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PROVINCE OF ONTARIO
DEPARTMENT OF MINES

HON. CHAS. MCCREA, *Minister of Mines* THOS. W. GIBSON, *Deputy Minister*

Bulletin No. 76

PRELIMINARY REPORT

ON THE

Mineral Production of Ontario

IN

1930

Prepared by W. R. ROGERS and A. C. YOUNG

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THE LEGISLATIVE ASSEMBLY OF ONTARIO

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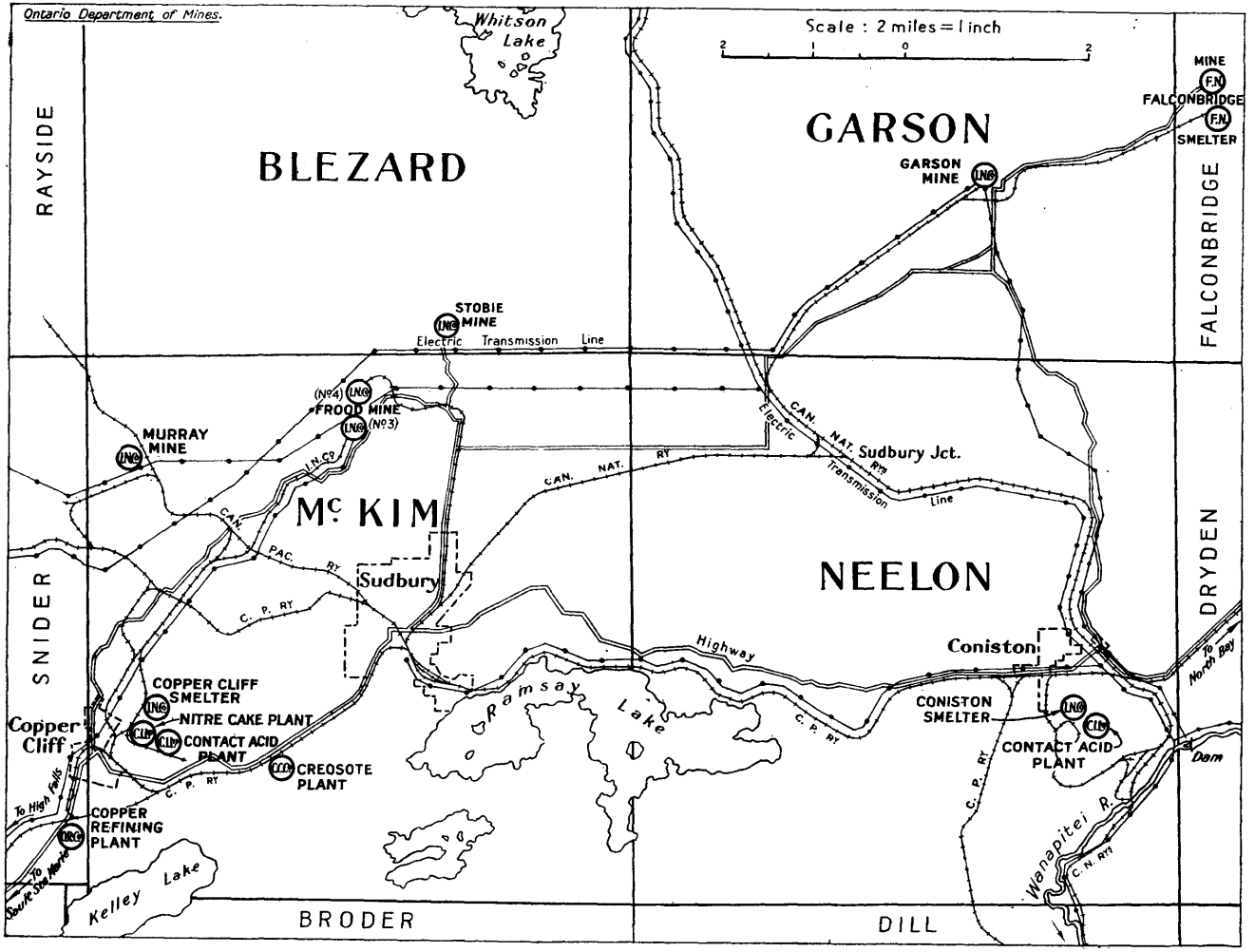


