion obtained from Ontario was 90·2 per cent and was practically all from the Cobalt district, the contribution of British Columbia being 9·5 per cent.

Statistics of the annual production in each of the Provinces are separately shown in Table 2.

SILVER.—TABLE 2.

Production by Provinces, 1887-1909.

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	3,958,175	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
1909	24,822099	12,784,126	13,233	6,815	2,649,141	1,364,387	45,000	23,176

The average price of fine silver in New York during 1909 varied between a maximum of 52·9 cents per ounce in May and a minimum of 50·1 cents per ounce in March, the average being 51·503 cents per ounce.

In London, the average price of silver in 1909 was 23·726 pence per standard ounce of a fineness of 0·925. For the year 1908 the average price per fine ounce in New York was 52·864 cents, the highest being 56 cents in February and the lowest 48·7 cents in December of that year.

The average monthly prices of silver in New York from 1904 to 1909 and in London during 1909, are shown in tabulated form below:—

Average Monthly Prices of Silver.

Months.	New York.—Cents per fine ounce.					London.—Pence per Standard ounce (a)
	1905.	1906.	1907.	1908.	1909.	1909.
January	60·690	65·288	68·673	55·678	51·750	23·834
February	61·023	66·108	68·835	56·000	51·472	23·706
March	58·046	64·597	67·519	55·365	50·468	23·227
April	56·600	64·765	65·462	54·505	51·428	23·708
May	57·832	66·976	65·981	52·795	52·905	24·343
June	58·428	65·394	67·090	53·663	52·538	24·166
July	58·915	65·105	68·144	53·115	51·043	23·519
August	60·259	65·949	68·745	51·683	51·125	23·588
September	61·695	67·927	67·792	51·720	51·449	23·743
October	62·034	69·523	62·435	51·431	50·923	23·502
November	63·849	70·813	58·677	49·647	50·703	23·351
December	64·850	69·050	54·565	48·769	52·226	24·030
Average for the year	60·352	66·791	65·327	52·864	51·503	23·726

(a) 925 parts fine.

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 Company 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 has been as follows:—

Year.	Fine Ozs.	Year.	Fine Ozs.
1904	551,450	1908	1,956,039
1905	1,088,328	1909	2,003,003
1906	1,263,809		
1907	1,631,422	Total	8,494,351

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

The Canadian Copper Company, at Copper Cliff, Ont.

The Deloro Mining and Reduction Company, at Deloro, Ont.

The Coniagas Reduction Company, at Thorold, Ont.

Silver bullion of fineness varying from 850 to 998·2 is produced at the 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 either shipped to the United States or held in re-

serve 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; in 1908, 11,168,689 fine ounces; and in 1909, 14,385,985 fine ounces. About 52 per cent of the total production of 1909 was, therefore, recovered in Canada as fine metal or as silver bullion.

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 $12,000,000 in 1909. Not only does it contribute 90 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.

According to returns received by this Department, there were shipped during 1909, 27,835 tons of ore and 3,059 tons of concentrates, or a total tonnage of 30,894 tons, having a value of $13,002,275, besides silver bullion carrying 143,440 fine ounces of silver.

The silver content of ore shipped was estimated as 22,349,717 ounces or an average of 803 ounces per ton, and of the concentrates shipped 3,627,819 ounces or an average of 1,186 ounces per ton; the total silver content of ore, concentrates, and bullion shipped from the mines being 26,120,976 ounces. The mine owners receive payment for only 93 to 98 per cent of the silver content, and in estimating and valuing the production, a deduction of 5 per cent is made from silver contained in ore and concentrates to cover losses in smelting and refining. On this basis the silver recovery is estimated at 24,822,099 ounces and valued at $12,784,126. Payments for cobalt content were reported as $94,609.

In 1908, the total shipments, including ore and concentrates, were 25,682 tons containing 19,398,545 ounces of silver, and in 1907, 14,644 tons were reported as shipped containing 9,982,363 ounces of silver.

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 Ore and Bullion Shipments from Cobalt Mines, 1904-1909.

Year.	Shipments.		Silver Content.		Silver in Ounces. per Ton.		Silver Bullion Shipments. Fine Ounces.	Total value of Silver.
	Ore. Tons.	Concentrate. Tons.	Ore. Ounces.	Concentrate. Ounces.	Ore.	Concentrate.		
								$
1904....	158	.....	206,875	.....	1,309	.....	.....	118,376
1905....	2,144	.....	2,451,356	.....	1,143	.....	.....	1,473,192
1906....	5,335	.....	5,401,766	.....	1,013	.....	.....	3,607,394
1907....	14,644	.....	9,982,363	.....	682	.....	.....	6,521,178
1908....	25,682	*	19,398,545	*	755	*	.....	10,254,847
1909....	27,835	3,059	22,349,717	3,627,819	803	1,186	143,440	12,784,126

* Included with ore.

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.

With respect to the content of the nickel, cobalt, and arsenic ores, the mining companies are paid for only a small portion of the cobalt content and nothing for the nickel and arsenic; in fact, in certain cases, the latter two are penalized.[1]

The total nickel content of these ores, as estimated by the Ontario Bureau of Mines, is shown in the next table. The figures for ore shipments and silver content while not identical, agree very closely with those given in the previous table.

Total Production Cobalt Mines, 1904-1909.*

Year.	Ore and Concentrate shipped.	Metallic Content.			
		Nickel.	Cobalt.	Arsenic.	Silver.
	Tons.	Tons.	Tons.	Tons.	Ounces.
1904.....	158	14	16	72	206,875
1905.....	2,144	75	118	549	2,451,356
1906.....	5,335	160	321	1,440	5,401,766
1907.....	14,788	370	739	2,958	10,023,311
1908.....	25,624	612	1,224	3,672	19,437,875
1909.....	30,677	766	1,533	4,294	25,897,825
Totals	78,726	1,997	3,951	12,895	63,419,008

* As per Ontario Bureau of Mines.

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.

[1] See Schedule of Ore Purchasing Companies.

While the greater number of the operating companies hold unrestricted titles to their properties, several (nine in number) are operating on a royalty basis on mining lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. Arthur A. Cole, Mining Engineer to the Timiskaming and Northern Ontario 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 tables and extracts have been freely drawn:—

Ore Shipments from the Cobalt District for the Years 1904 to 1909.

	Mine.	1904.	1905.	1906.	1907.	1908.	1909.	Totals.
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1	Bailey	...	...	30·00	...	88·80	36·85	155·65
2	Beaver	...	...	...	...	...	51·38	51·38
3	Buffalo	...	200·80	992·80	1,241·54	536·90	648·86	3,620·90
4	Casey-Cobalt	...	...	...	...	10·00	8·50	18·50
5	Chambers-Ferland	...	...	...	...	223·89	517·88	741·77
6	City of Cobalt	...	...	...	50·61	761·04	566·82	1,378·47
7	Cobalt Central	...	...	...	77·33	187·99	339·01	604·33
8	Cobalt Lake	...	...	...	...	225·97	95·47	321·44
9	Cobalt Townsite	...	...	...	143·22	177·71	27·35	348·28
10	Colonial	...	...	15·00	40·38	...	...	55·38
11	Coniagas	...	30·60	422·02	2,447·37	616·25	806·93	4,317·17
12	Crown Reserve	...	...	...	...	657·35	3,167·52	3,824·87
13	Drummond	0·50	32·15	274·70	104·13	1,161·38	1,225·47	2,798·33
14	Foster	...	83·85	117·00	312·13	191·20	113·90	818·08
15	Green Meehan	...	...	37·03	98·39	...	...	135·42
16	Imperial Cobalt	...	...	...	14·61	...	...	14·61
17	Kerr Lake	...	54·95	158·35	319·76	660·24	1,173·42	2,366·72
18	King Edward (Watts)	...	19·00	...	31·12	338·19	146·58	534·89
19	La Rose	60·05	607·86	854·61	2,815·45	4,843·17	6,757·21	15,938·35
20	Lawson	...	14·61	...	61·12	...	...	75·73
21	McKinley-Darragh	20·00	447·09	80·45	742·42	1,808·39	1,056·49	4,154·84
22	Nancy Helen	...	...	...	30·10	201·32	116·32	347·74
23	Nipissing	57·00	486·02	2,125·08	2,538·26	3,571·96	6,470·52	15,248·84
24	Nova Scotia	...	...	43·95	272·21	237·95	224·79	778·90
25	North Cobalt	...	...	...	...	...	6·87	6·87
26	O'Brien	...	26·32	114·18	1,491·61	3,459·51	1,419·11	6,510·73
27	Peterson Lake (Leases)	...	...	...	...	...	...	...
	(Litt. Nipis'g)	...	...	...	...	40·67	39·62	80·29
	(N. Scotia)	...	...	...	...	...	121·15	121·15
28	Provincial	...	...	...	...	75·84	...	75·84
29	Princess	...	...	...	3·93	...	...	3·93
30	Red Rock	...	...	...	45·71	...	...	45·71
31	Right of Way	...	...	46·25	129·37	750·04	1,608·99	2,534·65
32	Silver Bar	...	...	...	...	0·58	...	0·58
33	Silver Cliff	...	...	...	...	160·44	149·96	309·50
34	Silver Leaf	...	9·00	...	46·36	197·03	...	252·39
35	Silver Queen	...	44·63	130·94	478·57	885·70	316·64	1,856·58
36	Timiskaming	...	...	...	204·32	795·20	852·14	1,851·66
37	Timiskaming Cobalt	...	...	20·47	67·98	...	...	88·45
38	Timiskaming and Hudson Bay	...	...	...	149·53	1,094·23	743·64	1,987·40
39	Trethewey	21·00	218·58	198·48	833·58	1,408·69	1,134·50	3,814·83
40	University	...	16·00	155·28	60·23	...	...	231·51
41	Victoria	...	...	...	...	0·47	...	0·47
42	Violet	...	16·00	20·00	...	...	...	36·00
43	White Silver Mining Co	...	28·45	...	...	...	...	28·45
	Totals	158·55	2,336·01	5,836·59	14,851·34	25,362·10	29,942·99	78,487·58

Shipments from the Cobalt District for the Calendar Year 1909.

Mine.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.
1 Bailey	36·85												36·85
2 Beaver											25·65	25·73	51·38
3 Buffalo	29·20	58·39	72·60	43·02	42·90	71·18	46·32	63·45	60·30	55·40	55·25	49·85	648·86
4 Casey-Cobalt			8·50										8·50
5 Chambers-Ferland	65·16	26 10	155·05	59·20	29·60	62·30	90·32	30·15					517·88
6 City of Cobalt	103·95	93·83	93·81	53·83		57·90	32·00	52·00		28·80	20·45	30·25	566·82
7 Cobalt Central		19·81	17·63	37·70	29·87	45·46	39·44	40·20	20·15	45·30		43·45	339·01
8 Cobalt Lake							39·68		30·69			25·10	95·47
9 Cobalt Townsite												27·35	27·35
10 Coniagas	54·15	65·93	91·23	57·66	64·85	61·83	72·26	76·71	86·88	101·03	43·00	31·35	806·93
11 Crown Reserve	143·71	362·24	231·46	207·69	279·69	259·97	337·76	250·32	309·80	274·13	167·35	343·40	3,167·52
12 Drummond						499·46			171·05		249·47	305·49	1,225·47
13 Foster										93·90		†20·00	113·90
14 Kerr Lake	30·69	73·33	88·72	62·45	162·03	152·15	91·44	91·79	80·26	90·56	91·05	158·95	1,173·42
15 King Edward	28·45		29·70		21·90		21·28				24·00	21·25	146·58
16 La Rose	603·76	487·97	457·08	736·62	585·72	309·20	568·28	420·70	624·81	717·33	629·23	616·51	6,757.21
17 McKinley-Darragh	110·49	45·39	56·48	61·87	80·73	118·45	89·71	111·09	106·48	92·85	119·65	63·30	1,056·49
18 Nancy Helen	21·95				21·70			28·97	20·65			23·05	116·32
19 Nipissing	461·95	426 88	675·74	392·09	518·48	1,013·72	447·97	578·56	352·62	440·28	482·25	678·98	6,470·52
20 Nova Scotia	190·54		34·25										224·79
21 North Cobalt											6·87		6·87
22 O'Brien	30·90	31·45	99·04	127·44	126·59	157·67	127·92	137·70	196·20	158·32	161·43	64·45	1,419·11
23 Peterson Lake (leases)													
(Little Nipissing)							19·62	20·00					39·62
(Nova Scotia)	41·05		25·45		32·35				22·30				121·15
24 Right of Way	156·46	152·52	91·71	319·48	165·46	141·65	61·66	102·72	120·84	62·09	100·45	133·95	1,608·99
25 Silver Cliff							30·41	32·05	30·60	29·00		27·00	149·06
26 Silver Queen		35·57		31·45		63·84		142·56		43·22			316·64
27 Timiskaming	97·72	88·03	56·44	125·16	139·04	115·90	50·60	30·00	29·50	30·00	59·60	30·15	852·14
‡28 Timiskaming and Hudson Bay	168·00	32·07	114·17	60·25	92·65	62·45	94·00				29·85	90·20	743·64
29 Trethewey	34·07	138·02	117·73	123·88	97·22	94·65	64·43	33·00	122·35	94·13	139·00	76·02	1,134·50
Totals	2,409·05	2,137·53	2,516·79	2,499·79	2,491·78	3,287·78	2,325·01	2,241·97	2,385·48	2,356·39	2,404·55	2,886·78	29,942·99

† Shipped by Argentum Lease. ‡ Now the Hudson Bay Mines.

The ore produced during 1907, 1908, and 1909 was shipped to the following countries for treatment:—

Country.	1907.		1908.		1909.	
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.
Canada	2,585·05	17·40	7,401·14	29·18	10,230·64	34·47
Great Britain	167·34	1·13	222·08	0·88	30·25	0·10
Germany			299·46	1·18	106·51	0·35
United States	12,098·95	81·47	17,439·42	68·76	19,575·59	65·08
Total	14,851·34	100·00	25,362·10	100·00	29,942·99	100·00

Almost all the ore treated in Canada has been high grade, so that while the tonnage in 1909 was about 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:—

'Milling and wet concentration have now become a well established feature of the Cobalt camp. There are now nine mills operating in this district with a maximum daily capacity of 850 tons, while four more are under construction which will add another 400 tons when running full. The following is a list of these mills with their respective daily capacities under full load:—

	Mill.	Capacity in Tons.
1	Buffalo	150
2	Cobalt Central (Standard Cobalt)	100–110
3	Colonial	50
4	Coniagas	90
5	King Edward	36
6	McKinley-Darragh	120–140
7	Nipissing Reduction	75
8	Northern Customs	140
9	O'Brien	90
	Under Construction—	
10	Nova Scotia	100
11	Silver Cliff	125
12	Timiskaming	75–80
13	Trethewey	100

The following is a statement of the concentration tonnage for the camp during 1909:—

Concentration in Cobalt for 1909.

Mill.	Mines.	Ore milled.	Concentrates.	Concentration.
		Tons.	Tons.	Ratio.
Buffalo	Buffalo	27,875·0	507·00	55-1
Cobalt Central	Bailey	2,482·0	36·24	68-1
	Cobalt Central	21,272·0	362·40	59-1
	Crown Reserve	45·0	1·02	44-1
	Foster	547·0	10·20	54-1
	Kerr Lake	1,093·0	104·79	10-1
Coniagas	Coniagas	19,671·4	465·70	42-1
Colonial	Colonial	1,500·0	25·00	60-1
King Edward	King Edward	4,769·6	105·43	45-1
McKinley-Darragh	McKinley-Darragh	18,703·0	741·59	25-1
Nipissing Reduction Co	Nipissing	9,597·0	229·00	49-1
	Cobalt Lake	301·9	60·00	5-1
Northern Customs Concentrator	City of Cobalt	2,576 3	57 01	45-1
	La Rose	5,988·2	255·62	23-1
	Nancy Helen	284·9	5·87	49-1
	Nova Scotia	1,173·1	39·71	30-1
	Right of Way	1,289·7	28·22	46-1
	Silver Queen	2,371·9	132·68	18-1
	Trethewey	1,130·8	17·02	66-1
O'Brien	O'Brien	3,749·5	57·00	†.....
	Totals	126,421·3	3,241·50	*39-1

† No comparative ratio can be stated for O'Brien, as all low grade concentrates were cyanided and yielded 12,656 ounces, which were shipped as bullion.
* The O'Brien is omitted from this ratio.

The mines without mills do a certain amount of concentration by hand picking, etc., and in the case of the Crown Reserve and Hudson Bay mines, coarse jigging is employed.

The Buffalo Mining Company is now operating the cyanide part of the mill, and at the O'Brien mill, cyaniding is one of the principal features. As a result of this, these Companies ship out a certain amount of silver bullion as well as raw concentrates.

A certain amount of ore was treated by wet concentration by the Montreal Reduction and Smelting Company of Canada, at Trout Mills.

The following are the rates offered by the customs mills in the camp, for treating ores.

Northern Customs Concentrator, Limited.

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

20	to	35	ounces	silver	pay	50 per cent.
35	"	50	"	"		55 "
50	"	70	"	"		60 "
70	"	90	"	"		65 "
90	"	110	"	"		70 "
110	"	125	"	"		75 "

Ore will also be treated on a tonnage basis of $4 per ton, ore to be delivered at the mill and concentrates delivered to owners, in their sacks, dried and loaded on cars.

The Standard Cobalt Mines, Limited—(Cobalt Central).

Makes the following schedule for milling ore:—

Ore in dumps running 30 ounces or better, 50 per cent of the product from concentration.

Ore	60	ounces and under	80	ounces	.....	55	per cent of product.
"	80	" "	100	"	.....	63	"
"	100	" "	125	"	.....	70	"
"	125	" "	150	"	.....	77	"
"	150	" "	200	"	.....	82	"
"	200	" "	250	"	.....	85	"

The above Company pays all charges for hauling and milling of ore, and will deliver at its mill the percentage of product due the mine furnishing the ore.

The *Nipissing Reduction Company* has not at present a fixed tariff for treating ore, but varies the rates to suit conditions and the nature of the ore.

The Montreal Reduction and Smelting Company of Canada, at Trout Mills, Ont., treated ores by wet concentration on the following schedule, after the first of June, 1909.

Settlement to be made on the thirtieth day after agreement upon the assays and at the New York quotation price of silver on the day of settlement.

Ores to be delivered f.o.b. at Trout Mills. Charge of treatment $5 per ton.

Grade.			Percentage of assay paid.
Over	30	ounces.....	75 per cent.
"	70	"	76 "
"	80	"	78 "
"	90	"	80 "
"	100	"	82 "
"	110	"	83 "
"	120	"	84 "
"	130	"	85 "
"	140	"	86 "
"	150	"	87 "
"	180 to 200	.....	88 "

Power and Labour.—The cost of power generation from coal in the camp is necessarily high, even in the most economical plants. In some plants it will run over $175 per annum, and the average price will likely be over $150.

With this high cost of power production it was only natural that the great water powers in the vicinity of Cobalt should not be long unharnessed, and now three companies are installing plants and expect to be delivering power in Cobalt early in 1910. These Companies are:—

Cobalt Hydraulic Power Company, Ragged chutes, Montreal river.
Cobalt Power Company, Hound chute, Montreal river.
Mines Power, Limited, Metabetchouan river.

Standard wages in Cobalt camp during 1909 were as follows[1]:—

Surface labourers	$2.25 per day.
Drill runners	3.25 "
Drill helpers	2.75 "
Mine labourers	2.50
Mill men	2.25-3.25
Mechanics	2.75-3.25
Mechanics helpers	2.25-2.75

Day's work consists of 9 hours in mine, 9½ on surface, 12 in mill.

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

'The ores produced in the Cobalt district were shipped for treatment during 1909 to the following smelting companies:—

American Smelting and Refining Company, New York, U.S.A.
Balbach Smelting and Refining Company, Newark, N.J., U.S.A.
Beer, Soudheimer and Company, Frankfort-on-Main, Germany.
Canadian Copper Company, Copper Cliff, Ont., Canada.
Coniagas Reduction Company of Canada, St. Catharines, Ont., Canada.
Deloro Mining and Reduction Company, Deloro, Ont., Canada.
Pennsylvania Smelting Company, Pittsburgh, Pa., U.S.A.
Quirk, Barton and Company, London, England.
United States Metals Refining Company, New York, U.S.A.

The Montreal Reduction and Smelting Company of Canada, with works at Trout Mills, Ont., also received some low grade ore from Cobalt, but this was treated by water concentration, as this Company has not yet commenced smelting operations.

American Smelting and Refining Company, New York, U.S.A.

This Company received both high and low grade ores from Cobalt, the former being treated at the Company's works at Perth Amboy, N.J., and most of the latter at Denver, Colorado.

The following schedule is offered:—

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

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

Treatment Charge.—$8 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.

[1] From the Annual Report of the McKinley-Darragh.

Silver.—Payment for 94 per cent of the silver content at the New York quotations.

Treatment Charge.—$8 per ton of 2,000 pounds, dry weight.

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 content at the New York quotations.

Treatment Charge.—$7 per ton of 2,000 pounds, dry weight.

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 $9.20 per ton, and from Cobalt to Denver $12 per ton.

Balbach Smelting and Refining Company, Newark, N.J., U.S.A.

This Company is buying high grade silver ore from Cobalt at the following rates. Pay for ores thirty days after agreement of assays and at the silver quotations on date of payment.

Penalties.—Forty-five cents for each per cent of arsenic in excess of six per cent, and 6 cents for each per cent of insoluble in excess of iron.

Ores over 1,000 ounces to 1,500 ounces, pay for 93½ per cent of the silver content and a smelting charge of $4 per ton of ore, with penalties as above.

Ores above 1,500 ounces to 2,000 ounces, pay for 93½ per cent of the silver content and a smelting charge of $20 per ton of ore, with penalties as above.

Ores over 2,000 ounces silver per ton, pay for 93½ per cent of the silver content and a smelting charge of $19 per ton of ore, with penalties as above.

Beer, Sondheimer and Company, Frankfort-on-Main, Germany, and New York.

High grade silver ore is bought for this Company as follows:—

Pay for 94 to 95 per cent of the silver content.

Smelting charge $30 per ton.

No refining charge.

Ore to be delivered at New York.

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	per cent 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 "

Purchaser to make payment of:—

$10	per ton of ore (2,000 lbs.)	when same	contains 6	per cent 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 content is greater than the cobalt content. Further, purchaser reserves the right to return, at shipper's expense, any such ores (*i.e.* nickel content higher than cobalt content) 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 its 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 pounds. 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.

No payment will be made for cobalt in ores containing less than 6 per cent cobalt, nor in which the nickel content is higher than the cobalt content.

Further, purchaser reserves the right to return at shipper's expense, any such ores (*i.e.* nickel content higher than cobalt content) received at Copper Cliff.

Ore to be delivered to seller at 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 the same has been taken into its sampler.

Purchaser to sample at its expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux and Company, New York, at seller's expense, which assays are to govern in settlement. Payment for 70 per cent of the silver returnable to the seller, as per the above scale, to be made at the New York official price of silver on the first settlement date, which shall be 90 days after sampling of 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 its 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 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 returnable to the shipper, on ore running from 100 to 200 ounces per ton of 2,000 pounds. This is to be considered as a penalty clause and to apply only 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.

All purchasers of these ores are made strictly subject to the following *force majeure* agreement:—

'If by reason of the Acts of God, strikes or other causes beyond the control of either parties hereto, which may legally be called *force majeure,* either of these shall be unable to carry out the conditions of this agreement as to shipment, receipt or treatment of consignments, this agreement shall be suspended as long as this condition shall continue, and the term of this agreement shall then be extended for such a period as shall be equivalent to the time of delay or interruption.'

Further, this clause shall also cover unavoidable and extraordinary delays should they occur when the speiss or silver bullion resultant from the smelting and treatment of these ores is in transit between the Copper Cliff and Camden plants of the purchaser and between either of the above plants and the silver refinery of the Balbach Smelting Company, Newark, N.J., U.S.A.

The Coniagas Reduction Company, Limited, St. Catharines, Ont.

The above Company will purchase cobalt and silver ores on the following schedule:—

Will pay for:—

70	per cent of silver content	assaying over	20 ozs.	and up to 200 ozs. per ton.
84	"	"	200 ozs.	per ton.
86	"	"	300	"
89	"	"	500	"
91	"	"	750	"
93	"	"	1,000	"
93½	"	"	1,500	"
94½	"	"	2,000	"
95	"	"	3,000	"

Ores containing less than 100 ounces per ton of ore subject to a treatment charge of $10 per ton of 2,000 pounds unless the ore contains 12 per cent or over of nickel and cobalt combined.

Terms of Payment for Silver.—Seventy-five per cent of the net proceeds at New York quotations, 30 days after completion of sampling.

Twenty-five per cent of net proceeds at New York quotations, 90 days after completion of sampling.

Cobalt.—

Pay 8	cents per pound of	cobalt when	ores assay	6 per cent or more.
" 10	"	"	8	"
" 12	"	"	10	"

No payment for cobalt when ore assays less than 6 per cent.

Payment for cobalt to be made ninety days after completion of sampling, which will be carried out without unnecessary delay on receipt of the ore. Ore to be delivered f.o.b. Thorold Smelter, via Grand Trunk railway, in carload lots. Ore to be at shipper's risk until sampling is undertaken. Sampling at Coniagas Reduction Company's works at buyer's expense. Sellers to have representatives present during sampling and weighing. Weights to be taken after milling. All purchasers of these ores are made strictly subject to the following *force majeure* agreement:—

'If by reason of the Acts of God, strikes, lockouts, combination by or amongst workmen for their own ends, fire, accidents to or derangement of, the Company's motive power, plant or any part thereof, or any cause or causes beyond its control, delay shall happen in the receipt or treatment of consignments, the terms of payments above specified shall be extended for such period as may be equivalent to the time consumed by such delay or interruption.'

Above terms subject to change without notice.

Deloro Mining and Reduction Company, Deloro, Ont.

Tariff on cobalt silver ores and concentrates:—

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

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

Terms of Payment.—Seventy-five 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 ores 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 and 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 car-load 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, U.S.A.

The Pennsylvania Smelting Company buys ores from Cobalt ranging from 50 ounces to 500 ounces per ton on the following schedule:—

Silver.—Pay for 90 per cent, less one cent per ounce.

Treatment Charge.—$8 per ton. Settling price, average for 20 days following date of arrival. No payment for cobalt or nickel. In some cases arsenic is penalized.

Special contract prices, a little more advantageous to the shipper, are offered for the entire output of the mine, or for a definite tonnage. This Company is also coming into the market for high grade ores.

Quirk, Barton, and Company, London, England.

A contract was made for the buying of a limited amount of cobalt ores from one of the mines of Cobalt, but this was of a private nature, hence no general schedule has been issued. At the present time they are not in the market, as the contract they have takes all their capacity.

United States Metals Refining Company, New York. Works at Chrome, N.J.

The silver ores from Cobalt that are being purchased by this Company are comparatively low grade, the richest containing 400 ounces silver per ton. No regular schedule is published, but the prices vary with the character of the ore purchased.'

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:—

Coniagas Mines Limited, year ending October 31, 1909.

'During the past year your mine has been operated day and night except Sunday without interruption, with an average force of 118 men.'

Shipments October 31, 1908, to October 31, 1909:—

Ore, 350 tons containing 807,253 ounces silver.
Concentrates, 426 tons containing 599,975 ounces silver.
Total, 776 tons containing 1,407,228 ounces silver.

'A contract has been entered into with the Cobalt Hydraulic Power Company, Limited, for a supply of compressed air for mining operations at a price that will materially reduce the cost of power. It is expected the power will be available in two or three months.'

The Coniagas Mines Limited owns the issued capital stock of the Coniagas Reduction Company, Limited, except six shares issued to Directors to qualify.

Buffalo Mines Limited, year ending April 30, 1910.

Shipments: Ore.—During the year 30 cars of ore were shipped, containing 654 tons of concentrates from the mill, and 115½ tons of high grade ore direct from the mine, making a total of 769½ tons of ore and concentrates shipped. The smelter returns from these shipments amounted to 1,386,323 ounces, of which, approximately, 1,026,800 ounces were contained in the concentrates and 359,523 ounces in the ore, or an average of 1,570 ounces per ton in the concentrates and an average of 3,126 ounces per ton in the ore.

Bullion.—In addition to this there were shipped 4,286 pounds of silver bullion, the smelter returns from which amounted to 54,479 ounces of fine silver.

There were also on hand on April 30, ready for shipment, 2 tons of high grade ore containing 4,466 ounces, 3½ tons of jig concentrates containing 7,018 ounces, and 10 tons of table concentrates containing 6,038 ounces, also 999 pounds of metallics containing 10,197 ounces, and 1,602 pounds of cyanide precipitates containing 23,229 ounces, or a total of 50,948 ounces on hand, making a total production for the year of 1,491,750 ounces.

Plant.—The capacity of the milling plant has been brought up during the year from 90 tons to 130 tons per day, and at present we are making preparations to increase the capacity to 160 tons per day. The cyanide plant has a capacity of from 30 to 40 tons per day.'

Crown Reserve Mining Company, Limited, year ending December 31, 1909.

Shipments.

Total Production.

Total Shipments 1909.	Weight (Lbs.)	Ozs. Silver.	Gross Value.	Freight and Treatment.	Net Value.
			$	$	$
High grade	1,513,895	3,622,029	1,867,509 22	126,609 83	1,740,899 39
Low grade	4,664,578	346,085	176,820 64	55,190 26	121,630 38
Bullion, ozs	76,152	66,211	35,826 22	2,871 07	32,955 15
Total	3,093 tons	4,034,325	2,080,156 08	184,671 16	1,895,484 92

Average Value of Ore.

—	Ounces per ton.	Value per ton.
		$
High grade	4,784·7	2,466 96
Low grade	184·4	75 81
Average	1,304·6	672 66

Bullion..... .... 0·869 fine.

Cost of Ore, 1909.

Smelter charges and deductions	$184,671 16
Ore handling and marketing	39,984 31
Mining and development	97,717 74
Power and light	29,826 67
Maintenance building, plant, and equipment	13,664 10
Mine, general expenses	19,389 31
Superintendence and travelling	12,332 00
Head office expenses	4,225 46
Depreciation at 20 per cent. on B. F. and E.	14,330 15
Total	$416,140 90
New buildings, plant, and equipment	$65,403 26

Total cost of silver per ounce, 10·31 cents.

Kerr Lake Mining Company, year ending August 31, 1910.

'The production for the year amounted to 3,046,295 ounces. Of this 2,451,384 ounces were produced from the high grade ore (average contents per ton 3,775 ounces) and 594,911 ounces from second grade ore and screenings.

The costs of production per ounce are as follows:—

Mining cost	7·54 cents
Shipment and treatment charges	2·29 "
Metal deductions	2·71 "
Administration and general	0·73 "
Total	13·27 cents

La Rose Consolidated Mines Company, year ending May 31, 1910.

Class.	Dry Tons.	Net Value per ton.	Gross Ozs. Silver.	Net Value.	Per cent of total Net Value.
		$		$	
Silver-cobalt-nickel ore	1,876·566	577 19	2,218,070·22	1,083,144 75	75·12
Low grade siliceous ore	3,878·235	48 54	519,073·06	188,257 62	13·05
Concentrates	599·104	305 08	363,300·65	170,571 72	11·83
Total	6,313 905	228 38	3,100,443·93	1,441,974 09	100·00

Average Assay of Shipments.

—	Ozs. Silver per ton.	Per cent Cobalt.	Per cent Nickel.
Silver-cobalt-nickel ore	1,181·98	8·71	7·99
Low grade siliceous ore	133·84	.....	.....
Concentrates	649·79	7·10	6·36
Average of Total	491 05	.....	.....

Summary of Shipments for Year ending May 31, 1910.

Dry tons shipped	6,313·905
Gross ounces silver contained	3,100,443·93
Gross silver value	1,620,341·31
Average price received per ounce—cents	52·261
Received from sales of cobalt	29,698·11
Gross silver value plus cobalt paid for	$1,650,039 42
Smelter deduction, freight, and treatment	208,065·33
Net value received from ore sales	$1,441,974 09

Cost of Producing Silver.

——		Per Ton Shipping Ore.	Per Oz. Silver.
Mine operation	$ 448,153 60	$ 70 76	0·1414
Concentration	61,351 54	9 69	0·0193
Depreciation	9,414 48	1 49	0·0030
Marketing ore	216,936 13	34 25	0·0684
Corporation and travelling expenses	2,261 63	0 36	0·0007
	$ 738,117 38	$ 116 55	0·2328
Operation University mine	9,885 92	1 56	0·0031
	$ 748,003 30	$ 118 11	0·2359
Less rents	10,160 93	1 61	0·0032
Total cost of production	$ 737,842 37	$ 116 50	0·2327

Nipissing Mines Company, year ending December 31, 1909.

Shipments in 1909.

——	Dry Tons.	Net Value Per Ton.	Gross Ozs. Silver.	Net Value.	Per Cent of Total Value.
High grade ore	1,047·6925	$ 1,518 17	3,241,259·39	$ 1,590,578 14	73·0
Low grade siliceous ores	5,174·196	84 88	1,098,166·93	439,226 56	20·2
Concentrates	183·074	400 73	156,606·74	73,364 05	3·4
Nuggets	7·6295	9,844 94	150,843·80	75,112 03	3·4
Total	6,412·592	$ 339 68	4,646,876·86	$ 2,178,280 78	100 00

Average Assay of Shipments.

