GEOLOGICAL SURVEY OF CANADA

G. M. DAWSON, C.M.G., LL.D., F.R.S., DIRECTOR

DIVISION OF

MINERAL STATISTICS AND MINES

ANNUAL REPORT

FOR

1893 & 1894

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OTTAWA

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1895

NOTES.

YEAR AND TON USED.

Except for the figures of imports, which refer to the fiscal year, ending 30th June in the current calendar year, the year used throughout this report is the calendar year. The ton is that of 2,000 pounds, unless otherwise stated.

EXPORTS AND IMPORTS.

The figures given throughout the report referring to exports and imports, are compiled from data obtained from the books of the Customs Department, and will occasionally show discrepancies, which, however, there are no means of correcting.

The exports and imports, under the heading of each province, do not necessarily represent the production and consumption of the province, *e. g.*, material produced in Ontario is often shipped from Montreal and entered there for export, so falling under the heading, Quebec.

N.E.S. = Not elsewhere specified.

VALUES ADOPTED.

The values of the metallic minerals produced, as per returns to this department, are calculated on the basis of their metallic contents at the average market price of the metal for the current year. Spot values have been adopted for the figures of production of the non-metallic minerals.

ASSAYS.

Except where it is specially mentioned that assays quoted have been made by the Geological Survey, these are given entirely on the authority of the person quoted as supplying the information.

To Dr. G. M. Dawson, C.M.G., F.R.S., &c.,
Director Geological Survey of Canada.

Sir,—I beg herewith to hand you the report of the division on mining and mineral production, &c., throughout the Dominion for the year 1893.

As in past years it will be found to present as complete a review of the mineral activities of the country and of their commercial results as it is possible to obtain with the means at command. These include the personal investigations of the officers of the division, supplemented by the issue of circulars asking the production direct from the operators themselves. Information selected from official provincial reports and various other sources is also incorporated, with a view to giving an outline of all the authentic information available.

The labour of collecting, comparing and collating these very varied materials, so as to ensure accurate results and obtain a completely uniform presentment of them, is very great, but it is hoped that the result will prove satisfactory.

As in the past, care is taken to avoid injury to private interests in the manner of publishing results, and all returns of production of individual mines are treated as confidential unless otherwise arranged with those interested. The confidence of the mining community thus gained, has resulted in an increasingly hearty response to our circulars, although to complete our data personal application is yet necessary in a small number of instances, and a yet more prompt response on the part of all applied to, will help still further towards an earlier publication of the material.

The preliminary summary of the mineral production for 1893, a revision of which will be found in the first pages of this report, was ready for press 5th April, 1894.

Apart from the preparation of the annual report, the other functions of the division have been performed as heretofore. Numerous inquiries have been received and answered respecting mining and the mineral resources of the country.

In view of criticisms of these statistics which have been made recently, and from time to time in the past, it may be well to take this opportunity to explain the working methods adopted, in order to prevent

the misunderstandings which underlie such criticisms and suggestions and to correct the impression thereby conveyed to the public that the reports are unreliable.

The figures given throughout the reports are based upon returns obtained direct from the various operators, and the totals have for some years been checked by comparison with railway exports and all other available sources of information. It can be therefore fairly claimed, that they are as accurate as it is possible to make such figures.

After investigation of the subject we have, however, found that in the nature of things export, and railway figures can only be taken as approximately correct in most instances. In the case of the export figures, entries are made as a rule by those having no technical knowledge of mineral substances, and in the case of the railways, but few of the shipments are actually weighed, so that car-load lots, for instance, may differ considerably from the theoretical load of the car.

It is desired to gratefully acknowledge the aid received from various sources. Thanks are due to those who, although too numerous to mention individually, have by answering our circulars or letters provided much valuable material for the report. Special mention must be made of the services rendered by my colleague, Mr. H. P. H. Brumell, assistant to the division, for his very important and efficient aid in every branch of the work.

Our acknowledgments are also due to the provincial mining departments of Nova Scotia, Quebec, Ontario and British Columbia and to the Dominion Customs Department for aid received.

I have the honour to be, sir,

Your obedient servant,

ELFRIC DREW INGALL.

27th April, 1895.

POSTSCRIPT.—The figures for 1894 having become available since this report was transmitted to the printer, it has been deemed advisable to incorporate these with the report for 1893, thus making it a joint report for the two years in respect to the statistics of production, exports and imports. The general information regarding mineral discoveries and development during 1894, is, however, reserved for the next report, wherein it is proposed to give a summary of progress for 1894 and 1895.

20th August, 1895.

SUMMARY OF THE MINERAL PRODUCTION OF CANADA IN 1893 AND 1894.

PRODUCT.		1893.		1894.	
		Quantity.	Value.	Quantity.	Value.
Metallic.					
Copper (fine, in ore, etc.)	lbs.	8,109,856	$ 875,865	2,737,016	$ 735,017
Gold	oz.	54,410	976,603	58,058	1,042,055
Iron ore	tons.	125,602	299,368	109,991	226,611
Lead (fine, in ore, etc.)	lbs.	2,135,023	78,996	5,703,222	185,355
Nickel (fine, in ore, etc.)	"	3,982,982	2,071,151	4,907,430	1,870,958
Platinum	oz.	.....	1,800	.....	950
Silver (fine, in ore, etc)	"	.....	330,128	847,697	534,049
Zinc	lbs.	11,763	470	.....	.....
Total metallic		.....	$ 4,634,381	.....	$ 4,594,995
Non-metallic.					
Arsenic (white)	tons.	.....	.....	7	420
Asbestus	"	6,331	310,156	7,630	420,825
Chromite	"	.....	.....	1,000	20,000
Coal	"	3,837,565	8,423,759	3,867,742	8,499,141
Coke	"	61,078	161,790	58,044	148,551
Felspar	"	575	4,525	.....	.....
Fireclay and mfrs. of	"	540	700	539	2,167
Grindstones	"	4,600	38,379	3,757	32,717
Gypsum	"	192,568	196,150	223,631	202,031
Limestone for flux	"	27,797	27,519	35,101	34,347
Lithographic stone	"	.....	.....	180	30,000
Manganese ore	"	213	14,578	74	4,180
Mica	lbs.	.....	75,719	.....	45,581
Mineral pigments—					
Baryta	tons.	.....	.....	1,081	2,830
Ochres	"	1,070	17,710	611	8,690
Mineral water	galls.	725,096	108,347	561,460	100,040
Moulding sand	tons.	4,730	9,086	6,214	12,428
Natural gas		.....	366,233	.....	313,754
Petroleum	brls.	798,406	834,334	829,104	835,322
Phosphate (apatite)	tons.	8,198	70,942	7,290	43,740
Precious stones		.....	1,500	.....	1,500
Pyrites	tons.	58,542	175,626	40,527	121,581
Quartz		100	500	.....	.....
Salt	tons.	62,324	195,926	57,199	170,687
Soapstone	"	717	1,920	916	1,640
Whiting	brls.	.....	.....	500	750
Structural materials and clay products—					
Bricks	M.	290,000	*a* 1,800,000	.....	1,800,000
Building stone	c. yds.	.....	*a*. 1,100,000	.....	1,200,000
Cement, natural	brls.	126,673	130,167	108,142	144,637
do Portland	"	31,924	63,848		
Flagstones	sq. ft.	40,500	3,487	152,700	5,298
Granite	tons.	22,521	94,393	16,392	109,936
Lime	bush.	6,750,000	*a* 900,000	.....	*a*. 900,000
Marble	tons.	590	5,100	.....	.....
Pottery		.....	213,186	.....	162,144
Roofing cement	tons.	951	5,441	815	3,978
Sands and gravels, exports	"	329,116	121,795	324,656	86,940
Sewer pipe		.....	350,000	.....	250,325
Slate	tons.	7,112	90,825	.....	75,550
Terra cotta	"	.....	55,704	.....	65,600
Tiles	M.	100,000	*a* 200,000	.....	200,000
Total non-metallic		.....	$16,169,345	.....	$ 16,057,330
do metallic		.....	4,634,381	.....	4,614,995
Estimated value of mineral products not returned (principally structural materials)		.....	296,274	.....	297,675
Total		.....	$21,100,000	.....	$20,950,000

(a) Estimated.

Exports.

Minerals and Mineral Products Mined or Manufactured in Canada during 1893.

Product.	Value.	Product.	Value.
Asbestus, first class	$ 41,084	Mineral pigments	$ 819
" second class	287,619	Nickel	629,692
" third class	10,004	Oil, crude	3,696
Bricks	44,110	" refined	394
Cement	1,172	Ore, iron	7,590
Clay, manufactures of	147	" manganese	12,521
Coal	3,270,384	Phosphate	67,952
Copper	269,160	Plumbago, crude	38
Felspar	500	" manufactures	10
Gold	268,939	Pyrites	68,527
Grindstones	21,672	Salt	1,267
Gypsum, crude	159,262	Sand and gravel	121,795
" ground	22,132	Silver	213,695
Iron and steel about	300,000	Slate	3,168
Lead	3,099	Stone, unwrought	37,662
Lime	86,623	" wrought	9,102
Mica, crude	67,087	Other articles	11,543
" cut	2,057		
" ground	937	Total	$6,045,459

Exports

Of Products of the Mine, with Destinations, During the Fiscal Year 1892-1893.

Exported to	Value.	Exported to	Value.
United States	$4,756,280	China	$9,843
Great Britain	244,560	Danish West Indies	5,466
Newfoundland	166,221	Holland	4,750
Germany	37,400	Norway and Sweden	850
Hawaiian Islands	32,172	Belgium	414
British West Indies	25,733	British Guiana	195
Saint Pierre	19,872	U. S. of Colombia	32
Spanish West Indies	13,538		
Japan	12,564	Total	$5,329,890

IMPORTS.

MINERALS AND MINERAL PRODUCTS FOR FISCAL YEAR 1892–1893.

Product.	Value.	Product.	Value.
Alum and aluminous cake.	$ 27,910	Lead and mfrs. of	281,590
Aluminum and alumina	1,700	Lime	4,917
Antimony	14,771	Litharge	24,401
Arsenic	12,907	Lithographic stone	4,449
Asbestus and mfrs. of	19,181	Manganese, oxide of	3,696
Asphaltum	36,208	Marble	96,177
Borax	31,069	Mercury	22,998
Brass and mfrs. of	499,144	Mineral water	57,953
Bricks	14,108	Nickel	15
" bath	1,921	Ochres	23,134
" and tiles, fire	125,900	Paraffine wax	40,670
Buhrstones	3,552	Petroleum and mfrs. of	472,406
Building stone	56,510	Plaster of Paris	3.143
Cement	10,969	Platinum	14,082
" Portland	316,179	Potash salts	48,864
Chalk	9,966	Precious stones	115,086
Clay, China	27,981	Pumice	3,998
" fire	42,587	Salt	361,300
" all other, N.E.S.	10,865	Sand and gravel	31,739
Coal, anthracite	6,355,285	Silex	1,301
" bituminous	3,967,764	Slate	51,179
" dust, &c	44,474	Soda salts	451,621
" tar and pitch	21,932	Stone and granite, N.E.S.	49,323
Coke	157,942	Spelter	49,822
Copper and mfrs. of	475,046	Sulphate of copper	40,747
Copperas	2,410	Sulphur	77,216
Earthenware	709,737	Sulphuric acid	2,367
Emery	23,368	Tiles, sewer pipes, &c	39,001
Fertilizers	21,580	Tin and mfrs. of	1,242,994
Flagstones	8,500	Whiting	25,563
Fuller's earth	3,113	Yellow metal	61,851
Graphite and mfrs. of	42,939	Zinc and mfrs. of	131,824
Grindstones	20,987		
Gypsum	1,456	Total	$25,377,185
Iron and steel	8,421,957		

ABRASIVE MATERIALS.

ABRASIVE MATERIALS

PRODUCTION.

The only material coming under this head for which there is any production to report is that of grindstones.

Grindstones.—The production for the year 1893 is shown below. On comparison with 1892 there is seen to be a falling off of 683 tons or nearly thirteen per cent. Grindstone

Nova Scotia	2,112	tons, valued at	$21,000
New Brunswick	2,488	" "	17,379
	4,600	" "	$38,379

ABRASIVE MATERIALS.

Grindstones.

According to the statements of operators, the industry, which finds its market largely in the United States, felt the results of the commercial depression there prevailing.

The production for past years was as follows:—

1886—4,000	tons,	valued at	$46,545
1887—5,292	"	"	64,008
1888—5,764	"	"	51,129
1889—3,404	"	"	30,863
1890—4,884	"	"	42,340
1891—4,479	"	"	42,587
1892—5,283	"	"	51,187
1893—4,600	"	"	38,379

The production for 1894 was as follows:—

Nova Scotia	2,128	tons valued at	$16,000
New Brunswick	1,629	" "	16,717
	3,757	" "	$32,717

Infusorial earth.

Infusorial Earth.—Two additional deposits of this material have been met with in the course of the work of the Geological Survey in 1893. One is in the concession of Trompe Souris, of the parish of St. Justin, in Maskinongé county, Quebec, where it occurs in small quantity at a few feet below the surface in a sand bank sixty to seventy feet high. The other deposit is on lot 15, range V., of Chertsey, in Montcalm county, Quebec, about twelve miles from the town of Rawdon in that county, and is found at the bottom of a marshy bay of Lac Michel, covering an area of three or four acres with a thickness of about eighteen inches.*

* Summary Report of the Geological Survey for 1893, pp. 35.

Exports and Imports.

Exports and imports.

The following tables give the exports and imports of various abrasive materials, compiled from data furnished by the Customs Department.

Abrasive Materials.

Table 1.

Exports of Grindstones.

Year.	Value.
1884	$28,186
1885	22,606
1886	24,185
1887	28,769
1888	28,176
1889	29,982
1890	18,564
1891	28,433
1892	23,567
1893	21,672
1894	12,579

Abrasive Materials.

Table 2.

Exports of Grindstones.

Provinces.	1891.	1892.	1893.	1894.
Quebec			$ 625	$ 1
Nova Scotia	$ 12,387	$ 10,575	11,317	10,048
New Brunswick	16,046	12,992	9,730	2,530
Totals	$ 28,433	$ 23,567	$ 21,672	$ 12,579

Abrasive Materials.

Exports and imports.

Abrasive Materials.

Table 3.

Imports of Grindstones.

Fiscal Year.	Tons.	Value.
1880	1,044	$11,714
1881	1,359	16,895
1882	2,098	30,654
1883	2,108	31,456
1884	2,074	30,471
1885	1,148	16,065
1886	964	12,803
1887	1,309	14,815
1888	1,721	18,263
1889	2,116	25,564
1890	1,567	20,569
1891	1,381	16,991
1892	1,484	19,761
1893	1,682	20,987
1894	1,918	24,426

Abrasive Materials.

Table 4.

Imports of Buhrstones.

Fiscal Year.	Value.
1880	$12,049
1881	6,337
1882	15,143
1883	13,242
1884	5,365
1885	4,517
1886	4,062
1887	3,545
1888	4,753
1889	5,465
1890	2,506
1891	2,089
1892	1,464
1893	3,552
1894	3,029

ABRASIVE MATERIALS.

Abrasive Materials.

TABLE 5.

Exports and imports.

IMPORTS OF "SILEX."

Fiscal Year.	Cwt.	Value.
1880	5,252	$2,290
1881	3,251	1,659
1882	3,283	1,678
1883	3,543	2,058
1884	3,259	1,709
1885	3,527	1,443
1886	2,520	1,313
1887	14,533	5,073
1888	4,808	2,385
1889	5,130	1,211
1890	1,768	2,617
1891	3,674	1,929
1892	1,429	1,244
1893	2,447	1,301
1894	2,451	1,521

ABRASIVE MATERIALS.

TABLE 6.

IMPORTS OF PUMICE STONE AND EMERY.

Fiscal Year.	Pumice Stone.	Emery.
1885	$ 9,384	$ 5,066
1886	2,777	11,877
1887	3.594	12,023
1888	2,890	15,674
1889	3,232	13,565
1890	3,003	16,922
1891	3,696	16,179
1892	3,282	17,782
1893	3,798	17,762
1894	4,160	14,433

ASBESTUS.

ANNUAL PRODUCTION.

Table A.

Year.	Tons.	Value.	
1880	380	$ 24,700	EXPORTS.
1881	540	35,100	
1882	810	52,650	
1883	955	68,750	
1884	1,141	75,097	
1885	2,440	142,441	
1886	3,458	206,251	
1887	4,619	226,976	
1888	4,404	255,007	
1889	6,113	426,554	
1890	9,860	1,260,240	
1891	9,279	999,878	
1892	6,082	390,462	
1893	6,331	310,156	
1894	7,630	420,825	

ASBESTUS.

Production.

The production of asbestus during 1893 was, according to direct returns to this office, 6,331 tons valued at $310,156 which as compared with last year's figures shows an increase of 249 tons in the production, but a decrease of $80,306 in the total value.

The fluctuations in production for past years are well shown in graphic table A, wherein will be found also the figures of production for 1894, which shows a very encouraging increase of business done.

EXPORTS AND IMPORTS.

Exports and imports.

The following tables, Nos. 1 and 2, are self-explanatory :—

ASBESTUS.

TABLE 1.

EXPORTS.

Quality.	1891.		1892.		1893.		1894.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1st class	4,530	$338,072	1,447	$113,595	975	$ 41,084	5,400	$312,280
2nd "	3,186	209,833	3,185	228,133	4,592	287,619	1,322	106,374
3rd "	298	13,636	748	31,375	350	10,004	1,265	5,9183
Totals.....	8,014	$561,541	5,380	$373,103	5,917	$338,707	7,987	$477,837

ASBESTUS.

TABLE 2.

IMPORTS.

Fiscal Year.	Value.
1885.....	$ 674
1886..... ..	6,831
1887.....	7,836
1888..... ...	8,793
1889.....	9,943
1890.'.....	13,250
1891..	13,298
1892.....	14,090
1893.....	19,181
1894.....	20,021

Discovery and Development.

Quebec.

Asbestus. Discovery and development.

There is little or nothing new to report in connection with the asbestus industry for the year 1893. As shown by the figures of production, the demand and prices have continued to fall off very considerably for the past three years. This lessened production has in no way been due to the working out of the districts, but must be credited to the exterior economic conditions.

All but a small proportion of the total production given, is from the Black Lake and Thetford districts, the only mine operated to any extent outside of these being that near Danville. Thus all the output of this mineral must be credited to the Eastern Townships, with the exception of a small shipment made from the Templeton Mine in Ottawa county. No mining work, however, was done at this place, the shipment being made from the material already on the dumps.

There were received thirteen returns giving production, and fifteen which stated that no work had been done during the year.

Ontario.

The only work to report as done outside of Quebec, is that of the Standard Asbestus Company of New York, on lots 7 and 8, concession 11, Elzevir township, in the county of Hastings, under the superintendance of Mr. James E. Harrison, who furnishes the following notes :—" Worked five and a half months sinking test shaft on magnesian range in vein of serpentine and chrysotile. Shaft over fifty feet deep. Took out about 400 tons, averaging over 50 per cent fibre. Shipped 100 tons (2,000 lbs.) to company's mill in Elizabeth, N.J., also 15 tons to Gouverneur, N.Y., all for tests." There were four men employed on this work. The material mined at this place is mostly used in the manufacture of roofing cements, and is different from that produced in Quebec, being mineralogically classed as actinolite.

As the mode of occurrence of the asbestus deposits of Canada, together with details of the method of working them, has been fully given in former reports, there will be no need to here restate the facts.

CHROMITE.

Chromite.

The existence of deposits of this mineral in Canada has been long known, mention of several occurrences being made in the volume issued by the Geological Survey in 1863, entitled the " Geology of Canada."

The deposits now receiving attention are all situated in the Eastern Townships of Quebec, where they are found in the serpentine rocks of that region. Bodies of this serpentine rock are frequent, and often of considerable extent, their position and distribution being well shown on the geological maps issued by the Survey. Mention is made of these deposits also in reports of the Survey. CHROMITE.

The mineral occurs in irregular pockets of very varying extent. They have received attention from time to time, but until the present, the work done has been irregular and small in amount. In April of 1894, a new discovery of the mineral on the lands of the Coleraine Mining Co. near Black Lake Station on the Quebec Central railway, again revived interest in this mineral, and the consequent renewal of prospecting has led to further discoveries.

The analyses given in the "Geology of Canada" show a content of about 60 per cent of chromic acid, but these were probably selected specimens, and the shipping grade will most likely only run about 50 to 52 per cent of the sesquioxide (Cr_2O_3) or even lower.

For use in the manufacture of bichromate of potash, the makers demanded an ore carrying 50 per cent of the sesquioxide.

So far as can be ascertained, the production of this mineral for 1894 was about 1,000 tons, which at $20 per ton would give a total spot value at shipping point of $20,000. The data to hand are somewhat contradictory, as by direct returns to this office some 2,234 tons were produced. This is evidently in error and must represent ore merely mined besides that shipped, which from other sources is learned to be as above.

In the reports of this division for 1886 and 1887, the following figures of production are given :—

1886—60 tons with a spot value of..... $945
1887—38 " " " 570

The market price per ton of ore seems to have been pretty low in these years or it must have been low grade, as in 1863 the price quoted for 50 per cent was about $55 per ton. In 1894 the price quoted is $26 per ton for the same grade delivered at the works, or about $20 per ton delivered on the cars at the nearest shipping point to the mine.

COAL. COAL.

STATISTICS. Statistics.

The total amount of coal mined during 1893 was 3,837,565, tons valued at $8,423,759, showing an increase over the previous year of 545,018 tons in quantity and in value of $1,239,249, or 16½ and 17¼ per cent respectively. This increase is not attributable to any

Coal. Production.

province in particular, but is largely due to the increased output of the two great producing provinces, Nova Scotia and British Columbia. The yearly production is shown for this and past years in graphic table A, to which has been added that for 1894 :—

COAL.

Annual Production.

Table A.

Year.	Tons.	Value. $
	2,091,976	
1886		4,017,225
	2,418,494	
1887		4,758,590
	2,658,134	
1888		5,259,832
	2,719,478	
1889		5,584,182
	3,117,661	
1890		6,496,110
	3,623,076	
1891		8,144,247
	3,292,547	
1892		7,184,510
	3,837,565	
1893		8,423,759
	3,867,742	
1894		8,499,141

In graphic table B, is shown the production by provinces, and it will there be seen that Nova Scotia continues to be the largest producer, though by reason of the higher price ruling on the Pacific

Coast the value of the production of British Columbia is slightly in excess.

COAL
1893
PRODUCTION BY PROVINCES
Table B

Province.	Tons.	Value.
N. S.	2,497,281	$3,902,001
B. C.	1,095,689	3,913,176
N. W. T.	238,395	598,745
N. B.	6,200	9,837

COAL
1894
PRODUCTION BY PROVINCES
Table B

Province.	Tons.	Value.
		$
N. S.	2,526,775	3,948,085
B C.	1,134,507	4,051,812
N. W. T.	199,981	488,980
N. B.	6,469	10,264

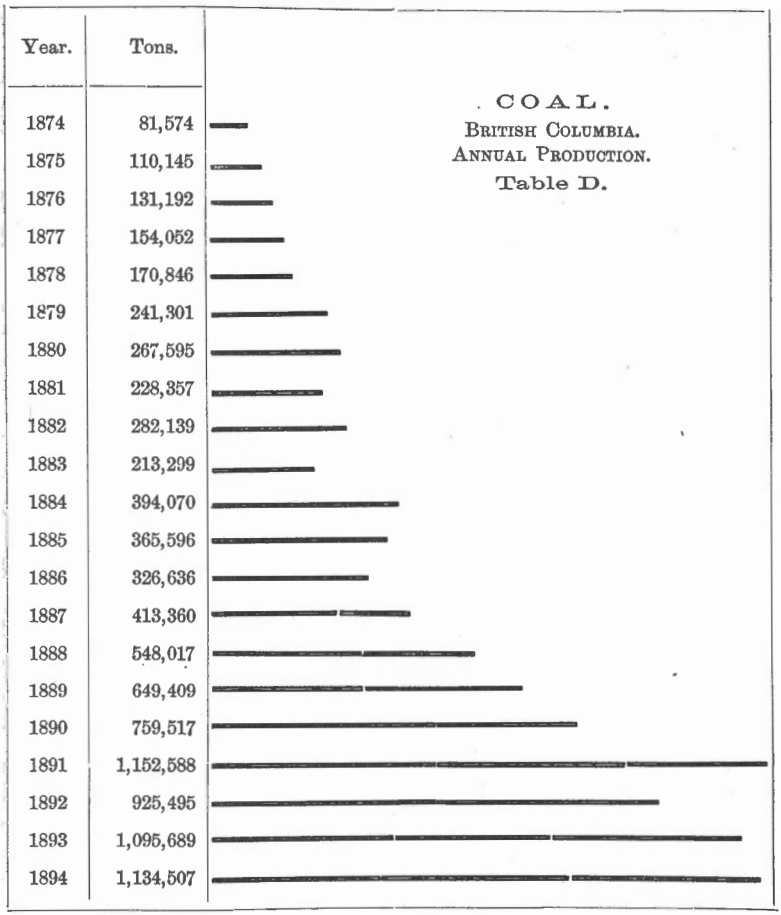
COAL. Production.

The production in the provinces of Nova Scotia and British Columbia during the past years is shown in the following graphic tables C and D.

COAL
NOVA SCOTIA
ANNUAL PRODUCTION
Table C

Year.	Tons.
1870	700,860
1871	754,031
1872	984,664
1873	1,117,643
1874	977,446
1875	848,395
1876	794,803
1877	848,395
1878	863,081
1879	882,863
1880	1,156,635
1881	1,259,182
1882	1,529,708
1883	1,593,259
1884	1,556,010
1885	1,514,470
1886	1,682,924
1887	1,871,338
1888	1,989,263
1889	1,967,032
1890	2,222,081
1891	2,290,935
1892	2,175,914
1893	2,497,281
1894	2,526,775

Coal. Production.



Year.	Tons.
1874	81,574
1875	110,145
1876	131,192
1877	154,052
1878	170,846
1879	241,301
1880	267,595
1881	228,357
1882	282,139
1883	213,299
1884	394,070
1885	365,596
1886	326,636
1887	413,360
1888	548,017
1889	649,409
1890	759,517
1891	1,152,588
1892	925,495
1893	1,095,689
1894	1,134,507

The production in the province of New Brunswick and the North-west Territories during past years is shown in the following table :—

Coal.

Table 1.

Production in New Brunswick and North-west Territories.

Year.	New Brunswick.		North-west. Territories	
	Tons.	Value.	Tons.	Value.
1887.....	10,040	$ 23,607	74,152	$ 157,577
1888.....	5,730	11,050	115,124	183,354
1889.....	5,673	11,133	97,364	179,640
1890.....	7,110	13,850	128,953	198,498
1891.....	5,422	11,030	174,131	437,243
1892.....	6,768	9,375	184,370	469,930
1893.....	6,200	9,837	238,395	598,745
1894.....	6,469	10,264	199,991	488,980

Exports and Imports.

Coal.

Exports and imports.

As in past years the figures of exports and imports of coal are taken from returns received from the Customs Department. In the following graphic tables, E and F, are shown the exports of the Dominion, both of domestic and foreign coal.

COAL
EXPORTS.
(PRODUCE OF CANADA)
Table E.

Year.	Tons.
1873	420,683
1874	310,988
1875	250,348
1876	248,638
1877	301,317
1878	327,959
1879	306,648
1880	432,188
1881	395,382
1882	412,682
1883	486,811
1884	474,405
1885	427,937
1886	520,703
1887	580,965
1888	588,627
1889	665,315
1890	724,486
1891	971,259
1892	823,733
1893	960,312
1894	1,103,694

COAL
Exports.
(Not the Produce of Canada)
Table F.

Year.	Tons.
1873	5,403
1874	12,859
1875	14,026
1876	4,995
1877	4,829
1878	5,468
1879	8,468
1880	14,217
1881	14,245
1882	37,576
1883	44,388
1884	62,665
1885	71,003
1886	78,443
1887	89,098
1888	84,316
1889	89,294
1890	82,534
1891	77,827
1892	93,988
1893	102,827
1894	89,786

COAL.

COAL.

TABLE 2.

Exports and imports.

EXPORTS: THE PRODUCE OF CANADA.

Provinces.	1893.		1894.	
	Tons.	Value.	Tons.	Value.
Ontario	.....	$ 2	104	$ 115
Quebec	712	1,118	7,600	22,995
Nova Scotia	203,198	470,695	310,277	633,398
New Brunswick	6,699	21,260	919	2,948
Prince Edward Island	.....	.....	1,221	2,850
Manitoba	.....	2	.....	.....
North-west Territories	41,475	83,560	13,134	24,293
British Columbia	708,228	2,693,747	770,439	2,855,216
Total	960,312	3,270,384	1,103,694	3,541,815

COAL.

TABLE 3.

EXPORTS: NOT THE PRODUCE OF CANADA.

Provinces.	1893.		1894.	
	Tons.	Value.	Tons.	Value.
Ontario	39,205	$ 240,461	83,599	$ 184,314
Quebec	1,230	1,603	5,338	11,378
Nova Scotia	2,105	4,790	631	1,374
New Brunswick	287	1,032	218	577
Manitoba	.....	.....	.....	.....
British Columbia	.....	.....	.....	.....
Total	102,827	247,886	89,786	197,643

The following, table 4, illustrates the exports of coal from the two large producing provinces, Nova Scotia and British Columbia, and shows in the case of both provinces a large increase in business done in 1893 and 1894 over the preceding years.

Coal.

Table 4.

Exports: Nova Scotia and British Columbia.

Exports and imports.

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	274,466	960,649
1887	207,941	390,738	356,657	1,262,552
1888	165,863	330,115	405,071	1,605,650
1889	186,608	396,830	470,683	1,918,263
1890	202,387	426,070	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

The three following tables, 5, 6 and 7, are of imports, and are self-explanatory. Attention is again drawn to the fact that these are for the fiscal year ending 30th June, 1894:—

Coal.

Table 5.

Imports of Bituminous Coal.

Fiscal Year.	Tons.	Value.
1880	457,049	$1,220,761
1881	587,024	1,741,568
1882	636,374	1,992,081
1883	911,629	2,996,198
1884	1,118,615	3,613,470
1885	1,011,875	3,197,539
1886	930,949	2,591,554
1887	1,149,792	3,126,225
1888	1,231,234	3,451,661
1889	1,248,540	3,255,171
1890	1,409,282	3,528,959
1891	1,598,855	4,060,896
1892	1,615,220	4,099,221
1893	1,603,154	3,967,764
1894	1,359,509	3,315,094

Coal.

Exports and imports.

Coal.

Table 6.

Imports of Anthracite Coal.

Fiscal Year.	Tons.	Value.
1880	516,729	$1,509,960
1881	572,092	2,325,937
1882	638,273	2,666,356
1883	754,891	3,344,936
1884	868,000	3,831,283
1885	910,324	3,909,844
1886	995,425	4,028,050
1887	1,100,165	4,423,062
1888	2,138,627	5,291,875
1889	1,291,705	5,199,481
1890	1,201,335	4,595,727
1891	1,399,067	5,224,452
1892	1,479,106	5,640,346
1893	1,500,550	6,355,285
1894	1,530,522	6,354,040

Coal.

Table 7.

Imports of Coal Dust.

Fiscal Year.	Tons.	Value.
1880	3,565	$ 8,877
1881	337	666
1882	471	900
1883	8,154	10,082
1884	12,782	14,600
1885	20,185	20,412
1886	36,230	36,996
1887	31,401	33,178
1888	28,808	34,730
1889	39,980	47,139
1890	53,104	29,818
1891	60,127	36,130
1892	82,091	39,840
1893	109,585	44,474
1894	117,573	49,510

On reference to the foregoing tables, and assuming the fiscal year to be the same as the calendar, there will be seen to have been a market for coal of all kinds in Canada equivalent to 5,987,717 tons as follows:— Coal. Consumption.

	Tons.
Production	3,837,567
Imports	3,213,289
	7,050,856
Less exports	1,063,139
	5,987,717

From previous statistics there is found to have been a yearly market as follows:—

	Tons.
1886	3,593,266
1887	4,406,916
1888	4,646,513
1889	4,519,787
1890	4,974,362
1891	5,632,039
1892	5,552,243
1893	5,987,717
1894	5,681,866

Markets.

The market for the bulk of the coal exported from Canada is still the United States, though of the Nova Scotia coal Newfoundland takes the greater quantity of that exported. Markets.

Of British Columbia coal, however, the United States, at the port of San Francisco alone, took 549,560 tons, while it is estimated that the lower ports in California took 200,000 tons more. Small shipments were also made to Alaska, Hawaii and to Eastern Siberia and other Asiatic countries.

Nova Scotia.

Coal. Nova Scotia.

The figures contained in the following tables are taken from information received from the Department of Mines of Nova Scotia and represent the production, etc., of that province :—

Coal.

Table 8.

Nova Scotia.

Production, Sales and Colliery Consumption.

Period.	Production.	Sales.	Colliery consumption.
	Tons.	Tons.	Tons.
1893, 1st quarter	454,465	275,468	50,830
1893, 2nd "	650,122	588,973	47,977
1893, 3rd "	780,051	799,794	61,456
1893, 4th "	612,643	535,209	53,486
Totals	2,497,281	2,199,444	213,749
1892	2,175,914	1,963,286	196,103
1891	2,290,935	2,071,938	195,981
1890	2,222,081	2,000,444	180,589
1889	1,967,032	1,741,720	177,106
1888	1,989,263	1,765,895	176,336
1887	1,871,338	1,702,046	156,550
1886	1,682,924	1,538,504	159,512
1885	1,514,470	1,405,051	142,939

Coal.

Table 8a.

Nova Scotia.

Production, Sales and Colliery Consumption.

Period.	Production.	Sales.	Colliery Consumption.
1894, 1st quarter Tons.	364,396	250,912	56,651
1894, 2nd " "	675,179	610,091	45,441
1894, 3rd " "	819,520	850,494	50,472
1894, 4th " "	642,311	579,054	56,964
Total "	2,501,406	2,290,551	209,528

Coal.

Table 8b.

Nova Scotia.

Production by Collieries for 1884.

Colliery.	Tons.	Colliery.	Tons.
Chignecto	587	Gowrie	154,880
Joggins	114,943	International	154,550
Minudie	2,671	Reserve	249,848
Springhill	485,997	Victoria	146,646
Maccan		Sydney	287,629
Acadia	256,038	Scotia	925
East River		Dominion No. 1	41,891
Intercolonial	249,406	Broad Cove	324
Old Bridgeport	59,211	Mabou	108
Caledonia	144,806	Cape Breton	14,682
Gardener			
Glace Bay	160,804	Total	2,525,946

Coal.

Table 9.

Nova Scotia.

Coal Trade by Counties.

1893.	Cumberland.		Pictou.		Cape Breton.		Other counties.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1st quarter	164,101	149,247	121,281	96,223	169,083	29,998		
2nd "	145,488	130,934	150,969	136,967	353,138	320,604	527	468
3rd "	142,311	115,628	147,800	146,673	489,778	537,291	162	202
4th "	164,064	136,156	136,502	127,348	312,077	271,705		
Totals	615,964	531,965	556,552	507,211	1,324,076	1,159,598	689	670
" 1892.	513,512	473,365	503,692	454,112	1,156,808	1,034,733	1,902	1,076
" 1891.	583,688	517,739	500,829	453,707	1,206,064	1,100,279	354	213

Coal.

Nova Scotia.

Coal.

Table 9a.

Nova Scotia.

Coal Trade by Counties.

Year 1894.	Cumberland.		Pictou.		Cape Breton.		Other Counties.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
First quarter	154,645	139,418	102,009	84,314	107,472	26,955	270	226
Second "	148,957	136,549	132,594	118,320	188,031	350,356	5,599	4,865
Third "	141,030	124,480	139,607	131,501	531,309	587,361	7,573	7,152
Fourth "	160,399	137,158	133,474	119,773	348,298	322,022	139	101
Totals, 1894.	605,031	537,605	507,684	453,908	1,324,076	1,286,694	13,581	12,344
" 1893.	615,964	531,965	556,553	507,211	1,375,011	1,159,598	689	670

Coal.

Table 10.

Nova Scotia.

Distribution of Coal Sold.

Market.	1892.	1893.	1894.
	Tons.	Tons.	Tons.
Nova Scotia, transported by land	391,023	453,611	418,123
" " " sea	307,832	316,883	338,121
Total, Nova Scotia	698,855	779,494	756,244
New Brunswick	240,296	285,669	261,262
Prince Edward Island	63,435	66,961	70,532
Quebec	835,561	959,139	973,617
Newfoundland	106,399	87,347	114,204
West Indies	3,191	1,689	10,743
United States	15,549	28,108	114,686
Other countries	.....	37	2,005
Total	1,963 286	2,199,444	2,303,293

Owing to the change recently made by the province in the period covered by the fiscal year, which now ends 30th September, many of the comparisons made in previous reports have to be omitted.

DISCOVERY AND DEVELOPMENT. COAL.