Key map of the Sudbury nickel-copper area, showing principal industrial developments, including location of smelters, copper refinery and certain mines, also chemical plants at Coniston and Copper Cliff.

INTRODUCTORY LETTER

To the Hon. Chas. McCrea,
Minister of Mines.

Sir,—The undersigned has the honour to present an advance statement dealing with the mineral production of the Province of Ontario for the year 1930. For purposes of comparison final figures for 1929 are given in the table (page 4). The report covers the output of mines, quarries, clay and gravel pits, also the products of metallurgical plants treating Ontario ores and minerals. These statistics, with such additions and corrections as may prove necessary, will be embodied in the Fortieth Annual Report of the Ontario Department of Mines, in which the mineral production for 1930 will be reviewed in greater detail. The Mineral Production Bulletin is issued annually early in March for presentation at the annual general meeting of the Canadian Institute of Mining and Metallurgy, along with reports from other Provinces and Canada at large.

To A. C. Young, Statistician, the bulk of the compilation work and much of the comment is due. Acknowledgment is made to all producers whose prompt response in forwarding statistics has rendered this report possible. Since 1921 one set of mineral production forms has served for both the Dominion Bureau of Statistics and the Ontario Department of Mines, and through this co-operation a saving to operators in time and effort has resulted.

Respectfully submitted,

W. R. Rogers,
Director, Publications and Statistics Branch.

Department of Mines,
Toronto, March 3, 1931.