——	Ozs. Silver Per Ton.	Cobalt Per Cent.	Nickel Per Cent.	Arsenic Per Cent.
High grade ore	3,093·71	8·46	6·98	40·93
Low grade siliceous ore	212·23			
Concentrates	855·42	8·32	3·78	
Nuggets	19,771·12			
Average of Total	724·64			

Summary of Shipments, 1909.

Dry tons shipped	6,412·592
Gross ounces silver contained	4,646,876·86
Gross silver value	$ 2,395,430 13
Average price received per ounce—cents	51·547
Cobalt paid for—pounds	177·706
Received from sales of cobalt	$ 19,832 91
Nickel paid for—pounds	117
Received from sales of nickel	$ 14·04
Gross silver value plus cobalt and nickel paid for	$ 2,415,277·08
Smelter deduction, freight, and treatment	$ 236,996·30
Net value received from ore sales	$ 2,178,280·78

Cost of Producing Silver.

——	—	Per Ton Ore.	Per Oz. Silver.
	$	$	$
Mine operation	383,152 11	59 95	0·0811
Concentration	35,433 96	5 54	0·0075
Depreciation	49,798 84	7 79	0·0105
Marketing ore	263,223 83	41 18	0·0557
Corporation, New York Office and travelling expenses	12,483 13	1 95	0·0026
	744,091 87	116 41	0·1574
Less miscellaneous income, rent, and interest	40,320 16	6 30	0·0085
	703,771 71	110 11	0·1489
Shafts and tunnels account charged to operation	71,039 18	11 11	0·0150
Total cost of production	774,810 89	121 22	0·1639

McKinley-Darragh-Savage Mines of Cobalt, Limited, Calendar Year 1909.

The following table shows the classification of ore shipped and smelter charges:—

——	Shipment Tons.	Silver Content Ounces.	Gross Value.	Total Smelter Charges.	Net Return.
McKinley-Darragh.			$		
Nuggets	0 673	13,305·60	6,861 26	348 46	6,512 80
No. 1 ore	135·172	494,981·59	253,047 90	19,415 89	233,632 01
Jig concentrates	178·124	386,149·13	198,561 81	17,193 65	181,368 16
Sand concentrates	276·402	264,476·12	135,961 75	14,242 91	121,718 84
Slime "	235·025	70,212·09	36,170 35	7,057 43	29,112 92
Miscellaneous	122·002	36,380·84	18,552 26	3,377 92	15,174 34
Total	947·398	1,265,505·37	649,155 33	61,636 26	587,519 07
Savage.					
No. 1 ore	23·658	51,890·91	26,822 03	2,288 03	24,534 00
Screenings	65·170	7,512·61	3,835 70	1,623 30	2,212 40
Total	88·828	59,403·52	30,657 73	3,911 33	26,746 40
Grand Total	1,036·226	1,324,908·89	679,813 06	65,547 59	614,265 47

Average Value of Shipments.

No. 1 ore	3,662·44	ozs. per ton.
Jig concentrates	2,176·04	" "
Sand "	957·85	" "
Slime "	294·03	" "

Timiskaming Mining Company, Limited, year ending January 31, 1910

Summary of Ore Shipped.

Grade.	Gross Weight at Mine.	Average Assay ozs. per ton.	Total.	Treatment and Freight.			Net Value Received.
				Recovery Discount.	Treatment	Freight.	
	Tons.		Ounces.	$	$	$	$
First	239·47	2,450·0	587,317	14,435 13	11,016 23	3,312 25	276,133 81
Second	383·93	198·0	76,042	1,913 66	2,199 13	5,285 14	30,653 22
Low grade	156·05	48·5	7,571	908 01	1,043 24	531 50	1,471 62
	779·45	861·5	670,930	17,256 80	14,258 60	9,128 89	308,258 65
						Cobalt sales	1,856 50
						Total receipts	310,115 15

Summary of Production Cost.

Ounces produced and shipped	670,930
Ounces produced, including milling ore	1,171,910

—	Total.	Cost per ounce shipped.	Cost per ounce produced.
	$		
Mining, prospecting, and developing	109,639 29	16·4	9·5
Power	41,014 63	6·1	3·6
Repairs to machinery and plant	4,974 84	0·7	0·4
Stable cost	1,590 53	0·2	0·1
Sorting and crushing	10,357 72	1·6	0·9
Smelting cost	23,387 49	3·5	1·8
General charges	40,344 69	6·0	3·4
Total cost of silver produced	231,309 19	34·5	19·7

British Columbia.

The chief sources of the silver production in this Province are the silver-lead ores of the East and West Kootenay, supplemented by the silver contained in the gold-copper-silver ores of Rossland, the Boundary, and the Coast districts. The production in 1909, based on smelter recoveries, was 2,649,141 ounces, valued at $1,364,387.

As usual the St. Eugene was the premier silver producer, followed among the silver-lead mines by the Whitewater Group, Richmond-Eureka, Van Roi, and Rambler Cariboo in the order named.

The Granby mines at Phoenix would, on account of their large tonnage of copper ores low in silver, come second as silver producers, with the others above mentioned maintaining their relative positions.

About 98 per cent of the total silver was produced from ores in which it was associated with lead, the remainder being obtained from copper-silver ores. The Slocan district, including the Ainsworth, Slocan, Slocan City, and Trout Lake Mining divisions, produced about 50 per cent of the total provincial output in 1909, and the Fort Steele Mining division about 23 per cent, all from argentiferous galena.

The following table is taken from the Annual Report of the Minister of Mines for British Columbia, 1909:—

SILVER.—TABLE 3.

Production in British Columbia by Districts, 1905-1909.[1]

	1905.	1906.	1907.	1908.	1909.
	Ounces.	Ounces.	Ounces.	Ounces.	Ounces.
Cassiar	477	26	2,291	14,169	4,593
Kootenay East—					
Fort Steele division	1,137,872	1,049,536	821,367	641,855	580,240
Other divisions	16,880	22,174	3,955	3,384	825
Kootenay West—					
Ainsworth division	99,781	165,915	301,322	314,142	352,555
Nelson "	116,729	211,122	236,837	25,067	75,908
Slocan "	1,045,948	571,613	590,998	848,595	738,175
Trail Creek "	147,753	126,174	126,661	129,558	80,026
Other divisions	121,551	79,262	122,232	173,675	169,435
Yale—					
Osoyoos	630,407	671,661	469,206	451,323	492,333
Yale	3,863	1,034	223	23	
Coast and other districts	118,156	91,745	70,356	29,598	38,676
Totals	3,439,417	2,990,262	2,745,448	2,631,389	2,532,642

* From the Minister of Mines Reports, British Columbia.

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 obtained in each five ounces of crude bullion. In 1908 about 41,000 ounces are credited to the placers and 22,000 ounces to the concentrates shipped from the Windy Arm district. In 1909 the production was 45,000 ounces of silver, valued at $23,176, all from the placer mines. The mines at Windy Arm were mainly engaged in development work. About 591 tons of ore were shipped during the year from the Venus and Big Thing mines, but no record of silver content was obtained.

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	1909	15,719,909

ZINC.

The production of zinc ore in Canada in 1909, as obtained by direct returns from the producers, was 18,371 tons valued at $242,699, the greater part of which was from British Columbia.

The zinc content of these shipments was returned as 16,468,204 pounds, which, if valued at the average New York prices of spelter during the year at 5·503 cents, would be worth $906,245.

The Richardson mine in Olden township, Frontenac county, Ontario, produced 895 tons of zinc ore and concentrates.

In the total for the year is included 7,424 tons of zinc ore produced by the Whitewater and Whitewater Deep mines in British Columbia in 1908 and previous years, but not shipped until late in 1908, and for which returns were not received in time for inclusion in that year's report. With this omission, which was noted in the report for that year, the zinc shipments from Canadian mines in 1908 were 452 tons valued at $3,215, produced by the Richardson mine, Ontario.

The electric zinc smelter at Nelson operated experimentally for a short time, but closed down and nothing further was done throughout the year. At the Blue Bell mine, Kootenay lake, magnetic concentration was experimented with, but no shipments were made.

During the early part of the year, there was much uncertainty regarding the probable outcome of the United States tariff question, but the advance in the price of ore in the United States subsequent to the adoption of the Payne tariff, has made it profitable for the Canadian mines to ship to the United States.

The present schedule of the tariff on zinc ores is as follows:—

On ores containing less than 10 per cent, free of duty.
" " 10 per cent or more, and less than 20 per cent, ¼ cent per pound.
" " 20 per cent or more, and less than 25 per cent, ½ cent per pound.
" " 25 per cent or more, 1 cent per pound.
All rates being based on the metallic content of the zinc.

Since the smelters demand over 30 per cent zinc, only the maximum rate affects Canadian ores. The zinc ore from Ontario is shipped to Europe for treatment, but the greater part of the British Columbia production goes to the United States zinc smelters, which usually pay on a basis of 45 per cent zinc content. The base price varies with the price of spelter at St. Louis, and a stated amount is added or deducted for every unit of zinc in excess of or less than the base. The silver is settled for at the New York price after making deductions for losses in treatment. Limits are frequently set which lead or lime contents may not exceed.

A typical example may be given. A certain mine is paid $20.50 per short ton for zinc concentrates carrying 45 per cent zinc, when spelter is quoted at 5 cents per pound at St. Louis. For every unit above or below 45 per cent zinc, 85 cents is added or deducted. For every increase or decrease of one cent per pound in the price of spelter at St. Louis, an increase or decrease is allowed of $7 per ton of 2,000 pounds, and proportionately for fractions thereof. In the case of the silver content, six ounces per ton are deducted and 75 per cent of the remainder paid for at the New York price. The seller pays freight, customs duty, and collection charges.

During the twenty years previous to 1900, the increase in the consumption of zinc in Canada as shown by the imports was considerable, though fluctuating, but since 1900 it has increased very steadily and rapidly. In 1880 the consumption recorded was some 744 tons, in 1889 it had risen to 1,426 tons, and remained near that point until about 1899, when the imports were 1,212 tons. Since that date, however, there has been a rapid and steady increase, the imports having risen to 4,610 tons during the fiscal year ending March 1909 and to 7,795 tons during the year ending December, 1909. It will be observed that the production in 1908 and 1909 was practically equivalent to the rate of consumption.

Statistics of the production and imports of zinc, and the average monthly prices of spelter on the New York and London markets for ten years, are given in the accompanying tables.

The imports of zinc, in blocks and sheets, and of spelter, totalled during the calendar year 1909 about 7,795 tons, valued at $791,164, in addition to about $16,073 worth of manufactures of zinc.

The following is a list of zinc producers in 1908 and 1909:—

Mine.	Locality.	Company Operating.
Whitewater	Whitewater, B. C	S.S. Fowler and associates.
Whitewater Deep	" "	" "
Lucky Jim	Kaslo, B. C	Lucky Jim Zinc Mines Ltd.
Van Roi	Silverton, B.C	Van Roi Mining Co. Ltd.
Reco	Sandon "	Reco Mining & Milling Co.
Ruth	" "	The Ruth Mines Ltd.
Long Lake	Olden Tp., Frontenac Co., Ont.	Jas. Richardson & Sons.

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	*	*
1909	†18,371	242,699	16,468,204	.....

* Figures not available.
†Includes 7,424 tons shipped late in 1908.

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	1908	30,362	191,081
1889	19,782	83,935	1899	18,785	107,477	1909 duty free	26,222	141,066

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 Duty free	55,593	314,369
1889	8,750	37,403	1899	5,450	29,687	1909	65,981	310,688

*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	1909	15,621

1909	Zinc seamless drawn tubing	Duty Free.		0
	" , manufactures of, N.O.P.	25 %		$ 15,621
	Total			$ 15,621

World's Consumption of Spelter by Countries, in 1907 and 1908, in Short Tons.[1]

Country.	1907.	1908.	Country.	1907.	1908.
Austria-Hungary	34,171	35,925	Russia	19,290	19,946
Belgium	60,627	74,936	Spain	5,180	5,290
France	76,720	85,956	United States	228,524	215,401
Germany	192,792	198,580	Other countries	13,228	11,020
Great Britain	154,653	152,627			
Holland	4,189	4,188	Totals	796,870	813,126
Italy	7,496	9,257			

[1] Mineral Resources of the United States, 1908.

World's Production of Spelter, in Short Tons.*

Country.	1904	1905	1906	1907	1908
Australia			1,131	1,098	1,198
Austria and Italy	10,192	10,315	11,883	12,522	14,063
Belgium	154,314	160,496	168,067	176,307	181,851
France and Spain	54,107	55,524	59,293	61,438	61,512
Germany—					
Rhine district	72,083	74,127	75,729	77,459	80,670
Silesia	138,538	143,243	150,282	152,611	158,328
Great Britain	50,949	56,140	57,971	61,286	60,029
Holland	14,442	15,176	16,150	16,526	19,017
Poland	11,693	8,422	10,595	10,735	9,740
United States	186,704	203,849	224,770	249,860	210,424
Total	693,022	727,292	775,871	813,842	796,832

* Mineral Resources of the United States, 1908.

Average Monthly and Yearly Prices of Spelter (ordinary brands) in London.[1]

Month.	1900			1901			1902			1903			1904		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	21	3	6	18	13	3	16	13	—	20	—	8	21	11	2
February	22	3	8	17	13	7	17	14	2	20	15	4	21	16	5
March	21	11	11	16	11	4	17	13	4	22	18	2	21	19	6
April	22	2	10	16	11	4	17	17	—	22	8	7	22	5	1
May	21	12	3	17	6	3	18	9	—	21	2	4	22	2	10
June	19	19	7	17	5	9	18	11	8	20	8	2	21	14	6
July	19	19	6	16	11	4	18	19	11	20	8	5	22	2	9
August	19	8	1	16	15	7	18	16	8	20	9	5	22	7	6
September	18	19	5	16	16	8	19	4	7	20	17	7	22	11	5
October	19	—	10	16	18	1	19	5	4	20	9	4	23	1	7
November	19	—	5	16	17	5	19	11	8	20	14	7	24	12	9
December	18	13	8	16	11	8	19	15	6	20	19	10	24	17	1
Year	20	5	6	17	0	7	18	0	11	20	19	5	22	11	10

Month.	1905			1906			1907			1908			1909		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	24	19	9	28	8	2	27	7	1	20	6	3	21	6	3
February	24	10	6	26	2	4	26	1	5	21	—	7	21	8	9
March	23	13	6	24	15	3	26	4	8	21	1	5	21	8	8
April	23	14	3	25	19	3	25	17	5	21	6	1	21	10	1
May	23	11	8	27	—	2	25	14	2	20	2	10	21	19	—
June	23	16	8	27	9	9	24	10	2	19	2	2	21	19	11
July	23	19	6	26	15	11	23	18	11	18	14	1	21	18	9
August	24	14	6	27	—	5	22	1	7	19	6	9	22	—	3
September	26	8	3	27	12	5	21	—	11	19	10	2	22	17	1
October	28	1	7	27	18	10	21	12	11	19	15	1	22	3	4
November	28	5	11	27	15	1	21	8	4	20	17	1	23	2	1
December	28	14	11	27	19	3	20	3	3	20	19	2	23	1	3
Year	25	7	7	27	1	5	23	16	9	20	3	5	22	3	—

[1] From the annual statistical publication for 1910 of the Metallgesellschaft etc. of Frankfort-on-Main, Germany.

Monthly and Yearly Average Prices of Spelter in New York, in Cents per Pound.[1]

Month.	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
January	4·65	4·13	4·27	4·865	4·863	6·190	6·487	6·732	4·513	5·141
February	4·64	4·01	4·15	5·043	4·916	6·139	6·075	6·814	4·785	4·889
March	4·60	3·91	4·28	5·349	5·057	6·067	6·209	6·837	4·665	4·757
April	4·71	3·98	4·37	5·550	5·219	5·817	6·087	6·687	4·645	4·965
May	4·53	4·04	4·47	5·639	5·031	5·434	5·997	6·441	4·608	5·124
June	4·29	3·99	4·96	5·697	4·760	5·190	6·096	6·419	4·543	5·402
July	4·28	3·95	5·27	5·662	4·873	5·396	6·006	6·072	4·485	5·402
August	4·17	3·99	5·44	5·725	4·866	5·706	6·027	5·701	4·702	5·729
September	4·11	4·08	5·49	5·686	5·046	5·887	6·216	5·236	4·769	5·796
October	4·15	4·23	5·38	5·510	5·181	6·087	6·222	5·430	4·801	6·199
November	4·29	4·29	5·18	5·038	5·513	6·145	6·375	4·925	5·059	6·381
December	4·25	4·31	4·78	4·731	5·872	6·522	6·593	4·254	5·137	6·249
Year	4·39	4·07	4·84	5·40	5·100	5·822	6·198	5·964	4·726	5·503

[1] As published in the "Engineering and Mining Journal" of New York.

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
1909	6,134,500	918,195	3,453

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.

In 1909, during the first six months of the year, the price of ingots in New York varied from 22 to 24 cents per pound, while during the last six months, quotations were from 20 to 23 cents. The price of aluminium in London, England, in December, 1909, was about 15 cents per pound.

ANTIMONY.

The total value of the production of antimony in Canada in 1909 was approximately $5,860. Some 35 tons of concentrates were produced at West Gore, Nova Scotia, and shipped to England for refining, while about 61,200 pounds of antimony metal were produced, chiefly at the new works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, and partly at the Consolidated Mining and Smelting Company's refinery at Trail, B.C. The refined metal was valued at about 7 cents a pound.

Direct returns were not received from producers of antimony ore for 1908, but the Customs returns show an export of 148 tons valued at $5,443.

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 recovered at Trail in 1907 and 1909, the recovery being somewhat irregular.

The auriferous antimony property at West Gore, Hants county, Nova Scotia, formerly operated by the Dominion Antimony Company, Limited, was in a receiver's hands during the early part of the year, but was taken over in July by the West Gore Antimony Company.

No mining was done during the year, but the 100 ton concentrating mill erected by the former owners was put in shape for operation, and a small quantity of concentrate made and shipped.

At St. George, New Brunswick, the Canadian Antimony Company, Limited, has put into operation smelting and reduction works for the treatment of the antimony ores from the Lake George mine.

The ore is treated in stack furnaces of special design, with the addition of coke for fuel. The percentage of coke used varies from 5 per cent to 10 per cent, according to the nature of the ore. The oxide is condensed in chambers and assays from 73 per cent to 80 per cent metallic antimony. The two furnaces in the sublimation plant will treat from nine to ten tons each per day of 24 hours.

The oxide is reduced to metal in a reverberatory furnace with the addition of charcoal and fluxes. This furnace has a capacity of from two to three tons of metal per day of 24 hours.

Annual Shipments 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.	1909*	35	1,575

(a) As recorded by the Nova Scotia Department of Mines; no value given.
(b) Exports.
* In addition to the shipments shown in the table, refined antimony was produced in 1907 to the extent of 63,850 pounds valued at $5,108, and in 1909, 61,207 pounds valued at $4,285.

Exports of Antimony Ores.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1880	40	1,948	1898	1,232	15,295
1881	34	3,308	1899	6¾	190
1882	323	11,673	1900	210	3,441
1883	165	4,200	1901	10	1,643
1884	483	17,875	1902	90	13,658
1885	758	36,250	1903	33	4,332
1886	665	31,490	1904	160	7,237
1887	229	9,720	1905	525	27,118
1888	352½	6,894	1906	420	17,064
1889	30	695	1907	1,327	37,807
1890	38	1,000	1908	148	5,443
1891	3½	60	1909	4	120
1892 to 1897	Nil.	Nil.			

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	89,787	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	1909	444,254	32,133

		Duty.		
1909	Antimony, or regulus of, not ground, pulverized or otherwise manufactured	Free.	405,231	28,482
	Antimony salts	"	39,023	3,651
	Total		444,254	32,133

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 Company, at Thorold, Ont., from the ore 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 Company and the Deloro Mining and Reduction Company, however, each paid for cobalt in the ore when the cobalt went 6 per cent or over, provided that the nickel content was lower than the cobalt content.

The amount received by the producers of ore for its cobalt content was reported to the Department as $94,609 in 1909, and $113,423 in 1908.

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 content of the ore shipped as shown in the following table, in which the values received by the shippers for cobalt are also shown.

Year.	Ores shipped.	Estimated total cobalt content.	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	14,788	739	5·0	104,426
1908	25,624	1,224	4·7	111,118
1909	30,677	1,533	5·0	94,965

During 1909, 8,384 tons of these ores were treated in metallurgical works in Canada, and the 2,660 tons of residues or speiss remaining after the recovery of silver and arsenic were reported to contain 1,321,083 pounds of cobalt, or an average of 7·87 per cent of the ore treated.

In 1908 the quantity of ore treated was 7,182 tons, the residue from which, amounting to 1,326 tons, contained 692,170 pounds of cobalt or 4·82 per cent of the ore treated.

The Nipissing Mines Company, as stated in the last Annual Report, shipped during the twelve months ending December 31, 1909, 1,047·69 tons of high grade ore averaging 8·46 per cent cobalt, and 183·07 tons of concentrates averaging 8·32 per cent cobalt. The amount of cobalt paid for was 177,706 pounds, and the value received therefor $19,832.19.

The La Rose Consolidated Mines Company, during the twelve months ending May 31, 1910, shipped 1,876·56 tons of high grade silver ore, averaging 8·71 per cent cobalt, and 559 tons of concentrates, averaging 7·10 per cent cobalt. The value received for cobalt content was $29,698.11.

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. During the first three months of 1909, from $1.45 to $2.60 was quoted, after which the price fell to from $1.10 to $1.75, which held until December. In the latter part of December there was a further falling off to 80 or 85 cents per pound.

If 50 per cent of the estimated cobalt content of the ore shipped had been recovered as oxide, it would have had a market value of about $1,000,000, provided a market could be found for such an output without reducing the price.

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	1892	30,936	15,038	1901	140,610	94,564
1883	7,410	2,991	1893	50,711	22,998	1902	97,283	56,615
1884	5,848	2,441	1894	36,914	14,483	1903	164,968	91,625
1885	14,490	4,781	1895	63,732	25,703	1904	151,107	80,658
1886	13,316	7,142	1896	77,869	32,343	1905	103,330	48,412
1887	18,409	10,618	1897	76,058	33,534	1906	150,364	69,505
1888	27,951	14,943	1898	59,759	36,425	1907 (9 mos.)	98,368	45,662
1889	22,931	11,844	1899	103,017	51,695	1908	178,411	76,549
1890	15,912	7,677	1900	85,342	51,987	1909 (Duty free)	92,220	46,217
1891	29,775	20,223						

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.

Dr. T. L. Walker, of Toronto, has been examining molybdenum occurrences, with a view to preparing a report on the molybdenum ores of Canada. In 1909 he visited the following localities:—

'In Nova Scotia I visited nearly all the known deposits—near Jordan falls, Shelburne county; New Ross, Lunenburg county; Glengarry and Gabarus, in Cape Breton. These properties have not been developed.

'In New Brunswick molybdenite is known to occur, but no attempt has, so far, been made to develop the deposits.

'In Quebec, where the areas of granite and gneiss are very extensive, a great many occurrences of molybdenite have been recorded, but none of the properties have been fully explored. I examined some of the properties at Romaine and Peaster bays on the north shore of the Gulf of St. Lawrence, and also some of those to the north of the Ottawa river, in Alleyn, Egan, Aldridge, and Calumet townships. The only place where explorations were being carried on was at Romaine, where Lt. Col. John Carson of Montreal, and associates, had a party of about ten men employed.'

[1] Summary Report, Mines Branch, Department of Mines, 1909.

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 the past three years there has been no production recorded, either of platinum, or metals of the platinum group.

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	1904	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	1909*	45,534

*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 1,500°C, platinum 1,750°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
1907–1909*	Nil.	Nil.

*Ontario Bureau of Mines Report, 1909.

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	1909	2,985,361

		Duty	Pounds.	$
1909	Tin crystals	Free.		1,365
	Tin in blocks, pig, and bars	"	676,260	980,714
	Tin plates and sheets	"	10,743,580	1,682,366
	Tin foil	"	715,909	85,058
	Tinware, plain, japanned or lithographed, and all manufactures of tin, N.E.S.	25%		235,858
	Tin strip waste	Free.		
	Total			2,985,361

TUNGSTEN.

Reference was made in the report for 1908 to the discovery of scheelite in Halifax county, Nova Scotia. Mr. Faribault, of the Geological Survey, visited this deposit again in the latter part of 1909, to study the character and structure, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909,[1] from which the following reference to general development is taken.

General Development.

'All the prospecting has been confined, so far, to a comparatively small area, extending 700 feet east and west along the course of the veins and 200 feet across them. This work was all done by the two Reynolds brothers and Currie, and consists mostly of trenching across the strike of the rocks to prove the ground. Some of the veins discovered were traced along their courses for short distances by prospect pits and shallow open-cuts; and on one of them a pit was sunk to a depth of 15 feet. Considering the amount of work done and the limited area covered, the results obtained are very satisfactory.

'Several tons of ore have been produced as a result of the prospecting already done. We are informed that one or two tons have been forwarded to Halifax and elsewhere, for the purpose of experimenting on a practical process of concentration, as well as to determine the best method of producing tungsten acid from concentrates and at the same time eliminating sulphur and arsenic. Although scheelite is richer in tungsten than the other ores of tungten, wolframite, and hübnerite, it was for a time considered less desirable, owing to the difficulty of its metallurgical treatment; but the modern method of reduction, in the electrical furnace, has rendered it fully as desirable.

'The zone of tungsten veins is probably limited on the north by the north syncline, situated at a distance of about 100 feet north of the middle anticline, and it probably extends some distance farther south than the present developments. Otherwise, the extent of the mineralized zone is not known; but enough veins 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 Reynolds and Currie, is shown by the fact that scheelite has been found in drift on the continuation of the same anticline, 900 feet west from Stillwater brook, and in an isolated boulder a mile and a quarter west. Further exploration will no doubt also disclose scheelite veins outside of the known zone, especially towards the south. Scheelite float has also been

[1] Summary Report Geological Survey, Department of Mines, 1909, pages 228-234.

found 1,350 feet south, on the east side of Stillwater brook where the first discovery was made. This material may have drifted south from the main deposit, or from another group of veins, possibly situated on another minor anticline not yet located.

'Since the discovery of these deposits, scheelite was found 2 miles east, on the same anticline, at the Moose River gold mines, where, on the Touquoy property, at the depth of 200 feet in Kaulbach's vertical shaft on the Dowell lead, pieces of scheelite as large as a hen's egg, in quartz, were brought to the surface at different times; also on the Moose River Gold Mining Company's property, where, at a depth of 90 feet in the Cameron shaft, a pocket was found containing a few pounds of ore.

'As already mentioned, scheelite was discovered last fall by Mr. A. L. McCallum, at a place one mile north of the Waverley gold mines, which are situated on the same anticline, 36 miles west of Moose river. Two or three interbedded quartz veins bearing scheelite similar to those of the Moose River deposit, have been uncovered here, and a quantity, possibly two tons, of ore has been produced.

'Scheelite has, therefore, been found at different places over a stretch of 3 miles along the Moose River anticline, and at another place 36 miles west, on the western continuation of the same great upheaval: indicating, seemingly, the persistence of this system of anticlinal veins, and its possibilities as a good field for further exploration.

'Mr. F. H. Mason, chemist, formerly of Halifax, states that he has often found traces of scheelite in his analyses of the tailings from the Lake Lode mine at Caribou, situated 6 miles north of Moose river on the next main anticline. Professor T. L. Walker reports that concentrates collected at Caribou mines were found, on chemical examination, to contain 0·22 per cent of tungstic acid; and that a sample collected in June, 1908, at the Moose River mill, contained 0·52 per cent tungstic acid.

'Scheelite, of a light, smoky colour, was found in a quartz vein intersecting the Middle Rabbit lead, on the Ballou gold mine, Malaga, Queens county. It is very probable that scheelite occurs in many other gold districts in Nova Scotia, especially in those situated near granite masses, and a systematic search for it over the old dumps and old workings may be rewarded by other important finds.'

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 earths.

CORUNDUM.

The total shipments of grain corundum from operator's mills in 1909 were 2,981,634 pounds, as compared with shipments in 1908 of 2,178,790. Corundum ores are mined in Canada by two companies, in the counties of Renfrew and Hastings respectively, and both mills were in active operation during the past year. A total of 35,894 tons of rock was milled, from which 3,158,300 pounds of grain corundum were graded during 1908. The largest operators shut down their plant during the greater part of the year, though sales and shipments were continued from the large stocks which had been accumulated.

Detailed statistics of output and shipments during the past three years are as follows:—

	1907.	1908.	1909.
Rock treated	60,532 tons.	2,678 tons.	35,894 tons.
Grain corunduin graded	5,365,257 lbs.	212,150 lbs.	3,158,300 lbs.
Shipments—			
Grain corundum sold in Canada	328,000 "	198,600 "	258,500 "
" " sold in other countries	3,457,450 "	1,980,190 "	2,723,134 "
Total sales	3,785,450 lbs.	2,178,790 lbs.	2,981,634 lbs.

Corundum is found in Faraday, Dungannon, Monteagle, Carlow, Raglan, and adjacent townships, the operating mines being located in the last two. Mining operations have been in progress since 1900. In the earlier years of the industry, the amount of grain corundum graded averaged about 2 per cent of the rock treated. In more recent years, however, a much lower grade of rock has been milled, the recovery of corundum in 1909 averaging about 4·4 per cent and in 1908 about 3·9 per cent of the rock treated.

The product finds a market in Canada, the United States, England, France, Germany, and Belgium. Descriptions of mines and mills will be found in the Annual Report of the Ontario Bureau of Mines, and in Memoir No. 6, Geological Survey Publications.[1]

[1] The geology of the Haliburton and Bancroft areas, Province of Ontario, by Frank D. Adams and Alfred E. Barlow.

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The present operating companies are:—

The Manufacturers Corundum Company, Limited, Craigmont, Ont.

The Ashfield Emery and Corundum Company, Limited, Burgess Mines, Ont.

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
1903 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	3,785,150	177,922	4·70
1908	2,178,790	100,398	4·60
1909	2,981,634	162,492	5·45

Statistics since 1900 showing the quantities of ore treated, the corundum produced, and the sales or shipments in Canada and in other countries are given in Table 1.

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
1909	35,894	1,579	129	1,362	1,491

(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, includ-

ing wood pulpstones, etc., in 1909, was 4,275 tons valued at $54,664; as compared with 3,843 tons valued at $48,128 in 1908, and 5,414 tons valued at $60,376 in 1907.

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 240 tons of pulpstones valued at $6,640 were shipped in 1909, to Canadian pulp and paper mills. These stones weigh about 2½ tons each and are usually made about 27″ face by 54″ diameter. About 33 tons of scythe stones, put up in one quarter gross boxes, thirty pounds to the box, were sold at a value of $50 per ton. At some of the quarries there is a considerable production of foundation and building stone, besides rough stone for breakwater and harbour works.

Most of the pulpstones are made at Renous Bridge, New Brunswick, by the Miramichi Quarry Company. This quarry also produces an excellent building stone, which finds a market in Quebec, Montreal, and Toronto.

Statistics of the production of grindstones by Provinces since 1886 are given in Table 2.

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
1909	312	3,204	3,963	51,460	4,275	54,664	12 79

The imports of grindstones into Canada, principally into the Provinces of Ontario and Quebec, reached a total value during the calendar year 1909 of $69,554. The value of the other abrasives imported during the same period includes: burrstones, valued at $2,001; emery, $29,752; manufactures of emery, $66,777; pumice stone, $11,291; sandpaper, $124,716; iron sand for glass or granite polishing or for paving stone, $6,068; a total value of $310,159.

Statistics of the exports and imports of grindstones and other abrasives are shown in the following tables:—

ABRASIVE MATERIALS.—TABLE 3.

Exports of Grindstones.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1884	28,186	1893	21,672	1902*	24,489
1885	22,606	1894	12,579	1903*	27,659
1886	24,185	1895	16,723	1904*	35,612
1887	28,769	1896	19,139	1905*	24,868
1888	28,176	1897	18,807	1906*	31,978
1889	29,982	1898*	25,588	1907	32,534
1890	18,564	1899*	23,288	1908	19,721
1891	28,433	1900*	42,128	1909	13,942
1892	23,567	1901*	29,130		

* Including stone for the manufacture of grindstones.

ABRASIVE MATERIALS.—TABLE 4.

Imports.

Fiscal Year.	Grindstones. Tons.	Grindstones. Value.	Burrstones. (c) Value.	Emery. (a) Value.	Mfrs. of Emery. (b) Value.	Pumice Stone. (d) 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
1909	.....	56,692	1,141	25,931	47,700	8,117

(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 millstones.
(d) Pumice and pumice stone, ground or unground. Duty free.

TRIPOLITE.

No shipments of tripolite were reported during 1909.

Statistics of shipments in previous years are shown in Table 5.

ABRASIVE MATERIALS.—TABLE 5.

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	1909	Nil.	Nil.

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 $2,300,000 in 1909, 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.

The industry has been marked during the past year by a number of important consolidations of interests which, from a technical point of view, should result in greater economy in production and an improvement in standardization of the different grades of product.

A revised edition of the special report on asbestos by Fritz Cirkel, published by this Branch, is now in press, and will shortly be ready for issue.

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.

Although the actual shipments of asbestos during 1909, 87,300 tons, valued at $2,301,775, were somewhat less than those recorded for 1908, 90,773 tons, valued at $2,573,335, the total output during the past year, nevertheless, showed an increase; since the stock on hand at the end of 1909 was reported as 20,921 tons valued at $1,179,679, as compared with stocks of 8,669 tons valued at $598,545 on hand at the close of 1908. Details of the several grades of shipments are given in Table 1.