Discovery and development in Nova Scotia

The following notes regarding operations in Nova Scotia are taken from the report of the Department of Mines of that province. They tend to show that the mining was carried on as in past years, little work being done elsewhere than at the old established collieries.

Pictou County.

Intercolonial Coal Mining Company—The old slopes.—All the coal raised during the year was drawn from the 3,000 feet lift. On the north side, the levels were run to the line and the work of drawing the pillars is now being actively carried on, while to the south the levels were driven 2,600 feet where also the pillars are being drawn. The hauling plant has been removed to the 3,600 feet lift, to which the coal is lowered and drawn by tail-rope to the landing. The plant for handling the coal has been greatly improved and it is now found possible to do with three employees the work formerly performed by ten. A new screen was erected during the year, and a considerable amount of timbering and repairing was done in No. 4 slope, with the intention of reopening it if required. During the year the water supply ran very low, and, to guard against a recurrence of the danger, pipes have been laid a distance of two miles to the Stellarton reservoir.

Scott Pit.—Very little work was done in this pit during the year, operations being confined to sinking on the slants referred to in last year's report. This was continued until the advent of warm weather when, through the amount of gas given off, it was deemed advisable to discontinue operations and put the mine in good order. Work was then begun on the old slopes and a new fan capable of supplying 1,800 feet of air to the sinking force at 2,600 feet was substituted for the old furnace used to ventilate the pit. This supply was not, however, deemed sufficient to thoroughly dilute the escaping gas and all work was stopped, though it is intended to open up again in the fall of the year. A rather serious accident occurred at the pit on the 8th of August. During a heavy thunder storm lightning descended the shaft by the steel wire cage ropes and caused an explosion of gas, but as the works were idle no loss of life occurred.

Albion Mines—Third seam.—Very little, if any, work was done on this seam on the south side of the slope, while to the north, No. 1 balance was completed, making a new double balance with nine bords on each side. No. 3 balance was nearly completed. The work of sinking a new lift was begun and operations on the Cage pit seam were carried

COAL.

Discovery and development in Nova Scotia

on and levels advanced. On the south side the pillars were being successfully drawn. Separated from this seam by five or six feet and overlying it is a four-foot seam which is being successfully worked on the "long-wall" system. During the year the drifts leading from the Ford pit seam were built off with brick and stone.

The bank house has been remodelled and new screens of belt pattern were erected.

Acadia Mine.—This mine is now worked altogether on the long-wall system, and although working six to seven feet of coal, the work is being very successfully done. The management began work at the 2,400 feet lift intending to reopen the old level as part of new return airway; this level may in the future be utilized to draw the coal from the old Black Diamond mine.

Thorburn Mine—Six feet seam.—Work was actively carried on at this mine and the balance driven up to the 1,100 feet lift, from this ten bords were being worked, another balance was driven inside this and bords turned off. On the east side of the 1,800 feet lift most of the coal, except the pillars, has been won. On the new lift about fifteen places are being worked. The company were also engaged in proving a new seam known as the four-foot seam.

McGregor Pit.—"This mine has been worked continuously with a small force of men, and they are now prepared to draw the pillars in the No. 3 lift, east side, south slant; ventilation has been well kept up during the year."

Cage Pit.—"Some preparations were made to open the Cage Pit, but for various reasons this has not been done."

Ford Pit.—"This pit remains partially filled with water."

East River Mine.—"Messrs. Muir and Son worked this mine until March, when they stopped, leaving it in good condition."

Old Pottery Mine.—"Mr. Wm. P. McNeil, of New Glasgow, has re-opened this mine, pumped the water out, had it re-timbered, and is now taking out coal."

Cumberland County.

Spring Hill Mines, No. 1 Slope.—The greater part of the work done in this slope was performed on the 1,900 feet lift and the back seam, the coal on the west side of the old balances being mostly exhausted. The coal lift at the 200 feet barrier on the 1,300 feet lift was being successfully won and that between the 1,900 feet and Stoney levels was being taken out as the levels were advanced. Notwithstanding trouble

with fire damp the pillars and low coal of the large area in the back seam were successfully won. COAL.

In the back seam on the level going west a fault was struck which was pierced and the coal found again. Little work was done on the 2,600 feet lift beyond drawing the levels and places up to the 1,900 feet lift; the coal here is very tender, of good appearance and quality. Discovery and development in Nova Scotia

Spring Hill Mines, No. 2 Slope.—The drawing of pillars has been carried on here continuously since last year's report. In the new lift little has been done beyond extending the levels and other necessary work. These levels will need to be driven east about one mile to connect with the Aberdeen slope, and when this is accomplished they will have cut around a large block of coal 1,200 feet by about one mile. The intention of the management is to have the levels in this new lift extended and the work properly opened up before the coal is all drawn from the old lift above.

Spring Hill Mines, No. 3 Slope.—The level on the west side at the 1,300 feet lift has now been driven up connecting with the syndicate slope. A large block of coal on the east side of the 1,300 feet lift, extending up to the 800 feet lift has been thoroughly and successfully extracted. On the west side of the 1,900 feet lift the levels were driven 5,000 feet and No. 8 balance was driven up to the 1,300 feet lift. On the east side the levels are in some 1,300 feet.

Joggins Mine.—Work was carried on actively at this mine as in past years. On the surface the bank-house has been enlarged and belt screens erected.

Minudie Mine.—"This mine was re-opened, the water being all pumped out, but no coal was raised."

Chignecto Mine.—"Last year four or five men worked a few months during the winter along the outcrop."

Cape Breton County.

During the year "negotiations were concluded by which a company called the Dominion Coal Company (Limited) has acquired the properties known as the Gowrie, Ontario, Caledonia, Reserve, International, Glace Bay, Sword, and Gardner Collieries, embracing an area of about forty-nine square miles. This leaves the Sydney Mines and Victoria as the only independent collieries working in Cape Breton county. The collieries of the new company have been connected with Sydney Harbour by extensions of the International railway, and the railway is being extended to Louisbourg, with the intention of utilizing

COAL.

Discovery and development in Nova Scotia

the harbour as a winter port. The general manager of the new company is Mr. D. McKeen, M.P., well known for his successful management of the Caledonia Colliery.

"This extensive change of ownership naturally caused much interest to be taken in coal, and an immense number of licenses to search were applied for in this county. On a few some prospecting has been done. Mr. Stephens opened a bed containing about three feet six inches of good coal. The Messrs. Cossit proved a seam about four feet thick. On the Murray property, in the rear of Cow Bay, several large seams were reported as passed through by boring. The Messrs. Routledge did some boring to the west of the Lingan area, and are said to have found workable coal. On the North Sydney side of the harbour, a seam five or six feet thick was reported near the Little Bras d'Or, which should underlie and increase the value of the coal leases in that vicinity."

International Colliery.—Work was carried on at this mine as usual, the levels and rooms on the north and south sides of the deeps being extended and the rise workings on the south side pushed ahead. The bank and pit-head frame was destroyed by fire on the 30th of March. This, however, has been rebuilt.

Gowrie Mines.—Levels and rooms were extended as usual on the south side of the east deep from No. 1 and No. 2 landings. On the west side of this deep the levels on the low lift were driven about 600 feet and rooms turned off. From the bottom of the west deep slant a section of rooms were started due north up the dip which is about 17°.

The plant was improved by the addition of two tubular boilers 5 x 16 feet, with smoke stack, one 20 x 24 inch air compressor and ten Ingersoll coal cutting machines.

Caledonia Colliery.—Work at this colliery was carried on as usual. A new landing was made at the bottom of the east deep, levels driven on the south side and a large section opened up, while the east and west levels No. 4 were extended and rooms opened up. During the summer a circular fan shaft ten feet in diameter was sunk to a depth of 187 feet and was equipped with a twelve foot Murphy ventilator.

Little Glace Bay Colliery.—The dip levels were extended on the north and south sides of the deep slant, where about thirty rooms are being worked. The west high level was steadily advanced and a large section of rooms opened up; rooms were also opened on the west side of the main north level. The surface plant was increased by the addition of two 100 horse-power tubular boilers, one air compressor and ten Ingersoll coal cutting machines.

Reserve Colliery.—The levels on the east slope low lift were extended north and south and rooms opened. On the west slope the water was pumped out of the deep and about forty men put to work drawing pillars.

Emery Colliery.—"There is nothing new to note here. The deeps that were being driven have been stopped owing to a band of stone in the coal; the rooms on the east side to the rise of this have been extended. A dip slant has been driven on the west side of the pit-bottom down to the level, with the intention of hauling the west side deep coal up that way."

Old Bridgeport Colliery.—The south levels are now in 3,185 feet from the shaft, having been driven 1,630 feet since the change of ownership; they have now only about 150 feet to go before reaching the boundary line of the reserve.

The remainder of the places up the slant are all worked by hand as usual, the rooms being 18 feet wide and the pillars 100 ft. x 12 ft. A new furnace has been built this season, which has increased the ventilation. Two new Ingersoll tubular boilers have been erected on the surface, 14 feet long by 5 ft. in diameter, each having 84 tubes 3 inches in diameter, and built in on the improved method known as the Jarvis furnace.

It is the intention of the management this fall to enlarge the size of the shaft to admit of larger cages and tubs of greater capacity being used, so as to make the output of this pit next season something like 800 or 1,000 tons per day. A new engine house, which is to contain winding engine, an underground hauling engine, two compressors, and one emery stone, is to be built this fall, and also a new heapstead 55 feet high.

Gardner Mines.—An extension of the workings already opened up was made and a section of long-wall of about 300 feet in width worked in at the south level. The roof over the horse road was taken down for a distance of 500 feet giving more room for travel.

Victoria Mines.—The west slope low lift levels were extended 300 feet to the west, a balance driven up and 16 rooms won. The levels on the east side were extended about 650 feet and the levels on the 1,200 feet lift, east slope, driven eight feet, where balances and rooms were opened. A section of long-wall work was opened up during the year. The face is about 350 feet long and is driven up hill on the plane of the coal. The pillars in Nos. 5 and 6 balances were successfully drawn.

COAL.

Discovery and development in Nova Scotia

Sydney Mines.—On the south side of the pit in the new angle-deep levels and deeps were extended and a fine section of coal was opened up, while to the south in No. 2 angle the works were extended as usual. On the north side of the pit, the deep workings were extended in the different sections with good results.

Victoria County.

New Campbellton Mines.—This property was acquired by Messrs. Burchell Brothers who began operations in the spring, consisting in building a new wharf and reconstructing and relaying with steel rails the old railroad from the pit. Six blocks of miners' cottages were repaired and an engine house and blacksmith shop built.

The old slope was cleaned out and retimbered and a Cameron pump placed in the pit, with which it was expected to have the mine dry by October. Mr. Burchell states that the intention is to drive to the dip of the present workings and gain a new lift, as the coal seems to improve in quality towards the dip.

Inverness County.

"In the county of Inverness much interest was aroused in coal in the spring, and a large number of licenses applied for at Broad Cove, Chimney Corner and Port Hood. Little work has, however, been performed. Some borings are being made at Broad Cove, but up to date of writing the department is not advised as to their success. The Boston and Nova Scotia Coal Company have surveyed a route from Orangedale, on the Cape Breton railway, to Broad Cove, and have acquired some areas at that point. It is understood that they contemplate the immediate building of the road and a development of a coal mine at Broad Cove.

"At Mabou the Mabou Coal and Gypsum Company have continued working and developing during the season.

"At the Coal Mine Cove, two and a half miles east of Mabou Harbour, an extension of 260 feet has been made to the coal wharf, and a double track laid to the mine. A breakwater wharf, 320 feet long, has been built, to which the Dominion Government are adding an extension 160 feet long. In fair weather both these wharfs can be used for shipping coal.

"The seams standing at a nearly vertical slope are entered by tunnels in the face of the cliff at water-level, by slopes driven every 25 feet along the level, &c. In the seven-feet-six-inch seam, there are 2,100

feet of levels and 1,750 feet of slopes. In the thirteen-feet seam, opened in August, there are 546 feet of levels and 46 feet of slopes. COAL. Discovery and development in Nova Scotia

"This property embraces an area of 2½ square miles, in which, according to Professor Hind, there are 4,000,000 tons above water-level, and 12,000,000 below.

Richmond County.

"In Richmond County, some prospecting has been done by the Eastern Development Company on areas owned by them at Little River, but the results have not yet been communicated to the department."

NEW BRUNSWICK.

As may be seen on reference to table 1, the production of coal in this province fell off slightly in regard to tonnage, yet the price obtained was somewhat higher. As in previous years, the production was carried on in a desultory way, work being done by the farmers and settlers of the vicinity when they could spare time from their other pursuits. The coal mined, finds a market in Fredericton and St. John and various points along the St. John River, a small quantity being utilized by the Central railway running between Hampton and Grand Lake. Many attempts have been made to mine the coal of the province on a systematic and more extensive scale, all of which have, however, fallen through. Discovery and development in New Brunswick.

NORTH-WEST TERRITORIES.

The production throughout the North-west Territories during the year, shows in quantity and value a marked increase over that of the year previous, the actual increase in quantity being 54,025 tons, or about 30 per cent. Discovery and development in North-west Territories.

As in previous years, the collieries producing the most extensively were those at Lethbridge, Canmore and Anthracite, while smaller quantities were produced from the mines at Edmonton, Medicine Hat and Estevan.

Regarding operations throughout the North-west Territories, the only information available is that contained in the report of the Superintendent of Mines for Manitoba and the North-west Territories for 1893.

COAL.

BRITISH COLUMBIA.

Discovery and development in British Columbia.

There was a marked increase in the production of coal during 1893. As may be seen on reference to the following tables, the production for the year as compared with that for 1892, shows an increase of 170,194 tons or over 18 per cent.

The following tables, Nos. 11, 11a and 11b, and notes regarding the industry are obtained from the report of the Minister of Mines of the province :—

COAL.

TABLE 11.

BRITISH COLUMBIA.

PRODUCTION, SALES, ETC., FOR 1892.

Name of Colliery.	Coal raised.	Sold for Home Consumption.	Sold for Exportation.	On hand Jan. 1st, 1892.	On hand Jan. 1st, 1893	Number of Men employed.
	Tons.	Tons.	Tons.	Tons.	Tons.	
Nanaimo.....	485,392	145,632	344,538	9,949	5,171	1,367
Wellington.....	325,216	62,789	267,008	11,760	7,177	815
E. Wellington.	37,688	5,992	31,360	.....	336	152
Union..	77,199	5,356	74,542	15,523	12,824	520
Total.....	925,495	219,769	717,448	37,232	25,508	2,854

COAL.

TABLE 11a.

BRITISH COLUMBIA.

PRODUCTION, SALES, ETC., FOR 1893.

Name of Colliery.	Coal raised.	Sold for Home Consumption.	Sold for Exportation.	On hand Jan. 1st, 1893.	On hand Jan. 1st, 1894.	Number of Men employed.
	Tons.	Tons.	Tons.	Tons.	Tons.	
Nanaimo	525,629	145,042	379,766	5,171	7,281	1,279
Wellington	377,814	46,056	330,637	7,177	1,120	983
E. Wellington.	30,768	8,400	22,705	336	.....	140
Union.....	161,198	33,015	128,079	12,824	12,928	442
N. Thompson..	280	280	.....	.....	....	....
Total.....	1,095,689	232,793	861,187	25,508	21,329	2,844

COAL.

TABLE 11b.

PRODUCTION, SALES, ETC., FOR 1894.

Name of Colliery.	Coal raised.	Sold for Home Consumption.	Sold for Exportation.	On hand Jan. 1st, 1894.	On hand Jan. 1st, 1895.	Number of Men employed.
	Tons.	Tons.	Tons.	Tons.	Tons.	
Nanaimo.....	441,980	121,396	323,826	7,281	4,039	1,178
Wellington....	422,191	56,185	341,434	1,120	25,692	986
Union.....	270,336	8,089	261,699	12,928	13,476	765
Total.....	1,134,507	185,670	926,959	21,329	43,207	2,929

The collieries in operation during 1893 were as follows:—

Nanaimo Colliery.....New Vancouver Coal Mining and Land Co., Ltd.

Wellington Colliery.....Messrs. Dunsmuir & Sons.

East Wellington Colliery....East Wellington Coal Company.

Union Colliery.....Union Colliery Company.

North Thompson Colliery....Kamloops Coal Company, Ltd.

The product of the latter colliery is used locally, finding a market in and around Kamloops, while from the others the coal is shipped at the ports of Nanaimo, Departure Bay, and Union near Comox, all on Vancouver Island. Of the coal shipped, the greater part went to the ports of San Francisco, San Pedro and San Diego in California. Shipments were also made to Alaska, Hawaii and Petropauloski.

As illustrating the market for British Columbia coal in California, the following figures of imports for 1893 and 1894 are given below:

	Tons.
British Columbia.....	490,679
England.....	110,363
Scotland.....	17,762
Wales.....	36,685
Australia.....	155,415
Puget Sound.....	444,493
Oregon.....	31,550
Eastern States.....	16,667
Alaska.....	200
Japan.....	7,727
Coal entered in San Francisco in 1893.	1,311,541
do at lower ports, 1893.....	168,244
Total coal entered	1,479,785

COAL

Discovery and development in British Columbia.

	Tons.
British Columbia	649,110
Australia	211,733
English and Welsh	157,562
Scotch	18,636
Eastern, Cumberland, and Anthracite	16,640
Seattle, Franklin, and Green River	153,199
Carbon Hill and South Prairie	241,974
Mount Diablo and Coos Bay	65,263
Japan, &c	15,637
Total for the year 1894	1,527,754

The following notes regarding the various collieries are taken from the report of the Minister of Mines for 1893:—

Nanaimo Colliery, No. 1 Shaft, Esplanade, Nanaimo.—"No. 1 shaft, situated on the esplanade in Nanaimo, is the most extensive coal mine in the province and has proved to be a most valuable mining property. The shaft is 650 feet in depth with a level driven to the north, known as No. 1 north level, and about 50 yards in this level there is a slope driven in an easterly direction for about 1,000 yards. At about 600 yards down the slope the No. 3 north level branches off. All the workings of these two levels are under the water of Nanaimo Harbour, except the workings of the back end of No. 1 level, which is now working under Protection (or Douglas) Island. The workings of this mine are dry, but not dusty. They are quite safe from any influx of water as there is a thickness of from 500 to 700 feet of débris and hard rock between the bottom of the harbour and the workings of the mine. All the workings are on the pillar and stall system, leaving large pillars of coal.

"The workings of No. 1 north level extend (as mentioned above) under Nanaimo Harbour and Protection Island, and the level is, with its windings, 4,000 yards to the face from the shaft bottom, being the longest underground hauling road in this district. For the long stretch of about two miles, the coal has been very good, varying in thickness from 5 to 10 feet, except in some small spots. At the face the roof is generally good. All the mining from the level is to the west side (other than a slope referred to in a previous report to connect with the Protection Island shaft, which was done on January 22nd, 1893), the coal on the east side being to the dip, and this coal is left to be worked from No. 3 north level and Protection Island shaft, where they are now working.

"No. 3, north level, branching from the main slope, is now in one and a half (1½) mile from the slope, where it connects with Protection

Island shaft workings in a slope from about 100 yards south of the shaft going east. There are 22 stalls working from this No. 3 level going towards No. 1. The coal is very excellent in quality and varies from 6 to 10 feet in thickness without any plies of rock. All this working will terminate at No. 1 level. Here, in No. 3, the same as No. 1 level, it is all solid to the east side, but at present they are putting two slopes into the solid coal, one of them about half way in No. 3 level, where the coal is 6 feet thick. The other slope is at the place where they connected with Protection Island shaft works. At this place the coal is also 6 feet thick, so that there are splendid prospects for coal to the east side, and quality and appearance keep good. Ventilation is amply sufficient. The mine is now ventilated from Protection Island shaft, on the separate split system, there being three main divisions, near to the bottom of the shaft.

"The motive power to keep this large volume of air constantly in motion, is a large Guibal fan, erected on the surface near the No. 2 shaft, being the upcast shaft near the No. 1 shaft. The fan is 36 feet in diameter, by 12 feet wide, and gives the above result from Protection Island shaft, not including what goes down No. 1 shaft, which latter I never found less than 32,000 feet per minute. All this air is kept in motion with 40 revolutions per minute, water gauge $1\frac{5}{10}$ inches. And if required this fan can be worked with safety up to nearly double what it is now working at.

"In the levels mentioned, the New Vancouver Coal Company has been hauling the coal out by electricity, which has been found to be a success. The Edison General Electric Company supplied and fitted up the whole of the plant. The dynamos are fixed on the surface and driven by a steam engine built for that special purpose, about 100 feet from No. 1 shaft, occupying a fine building or power-house. From the dynamos the electric current passes to and through all the different instruments to protect the plant against accident and everything that it is possible to work insulated is covered to protect against accident to any person that may be passing the wires, which are strung up in No. 1 level for two miles, this being the distance that the electric locomotive goes. In No. 3 level the locomotive goes fully one mile from the slope, or about one and one-half mile from the shaft. The usual rate is about 6 to 8 miles an hour, taking along, generally, about 40 tons at a time. There are four electric locomotives, three of them are eight tons each and of 30-horse power, these three are at work, one in No. 1 and two of them working in No. 3 level, the smallest one, of 15 horse-power, is on top."

COAL.

Discovery and development in British Columbia

Nos. 1 and 2 Southfield Mines.—These mines are now abandoned and all plant, rails, cars, &c., removed, as all the coal convenient for mining has been taken out.

No. 3 Pit (Chase River).—This mine also was abandoned during the year after drawing all available pillars. It is not the intention to re-open here.

No. 5 Shaft, Southfield.—This shaft is to the dip of Nos. 2 and 4 (Southfield) mines, with the latter of which it is connected. At this point great trouble has been met with through faults, &c., the coal in places measuring twenty-four inches and less, though the seam has a fair average thickness of good coal. Work was carried on here as usual.

Protection Island Shaft.—"This shaft is the deepest in the district; to the lower, or what is called the Newcastle seam, it is 740 feet, with sump 750 feet.

"The upper coal is a continuation of the Douglas seam from No. 1 shaft, and is now connected both with No. 1 and No. 3 levels.

"In No. 1 level they went through on a slope that had been put down 300 yards in good coal; and to get communication with No. 3 level they had to put down a slope from this shaft 200 yards, this being all good coal from the above distance. This slope is now down from the shaft to the east 500 yards in good coal for that distance, most of it being 6 feet thick. This slope branches off to the south, about 100 yards from the shaft. There is another slope from the level on the north side, going north-east, which is now down 250 yards. This is also in good coal, but only 3½ feet thick, good and hard. This is going to be the great highway to the coal underlying the north-east side of Protection Island, Northumberland Channel, and the Gulf of Georgia, and may yet have a connection with Gabriola Island. This may seem a long way off, but a few years ago the same might have been said about Protection Island, from No. 1 shaft. Now, however, we can walk to Douglas (or Protection) Island, and before long we may be able to walk from Nanaimo to Gabriola Island, as there is no reason to doubt that the coal extends to the latter island, which is only two miles away.

"The area of coal opened out here is very large. There are places enough to put on over 100 miners to work. All these places have been at a stand since the 1st September; but I hope to see this extensive mine in operation again soon.

"Protection Island Lower (Newcastle) seam of coal is 62 feet below the Douglas seam. They have done a considerable amount of mining, principally in the way of exploring to find out as to its regularity. The chief opening is by a slope to the east. This is down 350 yards in

good coal for all that distance, and from 3½ to 4 feet thick, of a good quality and is very hard. There were two levels started, but only got in a short distance when they suspended work for a time. The seam kept getting easier to work as they went down, having a strong rock roof. Everything about the top is fitted up in first-class style. Large double hoisting-engine; pit head gear; bunkers; in fact, all appliances that are necessary for the handling of a large output of coal; and to complete the whole, the company has built a large wharf, about 400 feet from the shaft, where they can load the largest ships that come to the harbour."

Northfield Mine—"This mine is entered by a shaft, as are now all the mines of this colliery, the workings extending to the north and south, by a level on the south and a slope on the north side.

"The coal is worked on the long-wall system; and averages not more than 2 feet 4 inches in thickness, but of very good quality and very hard, so that it stands handling well, and commands the highest price both in Victoria and the California market, and any other place where it has been introduced as a household coal; but owing to the thinness of the seam and the loose nature of the roof, it makes it very expensive coal for the company to produce. Ventilation is good, and on the separate split system."

Harewood Estate.—A considerable amount of prospecting work, consisting of tunnelling and boring, was done on this property as yet with but slight success.

Northfield Estate.—The company sank two diamond-drill holes on this estate finding coal of the usual quality, but of a less thickness than was expected.

Wellington Colliery—No. 1 Pit.—"This is the shaft mentioned in a previous report as near to Departure Bay. In this shaft the owners were having work done at one of the upper seams of coal, in connection with two thick beds of fire clay. They have only worked a short time here during the past year. At present there is nothing being done; the shaft is nearly filled with water, so that this place is in reserve for some future operations."

No. 3 Pit.—"There has not been any mining done here in the past year, pumping having been done all the time in connection with No. 4 pit. There is yet a large quantity of coal to be got from this mine."

No. 4 Pit.—This pit was during the year pumped free from water which had been let in from the Millstone River through pit No. 3 to quench a fire in that part of the mine. It has been cleaned and is being actively worked. The coal is good.

COAL.

Discovery and development in British Columbia.

No. 5 Pit.—"No. 5 pit is the greatest producing mine in the Wellington Colliery. The coal is brought to the bottom of the shaft from the west side by a self-acting incline; from the east level and east slant, on the tail-rope system of haulage. This is 1,100 yards long, and is near the boundary of Northfield (Nanaimo Colliery). This coal is very good and hard, from 3 to 10 feet thick. All down this section is worked by way of pillar and stall, leaving about two-thirds of the coal in the pillars, which are taken out after the stalls are finished. Close to the bottom of the shaft there is a slope, the general bearing of the workings of this is to the east, towards the No. 1 shaft, near Departure Bay. The coal this way is very good and hard, for which a ready sale is found even in these dull times for all that can be got out. The coal is hauled from the lower works here to the bottom of the slope by compressed air, on the tail-rope system of haulage, which—that on the east level and on this—works well. All the mining down here is now done on the pillar and stall system. All the mining in the south side, or west incline, is at the pillars (of coal). Ventilation is good: motive power, a Guibal fan, worked by steam engine."

"There is now very little gas found in this mine. Occasionally gas is found in caves from the roof, and sometimes in a stall. This mine is free from dust. In addition to the manager, there are the overman, fireman, and a staff of shot-lighters to each district in the mine, moving round from one place to another, so that the smallest change in any part of their particular district, or anything going wrong in the air-way, is sure to be found out soon by some one, when it would be reported to the proper authority. This pit is also connected by a travelling road with No. 6 pit, with hand-boards showing the way.

"Here, as in No. 1 shaft of Nanaimo Colliery, the bottom of the pit and round about it is lighted by electricity. This mode of lighting, and the use of electric power for coal cutting, pumping, and for locomotives in hauling coal underground, is now becoming quite an important factor in the use of machinery in our mines."

No. 6 Pit.—"This pit is mentioned in a previous report as being 900 yards from No. 4 pit, but the workings are only separated by a narrow strip of solid coal of about 40 yards thick, which is known as the barrier between the two mines. It was put to a severe test by the filling of the workings of No. 4 pit with water to about 107 feet up the pit, yet with all that pressure it did not show any appearance of leakage, after standing that way for months. This mine (No. 6) is connected with No. 5 pit, but only in one place, and this place is fixed so that it could be blocked as to be able to stand a great pressure. This is done in order, in case of accident to either of the two mines,

that it may serve the same purpose as the barrier served between Nos. 4 and 5 and Nos. 4 and 6 pits.

Discovery and development in British Columbia.

This No. 6 pit is quite an extensive mine. Most of the mining being done is to the east, and in a northerly direction towards the workings of No. 5 pit. In this mine, as in all the mines of the Wellington Colliery, the coal is hard, of good quality, and greatly in demand in the California market. There has been much of the coal worked here on the long-wall system during the past year, but now it is all worked on the pillar and stall system, and at the pillars (of coal). The roof is much stronger than in most of the mines of this colliery, and therefore the pillars of coal can be taken out to better advantage. Ventilation is good; the motive power is a fan on the Murphy principle, worked by a steam engine. Although this pit is connected with No. 5 pit, it is independent of it so far as ventilation is concerned, there being a close partition in this shaft, one side being the intake and the other the upcast for ventilation purposes. This pit is also free from dust."

No. 2 Slope.—No work was done here during the year.

Alexandra Mine.—No work was done here during the year.

Between No. 1 pit and the workings at No. 5 pit two bore-holes were sunk by the owners, which show that the coal is continuous between these two points.

East Wellington Colliery.—From January to October this company produced 30,768 tons of coal when, owing to the low price obtained and the proportionately high cost of production, work was discontinued. All cars, rails, pumps, &c., were brought to the surface and the mine abandoned.

Union Colliery, Comox, No. 1 Shaft.—No work was done here during the year beyond clearing the shaft and workings of water. It is the intention to continue mining as soon as the mine is clear.

No. 1 Slope.—"This is now the most extensive mine of the colliery. As in the other mines, there has been idle time here; but they kept driving the slope ahead so that its length from the entrance, under cover, is now 4,300 feet (with 700 feet further to where the engine stands), making it the longest slope in the district, with good hard workable coal the entire distance that the slope is down, and at the bottom there is no falling off, as the coal looks as well, and if anything, is better as it goes down. In the first 400 yards of the slope it is so flat that they have to haul out the coal by the tail-rope system, but after that distance there is a nice easy grade enabling the empty cars to take the rope down, and of course the engine can haul it up, and when it gets the cars to the flat it is again hooked on.

COAL.

Discovery and development in British Columbia.

"From this slope, nine levels have been started to the east side, and as many to the west side. At present, owing to the slackness in the coal trade, they are only working Nos. 6, 7, 8, and 9 levels, on the east side, employing about 60 men on one shift, with coal averaging about five feet thick, although in most of the places it is much thicker and very hard. On the west side of this slope they are at present doing all their mining from Nos. 7, 8, and 9 levels. Here, as in the east side, the coal is very good but much thicker, employing 40 men on one shift; but if the coal trade demand it, they could almost find places for double that number on both sides of the slope. At present they are getting out about 800 tons of screened coal from this mine alone; and if trade should justify it they could, with No. 1 shaft, No. 1 slope, and this No. 4 slope, under the present condition, almost put out 2,000 tons of marketable coal per day. Ventilation is good. Motive power is a Guibal fan, which running slow passes 50,000 cubic feet of air per minute."

Nos. 1 and 2 Tunnels.—These tunnels or adit levels were not worked during the year and all rails and plant were taken out. As the roof is secure and natural drainage good, the mine and coal, of which a large quantity remains in the property, will not be injured by remaining idle.

Tumbo Island Coal Mining Company.—"This company has been doing considerable work during the past year at the island, principally in sinking the shaft. Here they have had stoppages in many ways. The greatest drawback has been that they had too much water for the machinery in use. They worked up to the 28th August, when the depth of 245 feet was reached. At this point the water exceeded the power of the appliances for taking it out, and since then there has not been any work done in the bottom, and they are yet fully 100 feet from the coal. At the bottom where they left off they were in dark shale, and the rock will be soft until the coal is reached; but before they can resume operations in the shaft new appliances for raising the water must be placed in position, powerful enough to keep the shaft clear of water so that the miners may be able to work. If they had the proper machinery it would take only a comparatively short time to win the coal. The company have on the ground at the shaft, one stationary engine, four steam pumps, also an air compressor, and when working there were 21 white men employed."

The Nicola Valley Railway Company.—The occurrence of coal of good quality near the confluence of the Coldwater and Nicola rivers, has been known for many years. The natural outcrops and small openings made at that time are described in the Report of Progress of the Geological Survey for 1877-78 (p. 122B). Since the construction

of the Canadian Pacific, this field has been brought within forty miles of a railway and more interest has been felt in the coal deposits. As, however, their utilization on any important scale would involve the building of a branch line of some length, it became important to further test the character and extent of the coal seams. The following particulars of boring operations are abstracted from the report of the provincial Minister of Mines for 1893.

Coal.

Discovery and development in British Columbia.

The Nicola Valley Railway Company having secured from the settlers of the valley all their coal rights, with the addition of legislative right of way, attention was turned to the exploration of the coal. A diamond drilling machine was employed in boring at a spot, about half a mile to the dip of the crop-out, and here the coal was struck at the depth of 190 feet, and proved to be about 5 feet 7 inches thick. The hole was continued to the depth of 600 feet. Several other smaller seams were gone through before gaining that distance, and when the whole was stopped they were still in the productive coal measures. All the coal gone through, as well as what is seen at the crop-out, is very hard, and those who have tested it report it to be of a superior quality.

The drilling machine was then removed and another hole was put down two miles further up the valley. At the depth of 137 feet from the surface coal was struck, about 5 feet 6 inches thick. The whole was continued to the depth of 562 feet, having gone through some smaller seams of coal, thus proving that the valley has underlying it a large deposit of superior coal.

The Kamloops Coal Company, Limited.—"This enterprising coal company did considerable work in and about their mine on the North Thompson River, during last winter and spring. A quantity of coal was taken out for consumption in Kamloops, in order to thoroughly test the quality of it. About 250 tons were taken into Kamloops, and it is used there exclusively for domestic purposes, except where hard coal is required. The mine is not now in operation."

A description of this coal field was given by Dr. G. M. Dawson in his report for 1877, pp. 112B to 114B, and further notes by Mr. McEvoy will be found in the Summary Report of the Geological Survey for 1892, p. 10.

COKE.

Coke.

The production of oven coke during the year amounted to 61,078 tons, valued at $161,790, showing a slight increase over that of the year previous.

Coke.

The annual production for the past eight years was as follows:—

1886.....	35,396	tons, valued at	$101,940
1887.....	40,428	"	135,951
1888.....	45,373	"	134,181
1889.....	54,539	"	155,043
1890.....	56,450	"	166,298
1891.....	57,084	"	175,592
1892.....	56,135	"	160,249
1893.....	61,078	"	161,790

The production for 1894 was as follows:—

1894..... 58,044 tons, valued at $148,551

The production of oven coke given above was until 1894 altogether that of Nova Scotia, in which province it is all used at the various iron furnaces and works. Returns were received, however, of a small quantity of coke manufactured at the British Columbia mines in 1894.

The imports of oven coke are shown in the following table:—

Imports of coke.

Coke.

Table 1.

Imports of Oven Coke.

Fiscal Year.	Tons.	Value.
1880.....	3,837	$ 19,353
1881.....	5,492	26,123
1882.....	8,157	36.670
1883.....	8,943	38,588
1884.....	11,207	44,518
1885.....	11,564	41,391
1886.....	11,858	39,756
1887.....	15,110	56,222
1888.....	25,487	102,334
1889.....	29,557	91,902
1890.....	36,564	133,344
1891.....	38,533	177,605
1892.....	43,499	194,429
1893.....	41,821	156,277
1894.....	42,864	176,996

There are, of course, large quantities of gas coke produced annually, all of which finds a ready local market for domestic and other purposes; but it has not been found possible to obtain full or accurate returns of this product.

COPPER.

Production.

The production of copper in Canada for 1893, shows an increase over that of last year of more than fourteen per cent in quantity and over five per cent in value. The figures for the past years to 1893 are given below :

1886	3,505,000	lbs., valued at	$354,000
1887	3,260,424	"	342,345
1888	5,562,864	"	667,543
1889	6,809,752	"	885,424
1890	6,013,671	"	902,050
1891	8,928,921	"	1,160,760
1892	7,087,275	"	826,849
1893	8,109,856	"	875,865

The above production, represents as formerly, shipments of ore, &c., resulting from mining operations in the provinces of Quebec and Ontario in the Capelton and Sudbury districts respectively. No copper was produced and shipped from the other provinces except, perhaps, that some of the gold and silver ores shipped from British Columbia may have carried a small amount of copper, but the quantity must have been very small, and it has been found impossible to get any data regarding it.

In valuing the copper contained in the shipments of ore the average market price for the year is taken, to bring it to a uniform basis with the other metals. The spot value of the ore and matte shipped, however, is of course lower, and varies much, depending upon the extent to which the process of treatment for extraction of the useful metal has been carried.

This varies considerably according to the local conditions and the policy of each mine and operator. No copper, the product of Canadian mines, is at present exported in the metallic state. Thus the shipments of copper bearing material are represented by the following figures :—

Raw ore—50,702 tons carrying from 3 to 4 per cent of copper.
Matte — 9,800 " 15 to 20 " "

For 1894 the figures of production include the copper contained in the gold or silver bearing copper ores of British Columbia, which in this year first became an important item. The details are as follows :—

Quebec	2,176,430	lbs. valued at	$206,761
Ontario	5,207,679	"	494,730
British Columbia.	352,907	"	33,526
Total	7,737,016		$735,017

COPPER.

Exports and imports.

The data regarding exports and imports for 1894 and previous years are given in the following tables, Nos. 1, 2 and 3, whilst the fluctations in the price of this metal are shown in the general price table attached to this report.

COPPER.

TABLE 1.

EXPORTS, OF COPPER IN ORE, MATTE, ETC.