SUMMARY OF ONTARIO'S MINERAL PRODUCTION, 1929 AND 1930

Product (tons of 2,000 lb.)	1929 (Final)		1930 (Preliminary)	
	Quantity	Value	Quantity	Value
METALLIC:		$		$
Gold ..... oz.	1,622,267	33,535,226	1,736,855	35,903,841
Silver ..... "	8,711,643	4,630,820	10,481,772	3,994,169
Copper in matte exported (a) ..... lb.	16,898,515	2,534,777	11,709,866	1,170,987
Nickel in matte exported (a) ..... "	28,136,095	5,064,497	41,956,143	7,552,102
Copper metallic and in concentrates, exported ..... "	71,981,544	12,087,832	116,018,833	14,019,219
Nickel, metallic and contained in speiss and in ore exported ..... "	70,741,300	18,646,391	57,482,455	15,485,854
Nickel oxide and salts ..... "	14,916,784	3,404,573	5,797,257	1,417,178
Platinum metals ..... oz.	29,615	1,646,381	68,040	2,436,683
Bismuth ..... lb.	27,446	23,413	12,732	6,366
Cobalt, metallic and in residues exported Cobalt oxide (metal content) ..... " Cobalt in salts and unseparated oxides..	929,415	1,801,915	694,163	1,144,007
Lead, pig, and in concentrates exported. "	4,769,506	294,431	2,193,856	116,031
Zinc in concentrates exported ..... "	5,516,806	297,190	3,527,894	127,004
Total	.....	83,967,446	.....	83,373,441
NON-METALLIC:				
Actinolite ..... tons	30	375	34	437
Arsenic, white ..... lb.	3,742,913	154,887	2,750,887	109,932
Beryl ..... "	4,456	114	.....	.....
Diatomite ..... tons	.....	.....	10	140
Feldspar, crude and ground ..... "	21,737	206,979	9,722	102,871
Fluorspar ..... "	70	1,120	80	1,240
Graphite, crude and refined ..... "	1,288	90,522	1,338	865,43
Gypsum ..... "	100,347	832,689	94,946	776,069
Iron pyrites and sulphur (b) ..... "	4,579	51,516	7,275	73,835
Mica ..... "	2,991	45,919	756	34,275
Mineral water ..... Imp. gals.	309,700	13,651	211,700	20,594
Natural gas ..... M. cu. ft.	8,583,187	4,968,137	7,901,137	4,503,650
Peat ..... tons	1,000	4,500	628	1,602
Petroleum, crude ..... bbls.	121,125	253,678	117,302	235,746
Quartzite and quartz ..... tons	187,973	316,050	207,231	297,638
Silica brick (c) ..... M.	1,566	80,374	378	19,120
Salt ..... tons	302,445	1,420,424	245,793	1,568,250
Talc and soapstone ..... "	15,463	180,492	11,664	133,213
Tons	.....	8,621,427	.....	7,965,155
STRUCTURAL MATERIALS:				
Cement, Portland ..... bbls.	4,624,712	6,608,246	3,942,690	5,779,404
Hydrated lime ..... tons	55,916	740,127	41,839	495,146
Quicklime ..... "	314,246	2,624,285	211,082	1,688,641
Sand and gravel ..... "	8,045,213	3,156,254	9,356,573	3,241,858
Sand-lime brick (d) ..... M.	55,750	641,159	41,576	424,178
Stone: limestone, trap, granite, etc .... tons	5,244,194	4,771,616	5,101,860	4,608,564
Tons	.....	18,541,687	.....	16,237,791
CLAY PRODUCTS:				
Brick, face ..... M.	119,239	2,467,539	89,044	1,803,267
" common ..... "	75,060	1,188,688	58,263	873,206
" fancy and ornamental ..... "	111	9,012	265	23,858
" sewer ..... "	4,631	92,316	808	13,791
Tile, drain ..... "	22,535	629,322	21,310	563,590
" structural, roofing and floor	.....	1,047,807	.....	930,676
Sewer pipe, copings, flue-linings, etc	.....	1,167,463	.....	834,361
Pottery	.....	96,394	.....	80,060
Haydite	.....	131,621	.....	227,275
Total	.....	6,830,162	.....	5,350,024
GRAND TOTAL	.....	**117,960,722**	.....	**112,926,411**

(a) Copper and nickel in matte valued in 1929 at 15 and 18 cents per pound respectively, and 10 and 18 cents in 1930.
(b) Tonnage given is sulphur content.
(c) No deduction for ganister rock used, which is included with Quartzite.
(d) No deduction made for lime consumed in manufacturing.