ASBESTOS.—TABLE 1.

Production by Classes, Calendar Years 1908 and 1909.

—	1908.			1909.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		$	$ cts.		$	$ cts.
Crude, No. 1	857½	257,752	300 59	912·3	246,655	270 37
" 2	2,488	411,480	165 38	2,162	328,855	152 11
Mill stock, No. 1	5,282½	425,448	80 54	14,776	785,731	53 18
" " 2	45,545¼	1,345,750	29 33	32,417	800,728	24 70
" " 3	12,374¼	114,931	9 29	13,082	122,618	9 37
Total asbestos	66,548	2,555,361	38 40	63,349·3	2,284,857	36 06
Total asbestic	24,225	17,974	0 74	23,951	17,188	0 72
Grand total	90,773	2,573,335	.....	87,300·3	2,301,775	.....

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 1907-8-9.

—	1907.	1908.	1909.
	$ cts. $ cts.	$ cts. $ cts.	$ cts. $ cts.
Crude, No. 1	225 00 to 300 00	267 00 to 350 00	200 00 to 300 00
" 2	100 00 " 200 00	75 00 " 225 00	100 00 " 175 00
Mill stock, No. 1	57 00 " 163 00	60 00 " 100 00	45 00 " 100 00
" " 2	18 00 " 50 00	20 00 " 50 00	20 00 " 40 00
" " 3	8 00 " 15 00	5 00 " 13 00	6 00 " 10 00
Asbestic	0 50 " 2 00	0 35 " 1 16	0 35 " 1 28

Details of stock on hand on December 31, 1909 and 1908, are shown as follows:—

Asbestos Stocks in Producers Hands, December 31.

	1909.		1908.	
	Tons.	$	Tons.	$
Crude No. 1	1,138	310,417	432	129,450
" 2	2,076	324,719	382	72,775
Mill stock No. 1	3,791	209,962	2,480	243,534
" 2	11,823	317,823	4,205	138,423
" 3	2,093	16,758	1,170	14,363
	20,921	1,179,679	8,669	598,545

These figures appear to indicate a production beyond the capacities of the market to absorb, particularly in respect to the higher grade crude product, and there appears to have been a distinctly lower average price obtained for all grades during 1909.

In Table 2, following, the shipments of crude asbestos and mill stocks since 1903 are separately shown. The record indicates that during the past seven years there has been but little variation 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 two fold in the same time, with an increase of over 43 per cent in the average price per ton obtained.

ASBESTOS.—TABLE 2.

Annual Production of Crude and Mill Stock, 1903-1909.

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	3,345·5	669,232	200 04	63,202	1,886,129	29 84
1909	3,074·3	575.510	187 20	60,275	1,709,077	28 35

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
1909	63,349·3	2,284,587	36 06	23,951	17,188	0 72

(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.

Exports to Great Britain, United States, Germany, and other countries during the past seven calendar years, as compiled from the Reports of the Customs Department, are shown in Table 4, and the total exports each year since 1892 in Table 5.

Attention has been called to the fact that these figures apparently do not accurately indicate the destination of exports, that Germany, for instance, is a much larger consumer of Canadian asbestos than is shown by these figures. This may possibly be explained by the fact that frequently raw materials of this kind are sold in bond to brokers or dealers in New York and by them resold to consumers in other countries.

ASBESTOS.—TABLE 4.

Exports of Canadian Asbestos by Countries, 1903-1909.

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
1909..	5,227	204,978	45,675	1,243,795	693	17,706	5,376	263,378	56,971	1,729,857	30 36

ASBESTOS.—TABLE 5.

Annual Exports, Calendar Years 1892-1909.

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	1909	56,971	1,729,857	30 36

Although the chief source for the raw material, Canada does not 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 1885-1909.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	$		$		$
1885	674	1894	20,021	1903	75,465
1886	6,831	1895	26,094	1904	83,827
1887	7,836	1896	23,900	1905	116,836
1888	8,793	1897	19,032	1906	137,974
1889	9,943	1898	26,389	1907 (9 months)	127,509
1890	13,250	1899	32,607	1908	190,980
1891	13,298	1900	43,455	*1909	180,598
1892	14,090	1901	50,829		
1893	19,181	1902	52,464		

* Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

The imports of asbestos into the United Kingdom will be of interest as indicating the possible market in that country for this product.

These imports and the source of supply are shown as follows:—

Imports of Raw Asbestos into the United Kingdom, 1907-1909.

Country.	1907.		1908.		1909.	
	Short Tons.	Value	Short Tons.	Value.	Short Tons.	Value.
		$		$		$
Russia	1,545	143,708	1,162	123,146	599	71,063
Germany	290	39,318	309	40,243	351	48,681
Portuguese East Africa	84	17,199	258	39,678	324	56,526
Italy	176	27,764	169	26,961	215	38,369
United States	543	21,462	1,132	42,150	1,549	40,549
Other foreign countries	136	15,271	149	17,340	167	12,410
Total foreign	2,774	264,722	3,229	289,518	3,205	267,598
Cape of Good Hope	33	2,360	272	17,389	424	30,519
Natal	52	10,950	26	4,667	78	9,247
Canada	4,408	214,382	3,760	194,691	2,727	144,691
Other British possessions	10	759	89	12,507	43	5,596
Total British possessions	4,503	228,451	4,147	229,254	3,272	190,053
Grand Total	7,277	493,173	7,376	518,772	6,477	457,651

ASBESTOS.—TABLE 7.

World's Production, 1903-1909, in Metric Tons (2204·6 lbs.).

——	1903	1904	1905	1906	1907	1908	1909
Canada (*b*)	28,240	32,306	45,967	55,122	56,364	60,372	57,470
United States (*c*)	805	1,343	2,820	1,538	592	849	*
Russia (*e*)	5,624	7,502	7,266	9,201	10,430	9,835	13,343
Cape Colony (*e*)	(*g*) 276	373	454	473	548	1,149	*
Cyprus (*e*)	.....	.....	.....	(*g*) 19	(*g*) 89	472	*
Rhodesia (*f*)	.....	.....	.....	.....	.....	50	247
West Australia	.....	.....	.....	.....	.....	41	*

* Figures not available.

(*b*) Mines Branch, Ottawa. (*c*) United States, Geological Survey. (*e*) Home Office, London. (*g*) Exported. (*f*) Chamber of Mines, Bulawayo.

The following is a list of the principal asbestos companies in Canada:—

Name of Operator.	Location of Mine.	Address.
Amalgamated Asbestos Corporation Ltd	Coleraine, Thetford	Montreal, 263 St. James St.
Black Lake Consolidated Asbestos Co	Coleraine	Montreal.
Megantic Mining Company	Coleraine	Montreal, 88 McGill St.
Johnston's Asbestos Co. Ltd	Thetford, Black Lake	Thetford Mines, Que.
Bell Asbestos Mine	Thetford	" "
Robertson Asbestos Mining Co	"	" "
Jacob's Asbestos Mining Co. Ltd	"	" " West.
The B. & A. Asbestos Co	"	Robertsonville, Que.
The Berlin Asbestos Co	"	Robertson Sta., Que.
The Asbestos & Asbestic Co. Ltd	Shipton	Asbestic, Que.
Broughton Asbestos Fibre Co	Broughton	East Broughton Sta., Que.
Eastern Townships Asbestos Co	"	" "
The Frontenac Asbestos Mining Co. Ltd	"	" "
Boston Asbestos Co. Ltd	"	" "
The Ling Asbestos Co	"	" "
La Compagnie L'Amiante Champlain	" East	Quebec, 81 Rue St. Pierre.
Brompton Lake Asbestos Co	Brompton lake	Montreal, 17 Victoria Sq.
W. H. Lambly		Inverness, Que.

CHROMITE.

The shipments of chromite during 1909 were returned as 2,470 tons, valued at $26,604; as compared with shipments during 1908 of 7,225 tons, valued at $82,008.

The production has shown a considerable falling off in 1909 as compared with previous years, although considerable development work was in progress, which may result in a larger production in 1910.

The plant and properties of the Thetford Chrome Company, lot 16, range A, Coleraine, were taken over by the Chrome and Asbestos Mines, Limited, and preparations were being made for operations on a large scale in 1910. A complete new mill of Behrend concentrators was established.

Statistics of production since 1886 are shown in Table 1 following, the total during the last seven 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 the crude ore.

CHROMITE.—TABLE 1.

Annual Production in Canada, 1886-1909.

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
1909	54	720	13 33	2,416	25,884	10 71	2,470	26,604	10 77

The chromite finds its chief market in the United States, although a few carloads are occasionally shipped to Canadian points.

The exports during the calendar year 1909 are reported as 1,794 tons valued at $20,858.

The following table shows the quantity and value of Canadian chromite imported into the United States during the past six years:—

Imports of Chromite into the United States from Canada.[1]

Twelve months ending June 30.	Short Tons.	Value.	Twelve months ending June 30.	Short Tons.	Value.
		$			$
1904	2,790	36,322	1907	6,179	66,115
1905	6,489	70,934	1908	6,505	69,009
1906	9,951	107,580	1909	4,455	50,042

[1] The Foreign Commerce and Navigation of the United States, Washington. Long ton in orginal changed to short ton.

Chrome iron ore is used chiefly for the manufacture of ferro-chrome alloys, and chromium salts for pigments, and is also used for linings in steel and copper furnaces.

Prices in New York in 1907 and 1908 were practically uniform, ranging from $17 to $20 per long ton for 50 per cent ore.

During the first five months of 1909, prices had practically the same range, viz., from $17.50 to $20; but in June the market dropped, and until the close of the year, chrome ore was quoted at from $14 to $16 per long ton for 50 per cent ore in New York.

As an illustration of the market for chromite in the United States, the imports into that country during the past two years are shown in the following table. The record shows a large decrease in import in 1909.

CHROMITE.—TABLE 2.

Imports into the United States, years ending June 30, 1908 and 1909, in tons of 2,240 lbs.[1]

	1908			1909		
	Long Tons.	Value.	Per Ton.	Long Tons.	Value.	Per Ton.
		$	$		$	$
Belgium	197	2,492	12 65	2,018	28,649	14 20
Canada	5,808	69,009	11 88	3,978	50,042	12 58
France	468	7,776	16 39	.....	.....	.....
French Oceania	20,458	221,460	10 82	11,878	125,728	10 58
Germany	.....	20	.....	.....	.....	.....
Greece	9,921	136,996	13 81	3,500	33,214	9 49
India	35	357	10 20	350	1,005	2 87
Italy	.....	.....	.....	459	6,932	15 10
Japan	.....	.....	.....	2,781	20,529	7 38
Portuguese Africa	2,200	32,600	14 82	4,042	63,926	15 82
Turkey in Asia	439	5,312	12 10	.....	.....	.....
United Kingdom	4,336	57,719	13 31	786	10,559	13 43
Totals	43,862	533,600	12 17	29,792	340,584	11 43

* The Foreign Commerce and Navigation of the United States, 1908 and 1909.

CHROMITE.—TABLE 3.

World's Production of Chromite in Metric Tons (2,204·6 lbs.).

Locality.	1904	1905	1906	1907	1908	1909
Australia (a)	403	53	15	30	.....	*
Bosnia and Herzegovina (a)	278	186	320	310	500	*
Canada (d)	5,510	7,779	8,196	6,528	6,554	2,241
Greece (a)	6,530	8,900	11,530	11,730	4,350	*
India (a)	.....	2,751	4,445	18,597	4,821	*
New Caledonia (Production	(a) 47,247	(a) 76,933	(b) 84,241	(b) 3,800	(a) 15,800	*
" (Exports	(b) 42,437	(b) 51,374	(a) 57,367	(c) 31,552	(c) 46,309	*
Rhodesia	.....	Nil.	3,308	7,273	(c) 12,118	(e) 23,243
Russia (a)	26,575	27,047	16,976	26,357	*	*
Norway (a)	154	Nil.	Nil.	Nil.	Nil.	*
United States (f)	125	22	109	295	365	*
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 1908 were as follows, in metric tons :—

—	1904.	1905.	1906.	1907.	1908.
Salonica	8,000	5,700	5,600	4,900	2,100
Kossovo	3,100	3,000	4,100	2,800	1,300
Derendge and Marmora ports	12,000 to 15,000	12,000 to 15,000	13,000	12,000 to 14, 00	12,000 to 14,000
Smyrna	838	.....	1,080	.....	443
Adana	To value of £50	£2,824	.....	£1,000	.....
Adalia	.....	.....	.....	700	.....

COAL.

The coal mining industry was marked during 1909 by a decreased production in Nova Scotia and an increased production in the western provinces, resulting in an aggregate decrease for the whole of Canada of 384,836 tons, or about 3½ per cent.

This is the first year in fourteen in which a decrease has to be recorded in comparing with the previous year's output, and had it not been for the strike of coal miners, which began at Sydney on July 6, and at Springhill, N.S., on August 10, and continued throughout the year, it is fairly certain that the production would have shown an increase instead of a decrease.

The total production in 1909 was returned as 10,501,475 tons, valued at $24,781,236; as compared with a production of 10,886,311 tons, valued at $25,194,573, in 1908.

Coal mining has been for a number of years the most important of Canada's mining industries, and in 1909 is credited with 27 per cent of the total mineral production of the country. As would be expected in a young country rapidly growing in population and industrial activity and endowed with large coal resources, the increase in production has been very rapid. The output in 1909 is more than twice that of ten years ago, about four times the output of twenty years ago, and nearly ten times the production of 1879. The total production during the ten year period, 1880-1889, was 20,399,426 tons, and during the next ten years, 1890-1899, the total production was 37,689,071 tons, or an increase of 84·8 per cent. During the last ten year period, 1900-1909, the total production was 86,275,045 tons, or an increase of 128·9 per cent over the previous ten year aggregate.

Notwithstanding our large coal resources, Canada's total coal production in 1909 was only about 56·4 per cent of the estimated consumption, and our additional requirements are supplied by imports chiefly from the United States. The principal coal fields are located on the extreme east and west, while the central Provinces of Ontario and Quebec, comprising the great bulk of the population, are without coal deposits. Some inferior lignites are known in northern Ontario, but are not commercially available. Nova Scotia coal finds a considerable market in Quebec province, while the demands of Ontario, for both domestic and industrial purposes, are supplied from the south. There are no anthracite coals in eastern Canada, and our requirements of this fuel have to be met entirely by imports from Pennsylvania. The product of British Columbia and Alberta mines not only supplies local demands, including a growing ore smelting industry, but is also largely exported to the adjacent United States.

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, but roughly speaking, about 90 per cent of the production may be classed as bituminous.

There is but one anthracite mine in Canada, at Bankhead, near Banff, Alberta, operated by the Bankhead Mines, Limited. This mine possesses the only briquetting plant in operation in the country.

Statistics of the production by provinces during the past three years are shown in Table 1, and Table 2 shows the increases or decreases in each year as compared with the previous year.

It may be explained that the term production in these tables applies to the amount of coal actually sold or used by the producers, in contradistinction to output, which applies to the coal extracted from the mine and which in some cases includes coal lost or unsaleable or coal carried into stock on hand at the end of the year.

COAL.—TABLE 1.

Production by Provinces, 1907-8-9, in tons of 2,000 lbs.

Province.	1907.		1908.		1909.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Nova Scotia	6,354,133	$12,764,999	6,652,539	$13,364,476	5,652,089	$11,354,643
British Columbia	2,364,898	7,390,306	2,333,708	7,292,838	2,606,127	8,144,147
Alberta	1,591,579	3,836,286	1,685,661	4,127,311	1,994,741	4,838,109
Saskatchewan	151,232	252,437	150,556	253,790	192,125	296,339
New Brunswick	34,584	77,814	60,000	135,000	49,029	98,496
Yukon Territory	15,000	60,000	3,847	21,158	7,364	49,502
Totals	10,511,426	24,381,842	10,886,311	25,194,573	10,501,475	24,781,236

COAL.—TABLE 2.

Comparison of Production, 1907 with 1908, and 1908 with 1909.

Province.	(i) Increase or (d) Decrease.					
	Years 1907 and 1908.			Years 1908 and 1909.		
		Tons.	Per cent.		Tons.	Per cent.
Nova Scotia	(i)	298,406	4·70	(d)	1,000,450	15·04
British Columbia	(d)	31,190	1·32	(i)	272,419	11·67
Alberta	(i)	94,082	5·91	(i)	309,080	18·34
Saskatchewan	(d)	676	0·01	(i)	41,569	27·61
New Brunswick	(i)	25,416	73·49	(d)	10,971	18·29
Yukon Territory	(d)	11,153	74·35	(i)	3,517	91·42
Totals for Canada	(i)	374,885	3·56	(d)	384,836	3·535

The distribution of coal mined, as shown by the returns furnished by the operators, is given for the past three years in the next table.

In 1909, about 82·6 per cent of the total output was placed directly on the market, 7·1 per cent made into coke by the mine operators, and 8·8 per cent used in colliery consumption and by workmen. The quantities entered as loss due to washing, breakage, etc., do not necessarily include all the losses due to these causes, since many companies do not make any return under this heading. Also the quantity entered as sold in Canada probably includes a small quantity which is ultimately exported.

Distribution of Coal mined in Canada during the Years 1907-8-9.

—	1907.	1908.	1909.
Sales in Canada	7,358,135	7,715,203	7,468,880
Sales for export to United States	1,514,182	1,218,656	1,173,772
" " other countries	129,957	297,291	171,388
Total sales	9,002,274	9,231,150	8,814,040
Used by producers for the manufacture of coke	751,967	708,674	752,976
" " colliery consumption and workmen	757,185	946,487	934,459
Stock on hand January 1	212,559	183,443	202,432
" December 31	190,224	230,335	219,569
Difference	− 22,335	+ 46,892	+ 17,137
Loss due to washing, breakage, or other causes	351,783	157,610	154,162
Total output	10,840,874	11,090,813	10,672,774

The output by provinces, showing the distribution of coal mined in 1909, is shown in the next table.

Coal Output in Canada, 1909.

—	Nova Scotia.	New Brunswick.	Saskatchewan.	Alberta.	Yukon.	British Columbia.	Total Output.*
Sales in Canada	4,496,688	45,000	183,878	1,639,515	6,864	1,096,935	7,468,880
Sales for export to U. S.	300,134	.....	.....	114,101	.....	759,537	1,173,772
" " other countries	100,258	.....	.....	.....	.....	71,130	171,388
Total sales	4,897,080	45,000	183,878	1,753,616	6,864	1,927,602	8,814,040
Used by producers in making coke	169,832	.....	.....	143,854	.....	439,290	752,976
Used by producers for colliery consumption and workmen	585,177	4,029	8,247	97,271	500	239,235	934,459
Stock on hand Jan. 1	150,455	.....	.....	4,646	.....	47,331	202,432
" Dec. 31	154,832	.....	.....	12,150	.....	52,587	219,569
Difference	+ 4,377	.....	.....	+ 7,504	.....	+ 5,256	+ 17,137
Losses due to breakage or other causes	92,405	.....	10,788	17,573	.....	63,396	154,162
Total output	5,718,871	49,029	202,913	2,019,818	7,364	2,674,779	10,672,774

* Production is obtained by adding coal sold and coal used.

Statistics of the annual production of coal in Canada since 1874 are shown in Table 3. The total production from 1785 to 1909 has been 159,249,386 tons, of which 109,327,053 tons, or 69 per cent, are to be credited to Nova Scotia, and 36,718,469 tons, or 23 per cent, to British Columbia.

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
1909	10,501,475	25,781,236	2 36	(d) 384,836	(d) 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 " 2,000 "

The following table shows the proportional contributions of each province to the grand total production of Canada in 1874, 1890, and yearly since 1900:—

Province.	1874.	1890.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
	%	%	%	%	%	%	%	%	%	%	%	%
Nova Scotia, New Brunswick	91	71	62·9	64·4	69·4	71·3	68·0	65·5	64 07	60·79	61·40	54·29
Saskatchewan*	.....	.....	0·7	0·7	0·9	1·5	1·5	1·2	1·11	1·44	1·37	1·83
Alberta*	.....	4	5·4	5·2	5·4	6·2	8·0	10·8	12·77	15·14	15·42	18·99
British Columbia	8	25	31·0	29·6	24·2	21·0	22·5	22·4	21·98	22·50	21·77	24·82
Yukon Territory	.....	.....	.....	0·1	0·1	.....	.....	0·1	0·07	0·13	0·04	0·07

* 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 growth of the coal industry in the Provinces of Alberta and Saskatchewan. In 1900, these two Provinces were only contributing a little over 6 per cent, whereas in 1909 their aggregate production represents nearly 21 per cent of the total production in Canada.

The proportion contributed by Nova Scotia, although still more than half the total, has fallen considerably during the past ten years, and it will probably be but a short time before the production in the west exceeds that in the east.

EXPORTS AND IMPORTS.

The following tables give the statistics of exports of coal from Canada, as compiled from the reports of the Department of Customs. The United States constitutes the main market for coal exported, 78 per cent of the exports being sent to that country in 1909. The total exports of Canadian coal during 1909 were the smallest since 1904.

Exports of Coal produced in Canada during 1907-8-9.

Exported to	1907.		1908.		1909.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
Great Britain	8,514	25,106	5,557	18,065	10,671	36,403
United States	1,691,016	4,278,870	1,385,223	3,564,390	1,240,519	3,357,111
Newfoundland	131,784	357,005	194,034	532,121	175,801	493,040
Other countries	62,760	218,583	145,019	546,801	161,108	569,788
Totals	1,894,074	4,879,564	1,729,833	4,661,377	1,588,099	4,456,342

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	1892	823,733	93,988
1874	310,988	12,859	1893	960,312	102,827
1875	250,348	14,026	1894	1,103,694	89,786
1876	248,638	4,995	1895	1,011,235	96,836
1877	301,317	4,829	1896	1,106,661	116,774
1878	327,959	5,468	1897	986,130	101,848
1879	306,648	8,468	1898	1,150,029	99,189
1880	432,188	14,217	1899	1,293,169	101,004
1881	395,382	14,245	1900	1,787,777	62,776
1882	412,682	37,576	1901	1,573,661	53,894
1883	486,811	44,388	1902	2,090,268	23,453
1884	474,405	62,665	1903	1,954,629	27,138
1885	427,937	71,003	1904	1,557,412	27,308
1886	520,703	78,443	1905	1,635,287	86,792
1887	580,965	89,098	1906	1,835,041	44,758
1888	588,627	84,316	1907	1,894,074	101,778
1889	665,315	89,294	1908	1,729,833	102,071
1890	724,486	82,534	1909	1,588,099	161,098
1891	971,259	77,827			

The exports from Nova Scotia and British Columbia are shown separately in Table 5 up to 1899, but the Customs reports do not now give these details.

According to direct returns from the operators, Nova Scotia coal sold for export in 1909 amounted to 400,392 tons, and British Columbia coal, 830,667 tons.

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	356,018
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	274,446	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	508,882	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 15. † Since 1899, exports by provinces have not been published in Trade and Navigation report.

The imports of coal into Canada are shown in Table 6. Anthracite dust is included with the anthracite coal, but bituminous dust is classified as 'bituminous slack such as will pass through a ¾" screen.' The imports of anthracite and bituminous were both less in 1909 than in 1908, but there was a slight increase in the imports of bituminous dust.

The total imports aggregated 9,872,924 tons, valued at $26,831,859, an amount almost equal to the home production.

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	900
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
1909	5,625,063	11,455,818	3,017,844	13,906,152	1,230,017	1,469,889

(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.

With statistics of production, exports, and imports of coal available, a basis is furnished for an estimate of the country's coal consumption. The consumption in 1909 amounted to 18,625,202 tons, as compared with 19,351,902 tons in 1908, a decrease of 726,700 tons, or 3·76 per cent. Of the total consumption in 1909, 9,711,826 tons, or 52·1 per cent, were imported coal, and 8,913,376 tons, or 47·9 per cent domestic coal.

The per capita consumption in 1909, based on an estimate of the population made by the Census Office, was approximately 2·599 tons; this is somewhat less than the per capita consumption of the two previous years. During the past twenty-three years, however, the consumption has increased from a little over three-quarters of a ton per head of population in 1886, having doubled in 1900, and reached its highest point of 2·946 tons in 1907. The consumption in Canada, however, is still small when compared with that of the United States, where the production has reached a total of about 5 tons per capita.

Consumption of Coal in Canada, 1908-9.

	1908.		1909.	
	Tons.	Tons.	Tons.	Tons.
Production, Table 3	10,886,311		10,501,475	
Exports of Canada, Table 4	1,729,833		1,588,099	
Home consumption of Canadian coal		9,156,478		8,913,376
Imports, Table 6	10,297,495		9,872,924	
Exports not produce of Canada, Table 4	102,071		161,098	
Canadian consumption of imported coal		10,195,424		9,711,826
Total consumption of coal in Canada		19,351,902		18,625,202

COAL.—TABLE 7.

Consumption of Coal in Canada, 1886-1909.

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
1909	8,913,376	9,711,826	18,625,202	47·9	52·1	2·599

Nova Scotia.

The production of coal in Nova Scotia in 1909 was less than the 1908 production by 1,000,450 tons, or a decrease of 15 per cent. Yearly statistics of output, sales, colliery consumption and production since 1872 are shown in Table 8, the figures being given in both long and short tons. The production by counties during the past four years is shown in Table 9. The Provincial Department of Mines in this Province collects and publishes coal statistics covering the fiscal year ending September. The colliery output during the last three such years is shown in Table 10, and the distribution of coal sold during the same period, in Table 11.

The total production during the calendar year 1909 was 5,652,089 tons (5,046,508 long tons), of which 4,045,657 tons, or 72 per cent, were obtained from Cape Breton county, 734,042 tons, or 13 per cent, from Pictou, and 494,398 tons, or 9 per cent, from Cumberland county, the balance being from Inverness and Colchester counties.

The falling off in production in 1909 is probably to be attributed to a number of reasons, among which the labour strikes figure prominently. During the first five months of the year the demand for coal was apparently very much less than during the corresponding period in 1908. A large number of employes of the Dominion Coal Company went on strike in July, and although the collieries were not completely shut down the output was seriously reduced. A similar strike at the Inverness mine of the Inverness Railway and Coal Company affected that Company's output. The mines of the Cumberland Railway and Coal Company were almost completely closed by a strike on August 10.

The Marsh mine, in Pictou county, operated by the Nova Scotia Steel and Coal Company, was closed down at the end of March.

Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Sold or used, Tons, 2,240 lbs.	Colliery Consumption, Tons, 2,240 lbs.	Production,* Tons, 2,240 lbs.	Output, Tons, 2,000 lbs.	Sold or used, 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	1,177,669	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	1,670,880	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

(Table continued on page 14).

* 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.

Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Sold or used, Tons, 2,240 lbs.	Colliery Consumption, Tons, 2,240 lbs.	Production,* Tons, 2,240 lbs.	Output, Tons, 2,000 lbs.	Sold or used, Tons, 2,000 lbs.	Colliery Consumption, Tons, 2,000 lbs.	Production,* Tons, 2,000 lbs.	Price per Ton, 2,240 lbs.	Value of Production.
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	144,904	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	5,236,077	437,256	5,673,333	6,468,563	5,864,406	489,727	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
1909.....	5,106,135	4,524,029	522,479	5,046,508	5,718,871	5,066,912	585,177	5,652,089	2 25	11,354,643

* 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 1906-7-8-9.

Calendar Year.	Cumberland.		Pictou.		Cape Breton.		Other Counties.		Total.	
	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*
1906.	659,734	566,308	769,496	657,310	4,804,407	4,221,293	312,554	259,396	6,546,191	5,704,307
1907.	534,047	445,288	840,533	729,043	4,698,147	4,346,180	395,836	343,895	6,468,563	5,864,406
1908.	662,157	530,648	849,802	678,025	4,840,653	4,267,346	452,877	375,742	6,805,489	5,851,761
1909.	494,919	403,371	743,860	599,743	4,081,333	3,723,135	398,759	340,663	5,718,871	5,066,912

* Includes coal used for making coke.

COAL.—TABLE 10.

Nova Scotia: Output by Collieries during Fiscal Years ending September 30, 1908-9.

Colliery.	Tons of 2,000 lbs.	Tons of 2,000 lbs.
Cape Breton County.	1908.	1909.
Dominion Coal Company	4,274,993	3,119,556
Nova Scotia Steel and Coal Co	741,832	848,444
North Atlantic Collieries	65,330	81,292
McKay Mining Company	15,187	15,217
Sydney Coal Company	5,377	5,301
Colonial Mining Co	.....	709
Cumberland County.		
Cumberland Railway and Coal Co	466,068	421,437
Maritime Coal, Railway, and Power Co., Chignecto	17,740	56,392
" " " " Joggins	57,266	55,620
Minudie Coal Co	54,205	55,766
Strathcona Coal Co	26,799	7,936
Great Northern Coal Co	3,053	4,272
Atlantic Grindstone and Coal Co	964	721
Eastern Coal Co	.....	4,940
Colchester County.		
Colchester Coal Co	4,425	1,490
Pictou County.		
Acadia Coal Co	463,436	408,792
International Coal Co	353,461	327,576
Marsh Colliery	53,586	22,585
Inverness County.		
Inverness Coal and Railway Company	317,748	296,546
Mabou Coal Co	21,560	1,804
Port Hood Coal Co	111,664	107,669

COAL.—TABLE 11.

Nova Scotia: Distribution of Coal Sold.

Markets.	Fiscal Years ending September 30.					
	1907.		1908.		1909.	
	Tons of 2,000 lbs.	%	Tons of 2,000 lbs.	%	Tons of 2,000 lbs.	%
Nova Scotia—						
Transported by land	1,740,736	30·80	1,804,377	29·37	1,642,716	31·77
" " sea	322,773	5·71	380,332	6·19	339,462	6·57
Total, Nova Scotia	2,063,509	36·51	2,184,709	35·56	1,982,178	38·34
New Brunswick	478,383	8·46	571,570	9·30	607,968	11·76
Prince Edward Island	86,792	1·54	70,931	1·15	88,365	1·71
Quebec Province	1,914,743	33·88	2,293,352	37·33	1,689,876	32·69
Newfoundland	164,082	2·90	231,909	3·77	174,998	3·39
United States	690,269	12·21	559,592	9·11	359,224	6·95
West Indies	2,910	0·05				
Mexico	8,502	0·15				
St. Pierre			9,976	0·16	11,463	0·22
Bunker coal	229,121	4·05	216,554	3·53	254,681	4·92
Other countries	13,931	0·25	5,261	0·09	846	0·02
Totals	5,652,292	100·00	6,143,854	100·00	5,169,599	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 1909 would be about 49,029 short tons, valued at $98,496; this is a decrease as compared with 1908.

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	1899	10,528	15,792	1 50
1888	5,730	11,050	1 93	1900	10,000	15,000	1 50
1889	5,673	11,733	2 07	1901	17,630	51,857	2 94
1890	7,110	13,850	1 95	1902	18,795	39,680	2 11
1891	5,422	11,030	2 03	1903	16,000	40,000	2 50
1892	6,768	9,375	1 39	1904	9,112	18,224	2 00
1893	6,200	9,337	1 59	1905	29,400	58,800	2 00
1894	6,469	10,264	1 59	1906	34,076	68,152	2 00
1895	9,500	14,250	1 50	1907	34,584	77,814	2 25
1896	7,500	11,250	1 50	1908	60,000	135,000	2 25
1897	6,000	9,000	1 50	1909	49,029	98,496	2 25
1898	6,160	9,240	1 50				

Saskatchewan.

The coal production in Saskatchewan shows a considerable increase in 1909 over that of the previous year, the total being 192,125 tons, valued at $296,339. Production was reported by about twenty-one mines, of which four reported a production of 5,000 tons or over. There is probably a considerable tonnage of coal mined by farmers of which no record is obtained.

The output is obtained entirely from the Estevan or Souris fields, in the southern portion of the Province, and is used mainly for domestic purposes in Saskatchewan and Manitoba.

Statistics of production since 1890 are given in Table 13.

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
1909	192,125	296,339	1 54

† Including a small quantity from the Turtle Mountain district, Manitoba.

A new lignite field was found in this Province in 1909, in the Lac LaRonge district, about 120 miles north of Prince Albert, by Wm. McInnes, of the Geological Survey. The deposit is described in the Summary Report of the Geological Survey, as follows:—

'In the white quartz sands and sandstones, exposed in cliffs on the south shore of Wapawekka lake, a bed of lignite occurs, varying in thickness from 4′–6″ (with a sandy 6 inch parting in the middle) to 2′–5″ of fairly clean lignite. The seam lies about horizontal, and was traced in a longitudinal direction for a distance of 3¼ miles, following the windings of the shore, thinning out westerly, or being represented by very dirty lignite or highly carbonaceous beds of sand; and not traceable farther easterly, owing to the higher encroachment of talus on the scarped face of the cliffs.

'A proximate analysis, by fast coking, of a sample of this lignite, made by F. G. Wait, of the Mines Branch, Department of Mines, gave the following results:—

Moisture	11·23
Volatile combustible matter	30·97
Fixed carbon	34·80
Ash	23·00
	100·00

Coke, non-coherent—57·80.
Fuel ratio—1:1·13.
Colour of ash, light orange.
Split volatile ratio—1·88.

'From this analysis, it will be noted that, were it not for the rather high ash percentage—which is probably owing to included sand—this might be classed as a fairly lignitic coal.