Year.	Nova Scotia.	Ontario.	Quebec.	British Columbia.	Total.
1885			$262,600		$262,600
1886		$ 16,404	232,855		249,259
1887		3,416	134,550		137,966
1888			257,260		257,260
1889			168,457		168,457
1890		2,219	396,278		398,497
1891		64,719	283,385		348,104
1892	$100	79,141	198,391		277,632
1893		212,314	56,846		269,160
1894		25,029	12,005	54,883	91,917

COPPER.

TABLE 2.

IMPORTS : PIGS, OLD AND SCRAP.

Fiscal Year.	Pounds.	Value.
1880	31,900	$ 2,130
1881	9,800	1,157
1882	20,200	1,984
1883	124,500	20,273
1884	40,200	3,180
1885	28,600	2,016
1886	82,000	6,969
1887	40,100	2,507
1888	32,300	2,322
1889	32,300	3,288
1890	112,200	11,521
1891	107,800	10,452
1892	343,600	14,894
1893	168,300	16,331
1894	101,200	7,397

COPPER.

TABLE 3.

IMPORTS : MANUFACTURES.

COPPER. Imports.

Fiscal Year.	Value.
1880	$123,061
1881	159,163
1882	220,235
1883	247,141
1884	134,534
1885	181,469
1886	219,420
1887	325,365
1888	303,459
1889	402,216
1890	472,668
1891	563,522
1892	422,870
1893	458,715
1894	175,404

DISCOVERY AND DEVELOPMENT.

NOVA SCOTIA.

Discovery and development in Nova Scotia

The only work done in this province was at the Coxheath Mine in Cape Breton, where a small force of men was doing development work. The owners have in contemplation the erection of smelting works on the North-west Arm of Sydney Harbour, where they believe that their ore can be profitably smelted by bringing suitable ores for mixing from other places where such are known to exist, possibly from Newfoundland, and utilising the product of the adjacent coal fields for fuel.

Regarding this and other points, the company reports as follows* :

"The unexpected change in general financial situation all over the world prevented this company from carrying out plans for 1893. The main slope (No. 2) was unwatered in April and the following mining development work done. On the 190 ft. level the vein was under-stoped for 71 ft. in length, 10 ft. in width, and 12 ft. in depth, yielding about 600 tons of ore averaging 10 p.c. copper, from which a ton was forwarded to Chicago and added to the Nova Scotia exhibit at the World's Exposition. On the 250 ft. level the drifts were extended 45 ft. On the lower or 320 ft. level 86 ft. of continuous drifting was done, the vein yielding a very good grade of ore. Total amount of ore raised from shaft No. 2, 1,250 tons. The hoisting engine has been thoroughly overhauled and repaired. An

* Report of Provincial Department of Mines for Nova Scotia, 1893.

COPPER.

additional No. 4 Blake steam pump purchased. The residence for the mining captain and staff completed.

Discovery and development in Nova Scotia

"Preparatory to building permanent works, the company has purchased 522 acres of land covering sites for mining operations, concentration mill and a reservoir for ample water supply for the mill.

"At Watscn's Point, on the North-west Arm of Sydney Harbour, the company has purchased the Grantmyer farm and a portion of the Watson farm, in all 325 acres, with a water front of 2,300 feet. The main smelting works are designed to be built on the 20 acres lying between the Cameron road and the water front. The Intercolonial railroad runs through this property. Watson's Brook can furnish ample water supply and the rear land contains a large quantity of good timber. The location is connected both by rail and water with the coal fields of Cape Breton county.

"Amount of work performed during the year is as follows:—

"Skilled labour above ground	1,020 days.
" underground	1,177 "
"Unskilled labour above ground	910 "
" underground	836 "
"One horse team and man	413 "
	4,356 days."

Discovery and development in Quebec.

QUEBEC.

The copper produced in this province was altogether contained in the pyritous ores mined in the vicinity of Capelton near Sherbrooke. These ores carry from three to four per cent of copper, but are primarily used as a source of sulphur in the manufacture of sulphuric acid, the industry "according to our returns" employing altogether about 530 men.

The industry presents no new features from those described in our previous reports. The Nichols Chemical Company shipped part of their product as raw ore to their chemical works at Laurel Hill, New Jersey, U.S.A., and burned the rest at their acid works at Capelton, the resulting cinder being put through their water jacket furnace and the matte thus produced, containing about fifty per cent of copper, was shipped to the United States.

The Eustis Company shipped all their ore raw to different points in the United States (Buffalo, Cleveland, Boston, New York, &c.)

The Moulton Hill Mine of the Grasselli Chemical Company, was temporarily shut down, but they operated their Howard Mine, shipping the ore in the raw state to their works at Cleveland, Ohio.

ONTARIO.

COPPER.

In this province, the industry presents much the same features as last year. The only metal shipped was contained in the nickel-copper matte from the Sudbury mines.

Discovery and development in Ontario.

Sudbury.—The same operators as last year were active in 1893, viz., The Canadian Copper Company, The Dominion Mineral Company, and Messrs. H. H. Vivian & Company. As the mode of work at these mines has been fully described in previous reports nothing more need be said here. The number of men employed during the year at the various mines and works, according to our returns, was about nine hundred. The product was shipped in the condition of matte containing from 15 to 20 per cent of copper.

Mamainse.—At this place the Copper Creek Mining Company of Detroit continued the development of their property with a force of about twenty men under the direction of Captain T. H. Trethewey. The property comprises two locations on the eastern shore of Lake Superior, which were first acquired about the year 1842 by the old Montreal Mining Company, and subsequently transferred to the Ontario Mineral Lands Company, which also owned the well-known Silver Islet Mine on the Lake. The two locations on which the present work is being done, comprise some 11,200 acres, located upon the area of Keeweenian rocks constituting the Point Mamainse district, and is adjacent to that owned by the Lake Superior Native Copper Company, where extensive work was carried on from 1880 to 1885. The copper deposits of the formation are of two kinds, viz., fissures cutting the formation and carrying either native copper or sulphuretted ores of that metal or both, and amygdaloidal trappean beds, carrying native copper.

Captain Trethewey kindly furnishes the following data regarding the work done by the Copper Creek Company :—Plant and machinery, one double cylinder steam hoisting engine of 30 horse-power; four drill air compressor and power drills; duplex pump, etc., with 40 horse-power boiler; also one Sullivan Diamond drill, boiler, etc., complete of 700 feet capacity. The developments made to the end of 1893 were as follows, viz. :—One shaft, size 7 x 14 feet, sunk on a fissure vein to a depth of 308 feet, with pumping station and one drift. This shaft for nearly 100 feet was sunk through ground carrying native copper and "gray ore" (chalcocite) and proved the vein to average fully five feet in thickness and to average over 12½ per cent of metallic copper. For the next fifty feet sunk through, the vein proved less productive, after which to the bottom (308 feet) the vein in the shaft yielded copper ores, principally chalcocite, assays from some of which are as follows :—

COPPER.

Discovery and development in Ontario.

Gold (approximately)	$ 3.20 per ton
Silver	26·85 oz. "
Copper	62·80 per cent

(Valued at $142.72 per ton.)

The vein in the shaft is composed of crushed portions of wall rock, conglomerate and amygdaloid intermingled with calcspar and quartz.

Pits and surface cuts on the line of the same vein for a distance of 1,000 feet show rich chalcocite and native copper, whilst pits on other veins show satisfactory evidences of copper. About 3,600 feet of holes were bored with the diamond drill at various points inland.

No shipments were made, as the only work done was exploratory and but a small amount of ore fit for shipment without concentration would be thus obtained. About 25 tons of ore, however, averaging 18 per cent of copper to the ton, were thus obtained and stored at the mine.

Discovery and development in British Columbia.

BRITISH COLUMBIA.

Copper mining in this province remains about as in the past, the copper produced being contained in ores mined primarily on account of their contents of the precious metals.

Work has been done on numerous claims throughout East and West Kootenay, whose ores carry a greater or less percentage of copper. The ores of the Trail Creek and Toad Mountain camps are specially notable in respect of their copper contents, and the shipments made from these points during the year would represent therefore a certain production of copper, the amount of which it has, however, been impossible to obtain for 1893. Assessment work was done on many other similar deposits, and the report of the Minister of Mines for the province speaks of an interesting deposit having been located in September in the Fish Creek district, the ore assaying, beside silver and gold, twenty per cent copper. In the same report, mention is made of reported discoveries as follows:—Of a promising body of copper carbonate on the Canal claim on the east side of Columbia Lake, Thunder Hill Camp, East Kootenay district; of copper-bearing ores at the head of St. Mary's River, ore from one vein on the South Fork assaying thirty-one per cent of the metal; at Bull River Cañon, of a twenty-two per cent ore of the metal; at Sand Creek of copper glance, and at Kinbasket Lake and other places, all in the same district.

In Yale district assessment work was done on the copper claims at Copper Creek on the north shore of Kamloops Lake, and a discovery was made of a very large vein on Fall Creek in the vicinity of Adams Lake carrying copper and silver ores.

Some copper ores are reported as occurring along the survey line of the Esquimalt and Nanaimo railway. Mr. Ralph, speaking of this says that in the pass between Mount Grey and Mount Spencer, at the head of Franklin River, are several quartz veins from six to eight inches wide, rich in yellow copper ore, with indications of copper ores from the sixty-seventh to the sixty-eighth mile-post near Alberni Canal; also that at a place about two miles north-east of the 115-mile post, at an elevation of 6,000 feet, on the packers trail in the mountain pass at the head of the west branch of Cruikshank River are some mineral veins fifteen feet thick containing iron, copper and perhaps silver.

COPPER.

Discovery and development in British Columbia.

Texada Island.—On Texada Island some test work was done on a copper ore vein by the Minerva Marble and Mining Company, regarding which Mr. Alfred Raper sends us the following information:—The New Comstock Lode, as they have named it, lies about 2,000 feet north-west from the Puget Sound Iron Company's iron mine. In the shaft sunk to a depth of some thirty feet, the vein at six feet deep showed forty inches thick of sulphide of copper, at a depth of twenty-five feet the ore rib had narrowed down to three inches thick, thence downward, it widened again until it measured two feet of ore at the bottom of the shaft. The lode strikes north and south and dips to the west at an angle of about 75°, having limestone on the foot-wall and syenite on the hanging-wall. It is claimed to have been traced on the strike and tested by openings for 1,200 feet. The same gentleman reports work done in the same vicinity by the Texada Gold and Silver Mining Company, which has three copper veins on its property, work so far having been mostly done on that known as the Little Gem Lode upon which two shafts have been sunk. From the new shaft, thirty-three feet deep, some thirty tons of ore have been obtained and stored in the dump. Specimens of this ore yielded respectively :

	I.	II.
Copper.....	37 per cent.	15 per cent,
Silver.....	4 oz.	15 oz.

The local government report publishes an excellent study of the specimens of ore collected by their agents for exhibit at Chicago by Mr. W. Pellew Harvey, who made assays of all for them. Speaking of copper ores, his reports says :—"The signs of the existence of copper in this district (East Kootenay) are numerous and encouraging. We have carbonates, sulphides and oxides of this metal, as well as in combination with antimony, in which case the silver contents run exceedingly high. The Windermere Mountain deposits and also those of the Spallumcheen are very interesting, producing good smelting ores. The former carry it as red oxide and carbonate, and the latter carbonates.

COPPER.

Discovery and development in British Columbia.

From Jubilee Mountain we have splendid showings of purple copper ore, the assays in each case covering a range of from 35 to 59 per cent and there are instances outside of the collection sent to Chicago where even higher results than these have been obtained. In a few cases where the ore carries sulphide and a consequent decrease in the percentage of the metal contained, a little trouble and expense would be the means of eliminating the excess of sulphur and placing on the market parcels of such ore as would pay handsomely to ship." Other copper occurrences are mentioned as follows: "There was one sample of copper ore ('peacock') from the Silver Bow (Illecillewaet district) which struck me as being a particularly beautiful specimen carrying gold, silver and copper in heavy quantities." "The Silver King (Toad Mountain camp) argentiferous copper with silver 444 oz. and 23·50 per cent copper requires no further mention." "Trail Creek—sixteen specimens composed this exhibit. They contain various quantities of gold, silver and copper. The ore is a yellow sulphide and should be treated and converted into matte on the spot. The extent of the deposits and the gold contained should make these ores valuable apart from copper. I should expect to find nickel in such ore." "Kamloops—One sample of copper from the Victoria was first-class and carried 60 per cent of the metal." "Osoyoos district—I was particularly struck with the nature of the exhibits from this district. The ores seem to contain silver, gold, lead and copper in paying quantities." In connection with these remarks it must be remembered that whilst they represent the results of an extended and painstaking examination by assay, &c., of a large collection, still these were not *samples*, properly so called, representing some large body of ore, but were *specimens* selected for exhibition to illustrate the nature of the ores.

GRAPHITE.

GRAPHITE.

PRODUCTION.

Production.

There was no production of graphite during 1893, all the operators of last year having reported nothing done.

The production of past years is as under:

1886	500	tons, valued at	$4,000
1887	300	" "	2,400
1888	150	" "	1,200
1889	242	" "	3,160
1890	175	" "	5,200
1891	260	" "	1,560
1892	167	" "	3,763
1893	nil.		nil.
1894*	69	" "	223

* Exports.

Exports and Imports.

Exports and imports.

All data regarding exports and imports will be found in the following tables Nos. 1, 2 and 3. The small amount shown as exported from Ontario in 1893 in table 1 was doubtless of material mined in previous years and held in stock.

Graphite.

Table 1.

Exports.

Year.	New Brunswick.		Ontario.		Quebec.	
	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.
1886	8,142	$3,586	.....	.....	.....	.....
1887	6,294	3,017	.....	.....	.....	.....
1888	2,700	1,080	.....	.....	.....	.....
1889	660	422	22	$116	.....	.....
1890	400	160	329	1,369	.....	.....
1891	464	72	.....	.....	.....	.....
1892	1,224	449	15	60	4,590	$3,443
1893	.....	.....	12	38	.....	.....
1894	.....	.....	69	223	.....	.....

Graphite.

Table 2.

Imports of Raw and Manufactured Plumbago.

Fiscal Year.	Plumbago.	Manufactures of Plumbago.
1880	$1,677	$2,738
1881	2,479	1,202
1882	1,028	2,181
1883	3,147	2,141
1884	2,891	2,152
1885	3,729	2,805
1886	5,522	1,408
1887	4,020	2,830
1888	3,802	22,604
1889	3,546	21,789
1890	3,441	26,605
1891	7,217	26,201
1892	2,988	23,085
1893	3,293	23,051
1894	2,177	16,686

GRAPHITE.

Imports.

GRAPHITE.

TABLE 3.

IMPORTS OF BLACK-LEAD.

Fiscal Year.	Value.
1880	$18,055
1881	26,544
1882	25,132
1883	21,151
1884	24,002
1885	24,487
1886	23,211
1887	25,766
1888	7,824
1889	11,852
1890	10,276
1891	8,292
1892	13,560
1893	16,595
1894	17,614

Discovery and development.

DISCOVERY AND DEVELOPMENT.

No reports of discovery or of development of the numerous known occurrences of this mineral have come to hand for the year 1893. Particulars of these deposits occurring in the Laurentian rocks in Ottawa and Argenteuil counties, Quebec, and in the Kingston and Pembroke railway district in Eastern Ontario having been given already in previous reports need not be repeated here, but in view of the known extent of many of them, this suspension of the industry will doubtless prove only temporary, being in one case caused by failure to complete financial arrangements found necessary in order to work on a larger and more profitable scale.

From New Brunswick, Mr. W. F. Best writes regarding the mine near St. John, that it has been closed for a year on account of the high freight rates on plumbago to points west.

GYPSUM.

GYPSUM.

Production.

The figures of production of gypsum for 1893, show a falling off of a little over twenty per cent of the tonnage figures for 1892, as will be seen on reference to the following figures, relatively to this and past years:—

Gypsum.

Production.

1886..... 162,000 tons, valued at $178,742
1887..... 154,008 " 157,277
1888..... 175,887 " 179,393
1889..... 213,273 " 205,108
1890..... 226,509 " 194,033
1891..... 203,605 " 206,251
1892..... 241,048 " 241,127
1893..... 192,568 " 196,150

For 1894 the production was as follows:—

1894..... 223,631 tons, valued at $202,031

Tables 1 and 1a, following, show the relative contributions of the various provinces to the grand totals for the years 1893 and 1894.

GYPSUM.

TABLE 1.

PRODUCTION BY PROVINCES, 1893.

Provinces.	Tons.	Value.
Nova Scotia	152,754	$144,111
New Brunswick	36,916	41,846
Ontario	2,898	10,193
Total	192,568	$196,150

GYPSUM.

TABLE 1a.

PRODUCTION BY PROVINCES, 1894.

Provinces.	Tons.	Value.
Nova Scotia	168,300	$147,644
New Brunswick	52,962	48,200
Ontario	2,369	6,187
Totals	223,631	$202,031

DISCOVERY AND DEVELOPMENT.

Discovery and development.

This industry shows no features of any importance for the year 1893 needing any addition to the descriptions already given in previous reports.

GYPSUM.

Discovery and development.

The operations carried on are still confined to the provinces of Nova Scotia and New Brunswick, where numerous operators work quarries of this material located in various parts of the province, and to the Grand River district in Western Ontario.

Mr. H. Fletcher, in summarising the results of his work in the eastern part of Hants County, Nova Scotia, gives notes on sundry of the numerous gypsum deposits of that district in the Summary Report of the Geological Survey for 1893, pp. 40 to 43.

Exports and imports.

EXPORTS AND IMPORTS.

The following tables Nos. 2, 3, 4 and 5 give the exports and imports of the material for the current and previous years.

An examination of table 2 shows a considerable falling off in the exports of the crude mineral, and even with the addition of the $22,132 worth of the ground article, the figures are much below those for last year.

This is accounted for by the business depression in the United States where most of the gypsum is marketed.

GYPSUM.

TABLE 2.

EXPORTS OF CRUDE GYPSUM.

Years	ONTARIO.		NOVA SCOTIA.		NEW BRUNSWICK.		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	120	$ 180	87,720	87,590	4,925	6,616	92,765	94,386
1877	.....	.....	106,950	93,867	5,030	5,030	111,980	98,897
1878	489	675	88,631	76,695	16,335	16,435	105,455	93,805
1879	579	720	95,623	71,353	8,791	8,791	104.993	80,864
1880	875	1,240	125,685	111,833	10,375	10,987	136,935	124,060
1881	657	1,040	110,303	100,284	10,310	15,025	121,270	116,349
1882	1,249	1,946	133,426	121,070	15,597	24,581	150,272	147,597
1883	462	837	145,448	132,834	20,242	35,557	166,152	169,228
1884	688	1,254	107,653	100,446	21,800	32,751	130,141	134,451
1885	525	787	81,887	77,898	15,140	27,730	97,552	106,415
1886	350	538	118,985	114,116	23,498	40,559	142,833	155,213
1887	225	337	112,557	106,910	19,942	39,295	132,724	146,542
1888	670	910	124,818	120,429	20	50	125,508	121,389
1889	483	692	146,204	142,850	31,495	50,862	178,182	194,404
1890	205	256	145,452	139,707	30,034	52,291	175,691	192,254
1891	5	7	143,770	140,438	27,536	41,350	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

GYPSUM.

GYPSUM.

TABLE 3.

Imports.

IMPORTS OF CRUDE GYPSUM.

Fiscal Year.	Tons.	Value.
1880	1,854	$3,203
1881	1,731	3,442
1882	2,132	3,761
1883	1,384	3,001
1884		3,416
1885	1,353	2,354
1886	1,870	2,429
1887	1,557	2,492
1888	1,236	2,193
1889	1,360	2,472
1890	1,050	1,928
1891	376	640
1892	626	1,182
1893	496	1,014
1894		1,660

GYPSUM.

TABLE 4.

IMPORTS OF GROUND GYPSUM.

Fiscal Year.	Pounds.	Value.
1880	1,606,578	$ 5,948
1881	1,544,714	4,676
1882	759,460	2,576
1883	1,017,905	2,579
1884	687,432	1,936
1885	461,400	1,177
1886	224,119	675
1887	13,266	73
1888	106,068	558
1889	74,390	372
1890	434,400	2,136
1891	36,500	215
1892	310,250	2,149
1893	140,830	442
1894	23,270	198

GYPSUM.

Imports.

GYPSUM.

TABLE 5.

IMPORTS OF PLASTER OF PARIS.

Fiscal Year.	Pounds.	Value.
1880	667,676	$ 2,376
1881	574,006	2,864
1882	751,147	4,184
1883	1,448,650	7,867
1884	782,920	5,226
1885	689,521	4,809
1886	820,273	5,463
1887	594,146	4,342
1888	942,338	6,662
1889	1,173,996	8,513
1890	693,435	6,004
1891	1,035,605	8,412
1892	1,166,200	5,595
1893	552,130	3,143
1894	422,700	2,386

IRON.

IRON.

Production.

The production of iron ore during 1893 was as follows:—

	Tons.
Nova Scotia	102,201
Quebec	22,076
British Columbia	1,325
	125,602

The accompanying graphic table A shows plainly the variations in the production for past years. The increase since 1891 has been very nearly one hundred per cent in the tonnage. A comparison with the figures for 1892 shows a slight increase for the province of Quebec, a large proportional decrease for British Columbia and an increase of nearly fifty per cent for Nova Scotia. The iron deposits of Ontario still remained idle during the year 1893.

IRON.

ANNUAL PRODUCTION OF ORE.

Table A.

Year.	Tons.	Value.
1886	69,708	$126,982
1887	76,330	146,197
1888	78,587	152,068
1889	84,181	151,640
1890	76,511	155,380
1891	68,979	142,005
1892	103,248	263,866
1893	125,602	299,368
1894	109,991	226,611

IRON.

Production.

Table No. 1, following, shows the production of ore for the largest producing province, viz., Nova Scotia :—

IRON.

TABLE 1.

NOVA SCOTIA : ANNUAL PRODUCTION OF ORE.

	Tons.
1876	15,274
1877	16,879
1878	36,600
1879	29,889
1880	51,193
1881	39,843
1882	42,135
1883	52,410
1884	54,885
1885	48,129
1886	44,388
1887	43,532
1888	42,611
1889	54,161
1890	49,206
1891	53,649
1892	78,258
1893	102,201
1894	89,379

Exports and Imports.

EXPORTS AND IMPORTS.

In the following table, No. 2, the export figures appear to be somewhat in contradiction to those of production given above. These apparent discrepancies are, however, probably due to shipments made in 1892, and so appearing in the direct returns for that year, being held in stock *en route* and thus being only entered for export in the year following.

IRON.

TABLE 2.

EXPORTS OF ORE.

Province.	1891.		1892.		1893.		1894.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
Ontario	2,259	$ 3,932	*10,938	$39,954	1,042	$ 4,083	23	$ 93
Quebec	191	2,683	203	2,324	.....	.....	.....	13,813
Nova Scotia	.....	.....	.....	.....	2	6	.....	.....
Manitoba	.....	.....	.....	.....	30	86	.....	.....
British Columbia	359	4,958	1,986	10,802	1,345	3,415	878	7,388
Totals	2,809	$11,573	13,127	$52,720	2,419	$ 7,590	.....	$21,294

*Probably the product of the province of Quebec, shipped via Ontario.

As in past years there are no imports to report.

Discovery and Development.

In this respect the year 1893 showed no very novel features, the old established industries in Nova Scotia and Quebec being continued much on the same lines as before. Discovery and development in Nova Scotia.

Nova Scotia.

The operations carried on in this province were all for the supply of ore to the furnaces of the Londonderry Iron Company; the New Glasgow Iron Coal and Railway Company and the Pictou Charcoal Iron Company. Most of the ore was obtained by the companies from their own mines, although the Londonderry Company bought and used the output of the Torbrook mine situated in Annapolis County.

These four companies employ in all over one thousand men, probably one-third being engaged in mining proper, and the rest around and in connection with the furnaces, coke and charcoal burning and quarrying the limestone for flux, &c.

They each have a complete mining and furnace plant, together with the necessary outfit for providing themselves with coke and charcoal for fuel, the details of which have been given in the report for 1892. Further details will also be found on reference to the report of the Department of Mines of the province for 1893, pp. 38 to 42 and 49 to 52.

Quebec.

The Quebec iron mining industry was represented by the work done by the Canadian Iron Furnace Company and Messrs. John McDougall & Company on their deposits of bog ore in the province, to supply their furnaces at Drummondville and Radnor Forges. A small force of men was employed for about four months by Messrs. Ennis & Company at Bristol mine in Pontiac county. They shipped a small quantity of ore over the Pontiac and Pacific Junction railway. Discovery and development in Quebec.

At Radnor Forges a new furnace with a capacity of twenty-five tons per diem was blown in. A small quantity of the magnetic iron sand from the north shore of the St. Lawrence was shipped to England for experimental purposes.

It is reported that the Leeds iron mine on lot 7, range V., in Leeds township, Megantic county, has been sold to a company who intend to commence work next year.

IRON.

ONTARIO.

Discovery and development in Ontario.

Beyond a little prospecting and spasmodic and scattered test work iron ore mining in this province remained a dead letter.

Several reported deposits of iron ores in the townships of Dalton, Digby, Lutterworth and Galway in the counties of Victoria, Haliburton and Peterborough were visited by Dr. F. D. Adams for the Survey. His report on them constitutes part J of volume VI. From his statements it would seem that at most of the points visited the ore did not occur in sufficient quantity to be of economic importance. One is, however, mentioned where several hundreds of tons of ore has been extracted and shipped. This mine is situated on lots 5 in range V. and 5 in range VI. of Lutterworth, but no work had been done for many years.

During his work for the Survey in the district north-west of Port Arthur on Lake Superior, Mr. McInnes visited the iron-bearing range along the Aticokan River, examining it at a number of points, and says that * "although the trenches and test pits, which had been made, were largely filled by caving in, enough was seen to show that there exist along the eastern half of the range, extensive deposits of remarkably rich and pure magnetite. Towards the western end of the range the ore bodies are banded in character and the belts of clean ore are not extensive."

NORTHERN TERRITORY.

Discovery and development in Northern Territory.

Another officer of the Survey, Mr. D. B. Dowling, mentions having observed a deposit of magnetite on a small island in Woman Lake, which is situated in the part of Keewatin in which he was working east of Lake Winnipeg and north of Lake Seul.*

Mr. Tyrrell thus describes an occurrence of ores of iron on Lake Athabasca at its eastern end.* "Near the east end of this outcrop of Huronian quartzite is an extensive deposit of limonite and hæmatite. The point where this deposit was seen was in a hill 125 feet high, the scarped faces of which stand out boldly as high red cliffs. The whole hill is a mixture of quartz and iron ore."

Mr. Low in writing of the country passed through on his Labrador trip mentions* "immense deposits of Cambrian rocks along the Ungava River. These closely resemble the rocks along the east coast of Hudson Bay, and I believe they cover a great area of country about and to the westward of Ungava Bay. They are essentially an iron bearing series as almost every bed holds that metal and some of them are pure hæmatite ore."

*Summary Report of the Geological Survey Department of 1893.

It is interesting in this connection to refer back to Dr. Bell's report on the east coast of Hudson Bay* where he describes the outcropping of manganiferous carbonate ores of iron, apparently of very great extent, along the chain of islands skirting the coast at Nastapoka and Hopewell Sounds. IRON. Discovery and development.

BRITISH COLUMBIA.

The Puget Sound Iron Company did not operate during the year, but a small force of men were employed for about three months at the Glen Iron Mine near Kamloops in the district of Yale. The ore mined was shipped to the United States for use as flux by the Pacific coast lead and silver smelters. Owing, however, to a suspension of the demand and there being no smelters working in the province to create a local demand, operations closed in April. Discovery and development in British Columbia.

The following notes regarding operations at Redonda Island are taken from the Report of the Minister of Mines for British Columbia:

"The mines on Redonda Island also furnished 900 tons of ore, which were shipped by steamer to Portland, Oregon.

"This property, represented by Messrs. De Wolf & Co., of Vancouver, comprises one hundred acres, situated on the north shore of Redonda Island, which lies 100 miles north of the city of Vancouver. The island is of granite formation. Of the two veins running north-east and south-west, No. 1 vein has been worked at a point some six hundred feet above high-water mark, offering facilities for loading the ore direct into a vessel by a chute. This vein shows a solid face of ore over forty feet wide, the whole of which is estimated to run sixty per cent met. iron. No. 2 vein is undeveloped, and shows thirty-six feet of solid ore."

The following analysis made in the Laboratory of the Survey proves the ore to be of good quality †:—

Metallic iron	65·896
Sulphur	·015
Phosphorus	*Nil.*
Titanic acid	*Nil.*

* Annual Report of the Geological Survey for 1877-78, p. 21 c.

†Summarised from a complete analysis made in the Laboratory of the Survey For further details see Geological Survey Reports, vol. VI. (N.S.) p. 35 R.

IRON.

PIG IRON AND STEEL.

Pig iron and steel.

Of the 125,602 tons of ore mentioned previously as the product of the mines of the Dominion, 124,053 tons were consumed in the country in the manufacture of pig iron as shown in table 3 following.

IRON.

TABLE 3.

PIG IRON PRODUCTION: CONSUMPTION OF ORE, FUEL, ETC.

Materials made and used.	1893.		1894.	
	Quantity.	Value.	Quantity.	Value.
Pig iron made..... Tons.	55,947	$790,283	49,967	$646,447
Iron ore consumed. .... "	124,053	296,979	108,871	223,861
Fuel consumed { Charcoal. Bush.	1,302,720	90,976	1,173,970	53,958
Fuel consumed { Coke.... Tons.	58,711	163,849	52,373	142,303
Fuel consumed { Coal.... "	6,621	13,539	7,653	14,571
Flux consumed ..... "	27,797	27,519	35,101	34,347

There were five furnaces in blast during 1893, three in Nova Scotia and two in Quebec by the following companies. Of these, three used charcoal and two coke and coal for fuel.

The New Glasgow Iron, Coal and Railway Co., Ltd.. } In Nova Scotia.
The Londonderry Iron Company..... }
The Pictou Charcoal Iron Company..... }
The Canada Iron Furnace Company..... } In Quebec.
Messrs. John McDougall & Co..... }

The Canada Iron Furnace Company did not run full blast this year owing to scarcity of labour in the woods for securing a supply of fuel. This difficulty was subsequently obviated so that there should be no limitation of output on this account next year.

The returns received show that altogether this industry in the two provinces gave employment to some 1,735 men. This number, however, included, besides the force employed around the furnace, all others also engaged in mining the ore, quarrying the limestone for flux and in cutting wood and burning charcoal where that is used as fuel.

Exports and imports.

EXPORTS AND IMPORTS.

Data regarding exports and imports of iron and steel goods will be found in the following tables. No. 4 gives the exports of iron and steel goods, 5, 6, 7 and 8 relate to imports of similar goods of which the value is based chiefly upon the amount of iron they contain rather than upon their highly manufactured condition.

IRON.

IRON.

TABLE 4.

Exports and imports.

EXPORTS OF IRON AND STEEL GOODS, THE PRODUCE OF CANADA, 1893.

Province.	Scrap Iron.	Iron Stoves.	Iron Castings.	Iron, all other and hardware.	Steel and manufactures of.	Totals.
	$	$	$	$	$	$
Ontario	1,062	531	5,701	8,749	17,797	33,840
Quebec	3,145	372	3,653	99,844	15,440	122,454
Nova Scotia	.....	845	2,196	16,506	32,083	51,630
New Brunswick	.....	150	.....	3,582	.....	3,732
Manitoba	.....	249	3	69	856	1,177
British Columbia	.....	168	108	1,195	264	1,735
North-west Territory	.....	.....	.....	68	.....	68
Totals	4,207	2,315	11,661	130,013	66,440	214,636

IRON.

TABLE 4*a*.

EXPORTS OF IRON AND STEEL GOODS, THE PRODUCE OF CANADA, 1894.

Province.	Scrap Iron.	Iron Stoves.	Iron Castings.	Iron, all other and hardware.	Steel and manufactures of.	Totals.
	$	$	$	$	$	$
Ontario	833	957	7,542	12,110	14,459	35,901
Quebec	3,569	662	5,746	83,115	9,002	102,094
Nova Scotia	10	2,056	1,056	11,567	10,412	25,101
New Brunswick	626	.....	.....	2,142	.....	2,768
Prince Edward Island	.....	.....	.....	40	.....	40
Manitoba	.....	47	.....	51	349	447
North-west Territory	203	.....	.....	14	.....	217
British Columbia	.....	15	8	579	13	615
Totals	5,241	3,737	14,352	109,618	34,235	167,183

IRON.

IRON.

TABLE 5.

Exports and imports.

IMPORTS OF IRON, PIG, SCRAP, ETC.

Fiscal Year	Pig Iron.		Charcoal Pig Iron.		Old and Scrap Iron.		Wrought Scrap and Scrap Steel.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$		$
1880	23,159	(a) 371,956	.....	.....	928	14,042	.....	.....
1881	43,630	(a) 715,997	.....	.....	584	8,807	.....	.....
1882	56,594	811,221	6,837	211,791	1,327	20,406	.....	.....
1883	75,295	1,085,755	2,198	58,994	709	7,776	.....	.....
1884	49,291	653,708	2,893	66,602	3,136	44,223	.....	.....
1885	42,279	545,426	1,119	27,333	3,552	46,275	.....	.....
1886	42,463	528,483	3,185	60,086	10,151	158,100	.....	.....
1887	46,295	554,388	3,919	77,420	17,612	220,167	(b) 79	1,086
	Pig Iron, &c. (c)							
	Tons.	Value.						
		$						
1888	48,973	648,012	.....	.....			23,293	297,496
1889	72,115	864,752	.....				26,794	335,090
1890	87,613	1,148,078	.....				47,846	678,574
1891	81,317	1,085,929	.....	.....			43,967	652,842
1892	68,918	886,485	.....				32,627	433,695
	Pig Iron.		Charcoal Pig Iron.		Cast Scrap Iron			
	Tons.	Value.	Tons.	Value.	Tons.	Value.		
		$		$		$		
1893	56,849	682,209	5,944	84,358	729	9,317	45,459	574,809
1894	42,376	483,787	2,906	34,968	78	771	30,850	369,682

(a) Comprises pig iron of all kinds.

(b) From 13th May only.

(c) These figures appear in Customs reports under heading "Iron in pigs, iron kentledge and cast scrap iron."

IRON.

TABLE 6.

IMPORTS OF FERRO-MANGANESE, ETC.*

Fiscal Year	Tons.	Value
1887.....	123	$ 1,435
1888.....	1,883	29,812
1889.....	5,868	72,108
1890.....	696	18,895
1891.....	2,707	40,711

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

IRON.

IRON.

TABLE 7.

IMPORTS: IRON IN SLABS, BLOOMS, LOOPS AND PUDDLED BARS, ETC.

Exports and imports.

Fiscal Year.	Cwt.	Value.
1880	195,572	$244,601
1881	111 666	111,374
1882	203,888	222,056
1883	258,639	269,818
1884	252,310	264,045
1885	312 329	287,734
1886	273,316	248,461
1887	522,853	421,598
1888	110,279	93,377
1889	80,383	67,181
1890	15,041	45,923
1891	41,567	38,931
1892	64,397	56,186
1893	65,269	58,533
1894	50,891	45,018

IRON.

TABLE 8.

IMPORTS OF IRON AND STEEL GOODS.

Fiscal Year.	Value.
1880	$6,620,260
1881	8,484,175
1882	8,578,685
1883	8,613,739
1884	6,143,870
1885	4,606,193
1886	4,698,882
1887	6,084,704
1888	5,147,111
1889	7,108,052
1890	7,260,845
1891	9,188,502
1892	9,509,489
1893	7,580,999
1894	5,917,921

LEAD.

LEAD.

Production.

During 1893 the lead contents of the ores mined and shipped amounted to 2,135,023 pounds, which at the average price of the metal for the year, viz., 3·70 cents, would be worth $78,996. Compared with the preceding year, these figures show an increase of over twenty per cent in quantity.

The production for a number of years is as follows:—

1890.....	113,000 lbs.	valued at	$ 5,805
1891.....	588,665	"	25,607
1892.....	1,768,420	"	72,505
1893.....	2,135,023	"	78,996

Beyond about 4,000 lbs. to be credited to Ontario, the production given above represents the calculated lead contents of the silver-bearing ores shipped from the various camps in Kootenay and Yale districts in British Columbia, as far as could be ascertained.

The production for 1894 was 5,703,222 pounds valued at $185,355, the increase as compared with 1893, being entirely due to the further development of the mining of silver-lead ores in British Columbia.

Exports and imports.

EXPORTS AND IMPORTS.

LEAD.

TABLE 1.

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

LEAD.

TABLE 2.

IMPORTS OF LEAD MANUFACTURES.

Exports and imports.

Fiscal Year.	Value.
1880	$15,400
1881	22,629
1882	17,282
1883	25,556
1884	31,361
1885	36,340
1886	33,078
1887	19,140
1888	18,816
1889	16,315
1890	25,600
1891	23,893
1892	22,636
1893	33,783
1894	29,361

DISCOVERY AND DEVELOPMENT.