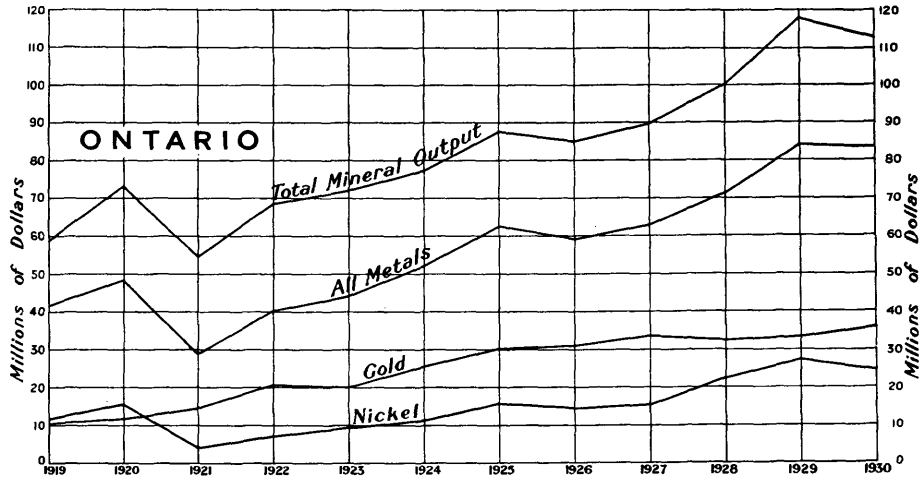
COMPARATIVE VALUE OF MINERAL PRODUCTION, 1926–1930

Product	1926	1927	1928	1929	1930
METALLIC:	$	$	$	$	$
Gold	30,950,753	33,627,040	32,629,111	33,535,226	35,903,841
Silver	5,781,706	5,230,402	4,156,431	4,630,820	3,994,169
Platinum metals	1,559,527	1,270,843	1,309,923	1,646,381	2,436,683
Cobalt (*a*)	1,136,014	1,764,534	1,671,900	1,801,915	1,144,007
Nickel (*b*)	14,374,163	15,262,171	22,318,907	27,115,461	24,455,134
Copper, metallic and in matte	4,828,964	4,946,533	8,770,149	14,622,609	15,190,206
Lead (pig) and in ore	580,730	528,729	402,289	294,431	116,031
Zinc in ore and concentrates	.....	.....	3,226	297,190	127,004
Bismuth	6,440	1,003	5,067	23,413	6,366
Total	59,218,297	62,631,255	71,267,003	83,967,446	83,373,441
NON-METALLIC:					
Abrasives (*c*)	576	.....	.....	.....	.....
Actinolite	1,000	1,075	875	375	437
Arsenic, white	135,549	197,668	178,149	154,887	109,932
Asbestos	3,935	.....	.....	.....	.....
Beryl	.....	.....	.....	114	.....
Diatomite	.....	.....	.....	.....	140
Feldspar, crude and ground	199,102	154,533	180,153	206,979	102,871
Fluorspar	.....	.....	.....	1,120	1,240
Graphite, crude and refined	158,994	109,613	52,373	90,522	86,543
Gypsum	496,059	500,688	553,271	832,689	776,069
Iron pyrites and sulphur	4,912	6,077	(*d*) 54,100	(*d*) 54,056	73,835
Mica	59,085	75,183	32,945	45,919	34,275
Mineral water	27,277	12,811	27,890	13,651	20,594
Natural gas	4,415,918	4,331,780	4,535,312	4,968,137	4,503,650
Peat	.....	.....	5,845	4,500	1,602
Petroleum, crude	376,822	289,391	249,981	253,678	235,746
Phosphate of lime (apatite)	.....	824	.....	.....	.....
Quartzite and quartz	339,304	266,204	308,608	316,050	297,638
Silica brick	56,411	(*e*) 28,549	86,323	80,374	19,120
Salt	1,388,672	1,510,777	1,377,629	1,420,424	1,568,250
Talc and soapstone	178,986	181,981	179,187	180,492	133,213
Total	7,842,632	7,638,605	7,822,641	8,621,427	7,965,155
STRUCTURAL MATERIALS:					
Cement, Portland	4,792,857	5,144,326	5,520,897	6,608,246	5,779,404
Lime, hydrated and quicklime	2,051,446	2,198,239	2,467,843	3,364,412	2,183,787
Sand and gravel	2,117,461	2,035,793	2,056,366	3,156,254	3,241,858
Sand-lime brick	461,376	(*f*) 721,485	(*f*) 745,719	(*f*) 641,159	(*f*) 424,178
Stone: limestone, trap, granite, etc.	3,258,168	4,060,709	4,024,989	4,771,616	4,608,564
Total	12,681,308	14,160,552	14,815,814	18,541,687	16,237,791
CLAY PRODUCTS:					
Brick, face	2,436,848	2,287,495	2,267,268	2,467,539	1,803,267
" common	768,734	1,063,724	1,154,763	1,188,688	873,206
" fancy and ornamental	20,047	25,016	25,714	9,012	23,858
" sewer	111,620	202,920	49,547	92,316	13,791
Tile, drain	340,403	521,957	572,577	629,322	563,590
" structural, roofing and floor	756,011	808,436	1,035,119	1,047,807	930,676
Sewer pipe, copings, flue-linings, etc	835,206	852,187	974,157	1,167,463	834,361
Pottery	87,600	91,300	98,519	96,394	80,000
Haydite	.....	.....	.....	131,621	227,275
Total	5,356,469	5,853,035	6,177,664	6,830,162	5,350,024
GRAND TOTAL	**85,098,706**	**90,283,447**	**100,083,122**	**117,960,722**	**112,926,411**