'The seam is at its best at the extreme southwesterly point of the bay, where it attains both its greatest thickness and greatest purity. Northeastward and northwestward along the shore, it deteriorates both in size and purity; hence there is a reasonable probability that in the country farther south, back from the lake, where it is not exposed, the seam may be better.'

Alberta.

The production of marketable coal in this Province in 1909, according to direct returns received from the operators, was 1,994,741 tons, valued at $4,838,109, an increase of 309,080 tons, or 18 per cent over the 1908 production. The output has increased very rapidly, having doubled in the past five years, and being now over six times the production of ten years ago. Of the total production in 1909, only about 5·7 per cent, or 114,101 tons, were sold for export. The quantity used for making coke was 143,854 tons, or 7·2 per cent of the total. The railways use a very large portion of the coal production in this Province, having taken in 1909 upwards of 750,000 tons, or about 45·7 per cent of the total sold in Canada.

In view of the extensive railway construction in progress and the continued rapid influx of settlers, it is evident that the demand for coal will continue to increase at a rapid rate for a number of years, necessitating the extension of present colliery facilities as well as the opening up of new mines.

Statistics of production since 1887 are given in Table 14:—

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	198,298	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	1,494,524	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
1909	1,994,741	4,838,109	2 43

These statistics cover the production of a small quantity of anthracite, as well as bituminous and lignite coal. The only operating anthracite mine at present is the Bankhead mine at Banff. The anthracite is very carefully prepared and sized for the market, and in its preparation much dust is produced; a part of this dust is manufactured into briquettes, which find a ready market for domestic use.

The following statistics showing the classification of the output of coal in Alberta during 1909, are quoted from the Report of the Provincial Inspector of Mines for 1909. The figures represent the total coal output, including non-merchantable coal, and are somewhat higher than those given in Table 14, which represent shipments only.

'Classification of output of coal in Alberta during the year 1909:—

	Tons.
Lignite coal	763,673
Bituminous coal	1,197,399
Anthracite coal	213,257
Coal used in coke production	148,104
Coke produced	87,812
Briquettes produced	89,785

Summary of Statistics.

Number of mines at present in operation	121
Number of new mines opened in 1909	32
Number of mines abandoned in 1909	8
Number of tons of coal mined	2,174,329
Number of tons of coke produced	87,812
Number of tons of briquettes produced	89,785
Average number of persons employed inside the mine	3,893
Average number of persons employed outside the mines	1,314
Number of fatal accidents inside the mines	7
Number of fatal accidents outside the mines	2
Number of non-fatal accidents inside the mines	47
Number of non-fatal accidents outside the mines	13
Number of mine managers certificates issued	27
Number of pit boss certificates issued	23
Number of fire boss certificates issued	44

Throughout the various coal mining districts of the Province, there has been during the year a considerable amount of development work and opening up of new mines, etc., of which the following summary is published by the Provincial Inspector of Mines:—

'At Taber a number of the small companies have consolidated, and three larger and more substantial companies formed, viz., The Great Western Coal Company, The Alberta Consolidated Coal Company, Limited, and The Rock Springs Sootless Coal Company, Limited. All three of these Companies have installed good sized plants, including complete compressed air plants and coal mining machines, and two of them have already procured railway facilities.

'In the Lethbridge district, the Diamond Coal Company, Limited, have completed the installation of their plant, put in a spur line of railway, and are now in a position to push the development of their mine ahead, which will put them in a position to produce a much larger output during the coming year. The Royal Collieries, Limited, are pushing the development of their mine ahead rapidly, and are getting it into shape for a much larger output. The new plant of the Alberta Railway and Irrigation Company, at their No. 6 mine, has been completed, and the development of the mine is being carried out on a large scale.

'In the Crowsnest pass, the Leitch Collieries, Limited, have opened a new mine, erected a tipple, and obtained railway connexions. At Burmis, there is another mine opened by the Davenport Coal Company, who have procured railway connexions. At Blairmore, a new mine has been opened by The West Canadian Collieries, Limited, which should develop into a large mine. West of Coleman, the McGillivray Creek Coal and Coke Company, Limited, a new company which has been formed, has opened a mine on a 12 ft. seam of coal, and a new tipple and plant are in course of erection.

'In the Pincher Creek district, the Western Coal and Coke Company, Limi-

ted, have had a gang of about thirty men prospecting the coal seams on their property during the last few months, and are now opening permanent tunnels.

'West of Edmonton, along the Grand Trunk Pacific railway, a number of companies which have recently been organized, have secured extensive properties, and have done considerable work in proving the coal seams. At least two of these companies have ordered machinery and are making preparations to develop their mines, and I understand will have railway connexions during 1910, which will place them in a position to produce a fair amount of coal by the end of the year.'

More complete details may be obtained from the report of the Provincial Inspector of Mines[1].

Amongst the developments of particular interest are those that have taken place on the new coal finds in the foothills of the Rocky mountains, on the Bighorn basin, Brazeau river, Pembina river, etc., to the south of the Grand Trunk Pacific railway. These fields have been under investigation by Mr. D. B. Dowling, of the Geological Survey, a preliminary report on which will be found in the Summary Report of the Geological Survey for 1909. Mr. Dowling summarized his conclusions as follows:—

'South of the Grand Trunk Pacific Railway line, in the foothills, there are coal fields of large extent. Of these, the nearest to the railway is situated in the outer portion of the disturbed foothills area. From it domestic, and a fair grade of steam coal may be obtained. The area is situated on the headwaters of Embarras and Pembina rivers, and may be of larger extent than outlined on the accompanying sketch map. Over a portion of this area a seam of from 12 to 17 feet can be mined.

'Higher grade steam and coking coals may be obtained from more distant fields, to which approach is more difficult, since they are situated behind high, rocky ridges. The areas containing the best grade of coal extend in narrow strips from the Saskatchewan river to near the Athabaska, behind the Brazeau, Bighorn, and Nikanassin ranges, respectively. The parts which seem minable, and easy of approach through gaps in these ridges may be outlined as: the Brazeau Range area, on the Saskatchewan; the Bighorn basin, from the Saskatchewan to the Brazeau rivers; and the southern part of the Nikanassin basin, drained by the McLeod and North branch of the Brazeau rivers. These areas may not be minable outside a strip which is not much over a mile in width, but they have a total length of nearly eighty miles. A section of the measures near the Saskatchewan shows nearly 100 feet of workable coal, in about nine seams. Northward, the seams possibly decrease in thickness and number, but on the McLeod the upper part of the coal-bearing horizon was observed to have about 20 feet of coal seams. This may be added to by further prospecting.

'The character of the coal is remarkably uniform; and in almost all parts of the field, coking coals that yield 75 per cent of coke may be found. The Fiddle Creek portion, at the northern end of the Nikanassin basin, has not been examined, but it is reported that coal has been found at points within half a

[1]Annual Report of the Department of Public Works of the Province of Alberta, 1909.

mile of the Athabaska. Possibly there are anthracitic coals in this part of the basin, but the location of minable areas is considered to be of more importance than the finding of harder coals.'

The general character of the coal is thus summarized:—

'The coal of the Kootanie measures in the Bighorn basin has been carefully examined by several prospectors, and analyses have been published in the Summary Reports for 1907 and 1908, which show that it is a bituminous, or steam coal, with a high carbon content, not generally high in ash, and always low in sulphur. Practical tests with a small coke oven on Bighorn river show that a very high grade of coke can be made. Northward, in places, the fixed carbon content is higher, but it seldom approaches that of an anthracite coal.

'The coal of the Edmonton measures in the foothills on Pembina and Embarras rivers is of lower carbon content, and approaches what might be termed a low carbon bituminous coal. Its coke is not as firm as that from the coal fields nearer the mountain. This might be expected, as the measures are younger and have not been subjected to great pressure.'

'DISTRIBUTION.

'In the Kootanie measures the coal seams found near the Saskatchewan are well distributed throughout the formation. There appears to be in nine seams a total thickness of 90 feet of workable coal. On George creek, one of the forks of the south branch of Brazeau river, Mr. McEvoy found ten seams, with 65 feet of workable coal. Near the north end of the range on Wapiabi creek, Mr. Malloch last year discovered four seams near the top of the formation, with about 26 feet of coal. On the north branch of the Brazeau, four seams are exposed in the same part of the measures, and on McLeod river the coal is apparently all in the upper measures.

'In the upper part of the Cretaceous, as exposed in the foothills on the Embarras and Little Pembina rivers, the coal seams occur in the Edmonton formation—the horizon in which the Big coal seam on the Saskatchewan, and that at the railway crossing on the Pembina occur.'

British Columbia.

A larger output of coal was derived from British Columbia mines in 1909 than in any previous year. The total production was 2,606,127 short tons (2,326,899 long tons), of which about 31·9 per cent was sold for export, the balance being used for home consumption and in the making of coke, of which a portion is also exported. The increase in production over that of 1908 was 272,419 short tons, or about 11·7 per cent. The total increase of production in ten years has been about 89·1 per cent. The quantity sold for export in 1909 is about the same as ten years ago, while the coal consumption of the Province has increased in the same time about 200 per cent. Of the total production in 1909, about 1,927,602 tons, or 74 per cent, were sold as coal, including coal sold for home consumption and for export; 439,290 tons, or 17 per cent, were used in making coke, and 239,235 tons, or 9 per cent, used for colliery consumption and by workmen.

The collieries of the Crows Nest Pass Coal Company in East Kootenay, and the Western Fuel Company and the Wellington Colliery Company on Vancouver island, contributed about 80 per cent of the total production.

The balance was mined from some seven smaller collieries, that are referred to by the Provincial Mineralogist in his Annual Report, as follows:—

'In the Coast district, among the newer collieries that are beginning to make an appreciable output may be mentioned the Nicola Valley Coal and Coke Company, which shipped in 1909 some 62,210 tons of coal, and this production was limited by the market which the Canadian Pacific Railway freight rates would allow it to reach, rather than by the capacity of the mines. Adjoining this colliery is the Diamond Vale Colliery Company's property, which, though still in a state of development, mined in 1909 some 1,700 tons of coal.

'Vermilion Forks Mining and Development Company, of Princeton, mined 150 tons of coal in 1909.

'On Vancouver island, the Pacific Coast Coal Mines, Limited, mined at South Wellington, a few miles south of Nanaimo, some 69,055 tons of coal. Railway and bunkers have been built at Boat harbour.

'Gilfillan colliery shut down; Henry Biggs, as an individual, produced 1,236 tons of coal from the property.

'In the East Kootenay field, the Hosmer and Corbin collieries each produced about 60,000 tons of coal during the year; neither of these collieries is as yet in full operation.

In the following table the production during the past two years is given, the sales in Canada and sales for export being given, as well as the quantity used for making coke and that used for colliery consumption. A distinction is also made between the production from the Coast mines and that in the East Kootenay and Nicola Valley districts.

Coal.	1908.			1909.		
	Coast.	Crowsnest and Nicola Valley.	Total.	Coast.	Crowsnest and Nicola Valley.	Total.
		Long tons.			Long tons.	
Sold for consumption in Canada	703,931	227,998	931,929	781,177	198,229	979,406
" export to United States	300,445	266,829	567,274	324,728	353,430	678,158
" " other countries	29,883	.....	29,883	63,509	.....	63,509
	1,034,259	494,827	1,529,086	1,169,414	551,659	1,721,073
Used for making coke.....	25,172	354,460	379,632	26,760	365,463	392,223
" colliery consumption...	49,975	124,975	174,950	70,625	142,978	213,603
Production.....	1,109,406	974,262	2,083,668	1,266,799	1,060,100	2,326,899

In Table 15 the statistics of coal production in British Columbia since 1836 are given. The total production to the end of 1909 has been 36,776,164 tons, of which 20,455,415 tons, or 55·6 per cent, have been produced during the past ten years. The average annual production during this period was 2,045,541 tons, as

compared with an average annual production of 1,081,764 tons during the ten year period 1890-1899.

COAL.—TABLE 15.

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, 2,240 lbs.	Price per ton, 2,240 lbs.	Value.
						$ cts.	$
1836–52...	10,000	From 1836 to 1873, inclusive, the output is taken as production.			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				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	768,927	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	619,860	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
1909.....	2,388,196	1,585,232	741,667	2,326,899	2,606,127	3 50	8,144,147

* 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 t has not been possible to find out the cause of the difference.

§ Two months only.

The coal fields of British Columbia, more particularly those of the Rocky Mountain district, have been very completely described by Mr. W. F. Robertson in his last annual report.[1]

The developed collieries include those of the Crows Nest Pass Coal Company in operation since 1898, the Hosmer Mines, Limited, and the Corbin Coal and Coke Company, each active producers since 1908. Statistics of the production of these several collieries are published as in the following tables:—

Production of Crows Nest Pass Coal Company—Gross Annual Output of Coal in tons of 2,240 pounds.

Year.	Coal Creek.	Carbonado.	Michel.	Total.
1898	9,954	.....	.....	9,954
1899	102,610	.....	.....	102,610
1900	196,837	.....	9,966	206,803
1901	322,245	.....	.....	322,245
1902	238,776	41,332	113,853	393,961
1903	215,791	138,750	235,347	589,888
1904	345,901	81,528	235,256	662,685
1905	425,493	96,934	309,505	831,932
1906	426,793	20,159	273,497	720,449
1907	522,783	220	353,728	876,731
1908	441,003	23,279	412,185	876,467
1909	379,968	32,287	390,462	802,717
	3,628,154	434,489	2,333,799	6,396,442

Gross Annual Output of Coke, in tons of 2,240 pounds.

Year.	Coal Creek.	Carbonado.	Michel.	Total.
1898	361	.....	.....	361
1899	29,658	.....	.....	29,658
1900	65,915	.....	.....	65,915
1901	111,683	.....	.....	111,683
1902	78,490	.....	29,347	107,837
1903	84,321	625	64,818	149,764
1904	118,551	4,621	95,685	218,857
1905	123,593	7,826	124,705	256,124
1906	93,171	.....	96,214	189,385
1907	88,775	.....	117,766	206,541
1908	102,322	.....	131,776	234,098
1909	117,268	.....	106,174	223,442
	1,014,108	13,072	766,485	1,793,665

[1] Annual Report of the Minister of Mines, British Columbia, 1909.

Production of Hosmer Colliery and Corbin Colliery—Gross Output of Coal and Coke, in tons of 2,240 pounds.

Year.	Hosmer Colliery.		Corbin Colliery.	
	Coal.	Coke.	Coal.	Coke.
1908	2,627	771	4,111	
1909	60,324	21,575	60,824	

Complete statistics of the production of each colliery, with one exception, have been published by the British Columbia Bureau of Mines, from which the following statement has been compiled:—

Coal Production by Collieries in British Columbia in 1909, in tons of 2,240 pounds.

Operator.	Name of Mine.	Sales.	Used in making Coke.	Used under Colliery boilers, etc.	Total Sales and Used.	Output.
The Western Fuel Co.	Protection	316,010		29,819	345,829	340,367
	Northfield	125,162		28,353	153,515	152,320
Wellington Collieries Co., Ltd.	Extension, Union				*	*
Pacific Coast Coal Mines, Ltd.	Fiddick	52,447		3,860	56,307	67,045
	Suquash	540		420	960	2,010
The Vancouver-Nanaimo Coal Mg. Co., Ltd.	New East Wellington	8,636		500	9,136	9,336
Nicola Valley Coal and Coke Co., Ltd.	Middlesboro	61,546		545	62,091	62,210
Vermilion Forks Mg. and Dev. Co., Ltd.	Princeton	120		20	**140	150
Crows Nest Pass Coal Co., Ltd.	Coal Creek	178,678	172,944	28,511	380,133	379,968
	Michel	207,815	157,245	25,546	390,606	390,462
	Carbonado	31,467		1,301	32,768	32,287
Hosmer Mines, Ltd.	Hosmer	11,643	35,275	12,180	59,098	60,324
Corbin Coal and Coke Co., Ltd	Corbin	60,192		632	60,824	60,824
Diamond Vale Colliery Co.	Diamond Vale					1,700

* Permission for publication refused.
** This Company began operations in December.

Yukon.

The coal production of the Yukon in 1909 is reported as 7,364 tons, valued at the mine at $49,502. Active mining operations were carried on only by the Tantalus Coal Company, at Tantalus, in the southern Yukon, and by the Northern Light, Power, and Coal Company, Limited, operating on Coal creek, forty miles northwest of Dawson. Run of mine coal sold in Dawson at about $10 a ton, and screened coal, $18.

Statistics of production since 1901 are shown in Table 16 following:—

COAL.—TABLE 16.

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
1909	7,364	49,502	6 72

† Part of this production was mined in 1900.

The Whitehorse and Five Fingers coal mines in southern Yukon were not operated in 1909. The coal fields of this district at Whitehorse, Five Fingers, and Tantalus have been described by Mr. D. D. Cairnes, of the Geological Survey.[1]

During the season of 1909, Mr. Cairnes found coal outcroppings in the Wheaton River district, south of the Whitehorse deposits, his description of the area being as follows:—

'BUSH MOUNTAIN COAL AREA.

'The Tantalus conglomerates which, in the southern Yukon, are known to be coal-bearing, were found outcropping about one mile west of the Union mines, on the ridge joining Bush mountain and Idaho hill, and search was made for coal, which, if found in this locality, would be of considerable value. Three seams were discovered: one over 6 feet, one 18 inches, and one of unknown thickness, but at least 3 feet. There were indications of other seams; but as the ground was frozen and the coal deeply covered, to have made a section of the measures, or even to have determined the thickness of the different beds of coal, would have entailed a very considerable amount of work. The measures were traced from the summit of the ridge to near the valley bottoms of Schnabel and Follé creeks, on the south and north sides respectively. These creeks are here two miles apart, and, opposite the coal, are about 2,000 feet lower than the summit of the ridge between them. The belt of coal-bearing formation is about half a mile wide, and the rocks comprising it are much folded and disturbed. The coal, which is bituminous and of the same age as that at Whitehorse and Tantalus, should make a good fuel.'

[1] Report on a portion of the Conrad and Whitehorse Mining District, Yukon, D. D. Cairnes, Geological Survey, 1908.

LABOUR AND ACCIDENTS.

This Department does not receive direct reports of mine accidents, and the labour statistics received are incomplete. The following tables, therefore, relating to labour and accidents in Canadian collieries are compiled from the published reports of Provincial mining bureaus.

The total number of persons engaged in coal mining, including the employes both above and below ground, may be taken as approximating very closely to 24,000, of whom about one-half are employed in Nova Scotia and New Brunswick, and the others in the western provinces.

The total number of accidents reported from Nova Scotia, Alberta, and British Columbia in 1909 was 344, of which 100 proved fatal and 244 more or less serious.

In Nova Scotia there were 112 accidents during the fiscal year ending September, of which 34 proved fatal. One-half of the fatal accidents were caused by falls of coal or rock, as were also 48 of the non-fatal accidents. No accidents were credited to gas explosions, and only three non-fatal to the use of explosives. In British Columbia, the total number of accidents was 163, of which 57 were fatal and 106 more or less serious. Thirteen fatal and 33 non-fatal accidents were due to falls of rock or coal. Thirty-two fatal and seven slight accidents were due to gas explosion. These thirty-two men lost their lives in the disastrous explosion that took place on October 5 at Extension colliery of the Wellington Colliery Company. Reports of special investigations into this disaster will be found in the British Columbia Bureau of Mines Report for 1909. Only one fatal and four non-fatal accidents were credited to the use of explosives in this Province.

Number and Classes of Workmen employed at each mine in Nova Scotia, year ended September 30, 1909.

Company.	Underground.				Surface.				Construction.				Totals.		Horses.		Pit Days.
	Skilled labour.	Labourers.	Boys.	Days.	Skilled labour.	Labourers.	Boys.	Days.	Skilled labour.	Labourers.	Boys.	Days.	Persons.	Days.	Above.	Below.	Worked.
Dominion Coal Co	2,157	1,190	300	910,545	440	289	47	194,435	....	....	....	.....	4,433	1,104,980	90	432	294
N. S. Steel & Coal Co	952	650	185	463,941	136	162	23	96,897	....	....	....	.....	2,108	560,838	13	473	275
" " Pictou	37	38	5	9,555	9	8	....	3,333	....	....	....	.....	97	12,888	2	.....	144
Cumberland Ry. & Coal Co.	578	469	138	258,578	150	293	35	88,839	....	....	....	.....	1,663	347,417	18	76	237
Acadia Coal Co	278	327	80	206,362	58	190	13	96,345	....	....	....	.....	946	302,707	37	49	256
Intercolonial Coal Co	302	221	72	160,903	65	125	27	64,804	3	3	....	230	818	225,937	11	35	294
Mar. Coal, Ry. & P. Co., Joggins	104	61	2	49,850	21	50	12	25,794	....	....	....	.....	250	75,644	3	5	298
" " Chignecto	82	45	13	35,712	11	35	7	12,215	....	....	....	.....	193	47,927	2	6	289
Inverness Ry. & Coal Co.	350	148	25	139,836	44	60	12	31,562	....	....	....	.....	629	171,398	6	25	261
Mabou & Gulf Coal Co	15	13	....	1,371	13	4	....	1,341	....	....	....	.....	45	2,712	....	.....	78
Sydney Coal Co	9	6	....	3,046	2	2	....	1,322	....	....	....	.....	19	4,368	1	1	243
McKay Mining Co	25	5	1	8,511	4	5	....	2,532	1	....	....	28	41	11,071	1	2	271
North Atlantic Collieries	86	54	16	37,468	13	44	6	15,351	3	11	....	3,121	233	55,940	8	20	237
Port Hood Coal Co	100	89	9	49,755	28	33	3	16,758	....	....	....	.....	262	66,513	6	8	250
Great Northern Coal Co	13	3	1	2,804	6	1	....	1,592	1	....	....	180	25	4,576	2	.....	300
Minudie Coal Co	108	10	18	28,878	12	16	4	8,123	2	....	....	445	170	37,446	3	1	210
Strathcona Coal Co	32	39	4	7,618	7	13	2	1,595	....	....	....	.....	97	9,213	1	4	74
Atlantic Grindstone & Coal Co.	2	2	....	654	2	.....	.....	472	....	....	....	.....	6	1,126	.....	.....	152
Colchester Coal Co	.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....	.....	.....
Eastern Coal Co	25	8	1	8,691	6	6	2	4,038	....	....	....	.....	48	12,729	....	1	217
Colonial Coal Co	.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....	.....	.....
	5,255	3,378	870	2,384,078	1,027	1,336	193	667,348	10	14	....	4,004	12,083	3,055,430	204	1,138	40

Number of hands employed in coal mining in British Columbia in 1909.

—	Coast Collieries and Nicola Valley.		East Kootenay Collieries.		Total.
	Underground.	Aboveground.	Underground.	Aboveground.	
Supervision and clerical assistance.	62	56	60	37	215
Whites, miners	1,479	9	806		2,294
Miners helpers	551		170		721
Labourers	551	96	202	370	1,219
Mechanics and skilled labourers.	114	224	476	268	1,082
Boys	126	51	23	15	215
Japanese	70	55			125
Chinese	20	524			544
Indians	3				3
	2,976	1,015	1,737	690	6,418

Accidents in Canadian Collieries, 1909.

Nature of Accident.	Nova Scotia.*		Alberta.			British Columbia.		
	Fatal.	Non-fatal.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.
Fall of coal, rock	17	48	3	14	4	13	20	13
Gas or dust explosions				1	6	32		7
Explosives		3		1	3	1	1	3
Miscellaneous	17	27	6	26	5	11	26	36
Total	34	78	9	42	18	57	47	59
Total men employed	12,083		5,207			6,418		

* Twelve months ending Sept., 1909.

Table showing Accidents in British Columbia[1] Collieries in Ten Years, 1900-1909.

Year.	Men Employed.	Coal Output.	Nature of Injury.	Explosion (cause unknown.)	Gas explosions.	Falls of coal.	Fall, rock.	Mine cars.	Mine timber.	Hoisting, ropes, etc.	Powder, etc., explosion.	Underground—Miscellaneous.	On surface—Miscellaneous.	Fire in Mine.	Total.	Grand Total.
1900	4,178	1,590,179	Fatal.	0	0	2	6	4	0	1	1	0	3	0	17	
			Serious.....	0	2	14	15	7	1	0	3	0	1	0	43	
			Slight	0	22	3	3	3	1	0	6	0	0	0	38	
																98
1901	3,974	1,691,557	Fatal.	64	2	6	6	3	0	0	0	0	2	19	102	
			Serious.....	0	2	9	8	5	2	2	4	0	2	0	34	
			Slight	0	12	2	4	5	0	0	6	0	2	0	31	
																167
1902	4,011	1,641,626	Fatal.....	125	1	1	7	3	2	0	0	0	0	0	139	
			Serious.....	0	0	4	6	6	0	2	0	0	3	0	21	
			Slight	0	8	1	2	5	0	0	1	0	1	0	18	
																178
1903	4,264	1,481,913	Fatal.....	0	21	4	8	5	1	0	1	0	2	0	42	
			Serious.....	0	0	5	8	7	2	4	7	0	0	0	33	
			Slight	0	16	2	4	2	0	1	0	0	1	0	26	
																101
1904	4,453	1,685,698	Fatal.....	14	7	5	4	3	0	0	1	0	3	0	37	
			Serious.....	0	0	12	7	15	2	2	0	0	3	0	41	
			Slight	0	8	1	1	5	0	0	1	0	0	0	16	
																94
1905	4,407	1,825,832	Fatal... ...	0	0	2	4	3	1	0	1	0	1	0	12	
			Serious.....	0	0	8	6	9	2	0	1	2	2	0	30	
			Slight	0	9	3	1	8	0	1	3	1	0	0	26	
																68
1906	4,805	1,899,076	Fatal.	0	0	5	7	2	0	0	0	0	1	0	15	
			Serious.....	0	0	6	8	13	1	2	1	2	3	0	36	
			Slight	0	1	3	7	13	1	1	1	3	2	0	32	
																83
1907	6,059	2,219,608	Fatal.....	0	1	8	2	8	0	0	1	1	10	0	31	
			Serious.....	0	1	15	7	22	4	0	2	1	9	0	61	
			Slight	0	18	7	8	15	1	3	4	4	2	0	62	
																154
1908	6,095	2,109,387	Fatal.....	0	1	3	5	1	1	1	0	4	2	0	18	
			Serious.....	0	0	6	10	19	3	4	2	2	4	0	50	
			Slight	0	8	10	7	15	0	0	4	5	3	0	52	
																120
1909	6,418	2,400,600	Fatal.....	0	32	7	6	6	0	0	1	2	3	0	57	
			Serious.....	0	0	7	13	17	2	0	1	2	5	0	47	
			Slight	0	7	4	9	24	3	3	3	2	4	0	59	
																163
1900-9	48,674	18,545,476	Fatal.....	203	65	43	55	38	5	2	6	7	27	19	470	
			Serious	0	5	86	88	120	19	16	21	9	32	0	396	
			Slight	0	109	36	46	95	6	9	39	15	15	0	360	
																1,226

[1] British Columbia Minister of Mines Report 1909.

COKE.

The total output of oven coke in 1909 was 871,727 tons, produced from 1,327,150 tons of coal; as compared with an output of 852,296 tons in 1908, produced from 1,315,904 tons of coal. The quantity of coke sold or used by the producer in 1909 was 862,011 tons, as compared with 858,257 tons in the previous year.

The production is derived almost entirely from domestic coal in the three Provinces of Nova Scotia, Alberta, and British Columbia, although during 1909 a quantity of imported coal was used by the Dominion Iron and Steel Company at Sydney, C.B.

The consumption of coke in Canada is much in excess of the domestic production, there being a considerable importation of coke, chiefly into Ontario and Quebec, for use in the metallurgical industries.

The imports during the calendar year 1909 were 661,425 tons, and the exports 74,067 tons. These figures, taken in conjunction with the production of 862,011, would indicate a consumption of about 1,449,369 tons. Similarly estimated, the consumption in 1908 was 1,285,228 tons.

With one or two exceptions, of which the Dominion Iron and Steel Company is the chief, the coke is produced by coal mining companies, and in ovens situated in proximity to the mines.

Statistics of coke production during the past three years are given in the following tables, in which is shown for each province, the quantity of coal used, the coke made, the quantity sold or used, and the stocks on hand, etc.

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

Coke Production, 1909.

Nova Scotia.....	756,719	493,184	209	401	492,992	1,608,092
Alberta.....	131,142	87,812	750	1,329	87,233	366,734
British Columbia...	439,289	290,731	10,170	19,115	281,786	1,509,567
Totals.....	1,327,150	871,727	11,129	20,845	862,011	3,484,393

Table 1 shows the annual production since 1886, and Table 2 the production by provinces since 1897.

COKE.—TABLE 1.

Annual Production, 1886-1909.

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
1909	862,011	3,484,393	4 04

COKE.—TABLE 2.

Production of Coke by Provinces, 1897-1909.

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	111,000	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	884,094	189,573	846,310	.....	.....
1904	275,927	808,022	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
1909	492,992	1,608,092	281,786	1,509,567	87,233	366,734

Coke production in Nova Scotia has shown successive decreases during the past two years, the production in 1909 being only slightly higher than that in 1906; in the western provinces, on the other hand, an increased production is shown. The coke output of Nova Scotia is used almost entirely in connexion with the manufacture of iron, while that of Alberta and British Columbia is used chiefly by the copper and lead smelters, finding a market in the United States as well as in British Columbia.

The total number of ovens in active operation on December 31 was 1,645, while 972 were reported idle on the same date and 120 in course of construction. In Nova Scotia, the Dominion Iron and Steel Company at Sydney has 500 finished ovens and 120 in course of construction, all of the Otto Hoffman by-product type.

It is claimed that the new ovens will be much more efficient than the old, that whereas the 500 old ovens with 200 men produced 1,250 tons of coke per 24 hours, the 120 new ovens with 56 men will produce 720 tons in the same time. The by-products from these ovens include 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. The production of tar in 1909 was 4,016,824 gallons, and ammonia liquor containing 3,351 tons of sulphate of ammonia. In 1908, the production of tar was 4,450,166 gallons, and of sulphate of ammonia, 2,984 tons.

The Nova Scotia Steel and Coal Company has 30 ovens of the Bauer type and 120 Bernard ovens; the latter are situated near the blast furnace, and the surplus gas used for the production of steam for the electric power plant. The surplus gas from the Bauer ovens is used in generating steam for general colliery use.

The other ovens in this Province number 181, and are all of the beehive type.

In Alberta, the West Canadian Collieries, Limited, at Lille, has 50 ovens of the Bernard type, or Belgian ovens. The ovens of the International Coal and Coke Company at Coleman, 216 in number, are the ordinary beehive, as are also all of the ovens in British Columbia, comprising 1,420 in the Crowsnest district and 100 on the Coast.

The distribution of the coke production during the past two years is shown in the following table:—

	1908.			1909.		
	Nova Scotia.	Alberta and British Columbia.	Total.	Nova Scotia.	Alberta and British Columbia.	Total.
Sold in Canada	6,412	287,930	294,342	6,027	291,453	297,480
Sold for export	.....	64,398	64,398	.....	77,407	77,407
Total sales	6,412	352,328	358,740	6,027	368,860	374,887
Used by maker in blast furnace or otherwise	499,517	.....	499,517	486,965	159	487,124
Total sold or used	505,929	352,328	858,257	492,992	369,019	862,011

Statistics of exports and imports of coke, as published by the Customs Department, are shown in Tables 3 and 4 following. The exports are almost altogether from British Columbia, and recently from Alberta, and the imports are from the United States, chiefly for consumption in the iron and steel and smelting industries of Ontario and Quebec.

COKE.—TABLE 3.

Exports of Coke to the United States, 1897-1909.

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
1909	74,067	329,051

COKE.—TABLE 4.

Imports of Oven Coke, 1880-1909.

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	619,269	2,166,036
1894	42,864	176,996	1909†	466,292	1,136,624

* For nine months only. † Duty free.

Coke is manufactured from coal mined in five of the coal basins in 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 in 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 five 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
1909	65·24	59·17	66·96	67·67	58·26
Average	64·60	53·02	64·47	64·70	51·32

The average has been computed from the total coal charged during the five 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 beehive 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 beehive ovens are used. On Vancouver island the coke is made in beehive 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.

GRAPHITE.

The total shipments of refined graphite in 1909 were returned as 864 tons, valued at $47,800, an average value per ton of $55.32. No shipments of crude ore were reported. In 1908, the total shipments were 251¼ tons valued at $5,565, of which, 250 tons valued at $5,400 were crude ore and 1¼ tons valued at $165 refined graphite. The 1907 shipments comprised 459 tons of ore valued at $11,000, and 120 tons of refined product valued at $5,000.

Statistics of the 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	1909	864	47,800

*Exports.

The graphite shipments in 1909 comprised 134 tons valued at $10,176, from mills in the Buckingham district, Que., and 730 tons valued at $37,624 from Ontario mills. The production in Quebec Province was mainly the result of development work and experimental mill work.

In Ontario, the Black Donald mine at Whitefish lake, 14 miles from Calabogie, was operated by the Black Donald Graphite Company, Limited. This Company refines all its product, which finds a market in the United States and Europe, as well as in Canada. The mill is operated throughout the year, and the mine for about three months. Power for the mine and mill is developed at the Madawaska river, 2 miles distant. Shipments are made from Calabogie station.

The Globe Refining Company, Limited, operated a mine and mill near Port Elmsley, Lanark county.

There appears to be a growing demand for graphite, and some inquiry has recently been received from England for supplies of this mineral.