Discovery and development.

QUEBEC.

There was very little done in this province during the year. The Lake Temiscamingue mine remained closed down, as it has been for some years. The Lawn mine on lots 10 and 11, Range IV., Calumet Island, was operated on a small scale by three men for about six months. Several openings were made and a trial shipment of about fourteen tons and a half of ore sent to Swansea, England, which it is said gave thirteen per cent of lead with 38·9 per cent of zinc and eleven ounces of silver to the ton. The cost of transport to Swansea is stated to have been from six to seven dollars per ton.

BRITISH COLUMBIA.

There is continued activity in the districts of the province producing the silver bearing ores which are the source of the lead. As full details regarding these mining operations are given later on in the article on Precious Metals, nothing further need be said here.

MANGANESE.

Production.

The figures of production of this mineral for 1893, show an increase of about 85 per cent in the quantity over those of 1892. Owing, however, to the lower average price realized, the increase in the total values is only about forty-two per cent.

MANGANESE.

Production.

During past years the production was as follows:—

1886	1,789	tons valued at	$41,499
1887	1,245	"	43,658
1888	1,801	"	47,944
1889	1,455	"	32,737
1890	1,328	"	32,550
1891	255	"	6,694
1892	115	"	10,250
1893	213	"	14,578

The production for 1894 is 74 tons valued at $4,180.

Exports and imports.

EXPORTS AND IMPORTS.

Tables 1 and 2, following, give the figures of exports and imports. The exports made were all to the United States.

MANGANESE.

TABLE 1.

EXPORTS OF MANGANESE ORE.

YEARS.	NOVA SCOTIA.		NEW BRUNSWICK.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
1873	.....	.....	1,031	$20,192	1,031	$20,192
1874	6	$ 12	776	16,961	782	16,973
1875	.....	200	194	5,314	203	5,514
1876	21	723	391	7,316	412	8,039
1877	106	3,699	785	12,210	891	15,909
1878	106	4,889	520	5,971	626	10,860
1879	154	7,420	1,732	20,016	1,886	27,436
1880	79	3,090	2,100	31,707	2,179	34,797
1881	200	18,022	1,504	22,532	1,704	40,554
1882	123	11,520	771	14,227	894	25,747
1883	313	8,635	1,013	16,708	1,326	25,343
1884	134	1,054	469	9,035	603	20,089
1885	77	5,054	1,607	29,595	1,684	34,649
1886	(a) 441	854	1,377	27,484	(a)1,818	58,338
1887	578	14,240	837	20,562	1,415	34,802
1888	87	5,759	1,094	16,073	1,181	21,832
1889	59	3,024	1,377	26,326	1,436	29,350
1890	177	2,583	1,729	34,248	1,906	36,831
1891	22	563	233	6,131	255	6,694
1892	84	6,180	59	2,025	143	8,205
1893	123	12,409	10	112	133	12,521
1894	11	720	45	2,400	56	3,120

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

MANGANESE.

MANGANESE.

TABLE 2.

IMPORTS: OXIDE OF MANGANESE.

Exports and imports.

Fiscal Year.	Pounds.	Value.
1884	3,989	$ 258
1885	36,778	1,794
1886	44,967	1,753
1887	59,655	2,933
1888	65,014	3,022
1889	52,241	2,182
1890	67,452	3,192
1891	92,087	3,743
1892	76,097	3,530
1893	94,116	3,696
1894	101,863	4,522

DISCOVERY AND DEVELOPMENT.

Discovery and development.

No new discoveries of any importance were reported in this industry. As in former years, the deposits of Nova Scotia and New Brunswick were the only ones worked.

In the two provinces, about fifty men were employed by some five operators, most of whom worked only a few months out of the year. It is thus seen that the work is very desultory, and the mines were in some cases sublet to tributors by the companies owning the mines.

A description of the mode of occurrence of these deposits having been given in previous issues, need not be repeated here. Mr. Fletcher, in summarizing the results of his work in the eastern part of Hants county, Nova Scotia, gives notes of sundry of the numerous manganese deposits of that district in the Summary Report of the Geological Survey for 1893, pp. 40 to 43.

MICA.

MICA.

Production.

The yearly values of the marketed production of this mineral for several years is given below, viz.:—

1886	$ 29,008
1887	29,816
1888	30,207
1889	28,718
1890	68,074
1891	71,510
1892	104,745
1893	75,719
1894	45,581

MICA.

Production.

The industry continues to be carried on much in the same way as in the past, for, outside of a few larger operators, it is mined in small lots and in an irregular manner, small gangs of men being employed wherever there would seem promise of obtaining large crystals of the mineral, the resulting product being sold to the buying agents of the consuming electrical manufacturers, or to the larger operators.

Owing to the difficulty thus arising of obtaining direct returns, the above figures of production are based upon the export, with the addition of the amounts of Canadian mica known to be used by the home manufacturers.

Exports and imports.

EXPORTS AND IMPORTS.

The exports of this mineral for the past few years are as follows:—

1887	$ 3,480
1888	23,563
1889	30,597
1890	22,468
1891	37,590
1892	86,562
1893	70,081
1894	38,971

The figures for 1893 include ground mica to the value of $932.

Discovery and development.

DISCOVERY AND DEVELOPMENT.

QUEBEC.

The history of the industry in this province during the year 1893, presents no very startling features. Most of the larger operators of 1892 continued to produce, and the usual number of new finds were reported.

Dr. Ells in the course of his work for the Geological Survey, visited many localities where mica occurs, or was said to occur, and his summary report* of his season's work makes mention as follows: "Mica occurs in several places, among which may be mentioned lot 13, range II., Denholm. The deposit has not been developed, but the specimens from the surface are clear and of good colour."—"Near the end of the road east from Paugan Falls, about four miles from the river, a deposit of mica has recently been opened at Wilson's, which has yielded some good crystals and several tons of mica have been extracted." Speaking of Lake Dumont district, north of Clapham

*Summary Report of the Geological Survey Department for 1893, pp. 29 & 30.

township in Pontiac county, he says:—"Reported outcrops of mica and phosphate at several points were examined, but the quantity seen in every case was insignificant." MICA.

"Mica was found near the road along the west side of the Gatineau on lot 36, range I., Bouchette, where several openings have been made in a pyroxene dyke which cuts red and gray gneiss, and on lots 14 and 15, range D of Wright, a mass of mica crystals occurs in a dyke of pyroxene with calcite. The quantity of mica crystals is here very great and some of them are of large size and good colour, but are injured by having, in the centre in many cases, small inclusions of calcite. Similar deposits are found on the west side of Bittobee Lake, south of the Gatineau, near the line between Wright and Northfield, though the quantity of crystals is here much less and they are of smaller size. Discovery and development.

"In the township of Aylwin, another deposit of mica (muscovite) occurs, about half a mile north of Venosta station. It occurs here in a dyke or vein of felspar and quartz, cutting grayish garnetiferous gneiss, and some excellent crystals were at one time obtained. The mica, however, appeared to terminate in the place where worked, which was near the centre of the dyke, and the mine was in consequence abandoned.

"In the township of Hincks, on lot 22, range II., on land owned by J. Quinn, of Aylwin, mica (phlogopite) occurs in large smooth crystals, in a pyroxene dyke cut by a cross dyke of felspar. The mica is dark amber-coloured, but the size of the crystals and the freedom from inclusions and flaws enables plates of extra size to be easily obtained."

In the same publication Mr. Giroux gives the result of a visit to a mica occurrence at Lac à Baude in the rear of Champlain county, which he thus describes: "At the northern end of this lake is a mass of quartz and felspar rock with crystals of mica..... At the western end of the above mentioned mass is a vein five feet wide of quartz and felspar rock, holding large crystals of biotite, and at the contact of this vein with the gneiss the quartz is almost black."

Mr. Brumell, while engaged in field work, visited several deposits in Hastings county, but found that nothing whatever had been done beyond locating the various properties, on none of which were the deposits of very great commercial value. The mica deposits visited were at L'Amable in Dungannon township, and north of Bird Creek in Monteagle.

MINERAL PIGMENTS.

MINERAL PIGMENTS.

Of the various mineral substances coming under the above heading, there is no production to report other than that given below for ochres.

Ochres.

Ochres.—The increase in the production of ochres amounts to nearly 175 per cent on the quantity returned for 1892, and about 205 per cent in the values. All but about ten per cent was produced in the province of Quebec, small amounts only having been mined in the provinces of Nova Scotia and Ontario.

The figures given below enable comparison to be made with previous years:

1887.....	385 tons,	valued, at	$2,233
1888.....	397	"	7,900
1889.....	794	"	15,280
1890.....	275	"	5,125
1891.....	900	"	17,750
1892.....	390	"	5,800
1893.....	1,070	"	17,710

The production during 1894 was 611 tons, valued at $8,690.

Barytes.

Barytes.—The McKellar's Island deposit was not worked, nor were any others of the numerous veins carrying this mineral in various parts of the Dominion.

During 1894 the shipments of baryta were 1,080 tons, valued at $2,830.

Exports and imports.

EXPORTS AND IMPORTS.

The customs returns show exports of ochre from Quebec to the United States, with a small amount to Newfoundland, to the amount of 150,150 lbs. valued at $819.

The imports of the various substances coming under this heading, will be found in the following tables, Nos. 1. 2, and 3 :— MINERAL PIGMENTS.

Exports and imports.

MINERAL PIGMENTS.

TABLE 1.

IMPORTS OF OCHRES.

Fiscal Year.	Pounds.	Value.
1880	571,454	$ 6,544
1881	677,115	8,972
1882	731,526	8,202
1883	898,376	10,375
1884	533,416	6,398
1885	1,119,177	12,782
1886	1,100,243	12,267
1887	1,460,128	17,067
1888	1,725,460	17,664
1889	1,342,783	12,994
1890	1,394,811	14,066
1891	1,528,696	20,550
1892	1,708,645	22,908
1893	1,968,645	23,134
1894	1,358,326	18,951

MINERAL PIGMENTS.

TABLE 2.

IMPORTS OF BARYTA.

Fiscal Year.	Cwt.	Value.
1880	2,230	$1,525
1881	3,740	1,011
1882	497	303
1883		185
1884		229
1885	7	14
1886		62
1887	379	676
1888	236	214
1889	1,332	987
1890	1,322	978

MINERAL PIGMENTS.

MINERAL PIGMENTS.

TABLE 3.

Exports and imports.

IMPORTS OF LITHARGE.

Fiscal Year.	Cwt.	Value.
1880	3,041	$14,334
1881	6,126	22,129
1882	4,900	16,651
1883	1,532	6,173
1884	5,235	18,132
1885	4,990	16,156
1886	4,928	16,003
1887	6,397	21,865
1888	7,010	23,808
1889	8,089	31,082
1890	9,453	31,401
1891	7,979	27,613
1892	10,384	34,343
1893	7,685	24,401
1894	38,547	28,685

MINERAL WATER.

MINERAL WATER.

Production.

The production of mineral water during the year 1893 amounted to 725,096 gallons, having a spot value of $108,347 ; showing an increase, compared with 1892, of 84,716 gallons, and in value of $32,999.

The production by provinces was as follows :—

Ontario	421,136 gallons,	valued at	$24,458
Quebec	251,660 "	"	57,839
New Brunswick	39,250 "	"	14,800
Nova Scotia	13,050 "	"	7,250

The following table shows the annual production since 1888 :—

1888	124,850 gallons	$ 11,456
1889	424,600 "	37,360
1890	561,165 "	66,031
1891	427,485 "	54,268
1892	640,380 "	75,348
1893	725,096 "	108,347
1894	767,460 "	110,040

It will be seen on reference to the above, that there has been a steady increase in production, which has not, however, tended to lessen the imports, a fact made evident by reference to the table of imports given below.

DISCOVERY AND DEVELOPMENT.

MINERAL WATER.

Discovery and development.

Large quantities of domestic natural mineral water are annually aerated bottled and go upon the market under the various names of "St. Leon," "Eudo," "Obico," "Havelock," "Spa," "Caledonia," and others too numerous to mention.

The following list comprises the principal and largest producers during the year 1893:—

Wilmot Spa Springs Co.	Middleton, N.S.
Havelock Mineral Springs Co.	Petitcodiac, N.B.
J. R. Smith, "Apohaqui Water".	St. John, N.B.
St. Leon Mineral Water Co.	St. Leon Springs, Que.
J. A. Harte, "Richelieu Water".	Montreal, Que.
" "St. Genevieve".	" "
Jos. Domphousse, "Divina".	" "
Grand Hotel Co., "Caledonia".	Caledonia Springs, Ont.
F. O. Ring, "Victoria Sulphur Water".	Ottawa, Ont.
Wm. Borthwick.	" "
W. K. Kains, "Georgian Water".	Treadwell, Ont.
J. Boyd & Son.	Eastmans Springs, Ont.
R. A. Smith, "Ancaster Water".	Toronto, Ont.
Eudo Mineral Water Co.	" "
Saugeen Natural Mineral Water Co.	Southampton, Ont.
W. J. Anderson, M.D., "Winchester Springs".	Smith's Fall's, Ont.
Chris. Kress, "Preston Water".	Preston, Ont.
Obico Mineral Water Co.	Toronto, Ont.

The natural mineral water of Harrison Hot Springs, in British Columbia, is now, it is believed, being bottled and sold by Messrs. Blackwood Bros., of Winnipeg.

The industry as a whole is assuming considerable proportions, and from information at hand it is expected that several other varieties will shortly be placed on the market, thus warranting the belief that Canada will soon be an exporter of natural mineral waters, of which she has within her boundaries a great many varieties.

MINERAL WATER.

The following table illustrates the imports during 1894, and previous years; no exports are reported.

Exports and imports.

MINERAL WATERS.

TABLE 1.

IMPORTS.

Fiscal Year.	Value.
1880	$15,721
1881	17,913
1882	27,909
1883	28,130
1884	27,879
1885	32,674
1886	22,142
1887	33,314
1888	38,046
1889	30,343
1890	40,802
1891	41,797
1892	55,763
1893	57,953
1884	49,546

MISCELLANEOUS.

MISCELLANEOUS.

Under this heading are included a number of mineral substances which are only produced irregularly or in a small way in Canada, and to which therefore only reference need be made.

Antimony.

Antimony.—As will be seen, this has been a failing industry for some years, and for the past three years there is no production to report. The production was as follows:—

1887	584	tons,	valued at	$10,860
1888	345	"	"	3,696
1889	55	"	"	1,100
1890	26½	"	"	625
1891	10	"	"	60
1892	nil	"	"	nil
1893	nil	"	"	nil

There is also nothing to report for 1894.

Table No. 1 gives the exports up to 1891, since which date there is nothing to report. Table No. 2 explains itself.

MISCELLANEOUS.

MISCELLANEOUS.

TABLE 1.

EXPORTS OF ANTIMONY ORES.

Antimony.

Year.	Tons.	Value.	Year.	Tons.	Value.
1880.....	40	$ 1,948	1887.....	229	$9,720
1881.....	34	3,308	1888.....	352½	6,894
1882.....	323	11,673	1889.....	30	695
1883.....	165	4,200	1890.	38	1,000
1884..... ...	483	17,875	1891.....	3½	60
1885.....	758	36,250	1892.....	.....	.....
1886.....	665	31,490	1893.....	.....	....

MISCELLANEOUS.

TABLE 2.

IMPORTS OF ANTIMONY.

Fiscal Year.	Pounds.	Value.
1880	42,247	$ 5,903
1881	.....	7,060
1882	183,597	15,044
1883.....	105,346	10,355
1884	445,600	15,564
1885	82,012	8,182
1886	89,787	6,951
1887.....	87,827	7,122
1888.....	120,125	12,242
1889	119,034	11,206
1890.....	117,066	17,439
1891.....	114,084	17,483
1892.....	180,308	17,680
1893.....	181,823	14,771
1894.....	139,571	12,249

Arsenic.—The production of white arsenic by refining the crude material of the condensing chambers of the old gold mines at Deloro, Hastings county, Ontario, has been suspended and for 1892 and 1893 there is nothing to report. Arsenic.

MISCELLANEOUS.

Arsenic.

The production during past years was as follows :

1885	440	tons,	valued at	$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

During 1894 the production was 7 tons, valued at $420.

Table No. 3 gives the home market for white arsenic for a number of years.

MISCELLANEOUS.

TABLE 3.

IMPORTS OF ARSENIC.

Fiscal Year.	Pounds.	Value.
1880	18,197	$ 576
1881	31,417	1,070
1882	138,920	3,962
1883	51,953	1,812
1884	19,337	773
1885	49,080	1,566
1886	30,181	961
1887	32,436	1,116
1888	27,510	1,016
1889	69,269	2,434
1890	138,509	4,474
1891	115,248	4,027
1892	302,958	9,365
1893	447,079	12,907
1894	292,505	10,018

Felspar.

Felspar.—There was an encouraging increase in the production of this mineral during 1893 over that for 1892, but no production is reported in 1894. The figures are as follows :

1890	700	tons,	valued at	$3,500
1891	685	"	"	3,425
1892	175	"	"	525
1893	575	"	"	4,525

A number of deposits of felspar, of greater or less extent, are known to exist in Ontario and Quebec, but most of them are not available at present owing to transportation difficulties. There were fifty tons exported in 1893. No figures of imports are available, nor is it

likely that any of the mineral has been brought in, the local demand being easily satisfied from the available Canadian mines. MISCELLANEOUS.

Fireclay.—The returns received of the production of fireclay since 1889 give the following result : Fireclay.

1889.....	400	tons,	valued at	$4,800
1890.....	Not reported.			
1891.....	250	tons,	valued at	750
1892.....	1,991	"	"	4,467
1893.....	540	"	"	700

This was produced in Nova Scotia and Quebec. In the former province it is obtained in connection with the coal mining carried on there.

During 1894, the production was 539 tons, valued at $2,167, the greater part of which is to be credited to New Brunswick and British Columbia.

Lithographic Stone.—During the year 1893 renewed interest was awakened in the deposits of this material which have been known to occur in the vicinity of Marmora in Hastings county, Ontario. Beyond samples, no shipments were made from the quarries. The work done consisted wholly in opening the quarry and the erection of a mill for the preparation of the stones. By direct returns to this office for 1894, the production is reported to have been 180 tons, valued at $30,000.* Lithographic stone.

Mercury.—Little was done in respect to mercury during the year. At the Rosebush group of claims at Savona, British Columbia, work was suspended during the summer pending negotiations for the sale of the property. Reports are to hand giving the amount of ore on the dump as almost five tons, running about seven to eight per cent. This deposit was noticed in the report for 1892, and since the start but little work has been done that would yield ore. Mercury.

The amount of mercury used in Canada is illustrated by the accompanying table of imports.

* It would seem from later information that this represents what was mined and that but a very small proportion of this amount was marketed, only test lots having been shipped away.

Miscellaneous.

Miscellaneous.

Table 4.

Mercury.

Imports of Mercury.

Fiscal Year.	Pounds.	Value.
1882.	2,443	$ 965
1883.....	7,410	2,991
1884.....	5,848	2,441
1885.....	14,490	4,781
1886.	13,316	7,142
1887.....	18,409	10,618
1888.	27,951	14,943
1889.....	22,931	11,844
1890.....	15,912	7,677
1891.....	29,775	20,223
1892.....	30,936	15,038
1893.....	50,711	22,998
1894.....	36,914	14,483

Moulding sand.

Moulding Sand.—As far as could be ascertained, the production of moulding sand during 1893 was as follows :—

Ontario.....	2,950 tons, valued at	$5,900
Nova Scotia.....	1,780 "	3,186
	4,370	$9,086

The production of previous years, as under, was altogether that of Nova Scotia :—

1887.....	160 tons, valued at	$800
1888.....	169 "	845
1889.....	170 "	850
1890.....	320 "	1,410
1891.....	230 "	1,000
1892.....	345 "	1,380

During 1894 the production is reported as 6,214 tons, valued at $12,428, the amount being about equally divided between Nova Scotia and Ontario.

Platinum.

Platinum.—As in past years the production of platinum is altogether that of British Columbia. It is obtained from the gravels of the stream beds of the Similikameen division of Yale district. The figures of production since 1887 are given below :—

1887	$ 5,600
1888	6,000
1889	3,500
1890	4,500
1891	10,000
1892	3,500
1893	1,800
1894	950

Miscellaneous.

Platinum.

Miscellaneous.

Table 5.

Imports of Platinum.

Fiscal Year.	Value.
1883	$ 113
1884	576
1885	792
1886	1,154
1887	1,422
1888	13,475
1889	3,167
1890	5,215
1891	4,055
1892	1,952
1893	14,082
1894	7,151

Precious Stones.—Under this heading are included all cut and polished Canadian gem stones and certain ornamental ones such as agate, perthite, peristerite, jaspet and jasper conglomerate. The cut gems include asteriated quartz, sodalite, garnet, labradorite, etc. Precious stones.

The production for the year 1893 was valued at about $1,500. The production for 1894 is about the same as the previous year.

There were imported $115,086 worth during the fiscal year ending 30th June, 1893. Diamonds, however, are included under this heading in the customs entries.

Quartz.—But a small quantity of quartz was produced during 1893, amounting to one hundred tons valued at $500. This was mined on the north shore of the St. Lawrence near Quebec and used in making sidewalks and floors. Quartz

MISCELLANEOUS.

Soapstone.

Soapstone.—There is a large falling off in the production since 1892 as will be seen by an inspection of the following figures :

1886.....	50	tons, valued at	$ 400
1887.....	100	"	800
1888.....	140	"	280
1889.....	195	"	1,170
1890.....	917	"	1,239
1891.....	Nil	"	Nil
1892.....1,374		"	6,240
1893.....	717	"	1,920

The material mined is used in the manufacture of fireproof roofing cement.

During 1894 the production is reported as 916 tons, valued at $1,640.

Tin.

Tin.—No tin has ever been produced in Canada, nor are any deposits of its ores, of economic importance, known to exist.

The following table is, however, given as illustrative to a certain extent of the local market for tin and tinned goods.

MISCELLANEOUS.

TABLE 6.

IMPORTS OF TIN AND TINWARE.

Fiscal Year.	Value.
1880.....	$ 281,880
1881.....	413,924
1882.....	790,285
1883	1,274,150
1884.....	1,018,493
1885...	1,060,883
1886...	1,117,368
1887.....	1,187,312
1888..... . .	1,164,273
1889.	1,243,794
1890.....	1,289,756
1891.....	1,206,918
1892	1,594,205
1893.....	1,242,994
1894.....	1,310,389

Whiting and chalk.

Whiting and Chalk.—As neither of these mineral substances were produced in Canada in 1893, there is no information to be given other than that to be found in the accompanying tables of imports.

MISCELLANEOUS.

TABLE 7.

IMPORTS OF WHITING.

Whiting and chalk.

Fiscal Year.	Cwt.	Value.
1880	84,115	$26,092
1881	47,480	16,637
1882	36,270	16,318
1883	76,012	29,334
1884	76,268	28,230
1885	67,441	23,492
1886	65,124	25,533
1887	47,246	15,191
1888	76,619	20,508
1889	84,658	22,735
1890	96,243	27,471
1891	84,679	27,504
1892	102,985	26,867
1893	88,835	25,563
1894	103,633	26,649

MISCELLANEOUS.

TABLE 8.

IMPORTS OF CHALK.

Fiscal Year.	Value.
1880	$2,117
1881	2,768
1882	2,882
1883	5,067
1884	2,589
1885	8,003
1886	6,583
1887	5,635
1888	5,865
1889	5,336
1890	7,221
1891	8,193
1892	9,558
1893	9,966
1894	11,308

Zinc.—As a result of the exploratory work begun in 1892 at the Lawn Mine in Calumet Island, Pontiac County, Quebec, and alluded to in last year's issue, there is a small amount of zinc to report as production for 1893. This represents the zinc contents of a trial shipment of ore sent to England in the early part of the year, and amounted to 11,763 pounds, which at the market price of the metal would be worth $470.

Zinc.

MISCELLANEOUS.

The following tables speak for themselves.

MISCELLANEOUS.

TABLE 9.

Imports of zinc.

IMPORTS OF ZINC IN BLOCKS, PIGS AND SHEETS.

Fiscal Year.	Cwt.	Value.
1880	13,805	$67,881
1881	20,920	94,015
1882	15,021	76,631
1883	22,765	94,799
1884	18,945	77,373
1885	20,954	70,598
1886	23,146	85,599
1887	26,142	98,557
1888	16,407	65,827
1889	19,782	83,935
1890	18,236	92,530
1891	17,984	105,023
1892	21,881	127,302
1893	26,446	124,360
1894	20,774	90,680

MISCELLANEOUS.

TABLE 10.

IMPORTS OF SPELTER.

Fiscal Year.	Cwt.	Value.
1880	1,073	$ 5,310
1881	2,904	12,276
1882	1,654	7,779
1883	1,274	5,196
1884	2,239	10,417
1885	3,325	10,875
1886	5,432	18,238
1887	6,908	25,007
1888	7,772	29,762
1889	8,750	37,403
1890	14,570	71,122
1891	6,249	31,459
1892	13,909	62,550
1893	10,721	49,822
1894	8,423	35,615

MISCELLANEOUS. MISCELLANEOUS.

TABLE 11. Imports of zinc.

IMPORTS OF ZINC, MANUFACTURES OF.

Fiscal Year.	Value.
1880	$ 8,327
1881	20,178
1882	15,526
1883	22,599
1884	11,952
1885	9,459
1886	7,345
1887	6,561
1888	7,402
1889	7,233
1890	6,472
1891	7,178
1892	7,563
1893	7,464
1894	6,193

NATURAL GAS. NATURAL GAS

By H. P. H. BRUMELL, F. G. S. A.

The value of natural gas marketed during 1893 shows a very marked increase over that of the previous year, being according to direct returns, $366,233, whilst the value for the year 1892 was only about $150,000. The production was practically altogether that of Ontario, a well at Medicine Hat, N.W.T., affording but a small quantity of gas for local use and the large increase shown over the output for 1892 is mainly due to the increased business of the companies operating in Welland county. Production.

According to the report of the Bureau of Mines of Ontario for 1893, the total number of producing wells was 107, while for the transmission of natural gas there were 117 miles of pipe lines and the number of men employed in direct connection with the industry was fifty-nine. As in the past few years the largest market for the natural gas of Ontario was found in Buffalo, N.Y., into which there are two companies feeding gas from the Welland field. During the latter part of the year the Ontario Natural Gas Company of Essex county were busy laying mains from their wells in Gosfield south to Windsor, Walkerville and Sandwich, Ont., and Detroit, Mich.

The natural gas produced during 1894 was valued at $313,754.

Discovery and development.

York County.—The New Toronto Oil and Natural Gas Company continued operations into the beginning of the year 1893, and completed seven wells, in no case finding any large flow of gas. In three of the wells only was gas found and then in too small quantities to be of economic value. Fortunately no expense was entered into for the transmission of the gas, so that the company only lost the actual outlay for the sinking of their wells.

In one of the wells, sunk near Islington, a heavy flow of mineral water was struck which has since been put on the market as "Obico mineral water" and is bottled and sold by the Obico Mineral Water Company of Toronto.

Wentworth County.—The Hamilton Natural Gas and Mining Company finished their second well without finding gas in paying quantity. No. 1 well was sunk 1,950 feet, to the granite, above which was twelve feet of arkose beds. Trenton limestone was met with at 1,200 feet and a small show of gas was struck in this formation at 1830 feet. No. 2 well was sunk 1,597 feet, at which point the tools were lost, the boring being in Trenton limestone; a small flow of gas was found at 400 feet and at various points down to 500 feet.

Elgin County.—During the year 1893, a deep boring was begun in the town of St. Thomas by Mr. John Campbell; the boring in October reaching a depth of 1,640 feet, at which point a small flow of gas was found in the red Medina sandstone, insufficient however to be of commercial value. The surface deposits measured 282 feet, beneath which was found shale presumably of Hamilton age.

Surface Gas Wells of Elgin County.—Between St. Thomas and Chatham County, is a large area apparently entirely underlain by a practically impervious bed of clay, holding in reservoir large quantities of surface gas of good quality. In the neighbourhood of, and in the town of Ridgetown many wells have been sunk, from most of which are obtained heavy flows of gas. The record of a well sunk by Messrs. McMaster Bros. gave the following section:—

Surface soil, loam	6 feet.
Gravel, with water	23 "
Clay	57 "
Hardpan	2 "

Beneath this was found a fine-grained white sand holding the gas. The initial closed pressure at this well on a three and one half inch pipe was 14½ pounds, and it is said to have afforded about 2,000,000 cubic feet of gas per day. Many other wells are said to have been

measured and to have produced 200,000 to 2,000,000 feet per day. As might be expected, the wells of this field have not so long a life as deep rock wells, but this difficulty seems to be offset by the fact that new wells can be sunk at a very slight cost. NATURAL GAS. Discovery and development.

Many wells have been sunk throughout the district, the product being used locally. Full notes regarding many of these may be found in the First Report of the Bureau of Mines of Ontario.

Essex County.

In this county, the two operating companies continued to supply gas to Kingsville, Ruthven and Leamington and to scattered residences and buildings in the neighbourhood. The two companies are the Kingsville Natural Gas and Oil Company of Kingsville and the Ontario Natural Gas Company of Walkerville.

Kingsville Natural Gas and Oil Company.—This company have done no drilling since they opened their well No. 4 in December of 1891, but have extended and improved their system of mains and regulators. Their wells now being operated are as follows :—

No. 2—Road well, with an initial flow of 4,184,900 c. ft.
No. 4—C. G. Fox " " 2,231,000 "

Ontario Natural Gas Company.—This company carried on active drilling operations during the year and sunk five wells as follows :—

No. 8—Hy. Lypp's well—Lot 5, Con. I., Gosfield S.
" 9—Whittle " — " 7 " II. "
" 10—Wesley Wigle " — " 7 " I. "
" 11—Ph. Fox " — " 8 " I. "
" 12—W. J. Fox " — " 9 " I. "

Well No. 8 was carried to a depth of 1,085 feet, the surface deposits measuring 55 feet. Casing was put down to a depth of 525 and a small show of gas was found at 700 feet, but as this was of no commercial value, the casing was drawn and the well abandoned.

Well No. 9 was sunk to a depth of 1,105 feet and at 800 feet a small show of gas was noted, not sufficient however to be of commercial value. The surface deposits measured 138 feet and casing was put down to a depth of 580 feet. A feature of this well, worthy of note, is that a small show of oil was met with at 1,035 feet.

Well No. 10 is one of the most successful wells of the field, the initial open flow being 5,877,500 cubic feet. The boring was carried to a depth of 980 feet, the surface deposits being 95 feet in thickness; casing was put down 530 feet. A small flow of gas was found at 685 feet, the main flow being from 900 to 955 feet.

NATURAL GAS. Discovery and development.

Well No. 11 was sunk to a depth of 1,004 feet, the surface deposits being 114 feet; casing 520 feet. Small flows of gas were met with at 685 and 890 feet while the large flow was struck at 965 feet, increasing in volume up to 990 feet. The initial open flow from this well was 5,700,000 cubic feet per day.

Well No. 12 was sunk late in the year to a depth of about 975 feet, the surface deposits being 123 feet, casing was carried to a depth of 510 and a small flow of gas was noted at 690 feet, the larger flow, —about 7,000,000 cubic feet— being found at 950 feet. At the time of my visit the well had not been measured, but the flow was thought to be equivalent to the above figures.

Welland County.

This county continued to be the largest producer of natural gas, most of the product being exported and utilized in the city of Buffalo, N. Y.

Provincial Natural Gas Company.—This company have during the year "brought in" several new wells which have been connected with their mains for the supply of Buffalo and the intermediate points, Erie, Victoria and Black Rock. They had at the end of 1893 finished sixty-nine wells, the greater proportion of which were still producing, though necessarily at a lower pressure than when first sunk.

A deep well was sunk on lot two, concession four of Willoughby township, reaching a depth of 3,030 feet, at which point granite was struck. The Trenton limestone was found at 2,340 feet, and proved to be entirely barren of gas. A small flow of gas was struck at 495 feet, in the Clinton, and again in the white sandstone of Medina age at from 615 to 637 feet.

Several of the new wells sunk during the year proved to be large producers, No. 63 producing 10,014,000 cubic feet when struck.

Before the close of the year the erection was begun by this company of a compressor plant near Sherk's Station, from whence to Buffalo they will lay a high-pressure main.

Erie County Natural Gas and Fuel Company.—This company continued to operate in this district, their wells being scattered through the territory drained by the Provincial Company. They have in the neighbourhood of thirty wells, most of which are producers. We have however been unable as yet to obtain from this company records of either capacity or boring.

Mutual Natural Gas Company.—This company did not undertake any boring operations during the year, but supplied the villages of

Port Colborne and the western part of Humberstone, as in the past, from their wells situated in these two places. NATURAL GAS.

Wells in vicinity of Humberstone.—That part of the village of Humberstone lying east of Welland canal, is largely supplied with gas from wells owned by Mr. A. Morningstar and G. A. Zimmerman, the former in the village and the latter about two miles further east. The well owned by Mr. Morningstar was sunk 830 feet and penetrated all the gas bearing strata of the Medina formation. Gas was struck at 665 feet and again in greater quantity at 798 feet; the gas at that point coming from the white Medina sandstone. Salt water was struck at about 513 feet, but was cased off, the casing reaching to the depth of 613 feet. At the time of my visit about sixty stoves, fifty-five lights, and several boilers and blacksmith's fires were being fed on the east side of the canal. Discovery and development.

Messrs. R. & J. Greenwood, also of Humberstone village, sunk a well on the west side of the canal and are now supplying about 100 stoves and many lights in Port Colborne in opposition to the Mutual Company of that place. The well reached a depth of 826 feet, was cased to 640 feet and affords gas from various points between 680 and 800 feet, the latter depth marking the base of the white sand of the Medina.

Bertie Natural Gas Company.—In the report of this division for last year, note is made of a well sunk by this company in Bertie village (Ridgeway). Since then the company has bored a second well in the northern part of the village, striking gas to the amount of 600,000 cubic feet, at a depth of 830 feet, the gas sand continuing to a depth of 842 feet. From these two wells the village now draws the greater part of its supply.

NICKEL. NICKEL.

The figures for the production of this metal during 1893 and several previous years are as follows :— Production.

	Pounds of Nickel in matte, &c.			Total Value.
1890.....	1,435,742	valued at 65c.	per lb.	$ 933,232
1891.....	4,626,627	" 60c.	"	2,755,976
1892.....	2,413,717	" 58c.	"	1,399,956
1893.....	3,982,982	" 52c.	"	2,071,151

The figures as given above show an increase in 1893 over the production for 1892 of about 65 per cent in the total quantity, but, owing to a drop in price, of only 48 per cent in the gross value.

NICKEL.

Production.

The valuations here adopted, conformably with that for other metallic products, is the average full value of the pure metal in the market.

The matte, &c., as shipped from the Sudbury Mines, must be valued at a much lower rate for the contained metals, so that the spot value of the product for 1893 would be about as follows :—

Nickel contents of matte, &c., 3,982,982 lbs. at 13c. per lb.....	$518,567.66
Copper contents of matte, &c., 3,647,197 lbs. at 6c. per lb	218,831.82
Value of the matte as shipped.....	$737,399.48

The amount of matte shipped from the district was 9,425 tons which, at the above valuation, would have an average spot value of $78.23 per ton.

The average contents of the shipments as above, give 21·125 per cent of nickel and 19·345 per cent of copper. Although some of the shipments would range as low as 11 per cent nickel and 16 per cent copper, much of the matte would run as high as 40 per cent, or thereabouts, for each metal.

The production of nickel during 1894, as per returns received, was 4,907,430 lbs. valued at $1,870,958.

Discovery and development.

DISCOVERY AND DEVELOPMENT.

There is nothing very new to note about the operations in this industry during the year.

Reports of the discovery of some deposits of pyrrhotite in various parts of the country, came to hand through the specimens received by the Laboratory of the Survey for assay, particulars of which will be found in the report of that branch for 1893.* Of the analyses made, 26 specimens were from various points in Eastern Ontario; one from Nova Scotia; one from Quebec; two from the region about Sudbury; one from the N. shore of L. Superior, and one from the Rainy River district; eight from British Columbia, and one from the N. W. Territories. With the exception of one from near Sudbury, Ontario, none ran over 0·25 per cent of nickel, whilst in many cases but a trace of that metal was found.

The productive work was confined to the operations of the following companies, descriptions of whose mode of operations have been given already in previous reports, viz. : The Canadian Copper Company, The

* Annual Report Geol. Surv. Can., vol. VI. (N.S.) pp. 37 R—46 R.

Dominion Mineral Company, Messrs. H. H. Vivian & Co. Work was carried on by the Drury Nickel Company at the Travers Mine, but no shipments were made, and no mining was done by them after February 1st, operations being confined to the completion of the works on the surface. When working both the mine and the smelter the company employed about 100 men. The plant consists of one Jenckes rectangular water-jacket cupola furnace of 60 tons capacity, with fixed fore-hearth and 12 tuyeres, six on each side, with two Baker blowers driven by a 50 horse-power engine to supply the cupolas, whilst the bessemerising plant is supplied by a vertical Fraser & Chalmers blower with 3 foot cylinder, the blast carrying about 16 lbs. pressure. There is also a coke shed 100 ft. by 120 ft., and pug mill and corn rolls for preparing the clay and quartz lining for the Manhé converters, with a very perfect system for elevating the furnace charges, &c. The bessemerised matte produced is said to run from 30 to 67 per cent of nickel. The depth attained up to the time of suspending the mining work was 120 feet. A 14 drill Western and Derby compressor supplies the air for the drill. The work at this mine was begun in February, 1891.