(*a*) Cobalt oxide, metallic cobalt, and cobalt content of residues marketed.
(*b*) Nickel in matte, oxide, and metallic nickel.
(*c*) Includes garnets and quartz pebbles. (*d*) Included value of sulphuric acid produced.
(*e*) Not included in the total of non-metallics or grand total.
(*f*) No deduction made for lime consumed in manufacturing.

General Remarks

While other industries throughout the country have been experiencing a severe business depression, the mining industry as a whole has maintained its position remarkably well, and although the total output was lower in value than in 1929, the decrease was small, particularly as regards the metallic group. The total value for 1930 was $112,926,411 as against $117,960,722 in 1929 or a decrease of 4.3 per cent. As will be observed, the decreases were proportionally greater in Clay Products and Structural Materials than in the Metallics and Non-metallics.



Graph showing progress of Ontario's mineral production during the post-war period, 1919 to 1930 inclusive.

TOTAL MINERAL PRODUCTION OF ONTARIO

Products	Production to December 31, 1929	Production, 1930	Production to December 31, 1930
METALLICS:	$	$	$
Gold	315,234,163	35,912,263	351,146,426
Nickel, including nickel oxide and salts	292,613,059	24,455,134	317,068,193
Silver	247,983,780	3,994,169	251,977,949
Copper (*a*)	105,987,805	15,190,206	121,188,011
Pig iron from domestic ore	84,775,556	.....	84,775,556
Cobalt (*b*)	22,948,374	1,144,007	24,092,381
Platinum metals	16,056,531	2,436,683	18,493,214
Iron ore (*c*)	9,463,516	.....	9,463,516
Lead	4,324,845	116,031	4,440,876
Molybdenite	209,735	.....	209,735
Zinc, in ore and concentrates	408,692	127,004	535,696
Bismuth	130,541	6,366	136,907
	1,100,136,597	82,369,850	1,182,506,447
NON-METALLICS	532,428,499	7,965,515	561,981,469
STRUCTURAL MATERIALS		16,237,791	
CLAY PRODUCTS		5,350,024	
Grand Total	1,632,565,096	112,924,611	1,744,487,916

(*a*) Includes small quantities of copper sulphate.
(*b*) Includes metal, oxide, salts, and cobalt contents of residues exported.
(*c*) Value of ore shipped out of the Province.

Total dividends paid by metal mines of the Province are noted hereunder. Details are given in the sections dealing with the respective industries:—

TOTAL DIVIDENDS BY METAL MINES

Industry	Total to end of 1929	During 1930	Total to end of 1930
	$	$	$
Nickel-Copper*	120,465,794	16,084,224	136,550,018
Gold	93,885,217	11,133,210	105,018,427
Silver-Cobalt	97,101,281	370,000	97,471,281
Grand Total	311,452,292	27,587,434	339,039,726

*The total for 1930 (unofficial) is made up of $14,150,305 dividends paid on common stock and $1,933,919 on preferred stock of the International Nickel Company of Canada, Limited.