The exports of graphite, according to customs returns, are shown in Table 2. These are classified as crude ore and concentrates, and manufactures. The ore and concentrates exported in 1909 are given as 1,004 tons, valued at $52,438, and manufactures of graphite as $864, or a total valuation of $53,302. Of the ore and concentrates exported 83 tons, valued at $9,035, were reported as shipped to Great Britain; 905 tons, valued at $41,558, to the United States, and 16 tons, valued at $1,845, to other countries.

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
1909	1,004	52,438	864	53,302

Statistics of imports of graphite into Canada, given in Table 3, show an importation principally of manufactured graphite products to a value of $76,548 during the fiscal year 1909, and a valuation of $83,592 during the previous fiscal year.

The imports of graphite during the calendar year 1909 were valued at $94,392, and comprised, plumbago, not ground, $5,075; black lead, $11,638; plumbago, ground, and manufactures, $37,538; and crucibles, clay, or plumbago, $40,141.

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
1909	1,408	11,009	26,918	37,213	76,548

The market for graphite in Great Britain is to some extent indicated by the imports into that country which are shown as follows:—

Imports of Plumbago into Great Britain, 1909.[1]

Country Whence Consigned.	Tons (short.)	Value.	Value per Ton.
		$	$
Germany	2,172	91,094	42
France	321	20,659	64
Italy	1,217	26,173	21½
Austria-Hungary	413	18,279	44
Japan	4,052	106,147	26
United States	326	32,042	98
Other foreign countries	704	29,862	42
British India	2,044	141,815	69
Ceylon and dependencies	7,237	690,434	95
Australia	71	16,790	236
Canada	71	7,957	112
Other British possessions	14	949	68
Total	18,642	1,182,201	63

[1] British Trade Report, 1909.

Prices of refined graphite in London as quoted in the 'Mining Journal' of December 31, 1909, were as follows:—

PURIFIED, MILLED, AND GROUND

Ceylon,	97 to 99	per cent,	£59 to	£63	per ton	c.i.f.,	London.
"	90 to 91	"	40 to	42	"	"	"
"	80 to 81	"	30 to	32	"	"	"
"	70 to 71	"	27 to	28	"	"	"
American	large flake,		45 to	49	"	"	"
"	small	"	35 to	45	"	"	"

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; in 1908, 428,540 pounds, and in 1909, 513,436 pounds.

GYPSUM.

The total shipments of gypsum products in 1909, including crude, ground, and calcined gypsum, were 473,129 tons, valued at $809,632; as compared with 340,964 tons, valued at $575,701, in 1908, an increase of 38·8 per cent in quantity and of 40·6 per cent in total value.

The total quantity of crude gypsum mined in 1909 was 493,086 tons, as compared with 375,444 tons in 1908. The quantity calcined in 1909 was reported as 63,670 tons, as compared with 48,727 tons in 1908. The 1909 shipments included 423,474 tons of crude gypsum of an average value of $1.08 per ton; 8,814 tons of ground gypsum, at an average value of $2.97, and 40,841 tons of calcined product at an average value of $7.99 per ton.

The total quantity of the gypsum mined, and the quantity calcined during the past five 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
1909	493,086	63,670

A very large part of the gypsum mined is shipped in lump form as quarried to calcining mills in the United States. From 8,000 to 10,000 tons are ground for use as land plaster, etc., while the balance, about 12 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 chief centres of production are as usual in the Provinces of Nova Scotia and New Brunswick, the output from which finds a ready market, mainly in the New England States and principally as crude gypsum. The calcined product of these Provinces finds a market throughout Canada. Small quantities are mined in Ontario and Manitoba, the greater part of which is sold calcined.

The United States tariff on gypsum was reduced in August, 1909, that on crude gypsum from 50 cents a ton to 30 cents a ton, and on ground or calcined gypsum from $2.25 per ton to $1.75 per ton.

The present United States tariff on gypsum and gypsum products is defined in the following clause:—

'Plaster rock or gypsum, crude, thirty cents per ton; if ground or calcined, one dollar and seventy-five cents per ton; pearl hardening for paper makers' use, twenty per centum ad valorem; Keen's cement or other cement of which gypsum

is the component material of chief value, if valued at ten dollars per ton or less, three dollars and fifty cents per ton; if valued above ten dollars and not above fifteen dollars per ton, five dollars per ton; if valued above fifteen dollars and not above thirty dollars per ton, ten dollars per ton; if valued above thirty dollars per ton, fourteen dollars per ton.'

It is expected that the reduced tariff will result in a largely increased production of gypsum from Nova Scotia and New Brunswick.

Detailed statistics of the production and sales during the past five 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.

GYPSUM.—TABLE 1.

Sales and Shipments of Crude, Ground, and Calcined Gypsum, 1905-1909.

—	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
1909	423,474	457,038	1 08	8,814	26,159	2 97

—	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
1909	40,841	326,435	7 99	473,129	809,632	1 71

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	1909	473,129	809,632	1 71

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	4,320	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	230,433	81,620	191,312	10,389	42,456	14,500	111,500
1909	345,682	364,379	98,716	226,975	11,731	48,278	17,000	170,000

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. The statistics given in Table 6 cover the fiscal year ending March, 1909. The imports during the calendar year 1909 include crude gypsum, 3,958 tons, valued at $12,507; ground gypsum, 10,737 tons, valued at $16,779, and plaster of Paris, 19,116 tons valued at $112,429, or a total tonnage of 33,811 and a total value of $141,715.

The imports of plaster of Paris previous to 1905 were comparatively small, ranging from only $2,500 to $8,000 in value annually; since that year, however, these imports have risen to an annual value of over $112,000.

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
1909							315,201	372,286

* 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	1904	2,333
1891	588	1898	6,448	1905	2,673
1892	20,255	1899	8,123	1906	2,934
1893	22,132	1900	19,834	1907	557
1894	20,054	1901	15,337	1908	9,765
1895	22,233	1902	5,101	1909	2,787
1896	21,267	1903	12,457		

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	140,330	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	1,968,600	1,799	12,866,500	43,742
1907 (9 mos.)	9,189	23,410	609,600	1,619	19,849,400	58,364
1908	9,393	36,510	382,500	1,781	15,020,000	51,328
1909	10,317	35,268	6,286,200	5,765	17,009,000	64,849

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 1909 was 357,813 tons, as compared with 254,540 tons in 1908, and 351,611 tons in 1907. Of the total in 1909, about 85 per cent was mined from quarries in Hants county at Windsor, Walton, Cheverie, Noel, etc., the balance being quarried at St. Ann, Victoria county, and Cheticamp, Inverness county. In New Brunswick the principal operating quarries are located at Hillsborough, some production being also made from the Tobique River deposits in Victoria county. The total crude gypsum mined in the Province in 1909 was 99,539 tons, as against 90,015 tons in 1908.

In Ontario, 10,734 tons were reported as having been mined during 1909, and in Manitoba, 22,000 tons. The output in both these Provinces is practically all calcined.

Following is a list of active operators:—

Location of Quarry.	Name of Operator.	Address.
St. Ann, N.S.	Victoria Gypsum Mining and Mfg. Co.	Quarry St. Ann, N.S.
Cheticamp, N.S.	Great Northern Mining Co., Ltd.	Eastern Harbour, N.S.
Cheverie and Walton, N.S.	Albert Parsons	Walton, N.S.
Newport Station, N.S.	Windsor Gypsum Co.	Windsor, N.S.
Eagle Swamp, N.S	Wentworth Gypsum Co., Ltd.	"
Burtons, N.S.	Windsor Plaster Co., Ltd	"
Threemile Plains, N.S.	Nova Scotia Gypsum Co., Ltd.	Threemile Plains, N.S.
Nappan, N.S.	Maritime Gypsum Co., Ltd.	New York, No. 1, Madison
Noel, N.S.	Noel Plaster Co.	Noel, N.S. [Ave.
Avondale, N.S.	Newport Plaster Mining and Mfg. Co.	Windsor, N.S.
McKinnon Harbour, N.S.	Newark Plaster Co.	McKinnon Harbour, N.S.
Hillsborough, N.B.	Hillsboro Plaster Co.	Windsor, N.S.
Hillsborough, N.B.	Albert Manufacturing Co.	Hillsborough, N.B.
Tobique River, N.B.	John E. Stewart	Andover, N.B.
Caledonia, Ont.	Alabastine Co., Paris, Ltd	Paris, Ont.
Cayuga, Ont.	Imperial Plaster Co., Ltd.	Toronto, King St. West, Ont.
Gypsumville, Man.	Manitoba Gypsum Co., Ltd.	Winnipeg, Man.

MANGANESE.

No return was received of any production or shipment of manganese during 1909, although three tons valued at $434 are reported by the Customs Department as having been exported.

The manganese industry was at one time of considerable magnitude in the Provinces of Nova Scotia and New Brunswick, particularly during the decade between 1880 and 1890, the annual value of shipments ranging from $30,000 to nearly $50,000.

Statistics of annual production are shown in Table 1, and of exports in Table 2. The annual imports of oxide of manganese are shown in Table 3.

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*	123½	3,975	32 19	1908			
1897*	15¼	1,166	76 46	1909			

* Exports.

MANGANESE.—TABLE 2.

Exports of Manganese Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1873	1,031	20,192	1892	143	8,205
1874	782	16,973	1893	133	12,521
1875	203	5,514	1894	56	3,120
1876	412	8,039	1895	108·3	6,351
1877	891	15,909	1896	123·5	3,975
1878	626	10,860	1897	15·3	1,166
1879	1,886	27,436	1898	11	325
1880	2,179	34,797	1899	70	2,410
1881	1,704	40,554	1900	34	1,720
1882	894	25,747	1901	440	4,820
1883	1,326	25,343	1902	172	4,062
1884	603	20,089	1903	135	1,889
1885	1,684	34,649	1904	123	2,706
1886	(a)1,818	58,338	1905	22	1,720
1887	1,415	34,802	1906	93	925
1888	1,181	21,832	1907	1	22
1889	1,436	29,350	1908		
1890	1,906	36,831	1909	3	434
1891	255	6,694			

(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	1909	382,137	6,561

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.

According to returns received from the operators, shipments of mica during the past two years were as follows:—

Mica, Rough and Thumb-trimmed, Reported as Shipped during 1908 and 1909.

Province.	1908			1909		
	Tons.	Value.	Value per Ton.	Tons.	Value.	Value per Ton.
		$	$		$	$
Quebec	148	82,613	558 20	128	93,298	728 89
Ontario	288	57,258	198 81	241	54,484	226 07
Total	436	139,871	320 80	369	147,782	400 49

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

The Ontario Bureau of Mines reports a larger production of mica than is shown in the above tables. According to this authority the production in Ontario in 1908 was 368 tons, valued at $73,586, and in 1909, 350 tons, valued at $73,124.

The market for mica has been rather dull during the past two years, and considerable stocks have been accumulated by some operators.

Table 1 following, shows the statistics of mica production since 1886.

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	1909	147,782

Table 2 following gives the exports of mica from Canada since 1887 as compiled from the reports of the Customs Department.

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	1909	359	256,834

The destination of exports during the calendar years 1908 and 1909 was as follows:—

	1908		1909	
	Tons.	Value.	Tons.	Value.
		$		$
To Great Britain	155	81,050	31	24,316
To United States	132	115,005	325	229,689
To other countries	3	2,784	3	2,829
Total	290	198,839	359	256,834

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 that country, the following table is given, while the market available in Great Britain is indicated by the statistics given in Table 4.

MICA.—TABLE 3.

Imports of Mica into the United States.[1]

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
1909	167	132,941	403	313,525

[1] The Foreign Commerce and Navigation of the United States.

MICA.—TABLE 4.

Imports of Mica into Great Britain.

	1908		1909	
	Pounds.	Value.	Pounds.	Value.
		$		$
Germany	73,136	14,581	75,264	13,349
German East Africa	17,920	2,287	68,320	15,009
United States	299,264	27,613	142,352	9,441
Brazil	23,296	3,728	4,032	793
Other foreign countries	56,112	11,476	22,848	4,804
British India	2,737,952	416,343	2,604,224	480,700
Canada	244,944	74,465	67,424	30,791
Other British possessions	24,416	3,777	2,352	886
Total	3,477,040	554,270	2,986,816	555,773

MINERAL PIGMENTS.

Under this heading is included the production of ochres and barytes.

Ochres.

The production of ochres in 1909 included 1,940 tons, valued at $25,093 or an average of $12.93 per ton, used for paint manufactures, and 2,000 tons valued at $3,000 shipped to gas works throughout Canada, a total production of 3,940 tons valued at $28,093. This is slightly less than the production during the previous three years.

The ochre used for the manufacture of paints is calcined and ground at the place of production, while that used for the purification of illuminating gas is shipped crude to gas companies.

Statistics of production since 1886 are shown in Table 1.

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	1909	3,940	28,093

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 deposits of ochre are found in the Province of Quebec, but are not worked at present. In Ontario small quantities of ochre are occasionally mined from a deposit situated near Campbellville, but no production has been reported for two years past.

The following are the firms which are mining ochres in Canada:—

The Canada Paint Company, Montreal, Que.

The Champlain Oxide Company, Three Rivers, Que.

Thos. H. Argall, Three Rivers, Que.

Ontario Mineral Paint Company, Campbellville, Ont.

The following tables show the annual statistics of 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	1909	2,122,781	27,540

——	Duty.	1908.		1909.	
		Lbs.	$	Lbs.	$
Ochres and ochrey earths and raw siennas	20 %	1,731,036	18,042	1,203,276	13,164
Oxides, dry fillers, fireproofs, umbers and burnt siennas N.E.S.	25 %	2,018,096	21,881	919,505	14,376
Total		3,749,132	39,923	2,122,781	27,540

MINERAL PIGMENTS.—TABLE 3.

Exports of Mineral Pigments, Iron Oxides, etc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1897	512	7,706	1904	416	7,260
1898	283	4,227	1905	353	7,704
1899	308	5,408	1906	139	2,379
1900	651	7,154	1907	191	10,043
1901	401	8,233	1908	125	4,850
1902	352	6,182	1909	658	7,956
1903	676	12,770			

Barytes.

The only production of barytes reported for 1909 was 179 tons, valued at $1,120, which was taken out in development work at Five Islands, Colchester county, Nova Scotia.

The mine of the Barium Reduction Company, at Lake Ainslie, Inverness county, was not in operation during the year, and the Company made an assignment in November, 1909.

At Five Islands, Messrs. Bayne and Soley Bros. continued the development of their property, and were engaged in the construction of roads, and preparing for the establishment of a mill and power plant. This firm proposes to turn out a finished product for the Canadian market.

Statistics of production since 1885 are shown in Table 4, and imports in Table 5. Statistics of imports of barytes have not been separately shown by the Customs Department since 1890, but the imports of blanc fixe (artificial sulphate of barium) and satin white, during the twelve months ending March, 1910, amounted to 629 tons valued at $14,735.

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	1898	1,125	5,533	4 92
1886	3,864	19,270	4 98	1899	720	4,402	6 11
1887	400	2,400	6 00	1900	1,337	7,605	5 69
1888	1,100	3,850	3 50	1901	653	3,842	5 89
1889				1902	1,096	3,957	3 61
1890	1,842	7,543	4 09	1903	1,163	3,931	3 38
1891				1904	1,382	3,702	2 68
1892	315	1,260	4 00	1905	3,360	7,560	2 23
1893				1906	4,000	12,000	3 00
1894	1,081	2,830	2 62	1907	1,344	3,000	2 23
1895				1908	4,312	19,021	4 41
1896	145	715	4 93	1909	179	1,120	6 26
1897	571	3,060	5 36				

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			

Exports of Barytes.

Calendar Year.	Cwt.	Value.	Calendar Year.	Cwt.	Value.
		$			$
1901	208	3,820	1906	1,350	6,750
1902			1907	550	2,750
1903	406	368	1908	3,509	13,690
1904	13,080	5,178	1909		
1905	34,488	14,343			

MINERAL WATER.

The statistics of production given herewith represent as closely as can be obtained the value of mineral water shipped from mineral springs in bottles, barrels, or other containers, and do not include any estimate for the value of mineral water used at the spring for drinking or bathing purposes, nor are the natural pure spring waters included, of which a considerable quantity is sold in bottled form.

The production in 1909 was valued at $175,173, and represented over 450,000 gallons.

Statistics of production and imports are shown in tables following:—

MINERAL WATERS.—TABLE 1.

Annual Production.

Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.
		$			$			$
1888	124,850	11,456	1896	706,372	111,736	1903	.....	100,000
1889	424,600	37,360	1897	749,691	141,477	1904	.....	100,000
1890	561,165	66,031	1898	555,000	100,000	1905	.....	100,000
1891	427,485	54,268	1899	.....	100,000	1906	.....	100,000
1892	640,380	75,348	1900	.....	75,000	1907	.....	136,020
1893	725,096	108,347	1901	.....	100,000	1908	.....	151,953
1894	767,460	110,040	1902	.....	100,000	1909	.....	175,173
1895	739,382	126,048						

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	1909	159,221

	1909.	
	Gals.	$
Mineral waters, natural, not in bottle. Duty free	4,445	1,030
Mineral and aerated waters " 20 per cent	.....	158,191
Total		159,221

NATURAL GAS.

The total value of the production of natural gas in Canada in 1909 was, according to returns received, $1,207,029, as compared with a value of $1,012,660 in 1908. The quantity used in 1909 was somewhat in excess of 5,600,000 M cubic feet.

The value of the production in Ontario was returned as $1,145,307, and in Alberta $61,722.

There has been a very considerable increase in the production and use of natural gas during the past seven years, the value having risen from $202,210 in 1903, to over five times that amount in 1909. Returns showed 660 producing wells in Ontario, of which 106 were completed during the year. In this Province, the three principal producing fields are known as the Welland county, Haldimand and Norfolk, and the Essex-Kent.

In Alberta, Medicine Hat is, as yet, the only place to use natural gas.

The annual value of the production of natural gas is shown in Table 1.

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	1909	1,207,029

Considerable quantities of gas were at one time exported to Detroit and Buffalo, adjacent respectively to the Essex and Welland fields, but this export has now ceased. Under the provisions of Chap. 16, 6-7 Edward VII, entitled 'An Act to regulate the exportation of electric power and certain liquids and gases,' assented to April 27, 1907, the export of natural gas is prohibited except under special license issued by the Governor in Council.

In order to consume the supply of natural gas and as far as possible prevent its waste, the Ontario Legislature in 1908 passed an 'Act to prevent the wasting of natural gas and to provide for the plugging of all abandoned wells' (7 Edward VII, Chapter 47), by which power was conferred upon inspectors appointed under the Act, to enforce the stoppage of waste. The Supplementary Revenue Act, 1907 (Ontario Statutes), also contained provisions which have

been even more effective than those of the first mentioned Act, and the enforcement of these laws has, according to the Bureau of Mines, reduced the waste of gas to a minimum.

In Alberta, while the commercial use of gas is confined to Medicine Hat and vicinity, the existence of natural gas in large quantities has been found over a wide area.

The Canadian Pacific railway, during the past 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, 4 miles east of Medicine Hat; at Suffield, some 26 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.

In the north, on the Athabaska, natural gas is escaping along the banks of the river. In the Pelican Rapids well, about 180 miles north of Edmonton, an enormous flow of gas was encountered in the test hole put down by the Geological Survey. These occurrences do not, of course, prove that a continuous field exists between these points, but it reveals a wide distribution and an abundant supply of that, almost ideal, fuel.

Natural gas rights in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon, etc., are the property of the Crown, and their disposal is now subject to the regulations approved by Order in Council dated the 11th day of March, 1910.

These regulations provide for a rental of 25 cents an acre for the first year and 50 cents an acre each subsequent year, lease to be for twenty-one years, renewable on conditions, and no applicant to be allowed to lease the gas rights under an area of more than 1,920 acres.

PEAT.

The attempts hitherto made to utilize the peat resources of Canada for fuel or other purposes have not as yet resulted in any large production.

For the year 1909 the only production is that recorded by the Ontario Bureau of Mines of 60 tons made by J. McWilliam, M.D., at a plant in the township of North Dorchester, Middlesex county, Ontario.

The total production in ten years, of which record is available, has been only 3,719 tons, shown by years as follows:—

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
1909	60	240

The subject of the development of Canada's resources in her peat bogs has been given much attention by the Mines Branch of this Department, and the following extract from the Summary Report of the Director of Mines for 1909 will give an outline of the work done.[1]

'It has been estimated that the known peat bogs of Canada, which are probably only a small fraction of the total, cover approximately an area of 36,000 square miles, from which about 28,000,000,000 tons of air-dried peat could be produced. This would be equal in fuel value to about 14,000,000,000 tons of coal.

'The comparative fuel value of peat, coal, and wood is: one ton of the best coal is equal to 1·8 tons of peat, or 2·5 tons of seasoned wood.

'Realizing that in matters industrial, it is good Canadian policy to begin where Europe left off, and armed with the practical knowledge gathered in an exhaustive study[2]—on the spot—of the peat industry of Northern Europe, the peat problem in Canada is being attacked systematically by the Mines Branch. Ten bogs have already been investigated, six of which are graphically described in Bulletin No. 1,[3] published June 30, 1909, and now in its second edition. The others are referred to in Mr. Anrep's preliminary report, and will be fully described and mapped in Bulletin No. 2, to be issued shortly.

'Conceiving that the most effective manner in which to awaken public interest in the utilization of our peat resources would be the establishment of a plant on

[1] Summary Report Mines Branch, Department of Mines, 1909, p. 11.
[2] Peat and Lignite: Their Manufacture and Use in Europe, 1908.
[3] Investigation of the Peat Bogs and Peat Industry of Canada, during the season of 1908-1909.
Bulletin No. 4. Investigation of the Peat Bogs and Peat Industry of Canada during the season of 1909-1910.

a commercial scale, equipped with the machinery and appliances which have been successfully used in European practice, a peat bog of 300 acres, with an average depth of 8 feet, was acquired by the Government at Alfred, near Caledonia Springs, Prescott county, Ontario. About five miles of ditches have been dug; a storage shed to hold 300 tons of air-dried peat, a blacksmith's shop, and an office have been built.

'The following modern machines, etc., have been installed:—

Anrep peat machine, with conveyer, having a productive capacity of 25 to 30 tons of air-dried peat per day. A 35 horse-power steam engine and boiler combined; cable appliances for transporting peat about 1,200 feet; Jacobson field press; circular track for transporting dumping cars to field press—about 1,200 feet long; eight steel dumping cars, each 0·7 tons capacity; and about 2,500 feet of 600 mm. gauge field track has been laid.

'This plant will be in active operation at the end of April, 1910, and interested parties may see for themselves the operations of a modern plant for the economic production of peat.

Fuel Testing Station at Ottawa.

'During the summer of 1909, a substantial brick building, suitable for equipment with modern fuel-testing machinery and appliances, was built on Dolly Varden and Division Streets, Ottawa. There is also a storage shed at the south end of the lot, capable of holding 150 tons of peat fuel. The present installation consists of a Körting Peat Gas Producer, with the necessary cooler, scrubber, tar extractor, etc., a Körting 60 horse-power, 4 cycle gas engine; a Westinghouse 50 kw. dynamo, direct connected; and a portable resistance of 60 kw. capacity, for the purpose of absorbing the load when making tests; also a switchboard with the necessary measuring and testing instruments.

'The main building is divided longitudinally into two parts, one of which is occupied by the peat gas producer and its auxiliary apparatus, with office at the north end; while the other half is divided by a partition wall into two compartments; one being occupied by the gas engine and dynamo; the other reserved for an ore dressing laboratory to be equipped with a 40 horse-power motor and concentrating machinery, the power for which is to be supplied by electric energy in the adjoining peat gas plant.

'The gas generating room has been made large enough to accommodate other types of gas producers—specially designed for using bituminous coal or lignite as fuel—which it is proposed to install in the near future.'

PETROLEUM.

The production of petroleum in Canada in 1909, estimated on the basis of the bounty payments, was 420,755 barrels, valued at $559,604, or an average of $1.33 per barrel. With the exception of 3,328 gallons produced in New Brunswick, the output was entirely from the Ontario oil fields.

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 bounty was continued during 1910 under the 'Petroleum Bounty Act, 1909,' which provides for the payment of bounty on crude petroleum produced from oil shales mined in Canada, as well as on oil from wells in Canada. 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, refiners or other purchasers, as well as by the supervising officers of the Department of Trade and Commerce.

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 imperial gallons each. During 1909 there was paid $220,896.50 on a production of 14,726,433 gallons or 420,755 barrels of crude oil, a decrease in production in 1909 of 107,232 barrels, or 20 per cent. The 1909 production was the lowest since 1882.

Table 1 following, shows the production of crude 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
1909	420,755	559,604	1 33

The figures for the years 1905 to 1909 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 refineries and 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 1909.

Petroleum.	Bounty Paid.	Production of Crude Oil Represented.	
	$	In Gallons.	In Barrels.
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
1909	220,897	14,726,433	420,755

For the years previous to 1901, the production of crude oil was deduced 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 92¾	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 33⅜	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	25,414,858	100:42	726,138	1 49⅝	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

From the above tables it will be seen that the production of petroleum in Canada reached a maximum in 1894, when the production was 829,104 barrels. During the six years following the production varied between 700,000 and 800,000 barrels. In 1904 the output fell to 486,637 barrels, increasing again in 1907 to 788,872 barrels, but falling rapidly during the past two years.

An estimate of the production of the various Ontario oil fields during 1907, 1908, and 1909 has been kindly furnished by the Imperial Oil Company and is shown in the next table.

It will be observed that the falling off in production during the past two years has been common to all the important fields, although the decrease in Tilbury and Raleigh has been most pronounced.

The figures do not agree in totals with the statistics of production published in previous tables, but they will probably serve to show the relative importance of the several fields.

Production of Ontario Oil Fields, 1907, 1908, and 1909.

District.	1907.	1908.	1909.
	Bls.	Bls.	Bls.
Dutton	14,698	12,268	10,052
Leamington (Staples, Comber, and Blytheswood)	16,210	18,117	9,367
Bothwell	40,556	39,820	38,707
Richardson (Chatham)	941	2,882	2,923
Thamesville	1,139	853	710
Moore township	32,720	25,667	18,033
Oilsprings	55,813	61,252	59,868
East Tilbury and Raleigh	344,358	170,589	115,862
Romney	49,783	11,165	1,082
Petrolia, (includes all districts not enumerated above)	206,285	171,019	156,581
	762,503	513,632	414,185

Another statement of production by districts is furnished by the supervisor of petroleum bounties as follows; the classification being somewhat different from that shown above, but the total agreeing more closely with those given in Table 1.

Field.	1906.	1907.	1908.	1909.
	Bls.	Bls.	Bls.	Bls.
Lambton	377,286	304,212	265,368	243,123
Tilbury and Romney	106,992	411,588	201,286	124,003
Bothwell	44,827	42,727	39,228	38,092
Leamington	39,655	6,135	9,334	5,929
Dutton	19,376	14,977	13,743	9,513
Thamesville	175	237	.....	.....
Comber	651	.....	.....	.....
Total	588,962	779,876	528,959	420,660

The oil refineries of Canada of which there are three, viz., The Imperial Oil Company, Sarnia, The Canadian Oil Company, and the British American Oil Company, now use considerable quantities of imported crude oils as well as oils from Canadian wells. The amount of crude oil distilled during 1909 was 35,530,918 gallons, of which 19,515,391 gallons were imported and 16,015,527 gallons obtained from Canadian wells.

The production of refined products, etc., is shown in the following table as published by the Ontario Bureau of Mines, and includes returns only from the first two firms mentioned above.

PETROLEUM.—TABLE 3.

Petroleum and Petroleum Products, 1906 to 1909.

Schedule.		1906.	1907.	1908.	1909.
Crude distilled	Imp. gal.	36,134,349	34,961,706	34,675,120	35,530,918
Value distilled products	$	2,506,177	2,568,464	2,347,680	2,501,384
Illuminating oil	Imp. gal.	16,125,450	18,319,233	17,604,920	17,902,254
Lubricating oil	"	4,351,818	3,931,767	3,384,940	3,856,778
Benzine and naphtha	"	3,497,954	4,132,239	3,667,997	3,930,691
Gas and fuel oils and tar	"	5,961,834	5,632,608	4,461,186	4,687,588
Paraffin wax and candles	Lbs.	5,011,467	5,132,394	5,400,003	7,092,278
Workmen employed	No.	496	435	430	436
Wages paid	$	308,986	265,316	247,829	261,014

Table 4 shows the amount of refined oil inspected, both that refined in Canada and that imported. Since 1904, large quantities of imported crude oil have been used in Canadian refineries, so that the figures since that date do not show the relative amounts that can be credited to Canadian oil fields.

PETROLEUM.—TABLE 4.

Total Amount of Oil Inspected, Canadian and Imported.

Fiscal Year.	Made in Canada.	Imported.	Total.	Canadian.	Imported.
	Gals.	Gals.	Gals.	Per cent.	Per cent.
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
1909	19,989,886	*10,610,882	30,600,768	65·0	35·0
1910	23,213,574	*8,652,285	31,865,859	73·0	27·0

* Item (c) Table 6.

The exports of oil are very small, the available statistics being shown in Table 5.

The imports of petroleum and petroleum products, on the other hand, have been steadily growing, and during the fiscal year 1909, aggregate a total value of $2,576,025, besides wax and wax candles to the value of $27,601.

Statistics of imports are shown in Tables 6 to 10.

PETROLEUM.—TABLE 5.

Exports of Crude and Refined Petroleum, 1881-1909.

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	13,331
1888					196,602	74,542
1889					235,855	10,777
1890					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			8,559	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
1909			7,768	934	7,768	934

PETROLEUM.—TABLE 6.

Imports of Petroleum and Products thereof, during the Fiscal Years ending 1908 and 1909.

Products.	1908 (12 mos. ending March.)		1909 (12 mos. ending March.)	
	Gals.	Value.	Gals.	Value.
		$		$
(a) Petroleum crude, fuel and gas oils (8235 specific gravity)	24,866,963	889,080	31,594,212	1,321,938
(b) Crude petroleum, gas oils (other than benzine and gasoline)	52,605	5,900	3,515	420
(c) Coal and kerosene, distilled, purified, or refined	6,295,457	503,829	10,610,882	785,418
(d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale, or lignite, costing more than 30 cents per gallon	2,232	1,035	3,597	1,818
(e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon	3,262,846	411,172	2,319,710	311,547
(f) Products of petroleum	1,834,615	195,003	1,473,146	154,834
Total	36,314,718	2,006,019	46,005,062	2,576,025

(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 1880-1909.

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	421,335	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	439,938	1909	46,005,062	2,576,025

PETROLEUM.—TABLE 8.

Imports of Crude and Manufactured Oils, other than Illuminating, 1881-1909.

Fiscal Year.	Gals.	Fiscal Year.	Gals.
1881	960,691	1896	1,079,965
1882	1,656,290	1897	802,286
1883	1,895,488	1898	1,047,026
1884	2,017,707	1899	1,017,278
1885	2,489,326	1900	1,406,700
1886	2,491,530	1901	1,838,966
1887	2,624,399	1902	2,296,353
1888	2,701,714	1903	4,316,010
1889	2,882,462	1904	7,141,109
1890	3,054,908	1905	25,002,047
1891	3,049,384	1906	23,365,674
1892	3,047,199	1907 (9 months)	16,761,713
1893	1,481,749	1908	30,017,029
1894	1,860,829	1909	35,390,583
1895	1,106,993		

The figures for the years from 1881 to 1894, 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, 1883-1909.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		$			$
1883	43,716	5,166	1897	138,703	7,945
1884	39,010	6,079	1898	103,570	5,987
1885	59,967	8,123	1899	92,242	4,025
1886	62,035	7,953	1900	47,400	3,529
1887	61,132	6,796	1901	118,848	9,639
1888	53,862	4,930	1902	225,885	12,750
1889	63,229	5,256	1903	592,642	28,674
1890	239,229	15,844	1904	418,967	18,440
1891	753,854	50,275	1905	81,992	7,795
1892	733,873	48,776	1906	112,612	9,721
1893	452,916	38,935	1907 (9 months)	55,021	5,922
1894	208,099	15,704	1908	62,308	8,041
1895	163,817	11,579	1909	129,631	12,795
1896	150,287	10,042			

PETROLEUM.—TABLE 10.

Imports of Paraffin Wax Candles, 1880-1909.

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	1909	110,848	14,806

While oil fields of commercial value do not as yet appear to have been developed in Western Canada, the seepages of oil found in Southern Alberta and British Columbia, and the existence of large areas of tar sands in the northern part of Alberta, have led to a great deal of prospecting in recent years, in the hope of finding valuable oil fields. The results of the work of the Geological Survey in this Province have been somewhat favourable to this hope. The oil prospects of Alberta form the subject of a special review by the Director of the Survey in his Summary Report for 1909, from which the following is extracted. The geology of the Province is first summarized.

'From this general description, it will be seen that the Cretaceous rocks which underlie almost the whole of Alberta have as their basal member, where exposed on the plains, the Dakota sandstone, a porous rock and a suitable reservoir for oil. It, in turn, along its exposed (northern and eastern) borders at least, rests upon the Devonian, and is overlain by shales that would form an impervious cover which might retain any oil that found its way into the Dakota sands.