NICKEL. Discvoery and development.

A visit was made to the Murray mine of Messrs. H. H. Vivian & Co., where there is a mining plant capable of turning out about 50 tons of ore per day, or about 85 tons if desired. In the smelter are two furnaces, one a water-jacketted Jenckes capable of handling 100 tons of ore per day, and the other an ordinary cupola, with fixed fore-hearth, with a capacity of 60 tons of ore.

The cupola matte contains about ten per cent of nickel and five per cent of copper, which percentages are increased by bessemerising to 40 and 20 per cent respectively in the Manhé converter. The product was marketed in Great Britain, the cost of transport being $10 per ton of matte. A force of 142 men was employed, 82 in the mine and 60 in the works.

The force employed by the Canadian Copper Company is stated to have been 500 all told, 470 men in the mines and 30 in the works.

PETROLEUM.

PETROLEUM.

By H. P. H. BRUMELL, F.G.S.A.

Production.

PRODUCTION.

Production.—Refining operations were carried on as in past years in Petrolea and London, the number of refineries however being reduced by the closing down of those operated by Messrs, McMillan, Kittredge & Co., the Premier Oil Co., and John McMillan, all in Petrolea.

Those actually in operation were :—

Imperial Oil Co	Petrolea.
Consumers' Oil Refining Co	"
Petrolea Crude Oil and Tanking Co	"
Fairbank, Rogers & Co	"
John McDonald	"
Empire Oil Co	London.

The production of petroleum for the year as given in the summary of the mineral production in Canada, page 5 s, is obtained as in past years by calculation from the inspection returns of the Inland Revenue Department.

During 1893 (calendar year) the inspection of domestic oil was as follows :—

247,122 packages at 10 cents inspection fee.
47,936 " " 2½ " "

Assuming that these packages contain forty-two and five gallons each, respectively, there was a total inspection as follows :—

10,379,124 gallons in packages of 42 gallons each.
239,680 " " 5 "

or a total inspection of 10,618,804 gallons. Computing this at the average proportion of 38 gallons refined to 100 crude oil, there would be shown a total consumption of crude oil of 27,944,221 gallons, or 798,406 barrels, which, at the average price for the year of $1.04½, has a value of $834,334.

From direct returns made to this office very similar figures are obtained. According to these there was a consumption of crude oil of 27,994,805 gallons, or 799,851 barrels, which at the average price quoted above would have a value of $835,844.

The two following tables illustrate the operations of the various refiners according to returns received at this office :—

PETROLEUM. PETROLEUM.

TABLE 1. Production

PRODUCTION OF CANADIAN OIL REFINERIES.

Products.	1892.		1893.		1894.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		$		$		$
Illuminating oils. galls	10,806,806	1,176,720	11,100,810	1,073,738	11,289,741	1,003,973
Benzine and naphtha ..... "	793,263	60,130	721,192	54,760	645,031	54,515
Paraffine oils..... "	1,051,161	127,351	1,243,924	116,233	1,282,749	118,053
Gas and fuel oils.. "	6,343,589	202,047	7,559,489	217,740	7,323,374	197,193
Lubricating oils and tar..... "	3,177,853	133,336	1,876,633	92,616	1,801,174	74,309
Paraffine wax.... lbs.	876,570	82,781	1,659,167	120,697	1,950,172	119,091
Totals.....	.....	1,782,365	.....	1,675,784	.....	1,567,134

PETROLEUM.

TABLE 2.

CONSUMPTION OF CRUDE OIL AND CHEMICALS.

Articles.	1891.	1892.	1893.	1894.
Crude petroleum. ..galls.	27,860,719	27,218,812	27,994,805	27,884,080
Sulphuric acid..... lbs.	4,213,984	4,803,301	4,676,353	4,974,610
Soda ..... "	319,736	369,857	420,047	430,810
Litharge..... .... "	394,715	434,982	470,666	472,139
Sulphur..... "	54,032	73,278	74,012	96,144

The tanking companies operating as such were, as in previous years, The Petrolea Crude Oil and Tanking Company, The Crown Warehousing Company and the Producers' Tanking Company of Petrolea, all of whom kindly furnished us with returns of their year's business. These returns afforded the following results :—

Stocks, 1st January, 1893..... 55,933$\frac{11}{55}$ bbls.
Quantity of oil received .....432,150$\frac{17}{55}$ "
" " delivered .....411,023 "
Stocks, 1st January, 1894..... 77,060$\frac{28}{55}$ "
Increase in stocks, during year... 21,127$\frac{17}{55}$ "

PETROLEUM.

The increase in stocks held at the end of the year, is no doubt largely due to the fact that the price of crude oil having fallen from $1.18¼ in January to $1.02 in December it was being held against a rise.

Inspection of oils.

INSPECTION OF OILS.

The following tables are compiled from the returns of the Inland Revenue Department and show the amounts of refined oil, domestic and imported, inspected annually since 1881.

PETROLEUM.

TABLE 3.

CANADIAN OILS AND NAPHTHA INSPECTED AND CORRESPONDING QUANTITIES OF CRUDE OIL.

Calendar Year.	Refined Oils Inspected.	Crude Equivalent Calculated.	Ratio of Crude to Refined.
	Galls.	Galls.	
1881	6,406,783	12,813,566	100 : 50
1882	5,910,787	13,134,993	100 : 45
1883	6,970,550	15,490,111	100 : 45
1884	7,656,011	19,140,027	100 : 40
1885	7,661,617	19,154,042	100 : 40
1886	8,149,472	21,445,979	100 : 38
1887	8,243,962	21,694,637	100 : 38
1888	9,545,895	25,120,776	100 : 38
1889	9,462,834	24,902,195	100 : 38
1890	10,121,210	26,634,763	100 : 38
1891	10,270,107	27,026,597	100 : 38
1892	10,370,707	27,291,334	100 : 38
1893	10,618,804	27,944,221	100 : 38
1894	11,027,082	29,018,637	100 : 38

PETROLEUM.

TABLE 4.

TOTAL AMOUNT OF OIL INSPECTED, IMPORTED AND CANADIAN.

Calendar Year.	Imported.	Canadian.	Total.
	Galls.	Galls.	Galls.
1881	476,784	6,406,783	6,883,567
1882	1,351,412	5,910,747	7,262,159
1883	1,190,828	6,970,550	8,161,378
1884	1,142,575	7,656,011	8,798,586
1885	1,278,115	7,661,617	8,939,732
1886	1,327,616	8,149,472	9,477,088
1887	1,665,604	8,243,962	9,909,566
1888	1,821,342	9,545,895	11,367,237
1889	1,767,812	9,462,834	11,230,646
1890	2,020,742	10,121,210	12,141,952
1891	2,022,002	10,270,107	12,292,109
1892	2,601,946	10,370,707	12,972,653
1893	4,520,392	10,618,804	15,139,196
1894	5,705,787	11,027,082	16,732,869

EXPORTS AND IMPORTS.

The following tables of exports and imports of oil are compiled from information obtained from the Customs Department.

Exports and imports.

PETROLEUM.

TABLE 5.

EXPORTS OF CRUDE AND REFINED PETROLEUM.

Calendar Year.	Crude Oil.		Refined Oil.		Total.	
	Gallons.	Value.	Gallons.	Value.	Gallons.	Value.
1881					501	$ 99
1882					1,119	286
1883					13,283	710
1884					1,098,090	30,168
1885					337,967	10,562
1886					241,716	9,855
1887					473,559	13,831
1888					196,602	74,542
1889					235,855	10,777
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

PETROLEUM.

TABLE 6.

IMPORTS OF CRUDE AND REFINED PETROLEUM.

Fiscal Year.	Gallons.	Value.
1880	687,641	$131,359
1881	1,437,475	262,168
1882	3,007,702	398,031
1883	3,086,316	358,546
1884	3,160,282	380,082
1885	3,767,441	415,195
1886	3,819,146	421,836
1887	4,290,003	467,003
1888	4,523,056	408,025
1889	4,650,274	484,462
1890	5,075,650	515,852
1891	5,071,386	498,330
1892	5,649,145	475,732
1893	6,002,141	446,389
1894	6,597,108	439,988

PETROLEUM.

Exports and imports.

Subtracting the quantity of imported oil inspected annually (table 4) from that shown in table 6, there will be found to have been an importation of oil, crude and other than illuminating, as follows:—

PETROLEUM.

TABLE 7.

IMPORTS OF CRUDE AND MANUFACTURED OILS, OTHER THAN ILLUMINATING.

Fiscal Year.	Gallons.
1881	960,691
1882	1,656,290
1883	1,895,488
1884	2,017,707
1885	2,489,326
1886	2,491,530
1887	2,624,399
1888	2,701,714
1889	2,882,462
1890	3,054,908
1891	3,049,384
1892	3,047,199
1893	1,481,749
1894	1,860,829

The above-shown importation consists largely of heavy black oil for railway purposes and other heavy lubricants, though in what proportion it is impossible to ascertain.

The imports of paraffine wax and paraffine wax candles are shown in the two following tables:

PETROLEUM.

TABLE 8.

IMPORTS OF PARAFFINE WAX.

Fiscal Year.	Pounds.	Value.
1883	43,716	$ 5,166
1884	39,010	6,079
1885	59,967	8,123
1886	62,035	7,953
1887	61,132	6,796
1888	53,862	4,930
1889	63,229	5,250
1890	239,229	15,844
1891	753,854	50,275
1892	733,873	48,776
1893	452,916	38,935
1894	208,099	15,704

PETROLEUM. PETROLEUM.

TABLE 9.

IMPORTS OF PARAFFINE WAX CANDLES. Exports and imports.

Fiscal Year.	Pounds.	Value.
1880	10,445	$2,269
1881	7,494	1,683
1882	5,818	1,428
1883	7,149	1,734
1884	8,755	2,229
1885	9,247	2,449
1886	12,242	2,587
1887	21,364	3,611
1888	22,054	2,829
1889	8,038	1,337
1890	7,233	1,186
1891	10,598	2,116
1892	9,259	1,952
1893	8,351	1,735
1894	10,818	1,685

DISCOVERY AND DEVELOPMENT. Discovery and development in Ontario.

ONTARIO.

There is practically nothing to report under this heading for the year. As in previous years, the whole source of supply is situated in Enniskillen township, Lambton county, Ontario, throughout which the usual amount of drilling was performed. As usual, many new wells were sunk, and practically a corresponding number abandoned, there being still about 5,000 wells, producing on an average about half a barrel per day.

As in previous years we are indebted to Mr. James Kerr, secretary of the Petrolea Oil Exchange, for the following prices of crude oil during the year; the prices quoted are those recorded on the Exchange.

PETROLEUM.

Discovery and development in Ontario.

AVERAGE CLOSING PRICES FOR CRUDE OIL.

Month.	1891.	1892.	1893.	1894.
	$	$	$	$
January	1 30	1 29¼	1 18¼	1 01¼
February	1 28½	1 29	1 18¾	1 01
March	1 31¾	1 27¾	1 19	1 01
April	1 37	1 26	1 19	99½
May	1 37½	1 25¾	1 07	92
June	1 37	1 27½	1 07	92¾
July	1 33½	1 26½	1 06	94
August	1 34¾	1 26	1 05	96
September	1 35	1 26¼	1 04½	98
October	1 35	1 26¾	1 04	1 06
November	1 33¼	1 25	1 04	1 12¼
December	1 31½	1 18½	1 02	1 13½
The Year	1 33¾	1 26¼	1 09½	1 00¾

Discovery and development in Quebec.

QUEBEC.

Prospecting operations were being carried on by the Petroleum Oil Trust in the neighbourhood of Gaspé Basin, where several new wells were begun. Although small quantities of oil are known to have been obtained, no particulars of this exploratory work are available.

PHOSPHATE.

Production.

PHOSPHATE.

The continued falling off in the production of Canadian phosphate (apatite) mines which began in 1890, is evident again in the figures for 1893 which are less than those of 1892 by 3,734 tons and $86,482.

On account of the disorganized state of the industry, it was found impossible to get satisfactory and complete returns direct from the operators, and, as the various estimates of total output received show considerable discrepancies, the exports have been taken as probably the most correct. By adding thereto the amount of mineral known to have been used in the country, the figures of production have been arrived at.

The following figures give the production for several years:—

1886	20,495	tons, valued at	$304,338
1887	23,690	"	319,815
1888	22,485	"	242,285
1889	30,988	"	316,662
1890	31,753	"	361,045
1891	23,588	"	241,603
1892	11,932	"	157,424
1893	8,198	"	70,942
1894	6,861	"	41,166

Exports and imports.

Table 1, following, gives the exports of the mineral by provinces. Of the total amount of 7,738 tons, there shown for 1893, all that proportion entered at Ontario ports went to the United States and the remainder to Great Britain. No crude phosphate was imported.

Table 2 shows the position occupied by Canadian apatite in the British market. This brings to light the same unfortunate falling off noticeable in the figures of production.

PHOSPHATE.

TABLE 1.

EXPORTS OF PHOSPHATE.

Year.	Ontario.		Quebec.	
	Tons.	Value.	Tons.	Value.
1878	824	$12,278	9,919	$195,831
1879	1,842	20,565	6,604	101,470
1880	1,387	14,422	11,673	175,664
1881	2,471	36,117	9,497	182,339
1882	568	6,338	16,585	302,019
1883	50	500	19,666	427,168
1884	763	8,890	20,946	415,350
1885	434	5,962	28,535	490,331
1886	644	5,816	19,796	337,191
1887	705	8,277	22,447	424,940
1888	2,643	30,247	16,133	268,362
1889	3,547	38,833	26,440	355,935
1890	1,866	21,329	26,591	478,040
1891	1,551	16,646	15,720	368,015
1892	1,501	12,544	9,981	141,221
1893	1,990	11,550	5,748	56,402
1894	1,980	10,560	3,470	29,610

Phosphate.

Exports and imports.

Table 2.

Great Britain : Imports of Canadian Apatite Compared with Total Imports of Phosphates in that Country.

Year.	Canadian Apatite.		Total Phosphates.		Per cent of Value of Canadian Apatite to total Value.
	Long Tons — 2,240 lbs.	£ stg.	Long Tons — 2,240 lbs.	£ stg.	
1882	8,187	39,851	199,428	613,198	6·5 per cent.
1883	16,531	66,714	246,945	813,825	8·2 "
1884	15,716	52,370	219,225	645,851	8·1 "
1885	21,484	76,179	238,572	628,027	12·1 "
1886	18,069	63,490	223,111	526,885	12·0 "
1887	19,194	65,974	283,415	614,088	10·7 "
1888	12,423	42,291	257,886	544,919	7·7 "
1889	23,123	71,037	304,953	703,704	10·1 "
1890	21,089	65,420	343,501	849,452	7·8 "
1891	15,918	54,235	256,772	628,395	8·6 "
1892	7,814	17,763	314,130	665,689	2·7 "
1893	5,068	11,735	323,527	594,467	1·9 "

Discovery and development.

DISCOVERY AND DEVELOPMENT.

The depression, due to competition with the phosphate producing districts of the Southern States and other new fields, still continues; so that no attention has been paid to prospecting for the mineral.

Small lots were produced as a by-product at many of the mica mines working in eastern Ontario and western Quebec.

The larger portion of the product was shipped from the Rivière du Lièvre district in Ottawa county, Quebec. Small lots of mineral mined in previous years were shipped from the High Falls, Central Lake and North Star mines by the General Phosphate Corporation, but the only mining of any extent was done by the Phosphate of Lime Company at their mine at High Rock where about thirty men were employed, and by the Anglo-Continental Guano Company at the Squaw Hill and Ætna mines. At the latter place the diamond drill was brought into use—it is claimed with success—in prospecting ahead of the workings for other bodies of the mineral.

In Ontario the only shipments of any extent were made by the Opinicon and Nicholson mines.

PHOSPHATE.

ANNUAL EXPORTS.

Table A.

Year.	Tons.	Value.
		$
1878	10,743	208,109
1879	8,446	122,035
1880	13,060	190,086
1881	11,968	218,456
1882	17,153	338,357
1883	19,716	427,668
1884	21,709	424,240
1885	28,969	496,293
1886	20,440	343,007
1887	23,152	433,217
1888	18,776	298,609
1889	29,987	394,768
1890	28,457	499,369
1891	17,271	384,661
1892	11,482	153,764
1893	7,738	67,952
1894	5,450	40,170

PRECIOUS METALS.

THE PRECIOUS METALS.

Gold.

GOLD.

Production.

PRODUCTION.

The production of this metal during 1893 amounted to 54,410 oz., valued at $976,603. These figures show an increase over those of 1892 of about eight per cent, as compared with a falling off of about two per cent from 1891 to 1892.

Table 1, below, gives the amounts contributed by the various provinces to the grand total.

GOLD.

TABLE 1.

PRODUCTION BY PROVINCES.

1893.

Provinces.	Ounces.	Value.
Nova Scotia	19,543	$381,095
Quebec	872	15,696
Ontario	749	14,637
North-west Territories (including Yukon District)	10,920	185,640
British Columbia	22,326	379,535
Total	54,410	$976,603

GOLD.

TABLE 1a.

PRODUCTION BY PROVINCES.

1894.

Provinces.	Ounces.	Value.
Nova Scotia	19,342	$377,169
Quebec	1,622	29,196
Ontario	2,032	39,624
North-west Territories (including Yukon District)	8,235	140,000
British Columbia	26,827	456,066
Total	58,058	$1,042,055

PRECIOUS METALS.

Gold.

Production.

The provinces of Nova Scotia and British Columbia continue to be the largest contributors, the one from its quartz mining operations and the other from the working of its placer deposits. The item designated North-west Territories (including Yukon District) includes a small amount of the precious metal washed from the bars of the Saskatchewan River, but the most is to be credited to the placer workings in the Canadian Yukon district which is estimated as closely as possible by those who know the ground.

Compared with last year's figures, Nova Scotia shows a decrease of 455 oz., and British Columbia 1,175 oz., whilst increases are shown for Quebec of 151 oz., Ontario 384 oz., and the North-west Territories of 5,155 oz.

BRITISH COLUMBIA.

British Columbia.

The accompanying graphic tables A, B and C give statistical details of the gold production of British Columbia as compiled from the report of the Minister of Mines for that province. As formerly, this represents the amount of gold actually known to have been exported by the banks, plus one-fifth estimated to have been carried away in private hands.

GOLD.
BRITISH COLUMBIA.
ANNUAL PRODUCTION.
Table A.

Year.	Value.
	$
1858	705,000
1859	1,615,072
1860	2,228,543
1861	2,661,118
1862	2,656,903
1863	3,913,563
1864	3,735,850
1865	3,491,205
1866	2,662,106
1867	2,480,868
1868	2,372,972
1869	1,774,978
1870	1,336,956
1871	1,799,440
1872	1,610,972
1873	1,305,749
1874	1,844,618
1875	2,474,904
1876	1,786,648
1877	1,608,182
1878	2,275,204
1879	1,290,058
1880	1,013,827
1881	1,046,737
1882	954,085
1883	794,252
1884	736,165
1885	713,738
1886	903,651
1887	693,709
1888	616,731
1889	588,923
1890	494,436
1891	429,811
1892	399,525
1893	379,535
1894	456,066

GOLD.
BRITISH COLUMBIA.
EARNINGS PER MAN.
Table B.

Year.	Value.
	$
1858	235
1859	403
1860	506
1861	634
1862	648
1863	889
1864	849
1865	813
1866	893
1867	814
1868	992
1869	749
1870	569
1871	734
1872	671
1873	567
1874	643
1875	1,222
1876	783
1877	820
1878	677
1879	607
1880	518
1881	551
1882	548
1883	404
1884	396
1885	246
1886	287
1887	296
1888	307
1889	330
1890	423
1891	358
1892	298
1893	304
1894	283

PRECIOUS METALS.

Gold.

GOLD.
BRITISH COLUMBIA.
NUMBER OF MEN EMPLOYED.
Table C.

Year.	Number.
1858	3,000
1859	4,000
1860	4,400
1861	4,200
1862	4,100
1863	4,400
1864	4,400
1865	4,294
1866	2,982
1867	3,044
1868	2,390
1869	2,369
1870	2,348
1871	2,450
1872	2,400
1873	2,300
1874	2,868
1875	2,024
1876	2,282
1877	1,960
1878	1,883
1879	2,124
1880	1,955
1881	1,898
1882	1,738
1883	1,965
1884	1,858
1885	2,902
1886	3,147
1887	2,342
1888	2,007
1889	1,929
1890	1,342
1891	1,199
1892	1,340
1893	1,247
1894	1,610

GOLD.

TABLE 2—1893.

YIELD, ETC., BY DISTRICTS.

District.	Division.	Men Employed.		Yield of gold by Divisions.	Total yield by Districts.
		Whites.	Chinese.		
				$	$
Caribou.....	Barkerville	83	136	73,000	
	Lightning Creek....	29	139	49,000	
	Quesnelle Mouth....	7	92	25,450	
	Keithley Creek.....	68	196	54,550	
		187	563		202,000
Cassiar.....	Laketown	14	30	10,909	
	McDame Creek.....	4	25	9,876	
	Liard River..	20	3	1,700	
	Stikine.....	1	3	450	
		39	61		22,935
Kootenay.....	Eastern	27	43	19,700	
	Western	.....	.....	6,150	
	Trail Creek sub-div'n	.....	.....	4,000	
	Nelson " .	.....	.....	6,000	
		27	43		35,850
Lillooet.....	....	35	55	51,376	51,376
Yale...	Yale.....	.....	.....	3,800	
	Osoyoos	118	39	18,254	
	Similkameen.....	29	53	14,340	
		147	92		37,394
	Total, Whites.....	435	.. . .		
	" Chinese.....	....	814		
	" employed ...	1,249			349,555

PRECIOUS METALS.

Gold.

GOLD.

TABLE 2a—1894.

YIELD, ETC., BY DISTRICTS.

District.	Division.	Men Employed.		Yield of gold by Divisions.	Total yield by Districts.
		Whites.	Chinese.		
				$	$
Cariboo	Barkerville	87	149	66,300	
	Lightning Creek	27	100	34,700	
	Quesnelle Mouth	37	78	26,200	
	Keithley Creek	167	199	65,150	
		318	526		192,350
Cassiar	Laketown	11	34	12,300	
	McDame Creek	6	20	9,750	
	Liard River	.....	.....	350	
	Stikine	.....	.....	300	
		17	54		22,700
Kootenay	Eastern	41	43	24,900	
	Western	205	3	37,780	
		246	46		62,680
Lillooet	.....	30	50		39,257
Yale	Osoyoos	138	40	65,150	
	Similkameen	75	70	11,805	
		213	110		76,955
	Total, Whites	824	.....		
	" Chinese	.....	786		
	" employed	1,610			393,942

Nova Scotia.

The following tables, D, E and F, are compiled from data given in the reports of the Department of Mines in Nova Scotia. It will be noticed that the total production of gold continues to fall off and that whilst the number of tons crushed has increased the yield per ton is much less than in any previous year.

GOLD.
Nova Scotia.
Annual Production.
Table D.

Year.	Value.
	$
1862	141,871
1863	272,448
1864	390,349
1865	496,357
1866	491,491
1867	532,563
1868	400,555
1869	348,427
1870	387,392
1871	374,972
1872	255,349
1873	231,122
1874	178,244
1875	218,629
1876	233,585
1877	329,205
1878	245,253
1879	268,328
1880	257,823
1881	209,755
1882	275,090
1883	301,207
1884	313,554
1885	432,971
1886	455,564
1887	413,631
1888	436,939
1889	510,022
1890	474,990
1891	451,511
1892	389,965
1893	367,556
1894	377,169

PRECIOUS METALS.

Gold.

Production.

Nova Scotia.

GOLD.
NOVA SCOTIA,
TONS OF QUARTZ CRUSHED.
Table E.

Year.	Tons.
1862	6,473
1863	17,000
1864	21,431
1865	24,421
1866	32,157
1867	31,384
1868	32,259
1869	35,144
1870	30,824
1871	30,787
1872	17,089
1873	17,708
1874	13,844
1875	14,810
1876	15,490
1877	17,369
1878	17,989
1879	15,936
1880	13,997
1881	16,556
1882	21,081
1883	25,954
1884	25,186
1885	28,890
1886	29,010
1887	32,280
1888	36,178
1889	39,160
1890	42,749
1891	36,351
1892	32,552
1893	42,354

GOLD.

NOVA SCOTIA.

AVERAGE YIELD PER TON OF ORE CRUSHED.

Table F.

Year.	Value.
	$
1862	21·91
1863	16·02
1864	18·11
1865	20·32
1866	15·28
1867	16·96
1868	12·41
1869	19·91
1870	12·56
1871	12·17
1872	14·81
1873	13·05
1874	12·87
1875	14·89
1876	15·08
1877	19·01
1878	13·63
1879	16·83
1880	18·42
1881	12·66
1882	13·04
1883	11·60
1884	12·44
1885	14·98
1886	15·70
1887	12·81
1888	12·08
1889	13·02
1890	11·11
1891	12·42
1892	11·98
1893	8·68

PRECIOUS METALS.

Gold.

Production.

Nova Scotia.

GOLD

TABLE 3.

PRODUCTION OF THE DIFFERENT DISTRICTS, FROM 1862 TO 1893, INCLUSIVE.

Districts.	Tons of ore crushed.	Total Yield.				Average yield per ton of 2,000 lbs.
		Oz.	Dwt.	Grs.	Value at $19.50 per oz.	
Caribou & Moose River	56,901	27,913	2	5	$ 544,306	$ 9·56
Montague	17,945	34,596	4	0	674,626	37·59
Oldham	42,953	47,558	2	18	927,383	21·59
Renfrew	46,071	31,814	13	2	620,385	13·46
Sherbrooke	166,295	119,767	9	2	2,335,465	14·04
Stormont	34,833	29,409	12	23	573,489	16·46
Tangier and Mooseland	30,705	19,604	12	19	382,290	12·45
Uniacke	40,032	26,201	11	13	510,931	12·76
Waverly	102,842	56,586	18	14	1,103,445	10·73
Salmon River	43,355	13,086	4	0	255,181	5·88
Brookfield	5,663	4,858	4	9	94,735	16·73
Whiteburn	6,879	9,904	19	20	193,148	28·01
Lake Catcha	8,124	8,393	19	3	163,683	20·15
Rawdon	11,389	9,060	14	4	176,683	15·68
Killag	379	354	6	16	6,909	18·23
Wine Harbour	41,798	28,639	6	1	558,466	13·36
Darr's Hill	39,909	18,715	19	19	364,962	9·14
Fifteen Mile Stream	14,764	8,044	19	5	156,877	10·62
Malaga	15,847	12,687	4	18	247,401	15·61
Unproclaimed	55,177	42,047	11	9	819,928	14·86
Totals	781,861	549,245	16	8	$10,710,293	$13·69

GOLD.

TABLE 4.

DISTRICT DETAILS.—1893.

Districts.	Mines.	Mills.	Tons of Ore Crushed.	Total yield of Gold.			Total yield of Gold per ton.		
				Oz.	Dwt.	Grs.	Oz.	Dwt.	Grs.
Tangier, Mooseland	1	1	1,213	406	4	13	0	6	16
Oldham	2	2	2,787	3,406	6	2	1	4	6
Caribou, Moose River	3	3	7,141	2,371	4	19	0	7	15
Stormont	3	3	11,709	5,143	6	14	0	8	19
Salmon River	1	..	3,570	965	0	0	0	5	9
Montague	2	..	890	653	11	8	0	14	16
Lake Catcha	2	2	1,665	963	0	0	0	11	14
Fifteen Mile Stream	1	1	1,401	497	17	0	0	7	2
Uniacke	2	3	825	1,305	9	5	1	11	15
Waverly	1	1	8,150	2,110	15	0	0	5	4
Whiteburn	1	1	1,004	623	17	0	0	12	10
Unproclaimed, etc	4	4	1,999	1,096	15	12	0	10	23
Totals and averages	23	21	42,354	19,543	7	1	0	9	5

QUEBEC.

PRECIOUS METALS.

Gold.

Production.

Quebec.

Reference to graphic table G shows an encouraging increase in the figures of production due to the continuance of greater activity in mining in this province.

GOLD.
QUEBEC.
ANNUAL PRODUCTION.
Table G.

Year.	Value.
	$
1877	12,057
1878	17,937
1879	23,972
1880	33,174
1881	56,661
1882	17,093
1883	17,787
1884	8,720
1885	2,120
1886	3,981
1887	1,604
1888	3,563
1889	1,207
1890	1,350
1891	1,800
1892	12,987
1893	15,696
1894	29,196

NORTH-WEST TERRITORIES, ETC.

The increase shown in this item is due to the greater activity of placer washing in the Yukon district.

SILVER.

Silver.

Production.

The production of silver for 1893 amounted to $330,128 subdivided as shown in table 1, from which it will be seen that there is a falling off both in Ontario and Quebec; in very large proportion in the latter. These deficits are more than made up by the very large increase of over 200 per cent in the value of British Columbia's production. The figures given represent the value of the silver contents of the ship-

PRECIOUS METALS.

ments of ore made by the various mines at the average market price of that metal for 1893, viz., 77 cents per ounce.

Silver.

Production.

The figures credited to Ontario represent the shipments of silver bearing ores from the Port Arthur district, as per export entries made to the custom house. Those for Quebec represent as in former years the silver contents of the cupreous pyrites ores shipped from the Capelton group of mines. Owing to the as yet unorganized condition of the mining industry of British Columbia, it was found impossible to get complete returns from the various operators. The figures available were the export entries of shipments made to customs officers in the province, checked by the figures of imports of British Columbia ores into the States, where all the mineral finds a sale for the present. Further data were obtained from well informed persons living in the districts who had means of obtaining the required information, and from a comparison of all these the figures given below were obtained.

SILVER.

TABLE 1.

PRODUCTION OF SILVER.

YEAR.	ONTARIO.		QUEBEC.		BRITISH COLUMBIA.		TOTAL.	
	Oz.	Value.	Oz.	Value.	Oz.	Value.	Oz.	Value.
1887.....	190,495	$190,495	146,898	$146,898	11,937	$11,937	349,330	$349,330
1888.....	208,064	208,064	149,388	149,388	37,925	37,925	395,377	395,377
1889.....	181,609	162,309	148,517	133,666	53,192	47,873	383,318	343,848
1890.....	158,715	166,652	171,545	180,122	70,427	73,948	400,687	420,722
1891.....	225,633	221,120	185,584	181,872	3,306	3,241	414,523	406,233
1892.....	41,581	36,072	191,910	166,482	77,160	66,935	310,651	269,489
1893.....	.....	8,689	.....	126,439	.....	195,000	.....	330,128
1894.....	.....	.....	101,318	63,830	746,379	470,219	847,697	534,049

The continued drop in the price of the metal is of course a great factor affecting the prosperity of the industry. The falling off in the average price has been from 98 cents for 1891; 86 cents for 1892 to 77 cents for 1893*.

Table 2 below gives the exports of silver ore for this and previous years and is compiled from data supplied by the Customs Department.

* See Table of Prices at end of report.

SILVER.

TABLE 2.

EXPORTS OF SILVER ORE.

Provinces.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
	$	$	$	$	$	$	$
Ontario	208,064	203,871	203,142	222,071	35,992	7,878	.....
Quebec	5	2,500	900	.....	.....	.....	.....
Nova Scotia	.....	50	.....	.....	.....	.....	.....
Manitoba	.....	5	.....	.....	80	820	.....
British Columbia	10,939	5,737	100	3,241	20,616	204,997	359,731
Totals	219,008	212,163	204,142	225,312	56,688	213,695	359,731

DISCOVERY AND DEVELOPMENT.

GOLD AND SILVER.

NOVA SCOTIA.

The below given data relating to gold mining operations are summarized from the notes of Mr. Wm. Maddin, jr., in the report of the Minister of Mines for the province.

He draws attention to the indications of gold in the new West Caledonia district, Queen's county, and expresses his belief that there appears to be every probability of the existence of gold bearing veins here and at many other places in the western counties quite as rich as any known east of Halifax, and goes on to say : "In this county gold mining is not so actively prosecuted as hitherto, although some of the best equipped mines in the province are standing idle with very little work done to develop the properties, so little in some instances that they are practically undeveloped to any extent. I am pleased to state, however, there are tangible signs of improvement in this industry. No accidents of any consequence have occurred during the past nine months in gold mining.

"I would like to say that in this country wherever gold mining has been prosecuted, a very large amount of labour, time and money have been spent in prospecting and working our gold fields, the extent of which cannot be seen anywhere, nor can the result of these operations be shown. In my opinion this is a serious misfortune, as if accurate plans, surveys, and records of such work were filed in some place available to the mining capitalist, it would eventually save a large amount of loss and be a source of information that would be profitable hereafter."

In the latter remarks, everyone with any knowledge of mining will quite concur, having in mind the true interests of the industry.

The following tabulations contain, in a condensed form, the information as to discovery and development in gold mining contained in the reports of the Department of Mines for the province.

Name of Mine.	Force employed.	Shafts.	Other underground Developments, Tunnels, Drifts, Winzes, &c.	Mining Plant and Additions to.	Milling Plant and Operations.	Remarks.
Crows' Nest Mine.	..	.....	.....	.....	.....	Nothing of importance during the year.
Cochran Hill Mine.	4	.....	Some trenching done and otherwise prospecting.	.....	Trial crushing made.	Several gold bearing leads exposed.
Country Harbour Mine.	35	Depth 109 feet.....	.....	.....	20-stamp mill.....	
Copeland Mine....	31	" 130 "	.....	.....	15-stamp mill.....	
North Star Mine...	30	" 500 "	Inclines exposing two new veins at 50 and 80 feet.	Ventilating fan 39 ins in diameter; blades 10 x 24 inches, run by mill engine at 200 to 300 revolutions per minute.	.....	At Isaac Harbour.
Richardson Mine...	28	Depth 90 feet; still sinking.	.....	.....	20-stamp mill.....	About 1½ mile from the main post-road on the northern side of Isaac's Harbour.
Near Richardson Mine.	..	.....	.....	.....	.....	An old mine being opened up and preparations being made for active work; new machinery being erected.
Goldenville.....	..	.....	.....	.....	.....	Very little doing except prospecting.
Ecum Secum Mine.	..	.....	.....	.....	.....	Idle when visited; resumption of work contemplated.
Dufferin Mine.....	40	Depth 300 feet and sinking.	Opening on "5 feet vein" N. of old south vein.	.....	.....	The shaft is being sunk to cut the "12 feet vein" lying south.
Oxford Gold Mining Co.	20	.....	.....	.....	Considerable amount of "surface" ore crushed with good results.	Work done principally on Coleman lead.
Anderson Mine....	8	Three shafts down 40 feet.	Working a vein west of the old works.	.....	.....	The vein worked, and the district in general looking well.

Montague	36	Depth 265 feet and sinking.		Considerable amount of building and remodelling of buildings and machinery		Expenditure considerable.
Salisbury Gold Mining Co.	18	Depth 65 feet; working on an old shaft.		Large trestle erected from pit head to mill house.	Five stamp mill	
Simons Kaye Mine.	11	Depth 90 feet; still sinking.			New millhouse and 10-stamp mill erected.	Expenditure considerable.
West Waverly Mine	60	Depth of shaft 230 ft.	Tunnel driven N. 125 feet and S. 256 feet, cross-cutting 6 leads; "Dominion lead" stoped 300 feet E. and 175 feet W.; "Tudor lead" stoped 86 feet E and 144 feet W.		10 more stamps added making it now a 20-stamp mill.	
East Waverly Mine.			A large amount of preliminary work done; Tunnel in 625 feet to "Barrel lead"; upraise made at the face to the surface 300 feet; levels driven about 500 feet on each dip of the vein; about 250 tons have been broken down and about 1,000 tons are standing.	Arrangements completed for plant, compressor, &c.		
Oldham	50	Shaft or incline down 475 feet; shaft sinking on "Napier lead" now down 134 feet. A well timbered perpendicular shaft cuts these leads.	Lead stoped 900 feet E and 800 feet W.; several leads exposed by cross-cuts driven 150 feet N 50 feet S. The "Blackie lead" has been opened up 140 feet E. and W. No. 6 lead opened up on the N. dip 40 feet and S. 25 feet. Of the "No. 5" and "Harrison leads" 100 feet opened up.			
The Caledonia Mining Co.	15	Depth 100 feet	Driving a tunnel N. 125 feet, to date, cutting three leads.			
Rhode Island Mining Co.	6	Depth 260 feet	Working the Dumbrack lead.			
Montreal Co	22					
Caribou Truro Mining Co,	16	Sinking on W. or Mill shaft.	Cross-cut driving at E. end of tunnel at a depth of 100 feet.			Sinking to cut the rich vein discovered last year in the E. shaft.
Old Lake Lead Mine						Re-opening, unwatering and re-timbering.