An index of activity in prospecting is afforded by the following table:—

MINING CLAIMS RECORDED IN ONTARIO 1907 TO 1930

1907	13,996	1915	2,519	1923	6,092
1908	4,634	1916	2,470	1924	5,222
1909	9,746	1917	1,936	1925	4,751
1910	5,792	1918	1,534	1926	13,496
1911	9,001	1919	2,918	1927	15,554
1912	3,104	1920	2,160	1928	15,046
1913	4,320	1921	2,459	1929	8,222
1914	1,913	1922	5,686	1930	3,886

Mining Company Incorporations.—Twenty-one companies having a stated capitalization were incorporated in 1930, and four of these companies had both stated capital and "No Par" shares. In addition a total of 16 companies were incorporated having shares without nominal or par value exclusively. A summary of mining companies incorporated and licensed in Ontario for the last pre-war year and subsequently is given hereunder:—

ONTARIO MINING COMPANIES INCORPORATED AND LICENSED, 1913 TO 1930

Year	Incorporated				Extra-Provincial and Mortmain Companies Licensed	
			"No Par" Companies			
	No.	Nominal Capital	No.	Shares	No.	Capital for use in Ontario
		$				$
1913	119	78,000,000	.....	.....	12	21,735,000
1914	80	39,030,000	.....	.....	13	5,445,000
1915	59	42,005,000	.....	.....	2	10,200,000
1916	83	109,079,500	.....	.....	8	7,011,650
1917	100	117,183,000	.....	.....	7	7,202,000
1918	59	49,800,000	.....	.....	7	15,000,000
1919	149	223,600,000	.....	.....	10	9,554,197
1920	119	146,094,000	.....	.....	12	9,435,000
1921	67	105,715,000	.....	.....	6	1,030,000
1922	91	181,040,000	.....	.....	6	830,500
1923	88	179,295,500	.....	.....	6	1,775,000
1924	85	156,485,000	.....	.....	2	200,000
1925	66	107,400,000	4	9,010,000	3	162,510
1926	117	165,655,750	28	22,386,500	6	4,850,000
1927	168	344,045,000	30	40,034,000	10	3,260,000
1928	182	495,575,000	28	30,454,400	17	2,248,500
1929	70	140,390,000	27	32,300,200	13	1,540,000
1930	37	23,234,600	20	16,808,909	6	5,525,000

Under the provisions of The Ontario Companies Act, companies incorporated outside the Province are required to take out an Extra-Provincial license or License in Mortmain in Ontario and stipulate the amount of capital to be used in connection with mining enterprises where the land is situate within the province.

Diamond-Drilling.—From 1926, the first year in which statistics of diamond-drilling were collected, until 1929 there was a general increase in the footage of core removed from the rock. In 1930 there was a decrease, when the total footage drilled in Ontario was 416,851 feet or 78.9 miles. The figures are shown in the subjoined table:—

DIAMOND DRILLING OPERATIONS, 1926–1930

Year	Machines Operated	Holes Drilled	Core Extracted	
			Feet	or Miles
1926	71	1,986	385,932	70.8
1927	72	1,484	359,041	68.0
1928	85	1,901	485,304	91.9
1929	144	2,325	488,156	92.4
1930	95	1,701	416,851	78.9

In addition to the above, considerable drilling was done in other provinces, principally Quebec and Manitoba. From incomplete statements Ontario companies, including their operations outside the Province, employed in excess of 300 men to whom more than $500,000 was paid in wages.

Hydro-Electric Power.—During the year the Abitibi canyon power development was undertaken by Ontario Power Service Company, a subsidiary of the Abitibi Power and Paper Company, and a transmission line was surveyed from that point to Sudbury. According to Dr. F. A. Gaby, Chief Engineer of the Hydro-Electric Power Commission of Ontario, in an address before the Toronto Branch of the Canadian Institute of Mining and Metallurgy in February, 1931, the length of transmission would be 260 miles, and with a load factor of 70 to 80 per cent., the cost of hydro-electric power in the Sudbury field in large blocks would be $22 per horsepower on 132,000-volt lines. The Hydro-Electric Power Commission has contracted for 100,000 horsepower.