'The Dakota sands are exposed along the Athabaska river and elsewhere in the north, where they are charged with tar to the extent of 12 per cent of the whole mass. The tar represents the residuum of petroleum which has escaped to the air along the exposed edges of the rocks. Natural gas and some petroleum are still escaping. McConnell[1] estimates the area of Tar sands seen by him to amount to 1,000 square miles, which, with an estimated thickness of 150 feet, would give 28·4 cubic miles of Tar sands, or 6·5 cubic miles of tar, equal to 4,700,000,000 tons of bitumen. Of course, the Tar sands have not been fully explored. A large amount of oil has escaped, but it is altogether improbable that this process has gone on indefinitely and that all has been drained off, for the hardening of the oil to tar effectively seals the openings for escape, and only the area near the exposed edges is likely to have lost its oil content. That the distri-

[1] Report on a portion of District of Athabasca, 1893, p. 65 D, G.S.C. Ann. Rep., Pt. I, Vol. V.

bution of oil is probably extensive is indicated by the finding of tar in sands near the surface, far to the south, in the Edmonton country, apparently formed by the limited escape of oil from minor fractures in the rocks. Oil seepages also occur in southwestern Alberta, in South Kootenay pass, and the Flathead valley.

'Southward from the northern edge of the Cretaceous, the covering of later Cretaceous formations over the Dakota sands becomes thicker. One of these formations, the Belly River, is thick and lens-shaped, and Calgary is just about over the centre of the lens. Most of the borings have been put down near the railways where, except in the east, the Dakota sands are far below the surface, and have failed to reach this, presumably, oil-bearing horizon. The best place to test is, of course, in the north, where the covering over the Dakota sands is thinner, and where the presence of oil is indicated by tar in the sands, yet the spot chosen should be far enough back to be beyond the influence of the leaks along the exposed edges. The Geological Survey put down three test holes, one at Victoria, one at Athabaska Landing, and one at Pelican rapids. The latter represented the best judgment of the Survey as to the location of a test hole. The two former, about 1,800 feet deep, failed to reach the Dakota owing to the great thickness of the cover at these points. Farther north, the Pelican well, at a depth of about 800 feet, reached the top of the Dakota and struck a tremendous flow of gas. Pushed 20 feet farther, it struck another heavy gas vein and some oil. The escaping gas froze the oil on the drilling tools and prevented further progress, so that the Dakota sands were not proved as to their containing commercial reservoirs of oil. None of the wells sunk about Medicine Hat, Edmonton, or Calgary, have penetrated deep enough to test the oil possibilities. The two Calgary wells, sunk to 3,400 feet each, were still considerably above the Dakota, and separated from it by impervious shales, but here the upper Cretaceous rocks are exceptionally thick.

'In southwestern Alberta, in the Pincher Creek district, oil is being prospected for in two areas, on the south branch of the south fork of Oldman river, and on Oil creek, a tributary of Watertown lakes. The Survey has done no recent work in this district, but in the first field the rocks are, so far as can be learned, Cretaceous. The rocks on Oil creek were regarded by Dawson as Cambrian, a view which Daly supports, but Dr. Walcott, of the Smithsonian Institution, believes them to be Pre-Cambrian—corresponding to the Belt terrane of Bailey Willis. On Oil creek a green schist is exposed from which there is a seepage of oil. The oil has a paraffin base, is of excellent quality, and free from sulphur. The Pincher Creek Oil Company has two shallow wells in this shale which have not been shot. These yield ½ to 2 barrels of oil per day, according to information deemed reliable. As this shale outcrops at the surface, apparently over a fairly wide extent of country, it would seem that by sinking a number of shallow wells into it and torpedoing them to form catchment basins, a considerable quantity of oil might be collected from it. Three other companies are prospecting here: one has a well down 1,020 feet, which is stated to have yielded at the outset 300 barrels per day. A second well, at a depth of 1,170 feet, is estimated

by the drillers to be capable of producing 25 barrels per day. These wells have not yet been shot. Three companies are prospecting on the south fork of Oldman river: one has three holes down, the deepest of which is reported to be down 1,400 feet.

'These districts lie within the front range of the mountains. Some uncertainty as to the oil prospects of this section is introduced by the occurrence of heavy overthrust faults which may have allowed oil reservoirs that once existed to drain off. Outside the mountains near Pincher Creek, an anticline, parallel to the mountains, appears to exist. While this structure is favourable for oil reservoirs, the thickness of the upper Cretaceous rocks presents difficulties, and there is a possibility that the Fernie shales and Carboniferous rocks may extend out from the mountains and form an impervious blanket which prevented the oil from reaching the Dakota horizon. The driller should be prepared to go as deep as 3,500 feet, and the soft shales, etc., of the upper Cretaceous present many difficulties in such deep boring. At Calgary borings would probably have to exceed 4,000 feet to test the possibilities of the district.

'Near Edmonton the thickness of the rocks above the Dakota is not definitely known, but it is probably considerably over 2,500 feet, as the holes at Athabaska Landing and Victoria, 1,800 feet deep, did not penetrate to the Dakota, and at both these points the thickness of the overlying formations is less than at Edmonton. In the vicinity of Pelican rapids a hole about 1,000 feet in depth is required. Eastward the Cretaceous also thins out, so that at Medicine Hat holes of 1,800 to 2,000 feet in depth would probably reach the Dakota.

'The presence of immense tar fields along the outcropping edges of the Dakota in the north; the occurrence near Egg lake and other points near Edmonton of Tar sands which seem to have been formed by oil escaping from fissures; the oil seepages from the disturbed rocks in the mountains of southwestern Alberta, and the heavy veins of gas encountered by boring in northern and eastern Alberta, warrant the belief that good oil fields may be found in Alberta. The best points to prospect would appear to be: in the south, near Pincher Creek (where it will be necessary to be prepared for deep drilling); in the east, where it would be reasonably sure that gas, at any rate, would be struck, or in the north at about the latitude of Pelican rapids, where test holes would not have to be deep, and where the Dakota is known to have had large supplies of oil. The neighbourhood of Pelican rapids would be far enough back from the outcropping edges to find sand that may not have been drained of its oil. The proposed railway to Fort McMurray would render this district accessible.

'About Fort McMurray and north of that point, the Devonian is exposed without a Cretaceous cover. Although the oil, which formed the Tar sands of the Dakota, probably came from the Devonian, and although the Devonian almost everywhere in the Mackenzie valley is more or less petroliferous, there are no grounds for supposing that the Devonian would be a particularly favour-

able formation to prospect, for oil escapes so readily, and in this case is known to have escaped in such quantities that it is uncertain that commercial reservoirs have been retained. It cannot, however, be stated that an undrained oil horizon does not exist in it, but only that prospecting in it is a gamble. If oil were found in the Dakota about Pelican and some information gained as to its distribution, prospecting could be continued southward, in the districts where deeper drilling would be necessary, with the element of chance to some extent eliminated.'

Regulations have been adopted by the Dominion Government for the disposal of petroleum and natural gas rights, and of tar sands, which are outlined as follows:—

Petroleum Regulations.

'Regulations for the disposal of petroleum and natural gas rights, the property of the Crown, in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon Territory, and within the tract containing three and one-half (3½) million acres of land acquired by the Dominion Government from the Province of British Columbia, and referred to in sub-section (b) of section 3 of the Dominion Lands Act, approved by Order in Council, dated the 11th day of March, 1910.'

These regulations provide for the leasing of petroleum and gas rights under an area of not more than 1,920 acres to one applicant for a period of twenty-one years, subject to a rental of twenty-five (25) cents an acre for the first year, and fifty (50) cents an acre for each subsequent year.

The lessee is required to have upon the lands leased, within one year of the date of the lease, such machinery as the Minister may consider necessary for the carrying on of prospecting operations, and is required to begin boring operations within 15 months of the date of the lease, which shall be continued with reasonable diligence, with a view to the discovery of oil or natural gas.

Tar Sand Regulations.

Regulations for the disposal of the tar sands, the property of the Crown in that portion of the Province of Alberta lying north of township 80, and between the 4th and 5th initial meridians, were approved by Order in Council dated 14th day of February, 1910.

These provide for the leasing of an area not exceeding 1,920 acres to one applicant for a period of twenty-one years, subject to an annual rental of fifty (50) cents per acre.

After the lease has been in existence one year, the lessee may, on one year's notice, be required to begin active operations, and may be required to excavate and produce ready for shipment or treatment, a quantity not exceeding ten tons per annum, for each acre leased. Copies of the full text of the regulations may be obtained from the Department of the Interior.

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 1909 the shipments were reported as 998 tons, valued at $8,054, or an average of $8.07 per ton.

Statistics of production and exports are shown in Tables 1 and 2 following:—

PHOSPHATE.—TABLE 1.

Annual Production.

Calendar Year.	Tons.	Value.	Average Value per ton.	Calendar Year.	Tons.	Value.	Average Value per ton.
		$	$ cts.			$	$ cts.
1886	20,495	304,338	14 85	1898	733	3,665	5 00
1887	23,690	319,815	13 50	1899	3,000	18,000	6 00
1888	22,485	242,285	10 77	1900	1,415	7,105	5 02
1889	30,988	316,662	10 21	1901	1,033	6,287	6 07
1890	31,753	361,045	11 37	1902	856	4,953	5 79
1891	23,588	241,603	10 24	1903	1,329	8,214	6 18
1892	11,932	157,424	13 20	1904	817	4,590	5 62
1893	8,198	70,942	8 65	1905	1,300	8,425	6 48
1894	6,861	41,166	6 00	1906	850	6,375	7 50
1895	1,822	9,565	5 25	1907	824	6,018	7 30
1896	570	3,420	6 00	1908	1,596	14,794	9 26
1897	908	3,984	4 39	1909	998	8,054	8 07

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
1909					895	15,735

*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.

There appears to be some demand for phosphate in Great Britain, but the price offered does not seem to be sufficiently high to afford any prospect for the development of trade in this direction. From $9 to $10 per ton c.i.f. British ports is offered for phosphate running 80 per cent phosphoric acid, whereas higher prices than these are now being paid at Buckingham, Que., without attracting sufficient mineral to supply the demand.

PYRITES.

The total shipments of pyrites in 1909 are reported as 64,644 tons, valued at $222,812, as compared with shipments of 47,336 tons, valued at $224,824, in 1908.

The 1909 production included 35,300 tons copper pyrites from Quebec, and 29,344 tons of iron pyrites from four properties in Ontario. In 1908, 26,598 tons of copper pyrites ores were shipped from Quebec and 20,738 tons of iron pyrites from Ontario mines.

Statistics of production and exports of pyrites and of imports of brimstone and crude sulphur are shown in the following tables:—

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	1909	64,644	222,812

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	1909*	44,049,172	426,569

* 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	41,192	1908	17,283	96,600
1901	24,971	57,263	1909	35,798	156,644

Following is a list of firms reporting shipments during 1909:—

The Eustis Mining Company, Eustis, Que.

The Nichols Chemical Company of Canada, Limited, Sulphide, Ont.

The Canadian Pyrites Company, Madoc, Ont.

The Northern Pyrites Company, Dinorwic, Ont.

The Northland Mining Company, Limited, London, Ont.

SALT.

Salt production in Canada has been increasing steadily for a number of years and the 1909 production is the largest recorded. The industry is still confined to the salt fields of southwestern Ontario, although there was at one time a very small production in New Brunswick and Manitoba.

The total sales of Canadian salt in 1909 were 84,037 tons, valued at $415,219 exclusive of packages; as compared with 79,975 tons, valued at $378,798, in 1908, showing an increased production of 4,062 tons or 5 per cent in 1909.

The value of the packages used in 1909 was $175,612, and in 1908, $168,019.

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, 1905-1909.

—		1905.	1906.	1907.	1908.	1909.
Sales of salt	Tons	67,340	76,762	72,697	79,975	84,037
Value of salt, (exclusive of packages)	$	320,858	329,130	342,315	378,798	415,219
Value of packages	$	113,004	147,705	149,823	168,019	175,612
Stock in manufacturer's hands at end of year	Tons	5,206	6,365	3,923	5,631	2,671
Men employed	No.	191	210	215	207	185
Wages paid	$	83,391	92,000	95,667	95,575	96,116

SALT.—TABLE 2.

Annual Production, 1886-1909.

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	129,547	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	1909	84,037	415,219

As will be seen by the above table, the salt industry is slowly but steadily developing; the figures of production for 1909 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 ends. This would cover an area of 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 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 importations during the calendar year ending December 31, 1909:—

—	Lbs. imported.	Value.
		$
Soda, ash, or barilla	30,567,464	249,882
Soda bichromate	367,271	21,501
Caustic soda in packages, 25 lbs. or more	11,100,980	218,728
Sal soda	11,318,633	106,440
Sulphate of soda	1,961,561	7,611
		604,162

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 for 1,000 parts in weight:—

Analyses of Brines.[1]

—	Sodium chloride.	Calcium chloride.	Magnesium chloride.	Sulphate of lime.	Specific gravity.	Degrees of salometer.
Goderich, sample taken August 19, 1866	259·060	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

[1] Analyses by Dr. T. Sterry Hunt, laboratory, Geological Survey of Canada.

The following tables give the statistics of the exports and imports of salt since 1880:—

SALT.—TABLE 3.

Exports.

Calendar Year.	Bushels.	Value.	Calendar Year.	Bushels.	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		Lbs.	
1888	15,251	3,987			
1889	8,557	2,390	1903	1,915,648	5,927
1890	6,605	1,667	1904	1,006,036	4,186
1891	5,290	1,277	1905	1,447,728	6,112
1892	2,000	504	1906	618,707	3,437
1893	4,940	1,267	1907	2,222,542	7,709
1894	4,639	1,120	1908	529,229	3,840
1895	4,865	959	1909	276,765	2,488

SALT.—TABLE 4.

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	1909	31,653,900	83,660

—	Duty.	1909.	
		Lbs.	Value.
			$
Salt, coarse, N.E.S.	5c. per 100 lbs.	19,197,300	32,086
Salt, fine, in bulk	5c. "		
Salt, N.E.S., in bags, barrels or other packages	7½c. "	12,456,600	51,624
Total		31,653,900	83,360

SALT.—TABLE 5.

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	1909	232,237,700	376,961

* Salt imported from the United Kingdom, or any British possession, or imported for the use of the sea or gulf fisheries.

† Nine months only.

The exports of salt are comparatively small, but the imports exceed the domestic production both in quantity and value. The consumption of salt in Canada in 1909, as showing in the following table, was approximately 215,844 tons, valued at $873,352, of which 39 per cent in quantity was of domestic origin and 61 per cent imported:—

Consumption of Salt in Canada in 1909.

——	Lbs.	Value.
		$
Canadian salt production in 1909.	168,074,000	415,219
Less exports	276,765	2,488
	167,797,235	412,731
Imports of salt paying duty.....	31,653,900	83,660
" " free of duty.....	232,237,700	376,961
	431,688,835	873,352

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.

ARSENIC.

The principal source of arsenic production in Canada at the present time is furnished by the silver-cobalt-nickel-arsenic ores of the Cobalt district.

There was formerly a considerable production of white arsenic from the mispickel ores of Deloro, but the operation on these ores ceased altogether in 1903.

Although the ore shipped from the Cobalt district contains important quantities of arsenic, practically nothing is now paid to the mine owners for the mineral by the purchasing companies. Considerable quantities of these ores are, however, being treated in Canadian metallurgical works, in which white arsenic is being recovered in addition to silver, cobalt oxide, etc. There are three of these plants, one at Copper Cliff, operated by the Canadian Copper Company, a second at Thorold, Ont., operated by the Coniagas Reduction Company, and a third at Deloro, operated by the Deloro Mining and Reduction Company.

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, 2,266 tons of ore were treated, with a recovery of 330 tons of arsenic. In 1908, the recovery was 915½ tons from 7,182 tons of ore treated, and in 1909 there were 8,384 tons of ore treated, with a recovery of 1,129 tons of arsenic valued at $64,100. 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
1909	30,677	4,294	14·0

During the past three years, arsenical concentrates have been shipped from the gold mine at Goldboro, Nova Scotia, now operated by the New England Mining Company. The arsenical concentrate is produced from the residue of the mill concentrates after the gold has been extracted by bromo-cyanide. The tailings, as discharged from the cyanide vats, carry about 40 per cent silica. These

are reconcentrated 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.

During 1909 there were shipped to Swansea 200 tons (of 2,000 pounds) which averaged 31·18 per cent in arsenic.

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
1909	224	3,346	1,129	64,100

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	1909	3,111,249	119,673

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
1909.....	Arsenious oxide.....	128,612	4,064
	Arsenic, Sulphide of.....	389,815	14,575
			18,639

CALCIUM CARBIDE.

Three firms are engaged in the manufacture of this product in Canada, viz.:—

The Shawenegan Carbide Company, Shawenegan Falls, Que.
The Ottawa Carbide Company, Limited, Ottawa, Ont.
The Wilson Carbide Company, Limited, Merritton, Ont.

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	1909.....	2,349	151,676	64 57

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, 1880-1909.

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	88,935	25,563	1908	24,122	228,699	63,499
1894	11,308	103,633	26,649	1909	24,066	150,484	45,314

(a) Chalk prepared. Duty, 20 per cent. *(b)* Whiting or whitening, gilder's whiting, and Paris white. Duty free.

FELDSPAR.

The total shipments of feldspar in 1909 were reported as 12,783 tons, valued at $40,383, of which 97 tons, valued at $1,719, represented shipments of high grade dental spar from Quebec Province, and 12,686 tons valued at $38,664, shipments from the district north of Kingston, Ont.

The shipping firms were:—

The Kingston Feldspar and Mining Company, Kingston, Ont.

The Dominion Mining Syndicate (O'Brien and Fowler), Ottawa, Ont.

Practically all the Canadian production is exported, the greater part finding a market with the pottery manufacturers in Trenton, N.J., and East Liverpool, Ohio.

Imports of feldspar into Canada are not separately stated in the Customs Reports, but considerable quantities of ground feldspar are imported for use in the manufacture of pottery, sanitary ware, enamelled ware, etc. The imports are of ground feldspar, which are laid down at points of consumption at from $10 to $14 per ton.

The annual imports probably exceed 1,500 tons at least, and may amount to much more. No doubt much of this could be supplied from Canadian sources if the material were suitably prepared for the market.

Statistics of the production and exports of feldspar are shown in the following table:—

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
1909	12,783	40,383	10,834	35,234

*Exports.

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. The property has been taken over by the Canadian Magnesite Company of Montreal, and during 1909. 330 tons, valued at $2.508, were shipped to Montreal.

QUARTZ.

Considerable quantities of quartz are used by the smelters of nickel-copper ores. It is also used in the manufacture of ferro-silicon, and ground quartz is used by the manufacturers of sanitary ware and enamelled ware.

The production of 1909 was reported as 56,924 tons, valued at $71,285. Statistics of the production of quartz, so far as they have been obtained, are shown in the next table.

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	1909	56,924	71,285

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	24,938	19,166
1894	2,451	1,521	1909 Duty free	6,206	6,909

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	342
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	1909	4,350	10,300

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

The subjects included under this heading comprise, in the order treated: cement; clay products of various kinds, such as brick, sewerpipe and tile, pottery etc.; lime; sand-lime brick; sands and gravels; slate; and stone for building and other purposes, including granite, marble, limestone, sandstone, etc.

That the year 1909 was one of record activity in the building trades, is evidenced by the greatly increased production of all classes of structural materials; nor was the increase confined to any particular section of the country, but appears to have been general throughout all the provinces. The value of cement sales in 1909 shows an increase of 44 per cent over 1908; clay products show an increase of 43 per cent; lime, an increase of 58·8 per cent; and stone production also a very large increase. The total value of the sales of these several classes of products in 1909 was $16,533,349, as compared with a valuation in 1908 of $11,339,955; showing an apparent increase in production of $5,193,394, or 45·8 per cent. Part of this increase, however, may possibly be ascribed to a more complete collection of the statistics for 1909, a special effort having been made to increase the efficiency of the returns, particularly as regards the statistics of clay and stone production.

A summary of the production of structural materials and clay products during the past four years is shown below:—

——	1906.	1907.	1908.	1909.
	$	$	$	$
Cement	3,170,859	3,781,371	3,709,954	5,345,802
Clay products	5,072,635	5,772,117	4,500,702	6,450,840
Lime	1,009.177	974,595	712,947	1,132,756
Sand-lime brick	.....	167,795	152,856	201,650
Sand and gravels (exports)	139,712	119,853	161,387	256,166
Slate	24,446	20,056	13,496	19,000
Stone	2,113,699	2,027,262	2,088,613	3,127,135
Total	11,530,528	12,863,049	11,339,955	16,533,349

The structural materials and clay products are a class for which it would be supposed, and not without reason, that Canada possessed practically unlimited supplies of the raw materials. It is, therefore, a matter of some regret, to still find large importations, particularly of clay and stone products.

With respect to cement it may be observed that nine years ago, or in 1901, 64 per cent of the cement consumed in Canada was imported. The growth of the cement industry, however, has been such, that in 1909 the imports of cement

amounted to only 3 per cent of the total consumption, showing the undoubted value of our resources in cement materials and the ability of Canadian cement mills to supply the home demand.

With clay products the conditions are somewhat different. The value of the production in 1900 was estimated at $3,195,105, which had grown to $6,450,840 in 1909, an increase of about 102 per cent. During the same period the value of the imports of clay products increased from $1,228,405 in 1900 to $3,247,539 in 1909, or an increase of about 152 per cent. In other words, the imports in 1900 constituted about 28 per cent of the total consumption, but the proportion had increased in 1909 to over 33 per cent. Thus Canada's imports of clay goods have apparently during the past ten years been increasing at a more rapid rate than the home production. This situation is no doubt due in large measure to our failure, up to the present, to locate or discover commercially available clays suitable for the manufacture of the better grades of clay products, also, it is probably due in no small measure to a general lack of technical training in methods and processes of clay working.

Limestone is found in abundance in almost every province of the Dominion. Both the exports and imports of lime are comparatively small and the production is consequently limited only by demand for home consumption.

There is a considerable importation of stone both for building and decorative purposes, the annual imports during the past four years having averaged in value somewhat above half a million dollars. Questions of economic expediency, and the personal desires of builders, have no doubt much to do with this, since there can be no doubt of the existence in Canada, in practically limitless quantities, of all kinds of stone of the best quality for either building or decorative purposes.

The development of both the clay and stone industries will proceed much more rapidly as the country grows in population and wealth, and when our resources in these products become better known and understood.

CEMENT.

Natural rock cement was not made in Canada in 1909, nor were any of the natural rock plants in operation in 1908, though a small quantity was sold during that year from the previous year's manufacture.

This industry, at one time of considerable importance in the Province of Ontario, has gradually given way to the manufacture of Portland cement, the production of which has shown a steady and rapid growth since its inception in 1890 or thereabouts. There is now also one plant at Sydney, N.S., making cement from blast furnace slag, the statistics of production being included with those of Portland cement.

The total value of cement sales in 1909 exceeded five million dollars. Statistics of the total annual sales of natural rock and Portland cement since 1887 are shown in the table following :—

Annual Production of Cement.*

Calendar Year.	Natural Rock Cement.		Portland Cement.		Totals.	
	Bls.	Value.	Bls.	Value.	Bls.	Value.
		$		$		$
1887	.....	.....	.....	.....	69,343	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	147,387	119,308	265,366	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	2,436,903	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
1909	0	0	4,067,709	5,345,802	4,067,709	5,345,802

* Quantities sold or shipped.

According to returns received from the manufacturers, the total quantity of Portland cement (including slag cement) made in Canada, 1909, was 4,146,708 barrels of 350 pounds net, as compared with 3,495,961 barrels in 1908 ; an increase of 650,747 barrels, or 18·6 per cent.

The total quantity of Canadian Portland cement sold in 1909 was 4,067,709 barrels, as compared with 2,665,289 barrels in 1908 ; or an increase of 1,402,420 barrels, or 52·6 per cent.

The total consumption of Portland cement in 1909, including Canadian and imported cements, was 4,209,903 barrels (of 350 pounds net), as compared with 3,134,338 barrels in 1908 ; or an increase of 1,075,565 barrels, or 34·3 per cent.

An interesting feature of the cement industry is the rapid decrease in importation of cement, indicating the increasing ability of Canadian plants to supply the home demand. The imports in 1909, which were 142,194 barrels, amounted to only 3 per cent of the total consumption, as compared with 15 per cent in 1908, and 64 per cent in 1901.

Detailed statistical returns respecting the stock on hand at the beginning and end of the year, the total value and price per barrel, the number of men employed and wages paid, the quantity and value of the imports etc. for the years 1908 and 1909 are shown in comparative form in the following table :—

Comparison of Production, Sales, and Imports of Portland Cement in 1908 and 1909.

——	1908.	1909.	Increase.	%	Decrease.	%
Cement sold..... Bls.	2,665,289	4,067,709	1,402,420	52·6	.....	.....
Cement manufactured..... "	3,495,961	4,146,708	650,747	18·6	.....	.....
Stock on hand, Jan. 1..... "	383,349	1,098,239	714,890	186·5	.....	.....
" " Dec. 31..... "	1,214,021	1,177,238	.....	.....	36,783	3·0
Value of cement sold ..... $	3,709,139	5,345,802	1,636,663	44·1	.....	.....
Average price per bl..... $	1.39	1.31	.....	.....	0·08	5·6
Wages paid..... $	1,275,638	1,266,128	.....	.....	9,510	7·5
Men employed..... No.	3,029	2,498	.....	.....	531	17·5
Imports of Portland cement..Bls.	469,049	142,194	.....	.....	326,855	69·7
Value of cement..... $	531,045	166,669	.....	.....	364,376	68·6
Average price per bl..... $	1.13	1.17	0.04	3·5	.....	.....
Total consumption of cement in Canada..... .....Bls.	3,134,338	4,209,903	1,075,565	34·3	.....	.....
No. of completed plants operated...	23	22	.....	.....	1	4·3
Total daily capacity of operating plants as at Dec. 31. .....Bls.	27,500	23,050	.....	.....	4,450	16·2

* The Canada Cement Company have made a somewhat more conservative estimate of the capacities of their several plants than was made by the previous operators.

The production of Portland cement in 1909 was derived from 22 operating plants with a total daily capacity of 23,050 barrels, equivalent to about 6,915,000 barrels per year of 300 operating days. This capacity is about 50 per cent in excess of the present rate of consumption. It will be observed, however, that the consumption in 1909 showed an increase of 34 per cent over that of 1908, and should a similar rate of increase be maintained during the next two years, it would require a fairly steady operation of present plants to supply demand. 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 fourteen in Ontario, of which, eleven used marl and three limestone. The mills of the Imperial Cement Company, Ltd., Owen Sound, and the Colonial Portland

Cement Co., Wiarton, were idle throughout the year, the former Company's affairs having been placed in the hands of an assignee, and the latter undergoing reorganization, the new Company to be known as The Crown Portland Cement Company, Ltd. Both of these Companies used marl. The total daily capacity of the plants using marl was 7,350 barrels, as compared with 15,700 barrels per day for all other plants. The two marl plants not operated are equipped for a daily capacity of 1,100 barrels. Of the total quantity of cement made in 1909, 810,706 barrels were made from marl and 3,336,002 barrels from limestone and slag. In 1908 there were 1,573,090 barrels made from marl and 1,922,871 barrels from limestone and slag.

It is not possible to give the *detailed* statistics of production in each of the provinces separately, as returned to the Department, without divulging confidential returns. The production in Ontario may be separately stated, however, and that of the other provinces grouped in one statement as follows :—

Cement Production in Ontario, 1908 and 1909.

——		1908.	1909.	Increase.	%	Decrease.	%
Cement sold	Bls.	1,518,886	2,462,027	943,141	62·1	.....	
Cement manufactured	"	2,016,737	2,283,263	266,526	13·2	.....	
Stock on hand, Jan. 1	"	314,579	765,873	451,294	143·5	.....	
Stock on hand, Dec. 31	"	812,430	587,109	.....	.....	225,321	27·7
Value of cement sold	$	1,909,815	3,084,218	1,174,403	61·5	.....	
Wages paid	$	636,955	606,639	.....	.....	30,316	4·8
Men employed	No.	1,619	1,340	.....	.....	279	17·2
Total daily capacity of operating plants	Bls.	14,900	12,450	.....	.....	2,450	16·4

Cement Production in other Provinces, 1908 and 1909.

——		1908.	1909.	Increase.	%	Decrease.	%
Cement sold	Bls.	1,066,403	1,605,682	539,279	50·6	.....	
Cement manufactured	"	1,479,224	1,863,445	384,221	26·0	.....	
Stock on hand, Jan. 1	"	68,770	332,366	263,596	383·3	.....	
Stock on hand, Dec. 31	"	401,591	590,129	188,538	46·9	.....	
Value of cement sold	$	1,799,324	2,261,584	462,260	25·7	.....	
Wages paid	$	668,683	659,489	22,806	3·6	.....	
Men employed	No.	1,410	1,158	.....	.....	252	17·9
Total daily capacity of operating plants	Bls.	12,600	10,000	.....	.....	2,600	20·6

Statistics of the annual production of Portland cement for a number of years showing the quantity made, the quantity sold, stocks 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.
	Bls.	Bls.	Bls.	$	$ cts.	Bls.
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	908,990	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
1909	4,146,708	4,067,709	1,777,238	5,345,802	1 31	23,050

Prices :—Manufacturers' prices of cement in car lots, cost of package excluded, as quoted by the Canadian Cement and Concrete Review, were as follows :—

Toronto :—During the first three months of the year, prices ranged from $1.55 to $1.75 per barrel ; from April to December, the range was from $1.30 to $1.65.

Montreal :—Quotations during the first three months, $1.65 to $1.75 ; April to December, $1.35 to $1.65.

Winnipeg :—Quotations throughout the year, $2.25 to 2.40 per barrel.

Imports and Exports :—There has been very little cement exported from Canada during past years, the value of the exports in 1907 being $9,618 ; this was increased in 1908 to a value of $34,591, and a further increase in 1909 is recorded, the exports being valued at $113,362. The quantity exported is not shown in the Customs Reports.

The imports of Portland cement, which, previous to 1904, were larger than the Canadian production, have been decreasing since 1906, and amounted in 1909 to only 142,194 barrels, or about 3 per cent of the consumption ; as compared with imports of 469,049 barrels, or 15 per cent of the consumption in 1908. 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.

During 1907 and 1908 the greater part of the cement imported was from the United States, over 53 per cent of the imports being from that source during the latter year. During 1909, however, over 64 per cent of the imports was derived from Great Britain and less than 30 per cent from the United States.

The imports of cement during 1908 and 1909 by countries were as follows :—

	1908.			1909.		
	Cwt.	%	Value.	Cwt.	%	Value.
			$			$
Great Britain	601,527	36·6	202,139	322,149	64·7	104,060
United States	902,576	55·0	283,899	145,962	29·3	51,222
Belgium	128,738	7·8	40,856	15,761	3·2	5,029
Other countries	8,831	0·5	4,151	13,806	2·8	6,358
Totals	1,641,672	99·9	531,045	497,678	100·0	166,669
Equivalent in barrels	469,049			142,194		

Statistics of the export of cement since 1891 and of the imports since 1880 are given in the next two tables :—

Exports of Cement.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1891	2,881	1898	2,117	1904	5,494
1892	938	1899	2,733	1905	3,143
1893	1,172	1900	3,296	1906	7,551
1894	482	1901	1,514	1907	9,618
1895	937	1902	2,267	1908	34,591
1896	1,328	1903	2,851	1909	113,362
1897	644				

Imports of Cement into Canada.

Fiscal Year.	Cement and Mfrs. of, N. E. S.	Hydraulic Cement.		Portland Cement.	
		Bls.	Value.	Bls.	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	122,462	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	1,301,331	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	6,323	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	963,839
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
1909	5,733	438	466	1,460,850	475,676

* Cement not elsewhere specified and manufactures of cement.

Consumption of Cement.—Although the exports of cement have been increasing during the past two years, the value is still comparatively small, and as the quantity has not been recorded, the consumption has been estimated on the basis of the Canadian production and the imports.

The total consumption of Portland cement in Canada in 1909 was 4,209,903 barrels (736,733 tons): made up of 4,067,709 barrels (711,849 tons) of Canadian cement, or 97 per cent; and 142,194 barrels (24,884 tons) of imported cement, or 3 per cent.

In 1908, the total consumption was 3,134,338 barrels (548,509 tons), of which 85 per cent was made in Canada, and 15 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 nine years :—

Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Bls.	%	Bls.	%	Bls.
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
1909	4,067,709	97	142,194	3	4,209,903

Quebec.

The Superintendent of Mines for the Province publishes the production of cement in 1909 as 1,011,194 barrels, valued at $1,314,551 ; as compared with a production of 801,695 barrels, valued at $1,127,335, in 1908. All the operating plants in this Province have been acquired by the Canada Cement Company.

Ontario.

Statistics of cement production in Ontario have already been given in detail in tabular form, the total sales for 1909 being 2,462,027 barrels, valued at $3,084,218. There were 14 plants in operation during 1909, of which six controlled by the Canada Cement Company produced the greater part of the cement sold.

Alberta.

There are two operating cement plants in this Province : one at Calgary, now owned by the Canada Cement Company, and a plant at Exshaw owned by the Western Canada Cement and Coal Company. A third plant was under construction at Blairmore by the Rocky Mountain Cement Company, with a proposed capacity of 500 barrels per day.

British Columbia.

There is but one cement plant in this Province, viz., that located at Tod inlet, twelve miles from Victoria, and operated by the Vancouver Portland Cement Co. The capacity of the plant is about 1,000 barrels a day, and during 1909 the Company made about 238,000 barrels of cement.