Discovery and Development in Gold Mining—*Concluded.*

Name of Mine.	Force employed.	Shafts.	Other underground Developments, Tunnels, Drifts, Winzes, &c.	Mining Plant and Additions to.	Milling Plant and Operations.	Remarks.
Old Caffery property	4					
McLeod & Anderson		Sinking perpendicular shaft in saddle to cut a 10 to 12-foot lead.				
Dixon Mine	20	Shaft down 180 feet.	350 feet of vein opened up; preparing to cross-cut E. and W.; anticipate cutting another vein.			
Fifteen Mile Stream	24	Shaft now working 90 feet deep.	Tunnel driven S. 143 feet cutting two leads.	Well equipped with machinery; Duplex hoisting engine; high pressure cylinder 7 inches in diameter, low pressure cylinder 14 inches; compressor with a capacity of 6 drills.	15-stamp mill with engine similar to the hoisting engine.	
McLeod & Sutherland areas.			Considerable prospecting going on.			E. and W. of Egerton respectively.
N. Brookfield District.						Idle for some time past; but in September some improvements begun on the machinery, and at date of visit (September) nearly ready to begin operations.
Malaga District (Boston Gold Co.)	25	Two shafts; one 30 feet the other 40 feet deep.		Good air compressor.	Good crusher and 10-stamp mill.	All the other mines in this district idle at the time visited (September) except some prospecting on Parker-Douglas property. Four or five well equipped properties standing idle.

Whiteburn District (Crocker Gold Mining Co.)	25	Deepest shaft 180 ft.; in all five shafts ranging from 40 to 180 feet deep almost ready for work.	.....	Extensive repairs made by present management.	10-stamp mill..	Several equipped properties in this district standing idle.
(Whiteburn Mining Co.)	8	....	Trenching	..... .	....	A large number of veins exposed, three or four of which look well on the surface.
West Caledonia....	..	....	....	.. . .	.....	A new mining district lately discovered lying 4 to 5 miles W. of Whiteburn mines. Four or five veins exposed showing gold.

PRECIOUS METALS.

QUEBEC.

Discovery and development.

Quebec.

The work of prospecting the gold deposits of the Chaudère River district, was continued during the year 1893, by the American Gold Mining Company, on the River Gilbert, and by Messrs. Haycock & Co., on the Rivière du Loup, both tributaries of the Chaudière River, near St. Francis, Beauce County.

Gold.

The American Gold Mining Co., of Portland, Me., employed a force of about thirty men for five months on preliminary work, building offices, etc., steam saw-mill and everything essential to carrying on extensive work next season. The gold resulting from these experimental, but roughly systematic operations, was taken from ground which, however, is said to have yielded about $1.35 per cubic yard. The force mentioned included carpenters and surface labourers, as well as those actually engaged in mining. The paid-up capital of this company is said to be $200,000.

The Star Mining Co.—Mr. E. B. Haycock, who has mining rights extending four miles along the Rivière du Loup and four miles along the Chaudière, continued operations on the former river, building a dam and flume for the purpose of working a portion of the river bed below. The construction of the mill for the purpose of testing the quartz leads of the vicinity was also continued.

Prospectors—A certain amount of desultory washing was also carried on by individual prospectors.

Ditton district.—In the Ditton district in Compton county, a small amount of preliminary prospecting work was done by the Ditton Gold Mining Company.

Dudswell.—It was reported that gold was found on a small stream in Dudswell Township, where a little prospecting was done during the year.

Ontario.

ONTARIO.

Mining for the precious metals in this province was confined to the gold mining in the Madoc and Marmora region in the east, the work done at the Ophir Mine in East Algoma, and the Rat Portage district in the west.

In the silver mining district south-west of Port Arthur, nothing was done other than a little prospecting work, all the large mines of former years being shut down.

Peterboro' County.

PRECIOUS METALS.

In Peterboro' county the Belmont mine operated with a force of twelve men for eight months on the east half of lot 20 in Concession I., of the Township of Belmont. The work consisted largely of prospecting work and tests of ore with the Crawford mill erected on the property. Reports of experts, who examined the property in the interest of parties desiring to bond it, seem to show the existence of a number of fissure veins, carrying free gold and auriferous sulphurets in a quartz gange. According to Mr. Brumell, who visited the place, the works consist of three shafts and two open cuts. The main shaft is said to be 132 feet deep; the Strickland shaft, the most easterly, thirty feet deep, whilst the O'Neill, on a cross vein to the south of the Strickland, is about thirty-five feet deep. The machinery in connection with the mine consists of one Blake crusher with feeder; two Crawford mills and plates; engine and boiler. Discovery and development. Ontario.

At the Ledyard gold mine on the east half of lot 19, concession I., Belmont township, a small force of from five to ten men was engaged for about seven months of the year. Mr. Ledyard informs us that a sample lot of three tons of the ore was shipped to Messrs. Ricketts & Banks of New York, which gave them an assay result of $27.60 per ton, and by actual mill test yielded $25.40 per ton. He further states that several hundred tons of gold bearing ore are in the dump obtained from the shaft and from other openings which have been made on the vein. One vein from four to six feet wide, it is claimed, has been proved for 200 yards. It is intended to erect a stamp mill on the ground to treat the ore. Mr. Brumell, when visiting this property for the Survey, found the workings to consist of an open cut about forty feet long, in the end of which a shaft had been sunk thirty-five feet on the vein which measured six feet in width on the surface, striking N. 65° E, dipping to the south at an angle of 60°. The ore consists of quartz carrying pyrites with a small proportion of mispickel and free gold. The latter occurs more abundantly in the rotten honeycombed quartz and "gossan" on the surface.

Hastings County.

Mr. Brumell during his visit gleaned the following information regarding operations in this district:

The Crescent Gold Mining Company own and, until quite recently, operated the Gladstone and Fiegle properties, consisting respectively of lots 17 and 16, range XI, Marmora. The operations consist of several open cuts and strippings and of two shafts ninety and sixty feet

PRECIOUS METALS.

Discovery and development.

Ontario.

deep respectively, which cut diagonally across the several stringers and leaders which go to make up the mass of vein matter constituting the main ore body. The various veins opened up are said to have afforded some very rich stuff, more especially in the rotten and weathered portions at the surface. The mill and plant in connection with the mine are in first-class condition, and include one Baker crusher, ten stamps, two automatic feeds, two amalgamating plates and one improved Frue vanner engine and boiler.

In Marmora village, the Hastings Mining and Reduction Company of Toronto, have erected and are now running a small custom mill, and state that very good results are being obtained. The mill is run by water-power and contains one Blake crusher, one Griffin mill, one Walker and Carter roaster, one amalgamator, three collecting pans, one settling pan, two arsenic condensers and drying floor.

This company worked the Pearce Mine on lot 8, concession VIII. of Marmora, for a short time on option, and took out a number of tons of mispickel ore which they treated at their own mill in Marmora.

At the Demarse mine on lot 24, concession V., of Marmora, no work was done.

Eastern Algoma.

The chief operations carried on in the Algoma district were those of the Creighton Gold Mining Company at their mine in Creighton township, and of the Ophir Mining Company at their mine in Galbraith township.

The Creighton mine is situated on lot 11 in concessions IV. and V. of the township of the same name. Exploratory work has been carried on here for some two years on quartz veins from which assays have been obtained giving returns of gold. One vein has been followed down to a depth of 160 feet by means of a shaft from which, at the respective depths of 80 and 130 feet, levels have been driven for twelve and twenty-five feet. A mill having a capacity of twenty tons per day has been erected. The ore is crushed by a Dodge crusher and treated in a Crawford mill. Besides the machinery for treating the ore, an engine-house attached to the mill contains a 100 horse-power boiler to work the hoisting engine, drill and mill machinery.

At the Gordon Lake location in the vicinity of the last described mine, some surface work was done to test a similar quartz vein.

Thunder Bay District.

Some prospecting work was done on veins in the gold bearing areas of rocks west of Port Arthur near Ignace and Taché Station on the

Canadian Pacific railway. Near Lake Shebandowan, Mr. O. Daunais, the well known explorer. and his associates acquired a property to which they were engaged in cutting a road with a view to commencing development work. PRECIOUS METALS. Discovery and development.

On location 395P, half a mile south of Rossland Station on the Canadian Pacific railway, work was done by Port Arthur capitalists under the superintendence of Mr. Peter McKellar. A number of surface cross cuts were made and a 50-foot shaft was sunk on the vein. This employed a force of five men for about six months and resulted in the mining of 75 tons of ore now on the dump. Ontario.

Lake of the Woods.

In this district development work was done at the Sultana, Gold Hill, Rajah, Black Jack and Bad mines and others. At the end of the year 1893, the chief developments were as below given, according to news received from a correspondent, who writes as follows :—

Black Jack Mine.—Shaft down 80 feet on the vein with a drift 65 feet in length at 60 feet from the surface. The vein matter is said to average $8 to $10 per ton with occasional lenses of very high grade ore, some of which has assayed as high as $1,500 per ton. The plant in January consisted of two Crawford mills with Blake crusher, engine and boiler and necessary fittings. The mill did not, however, prove successful. A force of only four men was retained during the whole of the summer and but little development was done beyond sinking a shaft 25 feet upon another vein on the property. Towards the end of the year a two drill Rand compressor and a 16 h.p. Bacon hoist were put in, whilst the shaft was straightened and retimbered and a substantial frame-shaft house erected. About 25 men were employed on the property in the fall.

Gold Hill.—Considerable money was spent at this mine experimenting with the Leeds process for the extraction of gold from the ore, but during the year this was abandoned and a ten stamp mill of the old slow-drop Colorado pattern was erected, and is doing excellent work. Two shafts are being worked on the Pebble and Ada G. veins respectively, and it is proposed to put in a compressor and hoisting plant.

The Sultana Mine.—Last fall a ten stamp mill of the regular fast drop pattern, with 12-foot copper tables, Blake crusher and Frue vanners, was erected at this point under the superintendence of Mr. Chas. Brant, M.E. This, during last summer, was supplemented by a small cyanide plant which is said not to have proved very successful. A shaft was being sunk on the vein, which had attained a depth of about

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70 feet by the end of the year, and drifts were being driven along the course of the vein on either side of it. The vein is about five feet in width and is said to yield free milling gold to the extent of about $20 per ton. It is proposed to put in a compressor and hoisting plant at an early date.

Ontario.

The Bad Mine.—This is situated about a mile south of Rossland station on the Canadian Pacific railway, and at this point the Rat Portage Mining and Reduction Company are sinking a shaft. At a depth of 20 feet it is said the vein has improved both in width and gold contents, and shows about 5 feet wide of $40 ore. It is proposed to develop the property as rapidly as possible and, if developments are satisfactory, it is the intention of the company to refit their reduction works at Rat Portage with stamps.

The El Divir Mine lies north of Rossland and after a shaft had been sunk to a depth of 95 feet it was abandoned for the present.

The Treasure Mine is situated south of Rossland and has also been abandoned for the present, after a 65 feet shaft had been sunk on the vein.

It is stated that both the foregoing show good ore at bottom of the shafts.

Rainy River District.

Attention has been directed to this district by reported discoveries of gold bearing veins in the belt of Huronian rocks which crosses the lake and runs up the valley of the Seine River. It is reported that numerous veins have been located, both on the American and Canadian sides and extensive work is expected for next year.

North-west Territories.

NORTH-WEST TERRITORIES, &c.

Saskatchewan River.

Washing for gold in the bed of the Saskatchewan River was continued as in past years. From the nature of the operations no very precise data are available, but they may be said to extend from about 80 miles above Fort Saskatchewan to about 125 miles below. The number of miners has been estimated at about 25.

Yukon District.

Considerable work has been done in this section of country in continuation of that done in previous years. It has been found impossible to get exact details, so that it can only be stated that a large number of prospectors have been at work washing gold from the gravels of various tributaries of the Yukon River in the vicinity of its crossing of the boundary line between Alaska and Canada. As

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the exact position of this line is as yet undetermined, there is no means of deciding exactly how much of the gold resulting from these operations has been obtained on Canadian territory. The figures adopted in this report, however, are based upon careful estimates of parties familiar with the district, and the operations carried on. The chief mining done has been on Forty-mile Creek with its tributaries Franklin, Nugget and Cañon Gulches and on Sixty-mile Creek, especially on its newly discovered tributary Miller Creek. The district is very difficult of access, the shorter but more difficult route being overland by trail through the Chilcat Pass in the mountains and thence by the Lewes River; the longer by steamer up the Yukon River. There is a small mining town at Forty-mile Creek where many of the miners make their headquarters when they stay over a winter in the country. Owing to the time and expense of getting into the country, this is said to be the only profitable course to pursue. It is estimated that a man can board himself living in his own tent or cabin for $1.50 per day, and that it takes about $400, including everything, for a man to provide himself for a season. The working season is about from the middle of May to the middle of September.

Mr. Wm. Ogilvie of the Dominion Topographical Survey, kindly furnishes the following data regarding operations in the Yukon country:

	Number of Men.	Total Gold Produced. 1893.
ALASKA—		
Franklin Gulch.....	30	
Scattering	15	
	— 45	
*LOCALITY DOUBTFUL—		
Miller Creek.....100		$90,000 to $100,000
Davis' Gulch..... 50		30,000 " 35,000
—150		120,000 135,000
CANADA—		
Stewart River.....	30	15,000 " 20,000
Pelly River.....	30	15,000 " 20,000
Scattering	25	12,000 " 15,000
	— 85	
	280	
Canada—Total, say.....		$42,000 " $ 55,000
Doubtful " "		120,000 " 135,000
		$162,000 to $190,000

*Miller Creek and Davis Gulch are tributaries to Sixty-mile Creek, but it cannot at present be stated whether they are in Canada or not.

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The details of mining for the precious metals will be found in the report of the Minister of Mines for the province, the main features of which are summarised below.

The amount of gold obtained by placer mining is rather less than in 1892, but the total yield is greater owing to the returns of some of the quartz claims in the Yale and West Kootenay districts.

The anticipations formed in 1892 of an increased output from hydraulic workings have not been realized, owing to the development work on the majority of the claims not having reached the stage when results could be expected, whilst in other cases operations have been hindered by an insufficient supply of water. This branch of placer mining is yearly attracting more attention throughout the province and the amount of capital already invested and to be laid out during the coming season, more particularly in working the bench lands in the vicinity of the Fraser river and its tributaries, is very considerable.

Interest is also being taken in the beds of the Fraser and Thompson rivers with a view to dredging, and judging from the number of applications for leases for the purpose a serious attempt will be made to prove the worth of the gold hidden in the beds of these rivers. Special machinery for dredging is in course of construction at different places on the Fraser.

Cariboo District.—(From the Reports of Messrs. Bowron and Stephenson.)

The operations in this district consisted largely of prospecting for deep ground in the vicinity of the previously worked shallow placer deposits and in the acquirement by strong companies of ground for hydraulicing and steps taken by them towards installing extensive plants for this purpose.

The two principal hydraulic companies are the Horsefly Hydraulic Mining Company, located on the Horsefly River, and the Cariboo Hydraulic Company under the same management, operating the old South Fork Company's concessions, and the well known Hop. E. Tong claim near Quesnel Forks, which they acquired from their previous owners in August. The former company employed a force of about 60 men and the latter about 40 men.

Williams Creek.—Examinations were made during the season, of the lower part of this creek for a syndicate of London, England, capitalists, with a view to working it by hydraulic lift. Operations will probably be commenced next year.

Prospecting work was done on the Quesnel River about twenty miles from its mouth by Messrs. Fry, Cameron & Co., testing the value of the gravel hills along its sides. PRECIOUS METALS.

Prospecting work of greater or less extent was also prosecuted on Chisholm Creek, a tributary of Cottonwood River, on Slough Creek; on Shepherd Creek and by the Nason Company on Antler Creek. Also on Keithley, Snowshoe, Harvey and Spanish creeks, and on the north fork of the Quesnel River. The Harper lease on the Horsefly River was not worked much during the season owing to the unusually high water and the damage done thereby to the dam. A party of prospectors were working, however, some 60 miles above this point. Discovery and development in British Columbia.

In addition to the list of paying claims and of those contributing to the gold product of the district as given in last year's report, must be mentioned that of Messrs. Joseph Shaw & Son on Hardscrabble Creek, which has paid handsomely this season and promises equally well for the future.

In quartz mining nothing was done beyond representative work.

The development of the country is retarded by the absence of railway communication. The construction of additional roads and trails is, however, constantly altering this condition, and the completion of the sleigh road from 150 Mile House, on the main stage road, into Horsefly will enable the needs of that part of the country to be better dealt with. The explorations and surveys made by the Government on the Nechacco River and elsewhere show the existence of extensive tracts of agricultural and grazing lands which, when settled, will form an important factor in supplying farm produce to the mining community.

The total output of gold for the season (1893) is, as near as can be ascertained, somewhat greater than last season. This must be regarded as highly satisfactory, as so many white miners have been engaged in opening up new mines and other non-productive works that the Chinese have been much the larger producers.

The estimated gold product of the district for the year is as follows, viz. :—

Barkerville Polling Division,	1st January	to	15th November	$73,000
Lightning Creek	"	"	"	49,000
Quesnel	"	"	"	25,450
Keithley Creek	"	"	"	54,550
Estimated product from 15th November to 31st December (say)				8,000
				$210,000

Cassiar District—(From Mr. Porter's Report).

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There is a decrease in the production of gold since last year which is due to the fact that the old creeks are becoming less remunerative every year, although McDame's Creek and its tributaries produced more gold this season than last.

About ten persons worked during the summer on the bars of the Liard River, but were not so successful this year as last owing in a great measure to the fact that the water kept at a high stage for the greater part of the season.

Dease and *Thibert Creeks* have produced less this year than any season since they were discovered for the reasons already stated that they are about worked out, though some of the hill claims may continue to pay a fair return for a time longer.

But little prospecting for new placer ground was undertaken during the year.

Quartz Mining—Eleven mineral claims have been located along the Hyland River on which some prospecting work was done, and several hundred pounds of samples taken out and sent to various points for assay.

The following is an approximate estimate of the gold yield of the district for the year :—

Dease Creek	$ 6,500
Thibert Creek	4,409
McDame's Creek	9,876
Liard River division	1,700
Stickine River division	450
Total	$22,935

Yale—(From Reports of Messrs. Tunstall, Lambly, Dodd & Hunter).

A small amount of washing was done by Chinese in the bed of the Thompson River, and alluvial prospecting was done on Deadman's Creek, resulting in finding coarse gold, and on Criss Creek, a tributary of the same, with but slight result.

"The *Van Winkle Bar Hydraulic Mining Company*, above Lytton, have made two satisfactory wash-ups. This cut is now close to the old channel of the river, where they expect to find the richest pay.

"The *Prince Albert Flat Mining Company*, at Emory, have had a strong force of men at work the past summer making preparations for

piping. A tunnel has been run in the leasehold at Botanie Creek, and encouraging prospects in coarse gold obtained. PRECIOUS METALS.

"On *Siwash Creek* the placer mining companies have not met with the success anticipated. Discovery and development in British Columbia.

"About twenty-four miles of the bed of the Fraser and Thompson rivers are already under lease for diving and dredging, and applications for over twenty miles more have been forwarded to the Lieutenant-Governor in Council.

"The principal applicants are Captain Finch and partners, with whom is associated Colonel Underwood, of Chicago. These gentlemen have formed a strong company for reclaiming the rich auriferous deposits of the Thompson River by means of a powerful centrifugal pump stationed on a boat, worked in conjunction with several new devices of recent invention and a portable coffer-dam, which is placed in position when needed in a strong current to enable working in still water, and the removal of boulders by a diver, who also has entire control of the apparatus and directs its application with the assistance of submarine electric lights. The gravel is sucked up and deposited in a string of sluice boxes on the boat, where it is washed and the tailings run into the river. Should the results justify the expenditure, it is the intention of the company to build and equip fifteen boats with the requisite machinery for the active prosecution of this new branch of mining, which will employ a number of men."

Mr. Dodd's report gives the following details relating to these important ventures :—

"The dredge is especially designed for use in any part of the river where it is impossible to do remunerative work with the aid of any other appliance hitherto available, and the property it possesses of saving the fine gold is claimed as the secret of its success. The scow is made into eight watertight compartments, is sixty-six feet long by twenty-four feet wide, strongly and substantially built, and draws only twelve inches of water; everything is under cover and well protected from the exposure of the elements. It is conveniently equipped with every necessary and useful appliance for the skilful handling of auriferous gravel. The powerful steam winch is worked, by suitable gearing, in connection with the other powerful hand winches, which can be worked together or independently, so as to allow of the greatest freedom in moving the dredge to suitable or convenient points of the river.

"One duplex steam pump and one centrifugal pump are used for distributing the auriferous wash-gravel into the rotary amalgamating basin, which is six feet in diameter and ingeniously arranged for the nfusion of gravel from the outlet delivery of the suction pipe. There-

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by the promoters claim the secret of the invention, by rapid rotation of centrifugal motion. Every precaution and advantage evidently is taken for securing, by the matte of quicksilver, which is deposited into the rotary amalgam basin, the finest particle of fine gold. One horizontal engine and one vertical engine, with 70 horse-power boiler, with a powerful telescope pump attaching to a projecting boom, sixteen by eighteen inches thick, and twenty-five feet in length, slightly elevated from the main deck of the scow, with a half-circle sweep of twenty-five feet, are available for raising the auriferous gravel from the bed of the stream.

"One thousand cubic yards can easily be excavated within twenty-four hours, and the suction pipe can be freely handled and adjusted to any suitable place, for operating the auriferous gravel, by one person. The dredging is partly on the principle adopted for sluicing claims, with improved appliances for saving fine gold. The electric lights to be used are of one hundred and twenty (120) candle power, and the intention of the company is to carry on operations night and day, and ten men can manipulate and carry out the necessary work of two shifts. By the electric light the owners of the project claim they can see the operations working at the bed of the river. A trial test of the gold-dredging machinery was made a few days ago which resulted very satisfactorily, Gravel was pumped from thirteen feet below the water, and several gold colours were brought up, demonstrating the fact that gold exists in the river's bed. Since the trial test, the promoters of the scheme are more sanguine than ever of the future success of the undertaking, and Mr. Shahan has applied to the Dominion Government for a patent of the new invention for gold dredging for Canada.

"A new era of gold mining has been inaugurated in the deep waters of the Fraser River, which for hundreds of miles in length can be remuneratively worked. From trials made in other parts of the world, extending over a period of five or six years, it has been found that wash-dirt can be elevated and the gold extracted from it in paying quantities when not more than one grain—say four cents' worth—exists per cubic yard, and I need hardly say that many rivers run through British Columbia which are known to contain very much more valuable pay-dirt.

"*The Prince Albert Flat Hydraulic Gold Mining Company's* claim, held under lease, is situated on the west bank of the Fraser River, near Emory Bar, about four miles west of the town of Yale, and consists of about eighty acres. During the latter portion of last year, extensive preparations were made by the promoters of the company for excavating and cutting through gravel benches, in places from

twenty to thirty feet deep, and equally as wide at the surface, to secure the sides of the cuttings from caving, and interrupting their course of work in diverting the water from the natural course of Emory Creek on to the initial point of operations. The company obtained prospects by panning from several points, which were sufficiently satisfactory to encourage them. A portion of ground contiguous was worked by pioneers in 1858, 1859, and 1860, which yielded $15 to the man per diem. About $8,000 have been expended in the completion of the flume, and on the ditch and steel pipes. The flume is strongly built and well laid, capable of carrying 3,500 inches of water. It is over a mile long, four feet wide, by three feet deep, and everything is in order awaiting the season to open and permit the company to commence early mining operations.

"*Hill's Bar Flat* is situated on the east bank of the Fraser River, and stretches away in a south-westerly direction for a distance fully a mile and a half. Operations are to be resumed on an extensive scale in the forthcoming spring on the Hill's Bar Flats in a more practical form than the last working. The close proximity of the celebrated Hill's Bar, which yielded such an enormous quantity of gold within a small area, has stimulated the confidence of mining experts, owing to the indications that the continuation of the auriferous channel that made Hill's Bar so rich has permeated through these grounds."

Queen Gold and Silver Mine, Yale Creek.—At this mine. considerable development work was done in the past, over 2,500 feet of tunnelling having been driven, intersecting five veins.

Gold Queen Mining Company, Siwash Creek.—Preparatory work was done here in developing the Company's numerous claims on the creek. To communicate with the property a wire cable 400 feet in length was stretched across the Fraser River with a trolley basket capable of transporting passengers, mining material, &c. Judging not only from the gold-bearing nature of the gravels of the creek, but also from the quartz obtained showing free gold, and from favourable assays of specimens of the same, it is believed that the indications are favourable. Some tests made in the company's small mill gave with the imperfect treatment possible $4 per ton free milling gold.

"The property of the *Van Winkle Hydraulic Gold Mining Company* is situated on the west bank of the Fraser River, two miles above the village of Lytton. It consists of five leases, containing some 660 acres.

"The benches rise from 110 to 397 feet above high-water mark of the river. The gravel in the prospecting shafts will run an average of 10 cents to the cubic yard, the gold being of a coarse nature.

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"Leases of 1,000 inches of water from Last Chance Creek, were brought on to the works last summer, and additional leases have been procured for bringing 9,000 (miners) inches of water from Stein Creek, a distance of 3½ miles by flume and ditch, at a cost of $15,000.

"Last summer the mine was opened by running a cut 800 feet through the front bench to tap the old channel, which was accomplished very satisfactorily, and the pit opened out and everything made ready for a continuous mining run in the spring. There is now a double pit capacity, 800 feet of main sluice, and 276 feet of broad sluices extending to the dump, emptying into the Fraser River. The cut at this point is some 750 feet wide, and has a rise of 48 feet from high water mark. The grade of main sluice is 7 inches to the box of 12 feet. The company use two No. 6 monitors, with a head of 377 feet. Last summer in opening the mine the company piped 350,000 cubic yards, and found the duty of the miner's inch, 4 cubic yards, at a cost of 2·8 cents per cubic yard, they obtained $3,800 worth of gold from the sluices during the process of opening the mine, which is considered very satisfactory in the preliminary workings of a cut of 800 feet. Eighteen to twenty hands were employed last summer, and this year the company expect to employ 13 to 15 hands all told. The prospects for the coming season are very bright and afford reason to expect good results."

In the Osoyoos subdivision of the Yale district some important work was done in developing and working quartz veins in the Fairview and Boundary Creek camps.

In placer mining, much prospecting for placer ground was done on Rock Creek and about $4,500 of gold taken out. Productive work was also prosecuted on Cedar Creek, a tributary of the Kettle River; on Boundary Creek and on Cherry Creek. Siwash and Mission creeks are virtually abandoned. The total amount of placer gold produced from the workings on the above mentioned creeks was $9,650, Rock and Cherry creeks being the principal producers.

Fairview Camp.—The result of the work done at this camp has an important bearing on the future of the district, illustrating as it does the possibility of successfully operating the gold bearing quartz veins there found, as shown by the satisfactory results of actual mill tests and not being dependent upon the doubtful data of the assays of specimens.

The following extracts from the report of Mr. Lambly, the Government Gold Commissioner for the district, will fully illustrate these points :—

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"Development work has been pushed with vigour in this camp during the past season; the satisfactory returns from the ore milled by the Strathyre Mining Company's mill; from a number of the principal claims, notably the Wide West, Brown Bear, Morning Star, and Victoria, being an incentive to the owners of claims adjacent to these properties to prosecute work on their claims with more than usual ardour; and I am pleased to be able to state, in many instances with marked success. A number of locations have been made on the range of mountains between the camp and Keremeos, on most of which the locators have done the annual assessment work, showing their confidence in these new discoveries."

The following information concerning the *Strathyre Mining Company (Limited)*, and list of assays and mill tests of ore from different mines in the camp, was kindly furnished to me by Mr. George Attwood, F.G.S. :—

The Strathyre Mining Company (Limited), Dominion charter; original capital stock, $125,000, lately increased by consent of the shareholders to $500,000.

"Directors.—Duncan McIntyre, President; Sir Charles Tupper, Bart; T. G. Shaugnessy; Edmund D. Reynolds, Managing Director. Consulting Engineer, Geo. Attwood, F.G.S., Assoc. M. Inst. C.E.

"Mining properties acquired by the company are: "The Rattler," "The Brown Bear," "The Wide West," "The Wynn M.", "The Ontario," and the Rattler mill site and water right.

"*The Rattler.*—Work on this claim has been confined to taking out about twenty tons of ore from the old shaft.

"*The Brown Bear.*—On this claim work has been pushed with vigour during the summer; a cross-cut tunnel has been driven some three hundred feet in length, and four veins intersected, the largest vein being over six feet in width. About one hundred tons of ore have been worked in the mill from one of the tunnel veins, and the yield in free gold and concentrates was about eight dollars per ton. Work on the tunnel is still going on, in anticipation of finding the main vein, which shows on the surface. The tunnel cuts the veins from 80 to 165 feet vertically below the surface. About ten men have been employed steadily during the summer on surface explorations and in the tunnel. The tunnel is about seven feet in height by five feet in width at the base, and it is supplied with a steel boiler-plate car, which runs on steel rails, connecting the mine with ore bin of fifty tons capacity.

"*The Wide West.*—The old tunnel on this claim has been extended to a length of 360 feet, and a shaft 4 x 5 feet clear of timbers sunk to a depth of 100 feet below the tunnel level, and an air-raise has been made

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from the tunnel to the surface. From ten to twenty men have been constantly employed on this mine during the summer, and suitable buildings have been erected for their accommodation.

"*The Wynn M.*—Work on this claim has been confined to sinking a new shaft thirty feet in depth; some very fine specimens of rock showing free gold was taken out.

"*The Ontario.*—Two trial pits were sunk on this claim during the ummer, and a drift run to connect them.

"*Strathyre Quartz Mill.*—A complete battery of ten rotary gravitation stamps, weighing about 750 lbs. each, has been put in place. The mortar boxes on which the stamps work, weighing over 6,000 lbs. each, and the foundations of the same have been made of timbers twenty feet long, squaring thirty inches, placed on end. Copper plates galvanized with mercury are used to collect the free gold, and the quantity employed is nearly double that of ordinary gold mills. The stamps are fed by a self-feeding apparatus called the Challenge feeder, and the rock after being broken, weighed and dumped into the large bins, is not again handled, as the system is automatic. The copper plates save most of the free gold, and the sands after passing over them are treated in six Frue Vanners, which collect the fine gold and amalgam which has escaped the copper plates.

"The present milling process has been found to be satisfactory, as the tailings when carefully saved and evaporated, and then assayed, show, from numerous assays, an average loss of twenty-five cents per ton in gold. The expenditure incurred by the company in the enterprise thus far is over $112,000, for purchase of property, development of their mines, construction of the mill and assay office, dwelling and boarding houses, and the construction of branch roads.

"*The Morning Star.*—The enterprising owners of this property, Messrs. Mangott, McEachern & Lefevre, have taken out and milled at the Strathyre Mining Co.'s mill during the season, 385 tons of ore, besides doing a large amount of surface prospecting."

Victoria Mine.—Besides other work done, the owners of this mine have taken out and milled ore as per statement below.

Mill Tests.—The following table has been arranged from data given in the report and illustrates the results of practical tests of the ores of this camp.

MILL TESTS

OF GOLD ORES OF FAIRVIEW CAMP.

STRATHYRE MILL.

Tons of ore milled.	Weight of bar, oz.	Gold, fine.	Silver, fine.	Value gold per ounce.	Value of gold in bar.	Tons of concentrates.	Gold per ton, oz.	Value of gold in concentrates.	Free gold per ton.	——
									$	
.....	58·32	692·5	284	$14·336	$ 835·72	.....	.....	.....	.....	
50	32·50	768	209·5	15·876	515·77	1	3·68	$ 76·06	10·31	Wide West Ore.
$100\frac{1200}{2000}$	60·00	791	188	16·351	989·25	$1\frac{800}{2000}$	3·88	80·19	.....	
96	.....	.....	.....	.....	1106·78	2	4·31	89·80	11·52	
385	92·25	728·5	252·5	15·059	1389·19	2	8·99	185·82	Average 13·14	Morning Star.
	90·20	720	241	14·883	1342·17					
	154·68	728	237	15·05	2327·93					

VICTORIA MILL.

$351\frac{1800}{2000}$	67·50	812	173	16·785	1132·98	$0\frac{400}{2000}$	12·15	251·15	.....	Return in gold and concentrates taking the value of the concentrates at 80% of the assay value = $32.40 per ton. — Victoria Mine.
$131\frac{1800}{2000}$	30·52	.....	.....	16·78	512·12	.....	.....	.....	37·38	

Total ore crushed by this company for season yielded free gold $13,404.

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Other Camps.—On the mountain south of Fairview with one exception nothing but assessment work was done. On *Harris Creek* considerable prospecting work was done on mineral claims, but no details of the results are available. *Camp McKinney*—With the exception of the sinking of a 61 feet air-shaft to connect with the tunnel on the Cariboo claim, nothing but assessment work was done.

Boundary Creek.—On the properties controlled by Mr. Howard E. Walters, of Spokane, Washington, some interesting developments have been made as follows:—

On the *American Boy*, near the Boundary Creek falls, a tunnel was run in 85 feet; on the *Providence* mine situate about five miles further up the creek from the last mentioned, one shaft is down 70 feet and a second 15 feet; the *Defiance* claim, which was recorded on 4th September, 1893, is adjacent to the Providence and has a shaft down 20 feet and the *Skylark* mine situate about three miles easterly from the Providence camp, or about half way between that point and the Greenwood camp, was recorded on the 28th July last, since which time two shafts, one of 55 feet and the other of 15 feet, have been sunk. As a result of the above mentioned developments about 34¾ tons of ore were produced which was packed out on horses to Grand Prairie, Kettle River, thence by wagon to Marcus, and thence to the smelter at Tacoma. This ore gave a total return of about 11,500 ounces of silver and 37 ounces of gold. The following tabulation gives the details of these statements:—

NAME OF MINE.	ORE SHIPPED.		SILVER, ounces per ton.	GOLD, ounces per ton.	REMARKS.
	Tons (2000 lbs.)	Sacks.			
American Boy.....	$2\frac{1400}{2000}$	83	230	1	
Providence.....	$16\frac{800}{2000}$	500	400	1	Since June.
Defiance.....	$2\frac{380}{2000}$	67	560	2	Since 4th Sept.
Skylark.....	$13\frac{1848}{2000}$	425	268	1	

In the other camps of this district, viz., the Wellington, Greenwood, Summit, Volcano, Mountain, White's and Attwood, little more than assessment work was done.

The necessity for a trunk road between Okanagan and Grand Prairie on Kettle River is greatly felt and the construction of this, together with a branch road for some distance up Boundary Creek, would be of great benefit to the mines.

Similkameen Division.—On Granite Creek the Pogue Company is the only one paying at present. Their tunnel is in over 1,000 feet and is

still being pushed. On the Tulameen and Similkameen rivers several companies of Chinese have been getting good results. The Tulameen Hydraulic Company have been prospecting the lower end of their ground; sinking shafts and drifting. The Similkameen Gold Gravels Exploration and Hydraulic Company, whose property is situated on the above river opposite Princetown, have been prospecting their properties with a force of fifteen whites, sinking shafts and drifting.

On a number of the creeks in this division applications for leases have been made for mining ground for the carrying on of hydraulicing operations. On quartz claims in this district, nothing but assessment work was done. The construction of the contemplated wagon-road from Nicola to Granite Creek, to the point reached in the south fork of the Otter Valley, has already proved very beneficial, and will greatly stimulate the settlement of the district opened up, as well as greatly assist in mining developments.

Lillooet District.—The following notes by Mr. Phair, the Government Gold Commissioner at Clinton, taken from the report of the Minister of Mines for the province, gives the main features of the mining activity in this district.

"The quantity of gold mined, which has been reported to me from reliable sources, is valued at $51,376, showing an increase of $11,613 when compared with the previous year's yield, Mr. A. W. Smith, M. P.P., of Lillooet, having purchased $24,616, and Mr. F. W. Foster, of Clinton, $11,060 of it. A large number of leases for hydraulic mining, especially near Lillooet, has been granted during the year, and applications for several more have been received.

"The North American hydraulic claim has been bonded for $10,000, a deposit having been paid, and it is the intention to bring water on to the ground from Cayoosh Creek at a cost of about $30,000, the route for which has been surveyed.

"A company of six men has been engaged during the season opening out a hydraulic claim on Bridge River. The Vancouver Company, on Cayoosh Creek, have not taken out as much gold as was expected, owing to the difficulty of meeting with large boulders, which have had to be blasted, but that claim is now open.

"The leases of the Lillooet Hydraulic, North American, and Mina companies have paid better than during the past years.

"Cayoosh Creek, which yielded a rich harvest to many Chinese, is almost abandoned, but undoubtedly it still contains a great deal of gold which cannot be taken out by unskilled miners with the pick and shovel, but, if capital were introduced, the creek could be profitably worked.

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"There is nothing to report as to mineral claims, none of them having been worked to any extent during the year."