At the present time there are 1,500 men employed in the construction work and the two temporary tunnels to by-pass the water during dam construction are nearing completion, one being finished and the other practically completed. The natural head at the canyon is 96.65 feet. The dam will be 260 feet in height, giving an effective head of 237 feet. The gate ventage allows for 150,000 cubic feet per second and the total development with 4 turbines will give 275,000 horsepower. With the installation of more turbines a maximum development of 376,000 horsepower is possible. The Abitibi canyon is 68 miles north of Cochrane and 55 miles southeast of the Onakawana lignite field. It is connected by a short spur line with the T. & N.O. Railway.

Gold

Gold from all sources in Ontario in 1930 totalled 1,736,855 fine ounces or an increase of 7 per cent. over 1929 production. Of this total 1,712,918 ounces were recovered by the gold mines, 22,867 ounces from the refining of nickel-copper mattes, and 1,070 ounces were contained in ores and concentrates shipped out of the Province for treatment.

As may be seen in the following table giving the tonnages of ore milled, and output of mines, the Kirkland Lake area, represented by six mines, has made important strides in production and closely approached that of Porcupine represented by eight operating mines. Average grades of ore treated in these camps works out as $6.96 per ton at Porcupine and $13.52 at Kirkland Lake.

ONTARIO GOLD PRODUCTION, 1930*

Source	Ore milled, tons	Gold Output		Silver Output	
		Ounces	Value	Ounces	Value
PORCUPINE			$		$
Ankerite (clean-up)	.....	41.86	865	36	13
Coniaurum	122,972	35,663.68	737,233	4,517	1,708
Dome (includes clean-up)	67,600	37,415.90	773,455	3,959	1,488
Hollinger	1,625,868	494,531.89	10,222,881	102,542	38,069
March	53,953	14,794.24	305,828	1,173	438
McIntyre	565,510	225,785.66	4,677,342	56,047	19,237
Porcupine United (Rochester)	7,815	2,745.41	56,753	421	160
Vipond	114,667	43,882.96	907,141	6,469	2,273
West Dome Lake	1,413	751.00	15,523	53	23
Miscellaneous	.....	2,985.24	61,700	619	230
Total	2,559,798	859,078.58	17,758,726	175,836	63,639
KIRKLAND LAKE					
Barry-Hollinger	31,725	10,516.22	217,290	1,229	446
Kirkland Lake Gold	52,106	25,763.72	532,583	3,526	1,268
Lake Shore	550,501	378,690.26	7,828,122	69,629	26,322
Sylvanite	81,213	38,303.45	791,803	7,181	2,656
Teck-Hughes	338,555	260,774.69	5,390,650	20,243	7,581
Wright-Hargreaves	220,430	117,454.90	2,428,008	13,090	4,880
Total	1,274,530	831,503.24	17,188,556	114,898	43,153
NORTHWESTERN ONTARIO					
Botham (Bad Vermilion Lake)	25	15.75	326	.....	.....
Cooper (Michipicoten)	1,074	123.64	2,556	6	3
Grace (Michipicoten)	750	28.19	583	13	5
Howey (Red Lake)	110,438	22,146.58	457,810	8,785	3,047
St. Anthony (Sturgeon Lake)	8	22.00	455	7	3
Total	112,295	22,336.16	461,730	8,811	3,058
GRAND TOTAL for Gold Mines	3,946,623	1,712,917.98	35,409,012	299,545	109,850
Nickel-Copper Refineries	.....	22,867.00	472,703	.....	.....
In copper and copper-lead-zinc ores	.....	981.35	20,286	.....	.....
GRAND TOTAL (all sources)	.....	1,736,855.33	35,903,841	.....	.....

*Premium received in addition to values quoted amounted to $20,912 at Porcupine and $15,791 at Kirkland Lake.