A feature of special interest in connexion with the cement industry in 1909 was the consolidation of ten plants, incorporated as the Canada Cement Company, Ltd. The following companies entered the consolidation :—

The Vulcan Portland Cement Co., Ltd.,	Longue Point, Que.
The Lakefield " "	Pointe aux Trembles, Que.
The International " "	Hull, Que.
The Owen Sound " "	Shallow Lake, Ont.
The Belleville " "	Belleville, Ont.
The Lehigh " "	"
Lakefield " "	Lakefield, Ont.
The Canadian " "	Marlbank and Port Colborne, Ont.
The Alberta Portland Cement Co.,	Calgary, Alta.

Following is a list of cement manufacturing companies :—

Name.	Location of Plant.	Head Office.
Sydney Cement Company, Ltd.	Sydney, N.S.	Sydney, N.S.
Canada Cement Company, Ltd.		Montreal, Que.
Montreal Mill No. 1	Longue Point, Que.	
" " No. 2	Kilbourn Siding, Que.	
International Mill	Hull, Que.	
Owen Sound "	Shallow Lake, Ont.	
Belleville "	Belleville, Ont.	
Lehigh "	" "	
Lakefield "	Lakefield, Ont.	
Marlbank "	Marlbank, Ont.	
Port Colborne "	Port Colborne, Ont.	
Alberta "	Calgary, Alta.	
Grey and Bruce Portland Cement Co.	Owen Sound, Ont.	Owen Sound, Ont.
The Sun Portland Cement Co., Ltd. (In liquidation).	" "	"
The Imperial " "	" "	"
Hanover " "	Hanover, Ont.	Hanover, Ont.
The Ontario " "	Blue Lake, Ont.	Brantford, Ont.
The National " "	Durham, Ont.	Durham, Ont.
Kirkfield " "	Raven lake, Ont.	Toronto, Ont.
Superior " "	Orangeville, Ont.	Orangeville, Ont.
The Maple Leaf " "	Atwood, Ont.	Listowel, Ont.
The Crown " "		Wiarton, Ont.
The Commercial Cement Co., Ltd.	Babcock, Man.	Winnipeg, Man.
The Western Canada Cement & Coal Co.	Exshaw, Alta.	Ottawa, Ont.
Vancouver Portland Cement Co.	Tod inlet, B.C.	Victoria, B.C.

Following is a list of companies building, or contemplating the erection of mills :—

Ben Allan Portland Cement Co.	Owen Sound, Ont.
Lake Medal " "	Hamilton, Ont.
Bell's Lake " "	Markdale, Ont.
The Brant " "	Brantford, Ont.
The Rocky Mountain Cement Co.	Blairmore, Alta.
Canada Cement Co., (Quebec Mill)	Montreal, Que.

CLAY PRODUCTS.

The clay products made in Canada comprise brick of various kinds, including common and pressed brick, paving, ornamental, and fancy brick, firebrick, porous fireproofing brick and blocks, sewerpipe, drain tile, pottery and sanitary ware.

There are a large number of manufacturers of brick whose individual output is comparatively small, and in past years it has been somewhat difficult to obtain complete returns of production. Our circular inquiry for 1909 was supplemented by a personal canvas in the Province of Ontario, with very satisfactory results, there being an evident willingness on the part of practically all producers to make the statistics as complete as possible.

The prompt co-operation of all clay manufacturers in furnishing returns of production would enable the Department to publish the statistics much earlier than has hitherto been possible.

The statistics of production given herewith represent actual sales; material produced but held in stock over the end of the year, not being included until disposed of.

According to the returns received the total value of the clay products sold in 1909 was $6,450,840, as compared with a total valuation in 1908 of $4,500,702; an increase of $1,950,138, or 43·3 per cent. The total value of the clay products sold in 1907 was $5,772,117; in 1906 it was $5,072,635, and in 1905, $4,709,842.

Of the total value of the clay production in 1909, about 76 per cent was made up of building and paving brick, and about 16 per cent of sewerpipe and tile.

The production by classes is shown as follows:—

Production of Clay Products, 1908 and 1909.

	1908.			1909.		
	Quantity.	Value.	Per M	Quantity.	Value.	Per M
		$	$ cts.		$	$ cts.
Bricks—						
Common..... No.	353,261,268	2,611,554	7 39	539,228,708	4,212,424	7 81
Pressed..... "	53,480,764	517,180	9 67	57,264,656	630,677	11 01
Paving..... "	3,719,961	59,456	15 98	3,759,803	67,408	17 93
Ornamental.....	.....	18,535	.....	.....	8,366	.....
Firebrick, and fireclay shapes, etc.....	.....	110,302	.....	.....	78,132	.....
Fireproofing, and architectural terra-cotta, etc.	.....	170,211	.....	.....	113,866	.....
Pottery.....	.....	200,541	.....	.....	285,285	.....
Sewerpipe.....	.....	514,362	.....	.....	645,722	.....
Tiles, drain.....	20,100,261	298,561	14 85	27,571,097	408,440	14 81
Totals.....	.....	4,500,702	.....	.....	6,450,840	.....

Production of Clay Products, 1907.

	1907.		
	Quantity.	Value.	Per M
		$	$ cts.
Bricks—			
Common ..... No.	439,015,556	3,455,524	7 87
Pressed ..... "	78,922,092	794,722	10 07
Paving ..... "	3,617,720	72,354	20 00
Ornamental		47,288	
Firebrick and fireclay shapes, etc		131,322	
Fireproofing and architectural terra-cotta, etc		89,389	
Pottery		253,809	
Sewerpipe		667,100	
Tiles, drain		260,609	
Total		5,772,117	

By provinces the production during the past four years has been as follows:—

Production of Clay Products by Provinces, 1906-9.

Province.	1906.	1907.	1908.	1909.
	$	$	$	$
Nova Scotia	160,506	125,560	117,833	188,185
New Brunswick	49,220	57,377	75,513	65,570
Quebec	769,458	1,214,108	893,717	1,153,832
Ontario	3,136,870	3,123,372	2,476,152	3,425,841
Manitoba	517,065	466,432	265,091	559,008
Saskatchewan	136,022	125,459	87,566	145,516
Alberta	180,217	353,672	240,384	442,486
British Columbia	123,277	306,137	344,446	470,402
	5,072,635	5,772,117	4,500,702	6,450,840

Annual Value of Production of Clay Products, 1899-1909.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1899	2,988,099	1903	4,034,289	1907	5,772,117
1900	3,195,105	1904	3,841,560	1908	4,500,702
1901	3,382,706	1905	4,709,842	1909	6,450,840
1902	3,625,489	1906	5,072,635		

Important as are Canada's clay industries, the output is far from sufficient to supply the home demand. The exports are almost negligible, the only item recorded being that of building brick, of which the exports in 1909 were 365,000,

valued at $2,255, as compared with 2,344,000 in 1908, valued at $9,047. The imports of clay and clay products on the other hand are very considerable, amounting in value during the calendar year 1909, to $3,247,539. These imports include chiefly manufactured products, such as brick, tile, earthenware and china of all kinds. There is also, however, quite a large importation of clays, such as the better grades of china-clay, fireclay etc. The imports of brick and tile were valued at $1,249,450. Earthenware and china were imported to a value of $1,781,759, and clays to a value of $216,330.

Statistics of the imports of clay products during the fiscal years 1908 and 1909, and the calendar year 1909, are shown hereunder.

Imports of Clay Products, 1908 and 1909.

Imports.	12 months ending March, 1908.	12 months ending March, 1909.	12 months ending December, 1909.
	$	$	$
Brick and tiles—			
Bath brick	1,834	4,432	1,495
Building brick	139,105	108,773	195,360
Paving brick	61,346	101,187	139,366
Firebrick of a kind not made in Canada	639,347	350,457	485,994
Drain tile, not glazed	2,080	2,394	2,785
Drain pipe, sewerpipe, etc	125,747	106,399	170,280
Mfgs. of clay, N.O.P	110,097	141,391	254,170
	1,079,556	815,033	1,249,450
Earthenware and chinaware—			
Brown coloured	22,847	28,273	36,673
Demijohns, churns, and crocks	17,336	10,571	8,888
Tableware of china, porcelain, white granite	1,555,517	1,202,537	1,212,365
China and porcelain	109,446	87,798	87,467
Tiles or blocks of	45,836	43,299	56,974
Earthenware tiles, N.O.P	116,480	79,854	81,393
Mfgs. of earthenware, N.O.P	83,309	66,932	78,063
Earthenware, N.O.P	239,513	197,623	219,936
	2,190,784	1,716,887	1,781,759
Clays—			
China-clay	97,236	90,922	100,066
Fireclay	155,873	77,146	86,161
Pipe-clay	319	887	310
Clays, all other, N.O.P	14,292	21,280	29,793
	267,720	190,235	216,330
Grand total	3,538,060	2,722,155	3,247,539

In addition to the above imports, there is also a considerable annual importation of "chalk, china or Cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground," much of which is no doubt used in connexion with the manufacture of clay products. The value of these imports during the fiscal year ending March, 1909, was $81,675; of which $55,909 worth was from the United States and $25,233 from Great Britain. The value of the imports under this item during the calendar year 1909 was $96,747. There is also an

annual importation of "baths, bath tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material," $157,881 worth during the fiscal year 1909; much of which would possibly come under the class of clay products known as sanitary ware.

The principal sources of the imports given in the above table for the fiscal year ending March, 1909, are shown in the next table. It will be observed that of the total, the largest proportion, $1,397,845 in value or over 51 per cent, was from Great Britain. The value of the imports from the United States was $887,400, or 32 per cent of the total; Germany supplied $187,381 worth, or about 7 per cent; France, Austria-Hungary, and Japan were also important sources of clay products, particularly of the manufactures of table ware, chinaware, etc.

Imports of Clay Products during the twelve months ending March, 1909, showing countries of origin.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other Countries.	Total.
	$	$	$	$	$	$	$	$
Brick and tiles—								
Bath brick	1,422	3,010						4,432
Building brick	20,493	88,260					20	108,773
Paving brick	75,497	25,468		222				101,187
Firebrick, of a class or kind not made in Canada	54,278	295,879	291	9				350,457
Drain tile, not glazed	351	2,043						2,394
Drain pipe, sewerpipe and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed	47,206	59,162					31	106,399
Manufactures of clay, N.O.P.	52,759	88,444	142	46			30	141,391
Total	252,006	562,236	433	277			81	815,033
Earthenware and chinaware—								
Brown or coloured earthen and stoneware, and Rockingham ware	9,591	17,922	234	20	245	218	43	28,273
C.C. or cream coloured ware, decorated, printed or sponged, and all earthenware, N.O.P	125,069	37,805	7,046	1,630	2,016	21,150	2,907	197,623
Demijohns, churns or crocks	1,993	8,385			61	94	38	10,571
Tableware of china, porcelain, white granite or ironstone	832,307	29,963	160,281	93,082	57,904	26,152	2,848	1,202,537
China and porcelain ware, N.O.P.	25,606	13,357	15,660	5,786	9,006	16,526	1,857	87,798
Tiles or blocks of earthenware or stone prepared for mosaic flooring	10,663	31,270		1,167			199	43,299
Earthenware tiles, N.O.P.	40,612	39,234					8	79,854
Manufactures of earthenware, N.O.P.	20,102	38,646	1,970	2,991	1,073	1,899	251	66,932
Total	1,065,943	216,582	185,191	104,676	70,305	66,039	8,151	1,716,887

Imports of Clay Products during the twelve months ending March, 1909, showing countries of origin—*Continued.*

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other Countries.	Total.
	$	$	$	$	$	$	$	$
Clays—								
China clay, ground or unground	59,795	30,092	1,035					90,922
Fireclay, ground or unground	18,492	58,483	171					77,146
Pipe-clay, ground or unground	308	28	551					887
Clays, all other, N.O.P.	1,301	19,979						21,280
Total	79,896	108,582	1,757					190,235
Grand Total	1,397,845	887,400	187,381	104,953	70,305	66,039	8,232	2,722,155
Per cent of total	51·35	32·60	6·88	3·86	2·58	2·43	0·30	100·00
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry-tubs of any material	25,832	132,024			21	4		157,881
Chalk, china or Cornwall stone, cliff stone, and feldspar, fluorspar, magnesite, ground or unground	25,233	55,909	325	181			27	81,675

A record of the total annual value of the imports of clay products since 1900 is shown in the next table. In ten years Canada has imported clay products to the value of over $22,000,000. The increase over the ten year period was about 122 per cent. Brick and tile imports in the ten years have increased 458 per cent, earthenware and chinaware over 78 per cent, and clays over 54 per cent.

These statistics indicate in a striking manner the possibilities for the development of Canada's clay industries.

Imports of Clay Products (total value) 1900–9.

Fiscal Year.	Brick and Tile.	Earthenware and Chinaware	Clays.	Total.
	$	$	$	$
1900	145,914	959,526	122,965	1,228,405
1901	133,343	1,114,677	141,251	1,389,271
1902	172,281	1,275,093	140,521	1,587,895
1903	157,783	1,406,610	176,416	1,740,809
1904	259,421	1,611,356	144,706	2,015,483
1905	761,756**	1,636,214	176,805	2,574,775
1906	1,000,372	1,692,359	220,504	2,913,235
1907*	770,686	1,422,880	178,240	2,371,806
1908	1,079,556	2,190,784	267,720	3,538 060
1909	815,033	1,716,887	190,235	2,722,155
	5,296,145	15,026,386	1,759,363	22,081,894

* 9 months ending March 1907.

** Includes fireclay classified as "for use in process of manufactures."

In view of the large imports of clay products into Canada, it may be of interest to quote herewith the Customs duties affecting these goods. Canadian pottery manufacturers claim to be unable to meet the competition of imported pottery, particularly that from England. The total duties collected on clay products during the fiscal year 1909 were $490,294.80, or an average of about 22½ per cent *ad valorem*, on the dutiable imports, or 18 per cent on the total imports of clay goods, including those entered free.

Canadian Customs Duties on Clay Products.

(From the Customs Tariff, 1907, revised 1910).

Item.	—	British Preferential Tariff.	Intermediate Tariff.	General Tariff.
281	Firebrick of a class or kind not made in Canada.....	Free.	Free.	Free.
282	Building brick, paving brick, and mfgs. of clay or cement (N.O.P).....	12½ %	20 %	22½ %
283	Drain tiles not glazed.....	15 "	17½ "	20 "
284	Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed, earthenware tiles (N.O.P.).....	25 "	32½ "	35 "
285	Tiles or blocks of earthenware or of stone prepared for mosaic flooring.....	20 "	27½ "	30 "
286	Earthenware and stoneware, viz., demijohns, churns or crocks.....	20 "	27½ "	30 "
287	Tableware of china, porcelain, white granite or ironstone.....	15 "	27½ "	27½ "
288	Earthenware and stoneware, brown or coloured, and Rockingham ware "C.C." or cream coloured ware, decorated, printed or sponged, and all earthenware, (N.O.P.).....	20 "	27½ "	30 "
289	Closets, urinals, basins, lavatories, baths, bath tubs, sinks, and laundry tubs of earthenware, stone, cement or clay or of other material.....	20 "	30 "	35 "
295	Clays, including china-clays, fireclay and pipe-clay, not further manufactured than ground; ganister and sand; gravels; earths, crude only.....	Free.	Free.	Free.

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, 1908, and 1909 in the next table.

In 1907, the total production was 517,937,648, valued at $4,250,246: made up of 439,015,556 common, 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 406,742,030, valued at $3,128,734: made up of 353,261,268 common, valued at $2,611,554, or an average value per thousand of $7.39; and 53,480,764 pressed brick, valued at $517,180, or an average value per thousand of $9.67.

In 1909, the total production was 596,493,364, valued at $4,843,101: made up of 539,228,708 common, valued at $4,212,424, or an average value per thousand of $7.81; and 57,264,656 pressed brick, valued at $630,677, or an average value per thousand of $11.01.

Production of Clay Building Brick (Common and Pressed) 1907, 1908, and 1909.

	1907.		1908.		1909.	
		$		$		$
Nova Scotia	19,646,000	110,338	9,125,000	56,064	18,875,000	114,795
New Brunswick	4,941,141	36,937	6,594,011	54,573	6,170,000	44,330
Quebec	104,394,709	715,922	90,667,177	601,874	101,471,567	690,918
Ontario	287,930,763	2,311,499	221,600,575	1,664,184	322,524,414	2,557,068
Manitoba	45,094,180	465,282	26,818,000	254,591	59,110,000	544,548
Saskatchewan	12,024,070	125,459	8,262,996	87,566	14,416,770	144,316
Alberta	31,384,740	353,672	25,521,911	240,336	45,479,855	441,606
British Columbia	12,522,945	131,137	18,152,362	169,546	28,445,758	305,520
Totals	517,937,648	4,250,246	406,742,030	3,128,734	596,493,364	4,843,101

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, but falling in 1909 to a value of $2,255. The annual imports for a number of years previous to 1903 averaged only about $20,000 in value; during the past six years, however, the value of the imports has varied fro n $100,000 to nearly $200,000 per annum. During the calendar year 1909 the imports were 27,972,000 brick, valued at $195,360: of which, 1,738,000 valued at $21,680, an average of $12.47 per M, were imported from Great Britain; and 26,234,000 valued at $173,680, an average of $6.62 per M, from the United States.

Exports of Building Brick.

Calendar Year.	M.	Value.	Calendar Year.	M.	Value.	Calendar Year.	M.	Value.
		$			$			$
1891	246	1,163	1898	65	442	1904	696	5,357
1892	1,963	12,192	1899	172	1,351	1905	754	5,888
1893	6,073	44,110	1900	546	4,528	1906	697	6,541
1894	1,095	7,405	1901	646	5,189	1907	802	6,193
1895	1,655	8,665	1902	2,110	12,786	1908	2,344	9,047
1896	983	5,678	1903	891	5,699	1909	365	2,255
1897	573	2,679						

Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
		$			$			$
1880.....	340	2,067	1890.....	1,933	12,500	1900.....	1,792	19,305
1881.....	415	4,281	1891.....	589	9,744	1901.....	2,800	20,677
1882.....	3,500	24,572	1892.....	621	5,075	1902.....	4,087	33,802
1883.....	1,448	14,234	1893.....	1,489	14,108	1903.....	2,881	28,493
1884.....	3,263	20,258	1894.....	2,220	18,320	1904.....	13,455	117,468
1885.....	3,108	14,632	1895.....	575	4,705	1905.....	25,515	168,122
1886.....	983	5,929	1896.....	1,057	23,189	1906.....	21,934	194,897
1887.....	276	2,440	1857.....	2,094	10,336	1907 (9mos)	8,495	88,144
1888.....	2,483	20,720	1898.....	639	6,652	1908.....	13,790	139,105
1889.....	2,590	24,585	1899.....	2,611	21,306	1909.....	10,894	103,773

Prices:—The price of brick is somewhat lower in the eastern parts of Canada than in the west. The average price of common brick at the yard in 1907, according to the returns furnished by the producers, ranged from a minimum of $5.47 in Nova Scotia to a maximum of $10.67 in Alberta. Prices in 1908 averaged somewhat higher in the Maritime Provinces, but lower in Ontario and the west; this was a year of comparative dullness in the building trades with a falling off in production. In 1909, however, the demand became brisk again and prices averaged somewhat higher, running from a minimum of $5.69 in Nova Scotia to a maximum of $9.73 in British Columbia.

The following table shows the average prices of co nmon and pressed brick in the several provinces during 1907, 1908, and 1909. These are the average values of brick sold at the yard as furnished by the producers.

Average Prices per Thousand of Common and Pressed Brick.

	Common Brick.			Pressed Brick.		
	1907.	1908.	1909.	1907.	1908.	1909.
Nova Scotia.	$ 5.47	$ 5.81	$ 5.69	$12.53	$13.84	$12.36
New Brunswick. ..	7.45	8.17	7.14	8.21	16.70	12.00
Quebec.	6.43	6.37	6.38	11.60	11.62	14.00
Ontario.	7.61	7.24	7.71	9.45	8.74	9.46
Manitoba.	10.19	9.24	9.14	13.67	15.45	12.00
Saskatchewan.....	10.43	10.46	9.66	.....	11.18	14.00
Alberta.....	10.67	8.60	9.21	17.89	12.97	13.03
British Columbia..	10.45	9.21	9.73	20.95	20.40	31.05
Canada.	7.87	7.39	7.81	10.07	9.67	11.01

Ontario :—Over 52 per cent of the total production of building brick in Canada in 1909 was made in the Province of Ontario, and of the Ontario production over 47 per cent was made in the county of York, so that the City of Toronto and vicinity produces about one-quarter, or including the county of Halton, nearly 30 per cent of the total brick production of Canada; Wentworth county, or the vicinity of Hamilton, is perhaps the next important brick centre, producing over 7 per cent of the Ontario output. The counties of Carleton and Russell, or the Ottawa district, are the next in order with a little under 7 per cent. Other important districts are Algoma and Nipissing, which cover a wide area, and the western counties of Middlesex, Kent, Waterloo, and Simcoe. These eleven counties contributed over 82 per cent of the Ontario production. Practically all the pressed brick, reported as such, was made in Toronto and vicinity.

The production of these counties in 1909 is shown in tabular form herewith.

Production of Common and Pressed Brick by Principal Counties.

County.	Common.			Pressed.			Total Value.	Per cent.
	No.	Value.	Per M.	No.	Value.	Per M.		
		$	$ c.		$	$ c.	$	%
York	118,604,500	969,032	8 17	27,125,800	250,461	9 23	1,219,493	47·69
Halton	9,705,300	72,033	7 42	12,790,900	126,662	9 90	198,695	7·77
Wentworth	26,799,250	188,577	7 04				188,577	7·37
Carleton	12,903,165	101,618	7 88				101,618	3·97
Algoma	8,667,000	81,250	9 37	200,000	2,800	14 00	84,050	3·29
Russell	11,000,000	66,250	6 02				66,250	2·59
Nipissing	6,500,000	55,950	8 61				55,950	2·19
Middlesex	7,023,050	54,030	7 69	60,000	510	8 50	54,540	2·13
Kent	7,592,000	48,020	6 33				48,020	1·88
Waterloo	6,842,160	46,968	6 86				46,968	1·84
Simcoe	6,108,000	44,280	7 25				44,280	1·73
Total, 11 counties	221,744,425	1,728,008	7 79	40,176,700	380,433	9 47	2,108,441	82·45
Total, other counties	59,934,089	442,493	7 38	669,200	6,134	9 17	448,627	17·55
Total, Ontario	281,678,514	2,170,501	7 71	40,845,900	386,567	9 46	2,557,068	100·00

The annual production of common and pressed brick in this Province since 1898, as ascertained by the Ontario 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 given in the previous table.

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
1909	246,308	1,916,147	7 779	53,167	490,571	9 227

In reviewing the brick industry of Ontario, the Director of the Bureau of Mines states "The demand for brick was active during the year, especially in the larger cities, building operations in Toronto, for instance, which is essentially a city of brick, being decidedly brisk. A large quantity of brick is manufactured in and around Toronto, many of the brick-yards being extensive and well equipped. Reference to the figures published by the Bureau as to the production of brick, shows that the average value at the yard has risen from $5.73 per thousand in 1901 to $7.78 per thousand in 1909, an increase of over 35 per cent. The cost of brick constructions has been heavily affected during the same time, since the cost of labour has experienced an advance probably quite as great.

"There has of late years been a marked improvement in the quality of brick made in first-class yards. Kilns of modern construction burn harder and more evenly, and there is a smaller proportion of soft brick. The present taste in brick houses too, does not demand the same uniformity of colour that was formerly insisted upon; in fact, a variety of shade, instead of being objected to, is rather desired. There is also a much greater range of products than was made years ago. From white and buff to cherry red, and up to a dark even purplish hue, bricks of all tints and shades are freely used, and pleasing effects are sometimes obtained by employing clinker or overburned bricks, greenish or yellowish in colour."

Paving Brick:—Paving bricks are made in Ontario only at West Toronto, from shale found on the banks of the Humber river. The annual production has been fairly constant at from 3,000,000 to 5,000,000 brick per season. The output finds a market chiefly in Toronto. Statistics of production are available since 1897 and are shown in the next table. The average price per thousand has varied from $8 to $20.

In 1909 the number of paving brick sold was 3,759,803, valued at $67,408; while during the same year there were imported paving brick valued at $139,366. Statistics of production and imports of paving brick 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	1904	4,436	55,450	12 50
1898	.....	.....	.....	1905	4,500	54,000	12 00
1899	5,300	42,550	8 03	1906	3,000	45,000	15 00
1900	2,710	26,950	9 94	1907	3,618	72,354	20 00
1901	3,689	37,000	10 03	1908	3,720	59,456	15 98
1902	4,211	42,000	9 97	1909	3,760	67,408	17 93
1903	3,789	45,288	11 95.				

(a) Figures previous to 1907 compiled from Ontario Bureau of Mines.

Imports of Paving Brick.*

Fiscal Year.	M	Value.	Average per M.	Fiscal Year.	M.	Value.	Average per M.
		$	$ cts.			$	$ cts.
1895	275	5,006	18 20	1903	1,337	18,811	14 07
1896	918	10,132	11 04	1904	1,986	29,753	14 98
1897	52	719	13 83	1905	2,350	32,578	13 86
1898	367	2,337	6 37	1906	4,104	46,008	11 21
1899	1,583	23,648	14 94	1907 (9 mos.)	2,182	23,256	10 66
1900	2,175	35,644	16 39	1908	5,340	61,346	11 49
1901	900	10,414	11 57	1909		101,187	†
1902	1,030	16,788	16 30				

* Duty 20 per cent.

†The imports during July, 1908, under the general tariff, are reported as 6,581 M, value $7,317, an apparent error. There appears also to be an error in the entries for July, August, and September of the same year. The total number has, therefore, been omitted. The actual value of the imported brick varies from $10 to $12 per M.

Fireclay and Fireclay Products:—There are a number of clays from different localities that have been used in the manufacture of refractory brick or firebrick, and for furnace linings, etc., which have been usually termed fireclays. These include clays found with the Coal Measures at Westville, Nova Scotia, and at Comox, Vancouver island, also clays found south of Moosejaw, Saskatchewan, and at Clayburn, near the city of Vancouver, British Columbia. Stove lining and other refractory clay products are made at several places in Ontario and Quebec from imported fireclays.

The total value of the sales of fireclay, firebrick, and fireclay products in 1909 was $78,132, as compared with a valuation of $110,302 in 1908 and $131,322 in 1907.

The production of 1909 comprised 1,059,270 firebrick valued at $32,742, or an average of $30.92 per M; fireclay sold, 4,405 tons valued at $12,390, and other fireclay products valued at $33,000.

Fireclay products in 1908 included 2,415,871 firebrick valued at $70,429, an average of $29.16 per M; fireclay sold, 1,984 tons valued at $8,121, and other fireclay products valued at $31,752. The 1907 production comprised 4,323,179 firebrick valued at $113,322, an average of $26.21 per M; and other fireclay shapes to the value of $18,000.

Firebricks were imported during the calendar year 1909 to the value of $485,994, of which $426,602 worth was derived from the United States and $59,392 from Great Britain.

The imports during the fiscal year ending March, 1909, were valued at $350,457, and during the fiscal year ending March, 1908, the imports were valued at $639,347. The imports of fireclay during the calendar year 1909 were valued at $86,161, and were derived chiefly from the United States and Great Britain.

During the fiscal year ending March, 1909, fireclay was imported to the value of $77,146, and the imports during the fiscal year ending March, 1908, were valued at $155,873.

Statistics of the imports of firebrick and of fireclay for a number of years are shown as follows:—

Imports of Firebrick and Fireclay, 1900-9.

Fiscal Year.	Fireclay.	Firebrick.	Fiscal Year.	Fireclay.	Firebrick.
	$	$		$	$
1900	59,291	39,535	1905	73,837	44,746
1901	79,530	32,831	1906	131,130	51,892
1902	64,541	45,608	1907*	85,044	349,185
1903	94,509	34,522	1908	155,873	639,347
1904	52,716	38,335	1909	77,146	350,457

* 9 months ending March.

Sewerpipe and Drain Tile:—The total value of the sales of sewerpipe in 1909 was $645,722, as compared with a value of $514,362 in 1908, and a value of $667,100 in 1907.

The imports of drain pipe and sewerpipe during the calendar year 1909 were valued at $170,280: of which $135,809 worth were imported from the United States; $34,200 from Great Britain, and $271 from other countries. During the

twelve months ending March, 1909, the imports were valued at $106,399, and during the twelve months ending March, 1908, the value was $125,747.

Following is a list of firms manufacturing sewerpipe :—

Standard Drain Pipe Co. of St. Johns	New Glasgow, N.S.
	St. Johns, Que.
Ontario Sewer Pipe Company	Toronto, Ont.
Dominion Sewer Pipe Company	"
Hamilton & Toronto Sewer Pipe Co., Ltd	Hamilton, Ont.
B. C. Pottery Company	Victoria, B.C.

There was a considerably increased demand for drain tile in 1909, and the total sales reported to this Branch were 27,571,097 valued at $408,440, an average of $14.81 per M; as compared with sales of 20,100,261 valued at $298,561, or an average of $14.85 per M, in 1908. The Ontario Bureau of Mines reports the total quantity made in that Province in 1909 as 27,418,000 valued at $363,550, or an average of $13.25 per M; as compared with 24,800,000 valued at $338,658, or an average value of $13.66 per M, in 1908.

The imports of unglazed drain tile are comparatively small, the value in 1909 being $2,785 only.

Statistics of the annual production of sewerpipe, and of the imports of drain tile and sewerpipe, are shown in the next three tables.

Production of Sewerpipe, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1888	266,320	1896	153,875	1904	440,894
1889	Not available.	1897	164,250	1905	382,000
1890	348,000	1898	181,717	1906	350,045
1891	227,300	1899	161,546	1907	667,100
1892	367,660	1900	231,525	1908	514,362
1893	350,000	1901	248,115	1909	645,722
1894	250,325	1902	301,965		
1895	257,045	1903	317,970		

Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines).

Year.	No.	Value.	Year.	No.	Value.	Year.	No.	Value.
		$			$			$
1891	7,500,000	90,000	1898	22,668,000	225,030	1905	15,000,000	220,000
1892	10,000,000	100,000	1899	21,027,400	240,246	1906	17,700,000	252,500
1893	17,300,000	190,000	1900	19,544,000	209,738	1907	15,578,000	250,122
1894	25,000,000	280,000	1901	21,592,000	231,374	1908	24,800,000	338,658
1895	14,330,000	157,000	1902	17,510,000	199,000	1909	27,418,000	363,550
1896	13,200,000	144,000	1903	18,200,000	227,000			
1897		*	1904	16,000,000	210,000			

* Not stated.

Imports of Drain Tile and Sewerpipe.

Fiscal Year.	Drain Tile (a).	Sewerpipe (b).	Fiscal Year.	Drain Tile (a).	Sewerpipe (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	4,230	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	1909	2,394	106,399

(a) Drain tile, not glazed.

(b) Drain pipes, sewerpipes, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

Pottery and Earthenware:—The pottery made from Canadian clays has been, hitherto, chiefly of the common grades, such as flowerpots, jardinieres, crocks, jars, churns, etc. A number of potters make a higher grade product of stoneware, but the majority of these use imported clays. Sanitary ware is made at St. Johns, Que., and other points; but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and sanitary ware in 1909, according to returns received, was $285,285; as compared with a valuation of $200,541 reported for 1908. Annual statistics of production are shown herewith.

Annual Production of Pottery.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1888	27,750	1896	163,427	1903	200,000
1889	Not available.	1897	129,629	1904	140,000
1890	195,242	1898	214,675	1905	120,000
1891	258,844	1899	185,000	1906	150,000
1892	265,811	1900	200,000	1907	253,809
1893	213,186	1901	200,000	1908	200,541
1894	162,144	1902	200,000	1909	285,285
1895	151,588				

Details of the imports of earthenware and chinaware showing the values imported and countries of origin, have already been given on pages 15, 16, and 17.

The total imports in 1909 were valued at $1,781,759, of which the principal item is "tableware of china, porcelain, white granite or ironstone ware," to a value of $1,212,365. Great Britain is the principal source of the imports of this class of clays, but quite large supplies are also obtained from the United States, Germany, France, Austria-Hungary, and Japan.

Imports of Earthenware and Chinaware.

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	1909	1,716,887

The existence in Canada of commercially available clays suitable for the manufacture of the better grades of stoneware and pottery has not, as yet, been definitely determined, although it is quite reasonable to expect that such clays will yet be found, particularly in the western portion of the country.

Prospecting for clays has not yet the same lure as has that for the metals or other mineral products, and the determination of the value of a clay deposit presents, perhaps, a little more difficulty to the prospector than the recognition of some metalliferous ores.

In the United States a great deal of valuable work has been done in connexion with the investigation of the value of clay deposits.

Similar investigations of Canadian clay resources were initiated by the Mines Branch in 1905, when a report was prepared on the Clay Resources of Manitoba. This work has been continued by the Geological Survey Branch; Dr. Heinrich Ries having spent the season of 1908 in the Maritime Provinces, and the summer of 1909 in Alberta.

Although a complete report of the laboratory experiments on the Nova Scotia clays has not yet been made, the results of the field investigation are of sufficient interest to justify the following extracts from Dr. Ries' preliminary report.[1]

"The object of the study was to ascertain as far as possible, what geological formations were clay and shale-bearing, and which of these deposits were adapted to the manufacture of clay products. * * * * *

[1]Summary Report, Geological Survey Branch, Department of Mines, 1909, p. 240.

Important Clay-bearing Formations.