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East Kootenay—(From the Report of Mr. Cummins).

"The yield of placer gold this season, has been confined to two creeks, both situated in the Fort Steele Division, and is estimated by Mr. Edwards, the Mining Recorder, as follows :—

Wild Horse Creek	$19,000
Moyie River	700
Total	$19,700

"Mr. Griffith's hyraulic property on Wild Horse Creek, was sold to the East Kootenay Exploration Syndicate, of London. This company placed a considerable amount of new plant, supplied by the Albion Iron Works, of Victoria, on the ground this season, and piped for a time. The results are stated to have been such as to justify working next season on a much larger scale. The hydraulic ground, worked at a profit for many years by Chinese companies, has been bought by Mr. Griffith. It is probable that this ground will also become the property of the syndicate, in which case hydraulic mining, to an important extent, may be looked forward to in the near future on Wild Horse Creek."

Both in this vicinity and in the Donald division applications for leases have been made, having in contemplation extensive hydraulic operations, which will probably be commenced next season.

In quartz mining, whilst there has been a great deal of prospecting in various parts of the district, the commercial depression has had its effect in retarding the acquirement of the capital necessary for the prosecution of large undertakings.

Particulars of the discovery and development work in the various subdistricts and camps are as follows :—

McMurdo Subdistrict.

At the Bobby Burns and International group of gold properties nothing but assessment work was done and only inconsiderable development work on the claims on Cariboo mountain and Cariboo Basin and Copper Creek.

Vermont Creek Subdistrict.

The claims on the south side of this creek have been worked by Messrs. Wells & Pollock, the owners. One hundred tons of ore

were taken out of the tunnels and stopes and shipped out over a sleigh road to the Columbia River, which shipments would run about 100 ounces in silver with 50 to 60 per cent of lead.

On Spilimichene Mountain, Jubilee Mountain and Horsefly Creek but little work was done.

Thunder Hill Group.—Work proceeded rapidly during the early part of the summer and the previous winter, a force of 45 men being employed. The concentrating works described in last year's report were completed and ran for a short time in the beginning of August, the machinery working very smoothly and well. The works and mine shut down about the middle of August owing, it is understood, to lack of funds. No further developments of importance are reported in the Hughes Range between the Columbia Lake and the vicinity of Wild Horse Creek, though some locations were made.

Wild Horse Creek.—The future prospects of this creek and its vicinity for gold quartz are very encouraging.

"Several prospectors have worked in this direction during the past season, and made some important discoveries. On the south side of the creek, about seven miles above Fort Steele, three claims were located by Messrs. Banks & Young on a strong lead stated to be cropping continuously for over 2,000 feet. The following particulars are derived from a reliable aud disinterested person, after the examination of the ground in the end of October: The width of the ledge varies from 2 feet to 4½ feet. The strike is about east-and-west. It runs through about the centre of a belt of porphyritic rock, about 100 feet wide, the country rock on east side of this belt being quartzite. The ledge cuts the formation very clearly at about 30° and dips into the hill, or south about 45°. There is evidence of the lead becoming more vertical in depth. Picked samples can easily be obtained from the Western or Dardanelles claim showing quantities of free gold, the richest streak being on the hanging wall. The lead is described as having all the characteristics of a true fissure. Up to the end of October, the discoverers had done but little work on the lead, as they had been engaged in building a trail to the claim and putting up a cabin in order to work all the winter.

About three miles further down the creek, but on the opposite side, about 1,500 feet in elevation above the hydraulic properties, a ledge, known for some time, has been prospected by Messrs. Dougherty & Griffith. On the surface the quartz had a very favourable appearance for gold, but nothing could be panned from it, even after sinking a shaft to a depth of 20 feet. From this depth to 30 feet, which had

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been reached when last heard from, most satisfactory results were obtained by panning. So far, they have sunk two pits, one 30 feet deep and one 15 feet. No gold has been found yet in the latter. The pits are about 200 feet apart. The lead appears to strike in a north-westerly and south-easterly direction, but seems on the surface a good deal mixed with the quartzite formation, making it difficult to judge its exact width, which appears to be from 2 feet to 6 feet and possibly more. It is stated that a slate foot-wall has been struck near the bottom of the 30-foot shaft. The owners are sanguine of having a good free milling gold property.

"Another discovery of free gold quartz, near this locality, was made in the latter part of the season, on the front range facing the Kootenay Valley, between what is known as Horse Shoe Cañon and Mouse Creek. Numerous specimens shown me from here contained considerable quantities of free gold, plainly visible without a magnifier, in a copper stained quartz, gray copper being also present. The discoverers stated that the vein could be traced for a considerable distance and ranged in width from about 8 inches to 2 feet. The samples I saw seemed to me to come from the narrower portions of the vein. No work whatever had been done.

"*North Star Mine.*—In last year's report, page 538, a description is given of the discovery of an immense body of steel galena, near the St. Mary's River, about 20 miles north-west of Fort Steele. It is also mentioned that this property had been bonded by Mr. D. D. Mann, of Montreal. The property, consisting of four 1,500 feet square claims, taken up in a square block or nearly so, was purchased by Mr. D. D. Mann and associaties on 1st July last, after having been examined and reported on by Mr. George Attwood, the well-known mining engineer. A considerable amount of development work has been done on the property, both during the currency of the bond and since the purchase was completed. I annex a plan and sections explanatory of this work, which will set forth the work and its results better than any lengthy verbal description. The work extends over about 450 feet of the lode, the greatest depth from the surface reached is 66 feet in the main shaft, sunk at the original discovery cut, where the first body of ore was bared by the discoverers by removing the overlying wash material. The vast body of mineral run through at section 4, where the drift shows solid galena and carbonates for the remarkable width of 65 feet, was opened out until after the purchase of the mine was made. It seems fair to conclude that the work has shown the existence of huge mineral deposits. Though such bodies cannot be looked for in a regular width and richness throughout, there seem very good indications in in this case for their continuance in length and depth.

"The only regular sampling, the results of which I am aware, gave: Silver, 47·43 oz.; gold, nil; lead, 67·50 %; iron, 6·63%; zinc, 1·90%. Assays of over 85 oz. have been obtained, whilst the carbonate ore appears generally to run somewhat lower in silver. The ore is asserted to be of the very finest quality for smelting. PRECIOUS METALS. Discovery and development in British Columbia.

"The advantageous position of this mine, and neighbouring properties, as regards water communication, can be seen by referring to the annexed general sketch map of the district (see Group 15). The mine is within sixteen miles of the Kootenay River, on which there are at present two steamboats running, one in connection with the Great Northern Railroad at Jennings, the other with the Canadian Pacific at Golden. The country between the mine and the river is easy for wagon road construction. It will also be seen that the located line of the Canadian Pacific Railway's Crow's Nest Pass Railroad passes within about an equal distance from these mines.

One of the most important features regarding the smelting ores of this region, is their proximity on the proposed lines of railroad to the inexhaustible supplies of cokeing coal in the Crow's Nest Pass.

"A number of other locations have been made on the hill on which the North Star is situated, but little or no work has yet been done on these claims so far as I am aware.

"*Sullivan Group of Prospects.*—About 2 to 3 miles to the north of the North Star Mine, on the other side of Mark Creek, outcrops of galena, apparently of a similar nature and size to the North Star, have been located. Great masses of silver galena and iron have here been bared in several places, but sufficient work has not yet been done to enable one to say much about them.

"*Moyie Lake Claims.*—Some important discoveries of silver-bearing galena were made last spring, on the mountains on the east shore of the Upper Moyie Lake. Large outcrops of fine looking galena, 5 to 6 feet in width in some places, occur on the St. Eugene claim, about 1,400 feet above the lake. The little work done here has exposed large quantities of mineral, but has not gone sufficiently deep to show the existence of a lead of a continuous nature. Adjoining the St. Eugene claim, to the north, is the Queen of the Hills' claim. A line of claims extends from here westward down to the lake. A continuous vein is supposed to run through these claims, but sufficient work has not yet been done to determine the fact.

"*Locations at the Head of St. Mary's River.*—On the various forks of the St. Mary's River, no less than 46 mineral claims were located in the early part of the summer. There appears to have been a rush into that locality of prospectors from West Kootenay. Most of these

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locators returned to the Kootenay Lake country, forwarding their records to Fort Steele. I regret to say that it has not been possible for me to obtain information as to the importance of these discoveries. I am, however indebted to Mr. Sandilands, of Ainsworth, for some information derived from some of the prospectors. It is stated that the claims on the West and Middle Forks contain large bodies of galena assaying from 26 to 66 oz. in silver, and 65 per cent lead. The leads in some cases carry copper.

"All the discoveries on the South Fork carry copper and silver, assaying 56 oz. silver and 31 per cent copper, and are described as strong ledges 4 to 6 feet in width.

"*Lost Creek, Bull River, and Sand Creek.*—Nothing beyond assessment work was done on the claim on Lost Creek this season.

"Promising prospects are reported from both Bull River and Sand Creek. The average of 5 assays from the galena and grey copper leads, about half a mile above the bridge over Bull River Cañon gave: silver, 76 oz.; gold, $21; copper, 22 per cent.

"A large lead containing copper-glance and carbonates, was located on Sand Creek. There appears to be plenty of mineral in the lead, but the grade of the ore at the surface is not high.

"A number of claims are stated to have been located near the International Boundary Line to the east of the Kootenay River. These claims have been recorded in the state of Montana. It is, however, considered by some of the residents on Tobacco Plains, that these claims are really on the British Columbia side of the line.

"*Kimbasket Lake* is situated in the Donald Mining Division, to the north of the Canadian Pacific Railway about 35 miles down the Columbia from Beaver, the nearest point on the railway. A trail has been cut northward from Donald by the government, with a view to giving access to this region, which now reaches as far as the lower end of Kimbasket Lake. The country affords favourable indications for mineral and placer gold, and has tracts of very fine timber. It is satisfactory to find that prospectors are giving some attention to this region."

West Kootenay—(Reports of Messrs. N. Fitzstubbs, R. H. Kemp, M. E., and J. H. Kellie, M.P.P.).

The following condensed statement of shipments from the Kaslo-Slocan, Ainsworth and Nelson districts which is, according to the report, "taken from Customs returns, will give an idea of present out-

put of ore under very unfavourable circumstances as regards freights." The period covered is the six weeks between December 22nd, 1892, and February 8th, 1893, and the average value of the ore is taken at $130 per ton.

Mine.	Shipments—Tons.	Value.
Washington	574	
Noble Five	174	
Dardanelles	71	
Reco	20	
Mountain Chief	308	
Northern Belle	260	
Freddie Lee	107½	
Surprise	87	
Antelope	43½	
No. 1 (Ainsworth)	14½	
Kaslo-Sampler	58	
Mile Point	11½	
Big Boulder	40	
Hall Mines (Nelson)	120	
	1,889	$245,570

"The figures, though satisfactory, cannot be taken into account in computing the probable output of the Slocan. All the properties are doing development work chiefly. When they are put in shape for mining on the proper scale the output can be then computed; at present it can only be surmised.

"There are upwards of 400 men in the Slocan and between Kaslo and New Denver, who are employed, either directly or indirectly, in connection with the mines, and when the dangers of snow slides are passed there will be hundreds more. Without a single exception of note every mine in the Slocan has improved as it has been developed, the veins becoming stronger as they went deeper."

The information pertaining to this district contained in the report of the Minister of Mines for the Province will be found in a summarized form in the following tables:

Name of Claim or Mine.	Force employed.	Mining Developments.		Mining Plant.
		Shafts.	Tunnels, Drifts, Winzes, &c.	
				Nelson
Toad Mountain Camp.				
Silver King Group	45			
Dandy			[600 feet.] The adit cross cuts the vein at 100 feet in depth and runs on it for 150 feet, showing 4 to 6 feet vein well mineralised. Vein exposed on surface with a width of 10 to 50 feet in four places and traced to the Silver King.	
Other claims				
Poorman Camp				
Poorman Mine				
Majestic Claim			Development work done	
White Water Claim			Idle during the year	
Salmon River Camp				
Several claims lately located.				
Placer Diggings.				
Hall Creek			But little work done during the season.	
Salmon River			Twenty-one leases taken up. Active operations; principally developmental.	
Pend d'Oreille River				
				Trail Creek
				Thirty-three locations taken up and eleven
Le Roi Mine	30	Depth increased 100 feet.	Levels from bottom of the shaft 70 feet each way on the vein.	Hoisting machinery shipped to mine.
War Eagle Mine				
Nickel Plate Mine		50 feet deep	Work progressing	
Josie Claim				

*The figures in these columns do not refer to total quantities of ore mined or shipped but give

Milling Plant and Results.	Assays of Specimens and Samples.	*Ore Mined.		*Ore Shipments, Particulars of.		Remarks.
		Tons.	Contents or Value.	Tons.	Contents or Value.	
Subdivision.						
.....	.....	.....	.....	.....	.....	Said to have been sold for $1,000,000; ore shipped to Swansea, England
.....	Average reported gold $4 per ton.	.....	.....	.....	.....	An extension of the Silver King Group.
.....	.....	.....	.....	.....	.....	Not worked on account of financial stringency.
.....	.....	.....	.....	.....	.....	Five or six miles S.-W. of Nelson.
0-stamp mill	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	A few miles W. of Poorman.
.....	.....	.....	.....	.....	.....	On Rover Creek.
.....	Reported as similar to Toad Mountain.	.....	.....	.....	.....	About 20 miles S. of Nelson and near the Nelson and Fort Shepherd Railway.
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	$750	
.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	
Subdivision. transfers made of placer property.						
.....	$60 per ton in gold.	.....	.....	250	.....	Bottom levels show faces of ore of unknown width.
.....	.....	.....	.....	.....	.....	Recent operations said to show continuous body of ore 8 feet wide similar to that at Le Roi mine. About $10,000 said to have been expended to date.
.....	.....	.....	$150 per ton.	.....	$150	One vein 18 inches wide and pyritic.
.....	.....	.....	.....	Some.....	.....	$4,000 spent developing 7 feet vein of pyritic ore.

illustrative data of sundry lots of ore produced, &c.

Name of Claim or Mine.	Force employed.	Mining Developments..		Mining Plant.
		Shafts.	Tunnels, Drifts, Winzes, &c.	
				Trail Creek
Mountain View	..			
Cliff Claim	..		Vein traced whole length of claim. Much surface work done.	
O. K. Mine	..		Tunnel extended 100 feet. Uprise of 70 feet made.	
Other claims	..		Only slightly developed	
				Ainsworth
Number One Mine	20	1200 feet of shafts, tunnels, &c.		
Mile Point Mine	6		Two tunnels, each of 100 feet in length.	
Sky Line Mine	..		Much development already done.	
Little Phil and Little Donald.	..		Joint tunnel 75 feet long run on the dividing line shows 8 feet vein of galena.	
Budweiser	..	Shows 4 foot vein		
Bobtail; Schafer and Jay Gould Claim.	..		400 feet of tunnelling through hard rock.	
Highland	..			
Highlander	..			
Charleston	..			
Bluebell	..		Idle during year	
Rand, Turn of Luck and Baker's Fifth Claim.	..			

*The figures in these columns do not refer to total quantities of ore mined or shipped but give

Milling Plant and Results.	Assays of Specimens and Samples.	Ore Mined.		*Ore Shipments, Particulars of.		Remarks.
		Tons.	Contents or Value.	Tons.	Contents or Value.	
Subdivision—Continued.						
.....	.....	.....	.....	.....	About $25 per ton in gold.	Vein 30 feet wide showing for 200 feet.
.....	.....	.....	.....	.....	.....	On the same vein as last.
.....	.....	250	.....	.....	.....	The three owners, by means of a hand mortar alone, extracted $4000 in one week in September.
.....	.....	.....	.....	.....	.....	Show encouraging prospects.
Subdivision.						
50 ton concentrator erected and ready to run Expect to concentrate 5 tons ore to 1 of concentrate.	.....	4,000	Concentrating ore.	85	60 to 275 oz silver per ton.	.....
....	Ore said to contain ruby and native silver, assaying 80 to 3,000 oz. per ton silver and 30 per cent lead.	.....	.....	.....	.....	One mile S. of Ainsworth and only about 400 yards from Kootenay Lake shore.
.....	.....	.....	.....	.....	.....	Idle this year.
....	80 oz. silver; 75 per cent lead.	.....	.....	.....	.....	Adjacent claims; situated on the Government wagon road about 1½ miles S. of Ainsworth.
.....	.....	.....	.....	.....	.....	3 miles from Ainsworth on Woodberry creek.
.....	.....	.....	.....	.....	.....	S. of Ainsworth 1½ miles on L. Kootenay. Schafer Gold and Silver Mining Co. of Seattle.
.....	Silver 50 to 75 oz.	.....	.....	.....	.....	Idle.
.....	As high as 180 oz. of silver and 30 per cent lead.	.....	.....	.....	.....	
.....	95 oz. silver; 30 per cent lead.	.....	.....	.....	.....	On Government wagon road.
.....	.....	.....	.....	.....	.....	On E. shore of Kootenay Lake.
.....	.....	.....	.....	.....	.....	On Woodberry creek. Kootenay Mining and Development Co.

illustrative data of sundry lots of ore produced, &c.

Name of Claim or Mine.	Force employed.	Mining Developments.		Mining Plant.
		Shafts.	Tunnels, Drifts, Winzes, &c.	
				Kaslo
Wellington	12		Diamond drill used but ground too seamy.	Diamond drill
Whitewater Claim				
Montezuma and Mexico			X-cut tunnel, 70 feet long, cuts vein at 40 feet depth and a drift run 40 feet on the vein shows it to be 1 to 4 feet in width.	
Silver Glance				
Beaver, Lone Star and Silver Tip.			Being developed by tunnels	
Eureka, Yosemite, Homestake, Scottish Chief and Parrot.		644 feet of shafts.	150 feet of tunnelling and 60 feet of open cuts. Ore streak 16 to 30 inches.	
Echo Claim			Galena pay streak 6 to 12 inches; 25 feet tunnel.	
Northern Belle	14		Two tunnels, 150 and 200 feet	
Virginia	10			
Beaver				
Mountain Dew			4 feet of ore in upper tunnel	
Silver Tip				
Brennand Group			Idle	
Lucky Boy				
				Slocan
Slocan Star Group (Slocan Star, Slocan King, Jennie and Silversmith Claim.)	18		Systematic development work carried on. Three long X-cut tunnels tapping vein at different levels connected by winzes. Working tunnel 140 feet long to hanging wall, cuts vein at 100 feet depth with drifts on hanging and foot walls.	
Washington Mine	36		Development work continuous since opening of mine.	
Bluebird	12			
Noble Five Group	15		Three tunnels aggregating 600 feet; vein 2 to 6 feet thick.	
Recall	8		Developing	
Mountain Chief	16		Four tunnels on vein. Stoping, in all. Vein 2 to 6 feet wide with galena pay streak 1 to 3 feet wide.	

*The figures in these columns do not refer to total quantities of ore mined or shipped but give

Milling Plant and Results.	Assays of Specimens and Samples.	Ore Mined.		*Ore Shipments, Particulars of.		Remarks.
		Tons.	Contents or Value.	Tons.	Contents or Value.	
Subdistrict.						
.....	.....	.....	.....	100	High grade..	
.....	.....	.....	.....	7	$900	
.....	80 oz. silver; 60 per cent lead.	.....	.....	.....	.....	Idle.
....	Said to assay as high as 1,000 oz. per ton.	.....	.....	.....	.....	5 miles from any trail, &c.
....	.....	.....	.....	None so far.	.....	
.....	125 oz. silver; 77 per cent lead.	.....	.....	.....	.....	
....	As high as 327 oz. silver.	.....	.....	.....	.....	
.....	.....	600	.....	.....	.....	White Water Basin.
.. ..	.....	.....	.....	.....	.....	
....	.....	50 to 60	.....	.....	.....	
.....	Silver 26 to 204 oz.	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	
... .	.....	.....	.....	.....	.....	
....	High grade.....	.....	.....	 20	....	
Subdivision.						
.....	.....	At mine 300; 150 at Three Forks.	.....	... .	.....	Vein in working tunnel 50 feet between walls all shipping and concentrating ore. Ore in drift on foot-wall mixed and in drift on hanging wall 12 feet of solid clean galena.
....	.....	.....	.....	560 Previous to acquirement by present company.	.....	
.....	.....	.....	.....	300	144 oz. silver; 71 per cent lead.	
.....	.....	.. ....	.....	350 Shipping daily.	150 oz. silver; 69 per cent lead.	
.....	.....	.....	.....	.....	.....	
.....	Ore carries native silver.	1,000	.....	Continual shipments.	130 oz. silver; 70 per cent lead.	One mile and a half from New Denver.

illustrative data of sundry lots of ore produced, &c.

Name of Claim or Mine	Force employed.	Mining Developments.		Mining Plant.
		Shafts.	Tunnels, Drifts, Winces, &c.	
Slocan				
Alpha	..	.....	Contract let for tunnel.....	.....
Dardanelles Group .. .. (Dardanelles, Antelope, Buffalo, Okanagan, Diamond Cross, Hidden Treasure and Caribou Claims.)	25	Flat incline shaft 200 feet making bottom of ditto 100 feet vertically.	....	Steam hoist and pump. Further mining plant required owing to heavy water.
Lucky, Jim, Roadley and St. George Claims.	10	....	Tunnels and X-cuts aggregating 500 lineal feet testing vein to depth of 80 feet from surface.	.....
Ruecau Group ..... (Ruecau, Texas, New Denver, Ephraim and Clifton.)	10	....	Average width of vein 10 feet. Pay streak 18 inches to 8 feet.	....
Grey Copper.	..	....	Vein 3 feet wide. Ore streak showing 1 foot wide for 200 feet.	... .
Payne Groupe..... (Payne, Maid of Erin, Mountain Chief and Two Jacks.)	8	Five openings from 6 to 20 feet in depth.	40 feet tunnel on Maid of Erin. 100 feet tunnel on Mountain Chief which cuts the vein at a depth at 100 feet.	.....
			Vein 8 inches to 4 feet wide with ore streak 6 to 30 inches.	.....
Queen Bess..	..	Shaft 40 feet deep...	Vein shows in places 8½ feet of solid galena. Parallel vein carries galena and "carbonates." 300 feet tunnel cuts vein at 65 feet in depth.	....
Northern Belle Group... (Northern Belle, Dublin Queen, Kootenay Star and Ophir.	24	....	Two adit tunnels each 250 feet in length and one 15 feet with connecting winzes. Lode from 6 to 12 feet wide of concentrating ore with chutes of clean shipping ore from 18 to 42 inches thick.	... .
Freddie Lee.....	8	.....	About 2000 linear feet of development made. Vein irregular; ore streak sometimes widens out to 3 feet.	.....
Greenhorn..	..	. . ..	Vein traced 1500 feet; 3 feet solid galena.	.....
Alamo Group..... (Alamo, Twin L. and Ivy L. Claims.)	8	....	Vein 3 to 5 feet in width. Ore galena and carbonates. Two tunnels 250 and 165 feet in length.	.....
Young Dominion.....	..	.....	No information to hand.....	.....
Idaho and St. John Claims	10	....	One tunnel 300 feet long from which 3 cross cuts from 20 to 40 feet long. Another tunnel 60 feet long and 150 feet of lineal development. Veins 5 to 6 feet wide with pay streak 2½ feet solid in places. Ore galena and "grey copper."	.....

*The figures in these columns do not refer to total quantities of ore mined or shipped but give

Milling Plant and Results.	Assays of Specimens and Samples.	Ore Mined.		*Ore Shipments, Particulars of.		Remarks.
		Tons.	Contents or Value.	Tons.	Contents or Value.	
Subdivision—Continued.						
.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	50	99 oz. silver; 51 per cent lead.	Freight charges 10c. per lb. over the 4 miles of trail to the mine.
				150	248 to 322 oz. silver; 26 to 30 per cent lead.	
.....	.....	.....	.....	50 to 60	67 oz. silver; 60 per cent lead.	
.....	.....	.....	.....	40	167 to 671 oz. silver; 67 per cent lead.	
.....	145 to 150 oz. silver and 72 per cent of lead.	.....	.....	.....	.....	
.....	.....	.....	.....	100	225 oz. silver: and 70 per cent lead.	
.....	.....	.....	.....	.....	.....	
.....	.....	50	.....	.....	.....	S. side of Idaho basin.
.....	.....	.....	.....	600 since June 1.	100 oz. silver; 80 per cent lead per ton.	
.....	.....	100	.....	558	120 oz. silver; 70 per cent lead.	
.....	100 oz. silver; 60 per cent lead.	.....	.....	.....	.....	Near the Freddie Lee.
.....	Ore assays run high.	.....	.....	1 car load.	.....	
.....	.....	.....	.....	.....	.....	Twin L. basin.
.....	Ore average 200 oz. silver.	.....	.....	1 car load.	Valued at $1760.	Two parallel locations 200 feet apart.

illustrative data of sundry lots of ore produced, &c.

Name of Claim or Mine.	Force employed.	Mining Developments.		Mining Plant.
		Shafts.	Tunnels, Drifts, Winzes, &c.	
				Slocan
Chamber's Group (Chambers, Wellington, Eureka and Jay Gould.)	4		300 feet development work done. Vein 80 feet between walls. Concentrating ore with pay streaks of pure galena.	
Best Mine			No information available.	
Mammoth Mine	6			
Egypt Mine	5			
Eureka	6		Two tunnels aggregating 500 feet. Ore struck in the lower one. Vein 20 feet wide.	
Surprise	12			
Noonday Group (Boulder, Fourth of July and Grey Eagle Claims.)	15		8 feet vein of concentrating ore. 300 feet of tunnelling.	
Antelope	7			
Franklin	7			
Cumberland	6	Shaft 15 feet deep	Tunnel on vein 132 feet with cross cut 60 feet and drifts on vein from tunnel, one 40 feet and another 70 feet. Ore, galena in quartz. 4 feet vein with pay streak of 14 to 20 inches.	
Tom Moore and St. Lawrence.			Vein 5 feet wide	
Great Western			450 feet cross-cut tunnels, &c. Vein 2½ feet wide with 3 to 14 inch pay streak.	
R. E. Lee			No information to hand	
Bon Ton				
				Four-Mile
Grady Group				
Navigator			3 feet vein with 8 inch pay streak. Parallel vein to Alpha of Grady Group.	
Vancouver Group (Vancouver and Mountain Boomer Claim.)			Over $4,000 worth of development work.	
Lorna Doone			18 inches of rich ore	
Reid & Robertson (Tenderfoot, Reid, Robertson, N. Star and Cosmopolite Claims.)	5		Surface exposure of ore 20 x 1,000 feet. In places 2½ to 4 feet solid ore and the rest concentrating ore.	

*The figures in these columns do not refer to total quantities of ore mined or shipped but give

Milling Plant and Results.	Assays of Specimens and Samples.	Ore Mined.		*Ore Shipments, Particulars of.		Remarks.
		Tons.	Contents or Value.	Tons.	Contents or Value.	
Subdivision—Concluded.						
.....	120 oz. silver; 60 to 80 per cent lead.	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	
.....	169 oz. silver; 70 to 74 per cent lead.	.....	.....	.....	.....	
.....	.....	.....	.....	100	Rumoured 229 oz. of silver.	
.....	.....	100	115 oz. silver; 78 to 80 p.c. lead	.....	.....	
.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	
.....	.....	60	.....	.....	.....	In Idaho Basin.
.....	.....	.....	.....	.....	.....	N. E. of Great Western.
.....	.....	30	120 oz. silver; 70 per cent lead.	.....	.....	
.....	.....	.....	.....	.....	.....	Great Western Group.
.....	.....	.....	.....	A few tons.	$300 to $400 per ton.	Jackson Basin.
Creek Camp.						
.....	.....	500	Valued at $125 per ton.	Carload,....	263 oz. silver per ton.	
.....	120 oz. silver; 65 per cent lead.	.....	.....	.....	.....	Near Alpha of Grady Group.
.....	.....	.....	.....	Two carloads.	250 oz. of silver and 40 to 55 per cent lead per ton.	S. side of Four Mile Creek and 4 miles from Silverton town site.
.....	.....	Several tons.	.....	No shipments.	.....	Extension of Vancouver.
.....	Average sample of croppings 142 oz. silver and 70 per cent lead.	.....	.....	.....	.....	

illustrative data of sundry lots of ore produced, &c.

Name of Claim or Mine.	Force employed.	Mining Developments.		Mining Plant.
		Shafts.	Tunnels, Drifts, Winzes, &c.	
				Wilson
A rush to this camp occurred and much prospecting was done, it is said with satisfactory results, but				
				Eight Mile
Fisher Maiden Group... (Fisher Maiden, Stand-by, and Sixty-three Claims.)	..	....	6 to 7 feet veins with 18 to 20 inches of ore carrying ruby silver and silver glance.	....
Free gold bearing veins reported as discovered.	..	.....	.....	....
				Foot of
Dayton Claim.	..	....	Vein 2½ feet of "dry ore" with 10 inch pay streak.	.....
				Granite Belt, South
Archie Claim.....	..	.....	In Granite belt. Considerable high grade ore said to have been found.	.....
Dolly Varden.....	..	.....		
				Dry Ore
Apart from scattering veins elsewhere in the district yielding this class of ores the discoveries located waters of the N. fork of Carpenter Creek, are particularly noticeable as deposits of "dry ores." process cannot be over-estimated. A number of locations have been made, but so far develop- oz. of silver to the ton.				
Silver Glance and Summit Claims.	..	.....	Quartz gangue. Pay streak 10 to 20 inches wide.	.....
Miner Boy.....	5	....	Ore carries native silver, "black Sulphides," Antimonial silver and "Grey Copper." 175 feet tunnel on vein.	.....
Venmoerkerke.....	..	.....	.....	.....
				White Grouse and
Situated on the head waters of one of the branches of the St. Mary's River. Many locations have				
				La France
On the E. shore of Kootenay L. Over one hundred				

*The figures in these columns do not refer to total quantities of ore mined or shipped but give

Milling Plant and Results.	Assays of Specimens and Samples.	Ore Mined.		*Ore Shipments, Particulars of.		Remarks.
		Tons.	Contents or Value.	Tons.	Contents or Value.	
Creek Camp.						
further development work was delayed owing to the general depression.						
Creek Camp.						
.....	Lowest assay 220 oz. silver. Assay from 6 inch pay streak 600 oz. silver.	.....	.....	.....	.....	
.....	One discovery assayed $249, another $400 in gold per ton.	.....	.....	.....	.....	
Slocan Lake.						
....	Pay streak averages 215 oz. silver and $21 gold. Highest assay 920 oz. silver and $40 gold.	.....	.....	.....	....	Three miles E. of and near the foot of Slocan Lake.
of New Denver.						
.. ..	.....	.....	.....	.....	.....	.....
Belt.						
on the belt, extending from Slocan Lake near the mouth of Wilson Creek eastwards to the head- The importance of these ores for mixing with the others of the district to facilitate the smelting ment work has not been extensive but assays of specimens are said to have yielded from 91 to 1250						
.....	.....	.....	.....	1½	232 oz. silver.	
.....	Assays from 640 to 3834 oz. silver.	.....	.....	2½	395 oz. silver.	
....	....	.....	.....	3	195 oz. silver.	
Red Mountain Subdistrict.						
been staked out but although some rich specimens were obtained little or no developments were made.						
Creek Subdistrict.						
claims located but ore reported to be of low grade.						

illustrative data of sundry lots of ore produced, &c.

Name of Claim or Mine.	Force employed.	Mining Developments.		Mining Plant.
		Shafts.	Tunnels, Drifts, Winzes, &c.	
Fry Creek				
Placer Claim	..		Located too late to commence work.	
Gold-bug	..			
Lardeau and				
Although much interest was taken in that part of the district of S. W. Kootenay situated along the disappointing. Twenty-seven miles of new trails have been constructed making a valuable				
Great Northern Group	..		Tunnel run for some distance	
Wagner Group	..		Vein 20 feet wide. Some development work done.	
Silver Cup	..		4 feet vein being developed	
Abbott Group	..		Considerable work done in the fall.	
Riverside Claim	..		3 feet ledge of ore. 50 feet tunnel.	
Black Prince	..			
Gainor Group	..		4 feet vein	
Abrahamson Group	..		Considerable work has been done.	
Goat River and				
Locations made, 52; certificates of work, 28. Developments said to have proved the existence of better means of communication to ship the ore to market.				
Illecillewaet				
There were 31 locations made, 12 being new discoveries, the remainder re-locations of abandoned done in the district; no development.				
Glengarry and Sir John Macdonald Claims.	..		Large show of ore said to have been located in September.	

*The figures in these columns do not refer to total quantities of ore mined or shipped but give

Milling Plant and Results.	Assays of Specimens and Samples.	Ore Mined.		*Ore Shipments, Particulars of		Remarks.
		Tons.	Contents or Value.	Tons.	Contents or Value.	
Subdistrict.						
.....	.....	.....	.....	.....	.....	
.....	Quartz specimens obtained assaying high in gold.	.....	.....	.....	.....	
Duncan Subdistrict.						
rivers thus named and many prospectors went there, the results in general seem to have been rather addition to the means of operating the district.						
.....	110 oz. silver; considerable gold.	.....	.....	.....	.....	On N. fork of Lardeau R.
.....	110 oz. silver; 70 per cent lead.	.....	.....	.....	.....	Near head waters of Healy Creek.
.....	600 to 1300 oz. silver.	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	On a fork of Healy Creek.
.....	$17 to $20 in gold.	.....	.....	.....	.....	On Trout L.
.....	300 to 400 oz. silver.	.....	.....	.....	.....	
.....	103 oz. silver; $46.65 in gold.	.....	.....	.....	.....	12 miles from Trout L.
.....	23 to 153 oz. silver; $16 to $53 in gold.	.....	.....	.....	.....	
Duck Creek Subdivision.						
large bodies of rich ore many tons of which have been mined and are now on the dumps awaiting						
Subdivision.						
ground. 37 certificates of work were issued. 15 bills of sale were recorded. Only assessment work						
.....	Specimens, 400 oz. silver; 20 per cent copper; a little gold.	.....	.....	.....	.....	20 miles up Fish River.
illustrative data of sundry lots of ore produced, &c.						

Name of Claim or Mine.	Force employed.	Mining Developments.		Mining Plant.
		Shafts.	Tunnels, Drifts, Winzes, &c.	

Revelstoke

Locations made, 27; certificates of work, 2; bills of sale, 25. The majority of locations were

Big Bend Section	..	...	....	... .
French Creek	..	....	Quartz specimens obtained said to assay well in gold.	....
" [Consolidation Placer Claim.]	..	....	Reported to be taking out good pay but no returns to hand.	.....
" [McCullock Creek]	..	.. ..	Attention is being directed to this creek.	... .
Smith Creek and Goldstream.	..	.....	Gold obtained from placer on Goldstream, but cold weather prevented clean up on Smith Creek.	....

* The figures in these columns do not refer to total quantities of ore mined or shipped but give

Milling Plant and Results.	Assays of Specimens and Samples.	Ore Mined.		*Ore Shipments, Particulars of.		Remarks.
		Tons.	Contents or Value.	Tons.	Contents or Value.	
Subdivision.						
re-locations of abandoned ground.						
....	... .	....	.....	....	....	26 of the locations were made here.
....	.....	.....	.....	.....	....	
.....	..... .	.....	.....	....	.. ..	
.. ..	....	.....	....	.. ...	....	
....	.....	.....	.....	....	$400	
illustrative data o sundry lots of ore produced, &c.						

PRECIOUS METALS.

Vancouver Island.

Discovery and development in British Columbia.

The report of the Minister of Mines contains some interesting notes by Mr. Herbert Carmichael, the provincial government analyst, on certain mineral occurrences in the south-western portion of the island, from which the following data have been gleaned:—

Leech River Sub-district.—A good deal of prospecting has been done on the different branches of this river, the best results having been obtained from the West and South Forks, the few samples received from the North Fork proving of little value.

After leaving the slate country on the North Fork hardly any gold is found in the creek and no ledges have been discovered of any value, but some gold has been found on the West Fork that drains the Jordan Meadows.

Koksilah, Jordan and San Juan Rivers.—Gold has been obtained at the headwaters of these rivers, all of which rise in the same range of mountains.

Jordan Meadows.—"Colours" have been found in a bed of red gravel above the meadows at the headquarters of the Jordan River. A prospect hole was sunk some years ago to bed rock, which was found at 15 feet below the surface, but after going through the red gravel no more gold was found, the bed rock proving quite clean. All the gold in the creeks of this district is of a coarse character.

San Juan Sub-district.—Gold has been found in nearly all the streams flowing into the San Juan harbour. There are some good looking quartz ledges between the McDonald and Fleetwood creeks, which flow into the San Juan River near where the Leech River trail strikes it Some quartz veins are said to be at the headquarters of the Gordon River. A $10 gold nugget was found in a small stream flowing into Providence Cove, which led to further prospecting being done, resulting in the locating of several veins of white quartz, whose outcroppings showed small quantities of gold.

Carmanah Light.—Gravel which will give a "colour" to the pan in almost every place tried, is said to exist in large quantities in the neighbourhood of this point on the coast.

Cowichan Lake Sub-district.—Several of the streams flowing into this lake give "colours" of gold, and galena has been found in small quantities about the lake and on the Cowichan River and Nixon Creek.

Alberni sub-district:—

China Creek.—Chinese have worked profitably on this creek, saving the "flour gold" there found. Several claims have been located on

quartz veins at the head of the creek on which a small amount of development has been done. Most of the ore of this district has so far, however, proved refractory, the gold being apparently carried in the pyrites. PRECIOUS METALS. Discovery and development in British Columbia.

Texada Island.—It is reported from this place that finds of gold quartz have been made as a result of prospecting work during the season.

ASSAYS OF ORES.

Assays of ores.

The following extracts from the report by Mr. W. Pellew Harvey, on the assay of the ores exhibited by the province at the Chicago Exhibition, is here reproduced in full, as giving interesting and valuable general data regarding the ores of the various mining districts of the province. Various ores are included which would mineralogically be rather ranked as copper minerals, but which can properly be considered in this connection in view of their carrying considerable amounts of the precious metals. The range of Mr. Harvey's investigations covered the assaying and examination of some 200 specimens.

East Kootenay.—From East Kootenay, not including Fort Steele district, there were thirty-five specimens received, some carrying argentiferous lead, others argentiferous copper, and some were quartz, carrying small quantities of silver, with a good sprinkling of gold.

The silver average, taking one with another, was 45·50 oz. per ton.
The gold " " " " 4·30 "

Adding these, we have a result which is exceedingly encouraging, particularly when the fact is kept fully in view that some of the specimens from which the average is obtained should not really be classified as silver bearing at all.

The "silver-lead" ores from this particular district, were such that a smelting company, having opportunities of mixing their purchases, would have no necessity for making any deduction for zinc or other base metals, detrimental to the working of the product.

With the exception of the Monarch ores at Field, the little zinc contained is in nearly every case counterbalanced by the proportion of iron. The ores carrying most zinc are those, as a rule, which could not be concentrated on account of the considerable amount of silver contained in the zinc-blende. There is, however, no silver in the zinc-blende of the Monarch mine.

Gold Ore.—The samples treated were chiefly quartz, and quartz carrying iron and arsenical pyrites. In the majority of the cases the

PRECIOUS METALS.

Assays of ores.

gold was free. This would naturally be the case at the surface the action of the air having converted the original sulphides into oxides, leaving the precious metal, exposed and deposited in the cells vacated by the cubes of sulphurets, now decomposed.

Fort Steele.—The average contents of the silver and gold in the specimens from this camp was not so encouraging as from other parts of East Kootenay, but this may be accounted for by the fact that several samples were sent which should have remained where they were found. To compensate, however, the "North Star" comes in with a 47 oz. silver and 63·47 per cent lead ore. The partial analysis of this ore may be of interest to the smelting men, showing as it does good fluxing properties :

Lead	67·50 per cent.
Iron	6·63 "
Zinc	1·90 "
Antimony	5·41 "
Silver	47·31 oz. per ton.

West Kootenay.

The number of specimens received from the camps in West Kootenay was greatly in excess of that from East Kootenay. They average well in both silver and lead.

Thirteen specimens were received from the section which includes the following well known mines : Best, Great Western, Lucky Jim, Washington, Northern Belle, Monte-Christo, White Water, Wellington, Blue Bird, Reca, Bonanza King, Payne, and Dardanelles.

The silver contained averaged..... 237 oz. per ton.
The lead " " ..... 58·00 per cent.

with very little detrimental impurities if any. There was a little antimony, and in some cases a small percentage of zinc.

Hot Springs—Eighteen specimens, averaging in silver.. 58 oz. per ton.
" " lead.. 53·00 " cent.

No gold. A few of these were certainly refractory ores, but the majority could easily be smelted with mixing facilities. Sulphide of antimony was present.

Slocan.—The seventeen samples from the Slocan were excellent specimens of galena.

The silver average was..... 178 oz. per ton.
The lead " ..... 61·00 per cent.

As in the former case, they carry no gold. Any of these ores could be easily reduced. They carry with lead and silver, antimony and iron.

One glance at the averages show one what there is in store for the Slocan. Combining this group with that of the Payne and Dardanelles, etc., I doubt if any mining section of North America can equal these results. PRECIOUS METALS. Assays of ores.

Illecillewaet.—The exhibit from this old mining locality, favourably situated on the main line of the Canadian Pacific Railroad, is an exceptionally good one. There is hardly a sample which could not be classified as high grade. Some of the eight sent, although not quite as rich in silver as the ore from the Slocan, are quite equal in smelting qualities. Clean ores, running over 70 per cent in lead, with the balance sulphur, antimony, and a little silica, are not to be met with every day. These specimens are more than creditable to the contributors and the camp. The Elizabeth, North Star, Red Fox, and Annie, should be particularly mentioned. The Illecillewaet collection is no doubt equal if not superior to any.

The silver contents averaged.....111 oz. per ton.
The lead " ..... 64·00 per cent.

There was one sample of "peacock copper ore" from the Silver Bow which struck me as being a particularly beautiful specimen, carrying heavy percentages of gold, silver and copper.

Nelson.—Three pieces of quartz containing free gold were treated which came from near Nelson, the exact location not known. The gold average was $60.12 per ton, a fact which should lead to a strict investigation of the reef from which the specimens were obtained.

Toad Mountain.—A few samples only were sent from this camp. There was one fine ferruginous quartz specimen from the Majestic, carrying much free gold. The Silver King, argentiferous copper, with silver 444 oz., and 23.50 per cent copper, requires no further mention. The Dandy sent two specimens, but unfortunately my tests did not come anywhere near the produce generally credited to this ore. It is decidedly refractory.

Trail Creek.—Sixteen specimens composed this exhibit. They contained various quantities of gold, silver and copper. The ore is a yellow sulphide, and should be treated and converted into matte on the spot. The extent of the deposits, and the gold contained, should make these ores valuable apart from copper. I should expect to find nickel in such ore.

Nakusp.—These ores were certainly exceedingly good and particularly clean. Eight made the total sent, all of which were good wet ores.

The silver contents averaged.. 85 oz. per ton.
The lead " .. 64·00 per cent.

PRECIOUS METALS.

There is little else to be said of this camp, as the remarks of the Slocan are adapted to it.

Assays of ores.

Lardeau.—From the Lardeau eleven samples were treated. The specimens were very fine with very metallic appearance but in many cases, as the assays will show, they did not carry lead. The concentrator will have to be used freely in this camp, if the surface indications are to be taken as indicating the nature of the deposits. With development, however, we may expect more gold. These specimens are in remarkable contrast with any other argentiferous lead ores of West Kootenay, in containing gold. The Silver Cup was decidedly the leader in value of assay, which ran to 251 oz. silver, and $40 in gold to the short ton. The future treatment of these ores will require much consideration and careful analysis.

Yale.—These, which were chiefly gold ores, were slightly disappointing. The average value for gold is small, but, owing to the extent of the reefs, good results may follow. The writer may add, however, that during a private experience with these ores, he has found them of good average yield, and in one case platinum was discovered.

Kamloops.—But few specimens came from this section; but these were all good. One sample of copper from the "Victoria" was first-class and carried 60 per cent of the metal. The silver-leads were good as "concentrating propositions," and should receive the attention they deserve.

Osoyoos Division.—I was particularly struck with the nature of the exhibits from this district. The ores seem to contain silver, gold, lead and copper, in paying quantities. In one case a heavy specimen of antimony sulphide was met with. The majority of the claims sent gold ore, the best assay amounting to $360 per ton in gold; this was from the Stemwinder. All the ores are concentrating, carrying the precious metals, in association with iron and assencial pyrites, in a quartz gangue. The gold averaged $30 to $60 per ton.

This concludes my remarks on the ores treated. Attention is drawn to the fact that in individual cases the assays are below the generally reputed values. This is sure to happen in a new country, where the general idea is to "boom" everything. The collection of specimens has been reported upon as fairly and conscientiously as possible; and the splendid average in silver, gold, lead and copper—of the specimens forwarded will speak for itself.

Cariboo.—A few specimens came from this pioneer camp. These were mainly sulphurets (iron and arsenic), carrying from one to three ounces of gold to the ton. With the modern methods of gold extrac-

tion, there is every probability that this mining region will more than regain its proud position. PRECIOUS METALS.

MARKETING AND SMELTING.

Marketing and smelting.

So far the sale for these silver-bearing lead and copper ores of the East and West Kootenay districts has been to the smelting establishments of the Western States. The following figures, kindly furnished by one of the owners of the Wellington Mine in the Kaslo sub-district will give an idea of the smelting charges on this class of rich argentiferous galena, &c., for 1893.

The Tacoma smelter allowed 90 per cent of the lead contents at New York quotations, less 1½ cents for duty, and 95 per cent of the silver contents also at New York quotations, less a smelting charge of $9.

The smelter at East Helena allowed the full contents and deducted $23 for smelting charges.

Whilst there are several establishments for treating ores in the district either complete or in course of construction, none were in operation.

The smelters at Golden and Revelstoke have not yet been operated to any extent, but the small sampling plant recently erected at Kaslo meets a want, and when the reduction and concentrating plant at Ainsworth and the smelter at Pilot Bay on Kootenay Lake are completed and put into operation, doubtless much of the product of the mines will find a local market, which will result in a great saving on freight charges.

PYRITES.

PYRITES.

The production of pyrites was less during 1893, than in 1892, by 1,228 tons and $3,864, as shown by the following figures:— Production.

1887	38,043	tons, valued at	$171,194
1888	63,479	" "	285,656
1889	72,225	" "	307,292
1890	49,227	" "	123,067
1891	67,731	" "	203,193
1892	59,770	" "	179,310
1893	58,542	" "	175,626

The production for 1894 is 40,527 tons, valued at $121,581.

This material is worth about 13 cents per unit for the contained sulphur, which would give a value for the Canadian ore of about $5 in New York per long ton, or about $3 per short ton for its spot value at the mines.

PYRITES.

Production.

The figures given represent the quantities of the mineral shipped or used during the year for acid making. The great bulk of it is shipped to the United States, only a small proportion being used locally at the Capelton acid works of the Nichols Chemical Company and a little also at the Smith's Falls chemical works.

The average sulphur contents of the ore shipped during the year was about 38 per cent.

The reported introduction by many of the United States acid works of the necessary alterations to enable them use pyrites in place of sulphur, should cause an increasing demand for pyrites, and thereby give a proportionately larger market for the Canadian mineral.

Exports and imports.

EXPORTS AND IMPORTS.

The exports of pyrites are given by the Customs Department as 26,750 tons, which represents about half of the material known to have been exported. This discrepancy is doubtless due to some of the material having been classed as copper ore owing to the percentage of that metal it carries.

The imports are as follows :—

PYRITES.

TABLE 1.

IMPORTS: BRIMSTONE OR CRUDE SULPHUR.

Fiscal Year.	Pounds.	Value.
1880	1,775,489	$27,401
1881	2,118,720	33,956
1882	2,375,821	40,329
1883	2,336.085	36,737
1884	2,195,735	37,463
1885	2,248,986	35,043
1886	2.922,043	43,651
1887	3,103,644	38,750
1888	2,048,812	25,318
1889	2,427,510	34,006
1890	4,440.799	44,276
1891	3,601,748	46,351
1892	4,769,759	67,095
1893	6,381,203	77,216
1894	5,845,463	61,558

SALT.

SALT.

The production of salt for 1893 was as follows :—

Land salt	2,355 tons,	worth	$5,658
Coarse "	12,680 "	"	38,575
Fine "	42,497 "	"	129,275
Dairy "	4,792 "	"	22,418
Total	62,324 "	"	$195,926

The annual production during past years will be found graphically represented in table A, from which it will be seen that whilst there was a yearly decrease from 1886 to 1889, there has been since then a small but steady increase, which has brought the figures of production up to what they were in 1886. The production during 1894 was 57,199 tons valued at $170,687. SALT. Production.

The figures of exports and imports compiled from data provided by the Customs Department will be found in the following tables Nos. 1, 2 and 3 :—

SALT.
ANNUAL PRODUCTION.
Table A.

Year.	Tons.	Value.
1886	62,359	$227,195
1887	60,173	166,394
1888	59,070	185,460
1889	38,832	128,547
1890	43,754	198,857
1891	45,021	161,179
1892	45,486	162,041
1893	62,324	195,926
1894	57,199	170,687

SALT.

Exports and imports

SALT.

TABLE 1.

EXPORTS.

Year.	Bushels.	Value.
1880	467,641	$46,211
1881	343,208	44,627
1882	181,758	18,350
1883	199,733	19,492
1884	167,029	15,291
1885	246,794	18,756
1886	224,943	16,886
1887	154,045	11,526
1888	15,251	3,987
1889	8,557	2,390
1890	6,605	1,667
1891	5,290	1,277
1892	2,000	504
1893	4,940	1,267
1894	4,639	1,120

SALT.

TABLE 2.

IMPORTS: SALT PAYING DUTY.

Fiscal Year.	Pounds.	Value.
1880	726,640	$ 3,916
1881	2,588,465	6,355
1882	3,679,415	12,318
1883	12,136,968	36,223
1884	12,770,950	38,949
1885	10,397,761	31,726
1886	12,266,021	39,181
1887	10,413,258	35,670
1888	10,509,799	32,136
1889	11,190,088	38,968
1890	15,135,109	57,549
1891	15,140,827	59,311
1892	18,648,191	65,963
1893	21,377,339	79,838
1894	15,867,825	53,336

SALT.

TABLE 3.

Exports and imports.

IMPORTS: SALT NOT PAYING DUTY.

Fiscal Year.	Pounds.	Value.
1880	212,714,747	$400,167
1881	231,640,610	488,278
1882	166,183,962	311,489
1883	246,747,113	386,144
1884	225,390,121	321,243
1885	171,571,209	255,719
1886	180,205,949	255,359
1887	203,042,332	285,455
1888	184,166,986	220,975
1889	180,847,800	253,009
1890	158,490,075	252,291
1891	195,491,410	321,239
1892	201,831,217	314,995
1893	191,595,530	281,462
1894	196,668,730	328,300

DISCOVERY AND DEVELOPMENT.

Discovery and development.

With regard to the industry, there is nothing new and the permanent features have been dealt with in previous reports.

The figures of production for 1893, given above, represent the product of some 20 operators in Ontario employing, according to the returns received, over 200 men. Probably about half of this number were employed in the actual manufacture of the salt, the remainder working in the cooper shops, usually connected with salt works, making the necessary packages for the salt.

Except for a very small amount produced in New Brunswick, operations were as formerly confined to evaporating the brines pumped from the numerous wells throughout the Western Ontario salt field which borders on Lake Huron. Full descriptions have been given of these in previous reports, which it will be unnecessary to repeat here.

STRUCTURAL MATERIALS.

STRUCTURAL MATERIALS.

Building Stone.—No returns were asked for nor received for the year's production of building stone. There was, however, a much larger production than in previous years, due to the large amount of building operations in the larger cities. According to the report of the Bureau of Mines of Ontario for the year ending 31st October,

Building stone.

STRUCTURAL MATERIALS.

Building stone.

1893, there was produced in that province building stone of various grades as follows :—

Dimension stone,	c. ft.	1,400,000, valued at	$260,000
Heads and sills	"	44,700 "	21,000
Coursing stone	sq. yds.	170,000 "	180,000
Rubble, &c.	c. yds.	410,000 "	260,000
			$721,000

According to figures published in past reports of this division, Ontario has annually afforded about two-thirds of the total production. Assuming this to have been the case, there will be seen to have been a total output throughout the Dominion of about $1,100,000.

No further information regarding production or development is at hand.

The following tables of exports and imports are taken from the reports of the Customs Department and are self-explanatory.

STRUCTURAL MATERIALS,

TABLE 1.

EXPORTS OF STONE AND MARBLE, WROUGHT AND UNWROUGHT.

Province.	Wrought.		Unwrought.	
	1893.	1894.	1893.	1894.
	$	$	$	$
Ontario	4,558	17,497	2,203	16,250
Quebec	2,843	1,761	3,200	1,883
Nova Scotia	819	3,185	385	7,525
New Brunswick	882	133	3,543	5,686
British Columbia	.....	.....	3,201	2,786
Totals	,102	22,576	12,532	34,130

The foregoing table, probably, includes also a small quantity of granite.

STRUCTURAL MATERIALS.

TABLE 2.

IMPORTS OF BUILDING STONE.

Fiscal Year.	Value.
1880	$ 35,970
1881	58,149
1882	33,623
1883	35,061
1884	51,088
1885	30,491
1886	41,675
1887	54,368
1888	86,373
1889	100,314
1890	132,155
1891	170,890
1892	95,550
1893	56,510
1894	52,908

STRUCTURAL MATERIALS,

TABLE 3.

IMPORTS OF MANUFACTURES OF STONE OR GRANITE, N.E.S.

Fiscal Year.	Value.
1880	$29,408
1881	36,877
1882	37,267
1883	45,636
1884	45,290
1885	39,867
1886	41,984
1887	41,829
1888	47,487
1889	61,341
1890	84,396
1891	61,051
1892	39,479
1893	49,323
1894	49,510

STRUCTURAL MATERIALS.

According to the foregoing statistics, there will be found, during 1893, to have been a market for building stone in Canada of $1,159,069, as follows:

Building stone.

Production estimated	$1,100,000	
Imports, building stone	56,510	
" stone and granite (consisting principally of structural stone)	49,323	
		$1,205,833
Less.		
Exports, wrought stone	$ 9,102	
" unwrought stone	37,662	
		46,764
		$1,159,069

This amount shows an increase over figures obtained in the same way for 1892, of $469,317.

Marble.

Marble.—The production of marble, according to direct returns received at this office, is altogether that of the province of Ontario and amounted to 590 tons valued at $5,100, showing an increase in value over the previous year of $1,500, whereas the quantity was increased 250 tons.

The production during past years was as follows:

1886	501	tons, value,	$9,900
1887	242	" "	6,224
1888	191	" "	3,100
1889	83	" "	980
1890	780	" "	10,776
1891	240	" "	1,752
1892	340	" "	3,600
1893	590	" "	5,100

No returns of production were received for 1894.

In the following table are given the imports since 1880. No exports are reported as such, though there may be a small quantity included in table 1.

STRUCTURAL MATERIALS.

STRUCTURAL MATERIAL.

TABLE 4.

IMPORTS OF MARBLE.

Marble.

Fiscal Year.	Value.
1880	$ 63,015
1881	85,977
1882	109,505
1883	128,520
1884	108,771
1885	102,835
1886	117,752
1887	104,250
1888	94,681
1889	118,421
1890	99,353
1891	107,661
1892	106,268
1893	96,177
1894	94,657

Granite.—The production of granite during 1893 was 22,521 tons, valued at $94,393, showing a decrease in quantity compared with the previous year, yet in value there is seen to have been an increase of $5,067. Granite.

The production by provinces was as follows :—

Ontario	2,642 tons,	valued at	$ 4,951
Quebec	10,340 "	"	46,375
Nova Scotia	3,184 "	"	14,898
New Brunswick	1,625 "	"	17.300
British Columbia	4,730 "	"	10,869

During past years the annual production was as follows :—

1886	6,062 tons,	valued at	$ 63,309
1887	21,217 "	"	142,506
1888	21,352 "	"	147,305
1889	10,197 "	"	79,624
1890	13,307 "	"	65,985
1891	13,637 "	"	70,056
1892	24,302 "	"	89,326
1893	22,521 "	"	94,393
1894	16,392 "	"	109,936

The exports and imports, if any, are not available, being included in the figures shown in tables 1 and 3. Slate.

Slate.—This industry is showing a steady growth several new quarries having been opened up during 1893. The production during

STRUCTURAL MATERIALS.

1893 was 7,112 tons, valued at $90,825, an increase over the previous year of 1,932 tons and in value of $2,175.

Slate.

The production during 1894 was valued at $75,550.

The following tables are of exports and imports during the present and past years :—

STRUCTURAL MATERIALS.

TABLE 5.

EXPORTS OF SLATE.

Year.	Tons.	Value.
1884	539	$6,845
1885	346	5,274
1886	34	495
1887	27	373
1888	22	475
1889	26	3,303
1890	12	153
1891	15	195
1892	87	2,038
1893	178	3,168
1894	187	3,610

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TABLE 6.

IMPORTS OF SLATE.

Fiscal Year.	Value.
1880	$21,431
1881	22,184
1882	24,543
1883	24,968
1884	28,816
1885	28,169
1886	27,852
1887	27,845
1888	23,151
1889	41,370
1890	22,871
1891	46,104
1892	50,441
1893	51,179
1894	29,267

Flagstones.

Flagstones.—The production of flagstones during 1893 was as in previous years principally that of Quebec and Nova Scotia, from which provinces, only, were returns received. These show the production to have been 40,500 square feet valued at $3,487, an increase over 1894 of 26,800 square feet and in value $2,118.

During the past seven years the annual production has been as follows :

Flagstones.

1887—116,000	feet,	valued	at	$11,600
1888— 64,800	"	"	.....	6,580
1889— 14,000	"	"	.....	1,400
1890— 17,865	"	"	.....	1,643
1891— 27,300	"	"	.....	2,721
1892— 13,700	"	"	.....	1,869
1893— 40,500	"	"	.....	3,487

In 1894 the production was 152,700 square feet valued at $5,298.

No exports of flagstones are reported as such ; the imports are given below :

STRUCTURAL MATERIALS.

TABLE 7.

IMPORTS OF FLAGSTONES.

Fiscal Year.	Tons.	Value.
1881	23	$ 241
1882	90	848
1883	10	99
1884	137	1,158
1885	205	1,756
1886	1,602	9,443
1887	1,316	10,966
1888	2,642	21,077
1889	1,669	15,451
1890	5,665	48,995
1891	3,770	36,348
1892	1,571	15,048
1893	884	8,500
1894	218	2,429

Cement.

Cement.—During 1893, there was a production of natural and Portland cement amounting to 158,597 barrels valued at $194,015, showing an increase in quantity over the previous year of 51,189 barrels, the increase in value being $46,352.

In 1893 the production of both natural and Portlant cement was :

Natural cement, 126,673 barrels, valued at....$130,167
Portland " 31,924 " 63,848

STRUCTURAL MATERIALS.

Cement.

For the past seven years there has been an annual production of cement as follows :—

1887.....	69,843	bls.	valued at	$ 81,909
1888.....	50,668	"	"	35,593
1889.....	90,474	"	"	69,790
1890.....	102,216	"	"	92,405
1891.....	93,473	"	"	108,561
1892.....	107,408	"	"	147,663
1893.....	158,597	"	"	194,015

During 1894 the production was 108,142 barrels, valued at $144,637,

No data regarding recent developments are at hand. The following tables show the exports and imports of all classes of natural and Portland cements :

STRUCTURAL MATERIALS.

TABLE 8.

EXPORTS OF CEMENT.

Province.	1891.	1892.	1893.	1894.
Ontario.....	$2,534	$399	$ 718	$339
Quebec.....	283	539	386	42
Nova Scotia.....	64	.....	68	101
Totals.....	$2,881	$938	$1,172	$482

STRUCTURAL MATERIALS.

TABLE 9.

IMPORTS OF CEMENT IN BULK OR BAGS.

Fiscal Year.	Bushels.	Value.
1880.....	65	$ 28
1881.....	579	298
1882.....	386	86
1883.....	1,759	548
1884.....	4,626	1,236
1885.....	4,598	1,315
1886.....	6,808	1,851
1887.....	5,421	1,419
1888.....	23,919	5,787
1889.....	32,818	10,668
1890.....	21,055	5,443
1891.....	11,281	2,890
1892.....	14,351	3,394
1893.....	12,534	2,909
1894.....	9,027	2,618

STRUCTURAL MATERIALS.

STRUCTURAL MATERIALS.

TABLE 10.

IMPORTS OF HYDRAULIC CEMENT.

Cement.

Fiscal Year.	Barrels.	Value.
1880	10,034	$ 10,306
1881	7,812	7,821
1882	11,945	13,410
1883	11,659	13,755
1884	8,606	9,514
1885	5,613	5,396
1886	6,164	6,028
1887	6,160	8,784
1888	5,636	7,522
1889	5,835	7,467
1890	5,440	9,048
1891	3,515	6,152
1892	2,214	2,782
1893	4,896	8,060
1894	1,054	985

STRUCTURAL MATERIALS.

TABLE 11.

IMPORTS OF PORTLAND CEMENT.

Fiscal Year.	Barrels.	Value.
1880		$ 55,774
1881		45,646
1882		66,579
1883		102,537
1884		102,857
1885		111,521
1886		120,398
1887	102,750	148,054
1888	122,402	177,158
1889	122,273	179,406
1890	192,322	313,572
1891	183,728	304,648
1892	187,233	281,553
1893	229,492	316,179
1894	224,150	280,841

STRUCTURAL MATERIALS.

Cement.

Roofing Cement.—There was a production of roofing cement during 1893, of 951 tons valued at $5,441, showing a marked increase in quantity, yet the value fell off to the extent of $6,559. The production during past years was as follows:—

1890	1,171	tons,	valued at $	6,502
1891	1.020	"	"	4,810
1892	800	"	"	12,000
1893	951	"	"	5,441
1894	815	"	"	3,978

Lime.

Lime.—No returns being asked for by this office we are unable to give the exact figures of production for 1893.

The production in Ontario, according to the report of the Bureau of Mines of that province, for the year ending 31st October, 1893, was 2,700,000 bushels valued at $364,000. In past years Ontario has been found to produce about two-fifths of the total output; assuming this to be the case, there was therefore an approximate production throughout Canada of 6,750,000 bushels valued at about $900,000.

The exports and imports are given in the following tables:

STRUCTURAL MATERIALS.

TABLE 12.

EXPORTS OF LIME AND CEMENT.

Province.	1893.		1894.	
	Lime.	Cement.	Lime.	Cement.
Ontario	$16,494	$ 718	$13,208	$339
Quebec	25,947	386	30,294	42
Nova Scotia	4,710	68	3,482	101
New Brunswick	36,411		33,830	
Prince Edward Island			3	
Manitoba				
British Columbia	3,061		2,853	
Totals	$86,623	$1,172	$83,670	$482

STRUCTURAL MATERIALS.

STRUCTURAL MATERIALS.

TABLE 13.

IMPORTS OF LIME.

Lime.

Fiscal Year.	Barrels.	Value.
1880	6,100	$ 6,013
1881	5,796	4,177
1882	5,064	5,365
1883	7,623	9,224
1884	10,804	11,200
1885	12,072	11,503
1886	11,021	9,347
1887	10,835	8,524
1888	10,142	7,537
1889	13,079	9,363
1890	8,149	5,360
1891	6,259	4,273
1892	6,132	4,241
1893	6,879	4,917
1894	6,766	4,907

Building Brick.—It is impossible to give the exact production of building brick for 1893, as no returns were asked for. According to the report of the Bureau of Mines of Ontario, there was a production in that province of common brick of 162,350,000 valued at $932,500, and of plain and fancy bricks of 21,581,000, the latter with an average value of $10 per 1000 or $215,810. This would give Ontario a production of 183,931,000 valued at $1,148,310. It has been found that in past years Ontario produced about five-eighths of the total output of the Dominion; assuming this to be the case there would be a production approximately of 290,000,000 valued at $1,800,000. Building brick.

The following tables illustrate the exports and imports of building brick :—

STRUCTURAL MATERIALS.

TABLE 14.

EXPORTS OF BRICKS.

Province.	1890.		1891.		1892.		1893.		1894.	
	M	Value	M	Value	M	Value	M	Value	M	Value
Ontario	715	$3,449	229	$1,039	1,347	$8,784	552	$2,462	280	$1,257
Quebec	.....	.....	.....	...	353	1,566	2,189	17,969	68	917
Nova Scotia	19	156	14	94	252	1,662	2,561	16,449	489	3,252
New Brunswick	.....	.....	.....	.....	10	170	767	7,185	258	1,979
P. E. Island	15	157	3	30	1	10	.....	.....	.....	.....
British Columbia	.....	.....	.....	.....	.....	.....	4	45	.....	.....
Totals	749	3,762	246	1,163	1,963	12,192	6,073	44,110	1,095	7,405

STRUCTURAL MATERIALS.

Building brick.

STRUCTURAL MATERIALS.

TABLE 15.

IMPORTS OF BUILDING BRICK.

Fiscal Year.	Value.
1880	$ 2,067
1881	4,281
1882	24,572
1883	14,234
1884	20,258
1885	14,632
1886	5,929
1887	2,440
1888	20,720
1889	24,585
1890	12,500
1891	9,744
1892	5,075
1893	14,108
1894	18,320

Terra cotta.

Terra Cotta.—During 1893, the production of terra-cotta, both structural and ornamental, amounted to $55,704 of which Ontario afforded $30,704 and Quebec $25,000.

During past years the production was as follows:—

1888	$ 49,800
1889	Not available.
1890	90,000
1891	113,103
1892	97,239
1893	55,704
1894	65,600

Drain tile.

Drain Tile.—The production of drain tile in Ontario according to the report of the Bureau of Mines of that province was, during 1893, 17,300 thousands valued at $190,000 this would represent about nine-tenths of the total production of the Dominion, which would therefore be approximately 190,000 thousands having a value of about $200,000.

No imports or exports are reported as such, the imports, if any, are included with those of sewer pipe.

Sewer Pipe.—The production of sewer pipe during 1893, was $350,000, showing a slight decrease compared with 1892. In 1894 the production was valued at $250,325.

Drain tile.

The production during past years was as follows :—

1888	$266,320
1889	Not available.
1890	348,000
1891	227,300
1892	367,660
1893	350,000
1894	250,325

The following table illustrates the imports of sewer-pipe included with those of drain tiles :—

STRUCTURAL MATERIALS.

TABLE 16.

IMPORTS OF DRAIN TILES AND SEWER PIPES.

Fiscal Year.	Value.
1880	$ 33,796
1881	37,368
1882	70,065
1883	70,699
1884	71,755
1885	69,589
1886	57,953
1887	71,203
1888	101,257
1889	83,215
1890	77,434
1891	87,195
1892	59,537
1893	39,001
1894	24,625

Pottery.—The production of pottery during 1893 amounted to $213,186 ; showing a decrease when compared with 1892. The production according to provinces was :— Pottery.

Ontario	$115,000
Quebec	72,236
Nova Scotia	8,950
New Brunswick	10,000
Prince Edward Island	3,000
Manitoba	4,000

STRUCTURAL MATERIALS.

Pot

It is supposed that there was a small production in British Columbia, though of this we have no returns.

During past years the annual production was as follows:—

1888	$ 27,750
1889	Not available.
1890	195,242
1891	258,844
1892	265,811
1893	213,186
1894	162,144

No exports are reported as such; the only trade statistics available are the imports of earthenware given below:—

STRUCTURAL MATERIALS.

TABLE 17.

IMPORTS OF EARTHENWARE.

Fiscal Year.	Value.
1880	$322,333
1881	439,029
1882	646,734
1883	657,886
1884	544,586
1885	511,853
1886	599,269
1887	750,691
1888	697,082
1889	697,949
1890	695,206
1891	634,907
1892	748,810
1893	709,737
1894	695,514

Sand and Gravel.—No statistics of production are available as no returns were received bearing upon this somewhat uncertain industry; the following tables give, however, some information regarding exports and imports:— STRUCTURAL MATERIALS. Sand and gravel.

STRUCTURAL MATERIALS.

TABLE 18.

EXPORTS OF SAND AND GRAVEL.

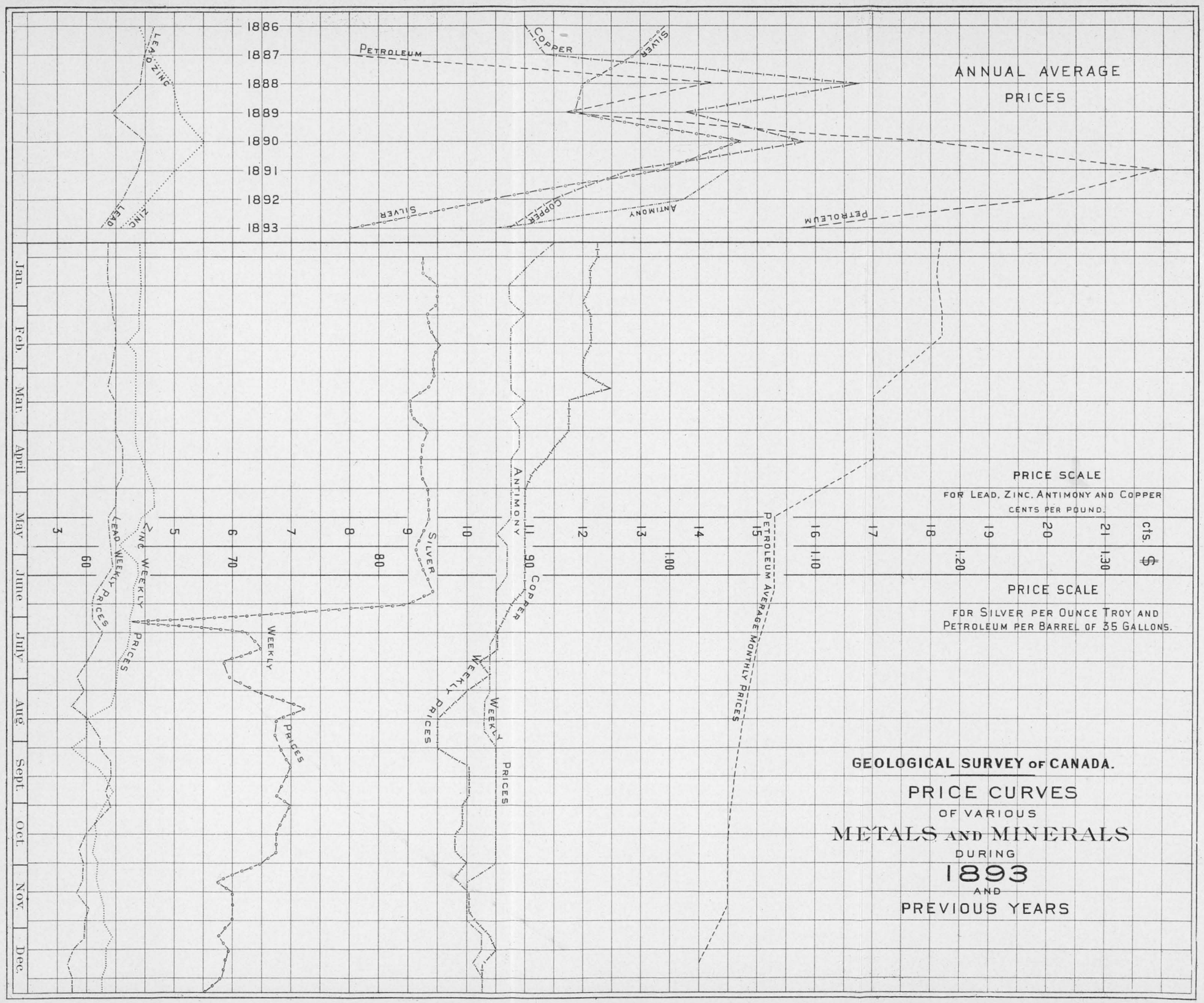
Province.	1892.		1893.		1894.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Ontario	297,406	$84,311	328,707	$121,237	323,679	$84,223
Quebec	25	30	.....	.....	.....	.....
Nova Scotia	175	703	10	9	401	1,605
New Brunswick	150	150	383	525	572	1,104
Manitoba	72	42	.....	.....	.....	.....
British Columbia	50	93	16	24	4	8
Total	297,878	$85,329	329,116	$121,795	324,656	$86,940

STRUCTURAL MATERIALS.

TABLE 19.

EXPORTS OF SAND AND GRAVEL.

Year.	Tons.	Value.	Year.	Tons.	Value.
1877	11,998	$ 2,151	1886	124,865	$ 24,226
1878	50,140	8,381	1887	180,860	30,307
1879	46,999	9,438	1888	260,929	38,398
1880	53,951	11,177	1889	283,044	52,647
1881	58,693	15,129	1890	342,158	65,518
1882	60,158	16,218	1891	243,724	59,501
1883	55,346	14,065	1892	297,878	85,329
1884	73,741	19,978	1893	329,116	121,795
1885	110,661	22,878	1894	324,656	86,940


ANNUAL AVERAGE
PRICES
1886
1887
1888
1889
1890
1891
1892
1893
LEAD
ZINC
PETROLEUM
COPPER
SILVER
ANTIMONY
Jan.
Feb.
Mar.
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
LEAD WEEKLY PRICES
ZINC WEEKLY PRICES
SILVER WEEKLY PRICES
ANTIMONY COPPER WEEKLY PRICES
PETROLEUM AVERAGE MONTHLY PRICES
PRICE SCALE
FOR LEAD, ZINC, ANTIMONY AND COPPER
CENTS PER POUND.
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PRICE SCALE
FOR SILVER PER OUNCE TROY AND
PETROLEUM PER BARREL OF 35 GALLONS.
GEOLOGICAL SURVEY OF CANADA.
PRICE CURVES
OF VARIOUS
METALS AND MINERALS
DURING
1893
AND
PREVIOUS YEARS