"From what has been said above, it will be seen that the formations likely to yield clay or shale deposits of value must be the lower Carboniferous, Millstone Grit, Coal Measures, and Pleistocene. These are few in number, but nevertheless they underlie areas of considerable size.

"*Lower Carboniferous.*—Underlying, as they do, a rather extensive area in central Nova Scotia, and another one in Cape Breton, it is to be regretted that the lower Carboniferous rocks have not been more widely looked into by clay-productmanufacturers. The formation is, however, somewhat variable in its character, carrying, as it does, beds of shale, conglomerate, gypsum, and limestone. Those shales closely associated with the gypsum beds may be of value for common brick manufacture, although they frequently contain considerable quantities of impurities, such as gypsum nodules, concretions of iron carbonate, or sandy streaks. At some points though, as near Pugwash, the shale occurs in large beds, and works up well to a plastic mass: the more so as it is slightly weathered. At that locality it supports one of the most active and best equipped brick plants in the Province.

"Northeast of Shubenacadie, also, promising shales were found in the lower Carboniferous, while in the so-called limestone series around Sydney there were found a number of beds which appear promising for brick manufacture, provided the sandstone layers do not occur too thickly.

"*Millstone Grit.*—This is well exposed in the area north of the Coal Measures in the Joggins district; north of the Pictou Coal Measures; south and southeast of Hawkesbury; and west and southwest of the Sydney coal field.

"One cannot predict the universal distribution of promising clay or shale beds in the Millstone Grit, but small beds are not uncommon. Unfortunately, outcrops are scarce in many of the areas underlain by the rocks of this age, which increased the difficulty of finding clays or shales in it. Several deposits of fair importance were seen, and may be referred to in passing. In the Sydney region, a pit has been opened near the Steel works, exposing a bed of soft bluish shale, not less than 5 feet in thickness. A second deposit occurs near the coke oven plant of the Dominion Iron and Steel Company, and a third one outcrops along the east shore of Sydney harbour, near Victoria Mines post-office. Although the tests of these have not yet been completed, it is highly probable that they represent a grade of material considerably higher than brick clay.

"In the Pictou coal region, a rather heavy bed of mottled, shaly clay has been found northeast of Woodbourne station, on the Intercolonial railway. Preliminary tests have shown its adaptability to the manufacture of pressed brick. It may be said here, that there is some doubt as to whether this bed lies in the Millstone Grit or Permian conglomerate, but the former view seems the more reasonable.

"The Millstone Grit contains at least one shale bed of some thickness in the Joggins area; but it is probably of red burning character.

"*Coal Measures.*—These represent the most important clay and shale-bearing formations of Nova Scotia, and were carefully examined in the several areas in which they occur. The largest is the Sydney field, of Cape Breton, and extends from the Big Bras d'Or channel to Cow bay, with only one important interruption, at Cape Percy on the northeastern shore of Cow bay, where the Millstone Grit cuts out the Coal Measures.

"Owing to the almost uninterrupted line of cliffs which fringe the shore-line, a fine series of exposures was obtained. The Sydney coal field is cut into several parts by somewhat deep northeast-southwest bays; which has rendered it difficult for geologists to correlate the sections of the several subdivisions of the field. It can be said that the coal seams are interstratified with a series of shales and sandstones. These are bent into a number of gentle folds, forming the bottom of a broad trough which dips out under the sea. Throughout the field, therefore, low dips prevail. This gives the beds broad outcrops, but still the dip is sufficient to carry the bed rapidly under cover. Toward the northwestern and southeastern parts of the field the sandstone beds predominate, and the shales are of poorer quality, but in the central portion the shales are as abundant as the sandstones. The shales themselves range from smooth, fine-grained, plastic ones, of grey or red colour, to others which are quite siliceous in their character, and of doubtful value. One important deposit is found underlying a large portion of Cranberry head, near Sydney Mines. It is a smooth, greyish shale, and may prove of value for vitrified wares. In the final report it will probably be referred to as the Cranberry Head type, as it appears at a number of points. A second type found at a number of localities in the Nova Scotia Coal Measures is a somewhat soft, reddish shale, well exposed along the shore just west of Cranberry head. Not a few of the shale beds are rather siliceous in appearance and touch, and it would be unwise to express any definite opinion on them until the tests have been completed.

"It seems curious that up to the present time these shales have been completely overlooked; and while it is true that they do not occur in deposits of great thickness, still they are easily accessible, and are capable of supplying a considerable quantity of raw material.

"Numerous references to fireclays in the Sydney field have been published; but as far as we were able to ascertain, this region does not contain any high grade fireclays, although some of them may prove to be low grade. Unfortunately most coal miners have formed the habit of calling any 'under clay' a fireclay.

"*Picton Field.*—In this field there are numerous shale beds associated with the coal seams, but they are best developed in the central portion of the area, and the most important known up to the present time are higher up in the section than the coal beds. Many of these shales when ground and mixed with water are of strong plasticity, but they unfortunately contain such a high percentage of carbonaceous matter as to require great care in burning, and some of the shale beds are too high in carbonaceous or petroliferous matter to be used at all; while others have to be avoided on account of the abundant siderite concretions; but in spite of these disadvantages, the field is an important holder of commercially valuable

shale deposits. In some parts of the section, as along Coal creek, south of the Allan shaft at Stellarton, the beds of shale are occasionally quite free from carbonaceous material. In only one instance is an under clay worked, viz., at the Drummond colliery at Westville, where a hard shale is mined for the manufacture of bricks. The most important utilization of the shales is near New Glasgow, where they are made into common and pressed brick, flue linings, sewerpipe, and drain tile. Pleistocene drift clay is sometimes added to the pipe mixture.

"*Inverness Field.*—This small field carries a number of shale beds associated with the coals, but few of them are of great thickness; indeed, none of them are equal in volume to those worked in the Pictou area. A good bed outcrops on the shore a few hundred feet south of the dock, and a plastic shale is said to underlie the 7 ft. coal. Most important, however, is the bed of grey, plastic clay which overlies the 13 ft. seam, and is found at several points where that seam is cut through by streams. It is, probably, a No. 2 fireclay, and varies in thickness from 18 inches to 3 feet. If the tests prove it to be of refractory character, it would be practicable to work it in connexion with the coal.

"*Port Hood Field.*—Here, too, there are scattered shale occurrences in both the Millstone Grit and Coal Measures; but the most important is along the shore a short distance north of Judique harbour, where a bluish-grey shale, with a vertical dip, and about 8 to 10 feet thick, outcrops for some distance along the shore.

"*Joggins Area.*—This field contains a number of thin shale seams interstratified with sandstone in the Coal Measure rocks, but few of them are of any thickness. The most important, perhaps, is south of McIntyre brook; while a second one, of possible value, underlies the coal seam at Joggins.

"*Pleistocene Clays.*—These may be roughly divided into two classes: (1) glacial clays, usually of stony character, but very plastic, tough, and red burning; and (2) marine clays, often strongly laminated, but also quite plastic and red burning. These two types of clay are rarely used for anything but drain tile and common brick. A few pressed brick are made from them, and the smoother ones could be utilized for the manufacture of common ornamental terra-cotta and cheap art pottery. The marine clays are best developed in the Annapolis and Shubenacadie valleys, while the stony, glacial clays are worked mainly in the Cape Breton region.

"A most remarkable clay, and one of undetermined age, is that found at Shubenacadie and in the Musquodoboit valley. The material is a highly plastic clay, of dark grey, white, or mottled red and white colour, lying beneath the glacial drift, and resting, possibly, on bed-rock. Its thickness, as indicated by a series of borings made by Mr. Keele, ranges from 7 to probably 50 feet. Scattered lumps of lignite were found in the clay at Shubenacadie, and it is hoped that the age of these can be determined.

"It is exceedingly difficult to determine the exact area underlain by this deposit, owing to the heavy mantle of glacial drift covering the region; but the fact that the material is found at several points extending over a distance of 7 miles, indicates its probable extent, unless some of the masses have been pushed along with the drift. Borings could, of course, only be made at those points where the drift cover was thin or absent.

"The clay burns to a cream colour, and fairly dense body at a comparatively low temperature. It is at least semi-refractory in its character, and may prove to be a stoneware clay. Some test bricks were made from a carload lot of this clay, taken from a shaft sunk in the deposit at Shubenacadie.

"It is safe to say that nothing like it has been found elsewhere in Nova Scotia, and its resemblance to some of the Cretaceous fireclays of New Jersey is striking.

New Brunswick.

"As most of our time was required for the examination of the Nova Scotia clays, but little of the field season was left for New Brunswick. Several localities were examined, and the following is a condensed statement of the results.

"In the vicinity of Albert Mines, in Albert county, there are some very promising beds of Devonian shales, which are probably of red burning character. In the event of the oil-shales at that locality being developed, these shales will be of importance for brick manufacture, but aside from this, they may prove to be of value for making pressed brick to be shipped to other markets. Nearby there are also red burning shales of lower Carboniferous age. Some of the latter are located along the line of the railway.

"Many shale deposits, some of which may prove to be of refractory character, are associated with the coal deposits around Minto and Chapman, northeast of Grand lake. Similar shales underlie and overlie the coal 12 miles southeast of Harcourt.

"Marine clays are worked for common, and some pressed brick, at both St. John and Fredericton.

Prince Edward Island.

"The only clay resources of Prince Edward Island are of Pleistocene age. Common brick clays are found at a number of points, but are worked to only a slight extent.

Clay Working Industry.

"Up to the present time, the clay deposits of Nova Scotia have been but little developed. Common brick are made at Annapolis, Middleton, and Avonport, in the Annapolis Valley region, and at Shubenacadie, and Elmsdale in the Shubenacadie valley. Other yards are in operation at Sylvester, New Glasgow, Pugwash, Eden Siding, and Mira River. In most cases these are operated to supply a rather local demand, although the Annapolis and Pugwash brick are sometimes

shipped some distance by water. Common pottery is made from the smoother sections of the surface clays south of Elmsdale. Most of the common brick-yards re-press a few brick. A hard brick, known in the trade as a firebrick, but not really such, is made from the Carboniferous shales at Westville. Sewerpipe, flue linings, and drain tile are made from the shales at New Glasgow; and some drain tile are manufactured in the Annapolis valley by the same firms that produce brick.

"It will be seen, therefore, that there is considerable room for expansion. If such development occurs, the markets will be mainly outside of the Province, except for common brick. At present the buildings in that region are constructed mainly of wood; but as the supply of this becomes scarcer and more expensive, brick must be utilized as a substitute. For outside markets, the plants should be located as near to water as possible, to avoid rail shipment.

"It is hoped that the studies of the samples now being carried on will demonstrate the value of the clay and shales for making pressed brick, vitrified brick, earthenware, and perhaps stoneware, sewerpipe, etc."

LIME.

The activity of building operations in 1909 is reflected also in the statistics of lime production for that year. The total sales were reported as 5,592,924 bushels, valued at $1,132,756, or an average of 20 cents per bushel; as compared with 3,601,468 bushels, valued at $712,947, or an average of 20 cents per bushel in 1908. The returns of production for 1909, particularly for the Provinces of New Brunswick and Manitoba, were probably a little more complete than those for 1908, so that the actual increase may not be quite so large as is indicated in the above figures.

The production or sales by provinces during the past four years is shown in the tables following. A small quantity of lime is usually made in Prince Edward Island, but mostly from stone brought over from Nova Scotia, and the figures have been included in the statistics for this Province.

Lime Production by Provinces, 1906 and 1907.

Province.	1906.				1907.			
	Bushels.	Value.	Average per Bushel.	%	Bushels.	Value.	Average per Bushel.	%
		$	cts.			$	cts.	
Nova Scotia	50,000	13,600	27	2·3	45,000	16,000	35	1·6
New Brunswick	405,450	94,290	23	9·3	554,330	124,786	23	12·8
Quebec	923,563	201,316	22	20·0	1,053,856	262,990	25	27·0
Ontario	2,885,000	496,785	17	49·2	2,333,879	393,474	17	40·4
Manitoba	620,201	119,792	19	11·9	431,548	84,793	20	8·7
Saskatchewan	...	...	...	...	3,700	1,480	40	0·2
Alberta	240,000	56,200	23	5·6	173,040	41,225	24	4·2
British Columbia	106,192	26,694	25	2·7	159,963	49,847	31	5·1
	5,230,406	1,009,177	19	100·0	4,755,316	974,595	20	100·0

Lime Production by Provinces, 1908 and 1909.

Province.	1908.				1909.			
	Bushels.	Value.	Average per Bushel.	%	Bushels.	Value.	Average per Bushel.	%
		$	cts.			$	cts.	
Nova Scotia	51,068	16,102	32	2·3	57,730	16,729	29	1·5
New Brunswick	155,748	34,262	22	4·8	697,466	154,151	22	13·6
Quebec	857,700	201,357	23	28·2	1,281,827	315,633	25	27·9
Ontario	2,087,731	358,507	17	50·3	2,619,553	434,147	17	38·3
Manitoba	138,786	24,192	17	3·4	423,954	69,670	16	6·2
Alberta	135,000	34,500	26	4·8	281,125	67,350	24	5·9
British Columbia	176,435	44,027	25	6·2	231,269	75,076	32	6·6
	3,601,468	712,947	20	100·0	5,592,924	1,132,756	20	100·0

As with the other structural materials, Ontario is the largest producer, this Province being credited with 38 per cent of the total value during 1909.

Quebec province has also a very considerable lime production, contributing about 28 per cent of the total value; and next to these in importance comes New Brunswick. The average price per bushel in the several provinces ranged from 16 cents in Manitoba to 32 cents in British Columbia. The average price per bushel in Ontario has remained constant during the past four years at 17 cents. Statistics of the annual production of lime in Ontario as published by the Ontario Bureau of Mines are available since 1896, and are shown in the next table. These returns are slightly higher than those obtained by the Mines Branch.

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	406,300	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	3,393,000	544,000	14	1907	2,650,000	418,700	17
1901	4,100,000	550,000	13	1908	2,442,331	448,596	18
1902	4,300,000	617,000	14	1909	2,633,500	470,858	18

Exports and Imports.—The value of the lime exported during the calendar year 1909 was $48,821, the destination of shipments being mainly the United States.

The imports during the same period were 168,357 barrels valued at $118,239, and were derived chiefly from the United States.

Annual statistics of exports and imports are given in the next two tables :—

Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	$		$		$
1891	119,853	1898	49,594	1905	85,723
1892	121,535	1899	73,565	1906	57,072
1893	86,623	1900	80,852	1907	55,903
1894	83,670	1901	99,194	1908	43,316
1895	71,697	1902	116,009	1909	48,821
1896	70,820	1903	131,412		
1897	53,177	1904	73,838		

Imports of Lime.

Fiscal Year.	Bls.	Value.	Fiscal Year.	Bls.	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	10,804	11,200	1899	15,720	11,124
1885	12,072	11,503	1900	12,565	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	129,379	99,611
1894	6,766	4,907	1909. Duty 20 per cent	153,934	106,263

SAND-LIME BRICK.

For the year 1909 returns were received from nine manufacturers of sand-lime brick, showing total sales to have been 27,052,864, valued at $201,650, or an average of $7.45 per thousand.

Annual statistics of production since 1907 are shown below :—

Annual Production of Sand-Lime Brick.

Calendar Year.	Number.	Value.
		$
1907	16,492,971	167,795
1908	17,288,260	152,856
1909	27,052,864	201,650

The following is a list of manufacturers of sand-lime brick whose returns of production were received :—

The Schultz Bros. Co., Ltd., Brantford, Ont.
Jno. Mann & Sons, Brantford, Ont.
The Silicate Brick Co. of Ottawa, Ltd., Ottawa, Ont.
The Peterboro Sandstone Brick Co., Ltd., Peterborough, Ont.
Toronto Indestructible Brick Co, Ltd., Toronto, Ont.
The Brandon Brick & Lumber Co., Brandon, Man.
Manitoba Pressed Brick Co., Ltd., Winnipeg, Man.
Interocean Pressed Brick Co., Regina, Sask.
The Silicate Brick & Lime Co. of Victoria, Victoria, B.C.

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 tables :—

Annual Exports of Sand and Gravel.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1893	329,116	121,795	1902	159,793	119,120
1894	324,656	86,940	1903	355,792	124,006
1895	277,162	118,359	1904	399,809	129,803
1896	224,769	80,110	1905	306,935	152,805
1897	152,963	76,729	1906	336,550	139,712
1898	165,954	90,498	1907	298,095	119,853
1899	242,450	101,640	1908	298,954	161,387
1900	197,558	101,656	1909	481,584	256,166
1901	197,302	117,465			

Annual Imports of Sand and Gravel.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		$			$
1893	26,065	31,739	1902	47,381	58,668
1894	41,573	33,506	1903	91,518	95,647
1895	19,609	24,779	1904	110,634	107,547
1896	18,953	24,604	1905	85,339	92,722
1897	21,308	25,222	1906	116,500	173,727
1898	32,148	43,287	1907 (9 mos.)	171,700	177,412
1899	30,288	42,209	1908	266,704	223,043
1900	35,713	41,280	1909	132,158	136,011
1901	35,749	42,891			

SLATE.

The production of slate continues much the same as in previous years. No new quarries have been opened up, and the output was obtained entirely from the New Rockland slate quarries of Richmond county, Quebec, which have for a number of years been operated under lease by Messrs. Fraser and Davies.

The production for 1909 was reported as 4,000 squares, valued at $19,000; as compared with a production valued at $13,496 in 1908, and $20,056 in 1907.

A small export of slate to the value of $612 was reported in 1909.

Statistics of annual production since 1886 are shown herewith :—

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		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	23,248
1893	7,112	90,825	1905		21,567
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	1909	4,000	19,000

That there is a more extensive market in Canada than is supplied by slate from Canadian sources is shown by the following statistics of imports :—

The total value of the imports of slate in 1909 was $135,221, of which $71,914 was roofing slate, and $34,085 school writing slates. The imports of roofing slate, school writing slates, and manufactures of slate n. o. p, are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils principally come from Germany and the United States.

Statistics of imports and exports are shown in the following table :—

Imports of Slate during the Years 1908 and 1909.

Slate and Manufactures of.	12 months ending March, 1908.	12 months ending March, 1909.	12 months ending Dec., 1909.
	$	$	$
Mantles		90	
Roofing slate	72,588	62,132	71,914
School writing slate	26,834	29,340	34,085
Slate pencils	3,398	4,379	6,154
Slate of all kinds and manufactures of	27,749	28,124	25,068
	131,069	124,065	135,221

Exports of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1884	539	6,845	1892	87	2,038
1885	346	5,274	1893	178	3,168
1886	34	495	1894	187	3,610
1887	27	373	1895	36	574
1888	22	475	1896	301	8,913
1889	26	3,303	1897 to 1907	Nil.	Nil.
1890	12	153	1908		2,539
1891	15	195	1909	154	612

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	1909	118,900

STONE.

Statistics of stone production given herewith, include the sales of all classes of stone used for building, monumental and ornamental purposes, stone for paving purposes, curbstone and flagstone, rubble, rip-rap and crushed stone, limestone for furnace flux, sugar factories, etc.; but stone used for burning lime or the manufacture of cement, is not included.

The kinds of stone quarried have been classed as granite, limestone, sandstone, and marble.

The records are practically confined to quarry operations or the production of sawn or polished stone when these operations are carried on by the quarry operators. In addition to this production of stone by regular operators there is no doubt a large stone production by individuals such as farmers and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is probably also used in railway construction work and in road building, of which no record has yet been obtained.

The statistics obtained for 1909 are much more complete than those for former years, and for that reason it is somewhat difficult to make comparisons.

It is impossible also, except in a few cases, to show the quantity of stone production, so that the value only of the shipment can be given.

The total value of the stone production in 1909 was returned as $3,127,135. In 1908, the total value, not including limestone for flux, was estimated at $2,088,613, or, including the stone used for flux, $2,378,318. In 1909 the total number of men reported employed in connexion with stone quarrying was 4,843, and the wages paid $2,111,987.

Of the total value of the 1909 production, limestone contributed 68·4 per cent or $2,139,691 in value; granite, 14·5 per cent or $454,824; sandstone, 12 per cent or $374,179; and marble, 5·1 per cent or $158,441.

Stone was used for building purposes to the value of $1,170,550 or 37·4 per cent of the total; monumental and ornamental stone a value of $306,338 or 9·8 per cent; curb, paving, and flagstone, $279,227 or 8·9 per cent; rubble $303,120 or 9·7 per cent; crushed stone $664,287 or 21·3 per cent, and furnace flux $403,613 or 12·9 of the total.

By provinces, Quebec shows the largest output, having a value of $1,359,349 or 43·5 per cent; the total being made up of limestone to the value of $972,253, granite valued at $257,096, and marble valued at $130,000. Ontario takes second place with a production of $748,639 in value or 23·9 per cent of the total: of which limestone is credited with $639,674; sandstone, $62,824; granite, $42,700; and marble, $3,441. The total production in British Columbia was $365,081: including granite to the value of $134,310; sandstone, $168,553; limestone, $37,258; and marble, $25,000. The production in Manitoba was valued at $331,899: made up of limestone $328,554, and granite $3,345. The Nova Scotia production was reported as $189,604: comprising limestone, $161,922; sandstone, $21,850, and granite, $5,832. New Brunswick is credited with $42,180: made up chiefly of sandstone and granite. Alberta reported a production of $90,383, all of sandstone.

Production of Stone by Provinces, 1909.

Province.	Granite.	Limestone.	Marble.	Sandstone.	Total.	%
	$	$	$	$	$	
Nova Scotia	5,832	161,922	.....	21,850	189,504	6·1
New Brunswick	11,541	30	.....	30,609	42,180	1·3
Quebec	257,096	972,253	130,000	.....	1,359,349	43 5
Ontario	42,700	639,674	3,441	62,824	748,639	23·9
Manitoba	3,345	328,554	.....	.....	331,899	10·6
Alberta	.....	.....	.....	90,383	90,383	2·9
British Columbia	134,310	37,258	25,000	168,513	365,081	11·7
Totals	454,824	2,139,691	158,441	374,179	3,127,135	100
Per cent	14·5	68·4	5·1	12·0	100	

Value of Stone sold for various purposes in 1909.

Kind.	Building.	Ornamental and Monumental.	Paving and Curbstone.	Rubble.	Crushed.	Furnace Flux.	Total.
	$	$	$	$	$	$	$
Granite	159,470	73,611	106,963	63,205	51,575	.....	454,824
Limestone	666,324	95,457	154,490	210,418	609,349	403,613	2,139,691
Marble	20,000	135,780	....	2,661	.....	.....	158,441
Sandstone	324,716	1,490	17,774	26,836	3,363	....	374,179
Totals	1,170,550	306,338	279,227	303,120	664,287	403,613	3,127,135

Exports and Imports.—The exports of stone are classified simply as wrought and unwrought; the total value of the exports in 1909 was $59,370, as compared with $58,005 in 1908.

The annual exports given since 1890 are shown in the following 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	1909	33,598	25,772

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 during the calendar year 1909 was $683,801, the imports during the fiscal year ending March were $531,822; as compared with a value of $651,525 during the fiscal year 1908.

Of the imports during the calendar year 1909, $280,557 in value was classed as building stone; $132,298 as granite, sawn and manufactures of; $58,355 as paving blocks, and $182,147 as marble and manufactures of. Details of the imports of the calendar year 1909 and the fiscal years 1908 and 1909, and of the annual imports since 1880, are shown in accompanying tables.

The imports during 1909 were derived chiefly from the United States and Great Britain; the United States supplying building stone, paving blocks, and marble principally. The imports from Great Britain consisted mainly of manufactures of granite. Marble is obtained in some quantity from Italy also.

Total Imports of Stone during the Calendar Year 1909.

Imports.	Tons.	Value.
		$
Building stone, rough (1)	21,746	102,470
" dressed (2)	35,910	178,087
Granite, sawn only	307	2,380
" mfgs. of		129,918
Paving blocks		58,355
Manufactures of stone, N.O.P.		30,444
Marble and mfgs. of—		
Marble, sawn only		118,095
" rough, not hammered or chiselled		8,414
" manufactures of, N.O.P.		55,638
		683,801

(1) Flagstones, granite, rough freestone, sandstone, and all building stone not hammered or chiselled.

(2) Flagstone and all other building stone, sawn or dressed.

Imports of Stone, showing Country of Origin, Calendar Year 1909.

Imports of.	Great Britain.		United States.		Italy.	Other Countries.
	Tons.	Value.	Tons.	Value.	Value.	Value.
		$		$	$	$
Building stone, rough (1)	506	2,048	21,115	99,933		489
" dressed (2)	144	987	35,766	177,100		
Granite, sawn only	120	802	187	1,578		
" mfgs. of		121,983		7,921		14
Paving blocks				58,355		
Manufactures of stone, N.O.P.		3,374		24,316		2,754
Marble and mfgs. of—						
Marble, sawn only		2,275		85,656	29,071	1,093
" rough, not hammered or chiselled				8,414		
" manufactures of, N.O.P.		1,393		53,092		1,153
		132,862		516,365	29,071	5,503

(1) Flagstones, granite, rough freestone, sandstone, and all building stone not hammered or chiselled.

(2) Flagstone and all other building stone, sawn or dressed.

Imports of Stone, Fiscal Years 1908 and 1909.

Imports.	1908.		1909.	
	Tons.	Value.	Tons.	Value.
		$		$
Building stone, rough (1)	19,344	80,950	14,011	63,984
" dressed (2)	17,166	90,740	16,841	72,961
Granite, sawn only	1,019	5,450	302	2,756
" mfgs. of	.....	119,381	.....	123,155
Paving blocks	.....	32,566	.....	42,420
Manufactures of stone, N.O.P.	.....	34,851	.....	25,618
Marble and mfgs. of—				
Marble, sawn only	.....	155,668	.....	108,522
" rough, not hammered or chiselled.	.....	5,319	.....	9,138
" manufactures of, N.O.P	.....	126,600	.....	63,268
	.....	651,525	.....	831,822

(1) Flagstones, granite, rough freestone, sandstone, and all building stone not hammered or chiselled.

(2) Flagstone and all other building stone, sawn or dressed.

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	104,879	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
1909	63,984	72,961	193,949	200,928	Nil	531,822

GRANITE.

Granite is produced largely for building, monumental, and paving purpose, and the main centres of production for 1909 were in Quebec and British Columbia, although Ontario and New Brunswick are also important producers.

The total value of the production in 1909 was $454,824, as compared with a production in 1908 of $282,320, and in 1907 of $194,712.

Statistics of the production by provinces, showing the purpose for which the stone was sold, and the annual total production since 1886, are shown in the following tables.

Value of Granite Production by Provinces, 1909.

Province.	Building.	Monumental or Ornamental.	Curb, or Paving.	Rubble.	Crushed.	Total.
	$	$	$	$	$	$
Nova Scotia	458	2,528	2,846	.....	.....	5,832
New Brunswick	3,378	7,038	450	675	.....	11,541
Quebec	139,634	58,845	56,167	20	2,430	257,096
Ontario	.....	2,700	36,500	.....	3,500	42,700
Manitoba	.....	.....	.....	.....	3,345	3,345
British Columbia	16,000	2,500	11,000	62,510	44,300	134,310
Total	159,470	73,611	106,963	63,205	51,575	454,824

Annual Production of Granite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1886	6,062	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	15,136	194,712
1896	18,717	106,709	1908	.....	282,320
1897	19,345	61,934	1909	.....	454,824

LIMESTONE.

No record has been obtained of the stone used for burning for lime or for making cement, the value of these manufactured products being separately tabulated. With these exceptions then, the total production of limestone in Canada in 1909 was valued at $2,139,691, of which, stone to the value of $761,821 was used for

building and ornamental purposes. The value of crushed stone sold was $609,349; curbstone and paving stone, $154,490; rubble, $210,418. For use as a furnace flux there was sold 842,232 tons valued at $403,613.

There is no separate record of the production of limestone in 1908 or previous years.

Value of Limestone Production by Provinces, 1909.

Province.	Building and Ornamental.	Crushed.	Curbstone and Paving.	Rubble.	Furnace Flux.		Total.
	$	$	$	$	Tons.	$	$
Nova Scotia	2,025				319,795	159,897	161,922
New Brunswick	30						30
Quebec	456,338	257,185	154,259	94,221	20,500	10,250	972,253
Ontario	78,823	297,589	169	66,885	427,422	196,208	639,674
Manitoba	224,605	54,575	62	49,312			328,554
British Columbia					74,515	37,258	37,258
Total	761,821	609,349	154,490	210,418	842,232	403,613	2,139,691

Nova Scotia.—The value of the limestone quarried in this Province in 1909 was returned as $161,922, of which the greater part was quarried at Marble Mountain and Point Edward, C.B., and used in the blast furnaces and steel plants of the Province.

Quebec.—The value of the limestone produced in 1909 was $972,253, of which about 80 per cent was quarried on the Island of Montreal. There is also an important production in Portneuf county and in the City of Hull, in Ottawa county; smaller operations being carried on in the counties of Vercheres, St. Johns, and Terrebonne.

About 46·9 per cent of the production was returned as for building purposes, etc.; 15·8 per cent for curbstone and paving; 9·7 per cent for rubble stone; and 26·5 per cent for crushed stone, and a small quantity used as furnace flux.

Ontario.—The production of limestone in Ontario, according to returns received, was valued at $639,674.[1] This figure is, however, an underestimate, owing to the non-receipt of returns from a number of known producers. Crushed stone was valued at $297,589; rubble at $66,885; building and ornamental stone, $78,823. There was also produced 427,422 tons of stone valued at $196,208, and sold for furnace flux.

The largest operated quarries are found in the counties lying about the western end of Lake Ontario, including Halton, Wentworth, Lincoln, Welland, and Haldimand.

Manitoba.—Limestone quarries are operated in the vicinity of Tyndall, 30 miles northeast of Winnipeg, and at Stony Mountain, Stonewall, Rockspur, and

[1] Additional returns received since completing the statistics have increased the total to $694,674, the increase being crushed stone and rubble.

Gunton on the Canadian Pacific railway, Teulon Branch, from 12 to 25 miles north of Winnipeg.

British Columbia.—The Consolidated Mining and Smelting Company operate a quarry at Fife on the Canadian Pacific railway, Boundary division, to supply flux for the Trail smelter.

MARBLE.

The value of the marble production in 1909 has been returned as $158,441. Complete statistics of the 1908 production were not received, but the total value of the finished stone produced was estimated at not less than $125,000. Marble quarries were operated at Philipsburg, Que.; at Tatlock, in Lanark county, and in Hungerford township, Hastings county, Ontario; and near Lardo, head of Kootenay lake, British Columbia.

The value of the Quebec production was $130,000; Ontario $3,441, and British Columbia, $25,000. With the exception of a small quantity used as crushed marble, the entire output was employed for building, ornamental, and decorative purposes. There has been only a spasmodic production of marble in Canada in past years, and from 1897 to 1907 there was no production whatever reported.

Annual Production of Marble.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		$			$
1886	501	9,900	1893	590	5,100
1887	242	6,224	1894	Nil.	Nil.
1888	191	3,100	1895	200	2,000
1889	83	980	1896	224	2,405
1890	780	10,776	1897 to 1907 inclusive	Nil.	Nil.
1891	240	1,752	1908		125,000
1892	340	3,600	1909		158,441

The most successful operations being carried on at present are at the quarries at Philipsburg, Quebec, operated by the Missisquoi Marble Company, Ltd., of Montreal. The quarry is provided with channeling machinery, steam drills, and derricks; while the mill and finishing shops contain gang saws, planer, lathe, polishing machinery, pneumatic tools, etc. The marble is in considerable demand as a decorative stone, and finds a market throughout Canada, from Prince Edward Island to Vancouver, and is also exported to the United States. During 1909 the Company installed additional equipment with the expectation of being able to double their output.

In Ontario the operations were practically in the initial stages of development, and the output consequently small.

The same was true also, to a large extent, of the British Columbia quarries, the production being merely incidental to development.

SANDSTONE.

The total value of sandstone produced in Canada in 1909 was $374,179; of which stone to the value of $168,513, or 45·1 per cent, was quarried in British Columbia. The production in Alberta was valued at $90,383, or 24·1 per cent of the total. Ontario was credited with $62,824, and the Maritime Provinces with $52,459. The production was chiefly used for building purposes, the stone being also used for paving purposes and rubble. There is no complete record of the sandstone production throughout Canada in previous years.

Value of Sandstone Production by Provinces, 1909.

Province.	Building and Ornamental.	Crushed.	Paving.	Rubble.	Total.
	$	$	$	$	$
Nova Scotia	15,050	800		6,000	21,850
New Brunswick	25,784			4,825	30,609
Ontario	29,584	2,563	17,774	12,903	62,824
Alberta	87,450			2,933	90,383
British Columbia	168,338			175	168,513
Total	326,206	3,363	17,774	26,836	374,179

The Maritime Provinces have in past years been large producers of sandstone or freestone, large quantities being at one time exported to the United States. At the present time the principal quarries are situated at Wallace, Sackville, Renous Bridge, etc.

The Ontario production was derived from Georgetown, Halton county, and Nepean township, Carleton county.

In Alberta, sandstone is quarried at Glenbow, 18 miles west of Calgary; Brickburn, 5 miles west of Calgary; and at Novar, about 16 miles northeast of McLeod.

Sandstone was quarried in British Columbia on Saturna, Haddington, and Gabriola islands.

CANADA

DEPARTMENT OF MINES

MINES BRANCH

HON. W. TEMPLEMAN, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;
EUGENE HAANEL, PH.D., DIRECTOR.

REPORTS, AND MAGNETIC SURVEY MAPS OF ECONOMIC INTEREST.

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