The milling rates per day of the several gold mines in order of tonnage for the month of December were: Hollinger 4,612 tons, Lake Shore 2,172, McIntyre 1,511, Dome 1,114, Teck-Hughes 923, Wright-Hargreaves 700, Howey 464,

Coniaurum 355, Vipond 293, Sylvanite 247, March 190, Kirkland Lake Gold 122, and Barry Hollinger 85 tons. The new 1,500-ton Dome mill started operating in November but had not reached full capacity at the close of the year. Mill capacities are being increased at some of the properties. The Hollinger is equipped to treat a much greater tonnage. The new flotation section of the McIntyre mill is operating, and when the new mill is completed during 1931 capacity will be 2,000 tons daily. The Lake Shore mill enlargement is now completed, and could be stepped up somewhat from the December figures without any increase of plant, while the Teck-Hughes is expected to have its enlarged mill in operation by the first of May, 1931, increasing capacity to 1,250 tons daily.

In Northwestern Ontario five properties produced a total of $464,788, of which the Howey accounted for $460,857. Considerable activity was apparent during 1930. A small gold mill was completed on the Cooper gold mine, Michipicoten area, by John Knox, Jr., and contract let for a 75-ton mill on the property of the Parkhill Gold Mining Company. The Goudreau mine was dewatered and exploratory work undertaken. In Moss township, west of Port Arthur, development was carried on by a company now known as Moss Gold Mines, Ltd. Recent financing has provided funds for further development, and a 100-ton mill is contemplated.

In the Boston Creek area the Telluride Gold Mines in Skead township started up its new mill and expected to be producing a gold-copper concentrate early in 1931.

In the following table the value of the total gold output of the Province, exclusive of premium, is given; also that from the main camps, Porcupine and Kirkland Lake, beginning in 1910 and 1913, respectively:—

TOTAL GOLD PRODUCTION IN ONTARIO

Year	Total Production $	Porcupine		Kirkland Lake	
		$	Per cent.	$	Per cent.
1866-1891	(a) 190,258	.....	.....	.....	.....
1892-1909	(b) 2,509,492	.....	.....	.....	.....
1910	68,498	35,539	51.8	.....	.....
1911	42,637	15,437	36.2	.....	.....
1912	2,114,086	1,730,628	81.8	.....	.....
1913	4,558,518	4,294,113	94.1	86,316	1.9
1914	5,544,979	5,206,006	93.8	114,154	2.0
1915	8,501,391	7,462,111	88.6	551,069	6.5
1916	10,339,259	9,391,408	90.8	702,761	6.8
1917	8,698,735	8,229,744	94.5	404,346	4.6
1918	8,502,480	7,767,907	91.4	632,007	7.4
1919	10,451,709	9,942,803	95.1	486,809	4.7
1920	11,686,043	10,597,572	90.7	1,033,478	8.8
1921	14,692,357	13,103,526	89.5	1,524,851	10.4
1922	20,579,569	18,374,658	89.3	2,159,581	10.5
1923	20,136,287	17,313,115	85.9	2,719,939	13.5
1924	25,669,303	22,135,534	86.2	3,446,632	13.4
1925	30,206,432	24,733,120	81.8	5,385,256	17.8
1926	30,950,753	23,680,670	76.5	7,174,083	23.2
1927	33,627,040	23,851,857	70.9	9,674,114	28.7
1928	32,629,111	20,246,319	62.0	12,233,524	37.5
1929	33,535,226	19,281,286	57.6	14,046,596	41.8
1930	35,903,841	17,758,726	50.2	17,188,556	48.5
Total to end of 1930	351,137,004	265,151,079	75.5	79,564,072	22.7

A promising discovery of gold, known as the Ashley find, was made on October 6, in Bannockburn township about one mile east of the northwest corner. Diamond-drilling was undertaken at once by the Mining Corporation of Canada, one of the principal owners. By the end of the year two drills were operating which to the present have indicated a well defined ore body which offers encouragement to the owners. This discovery was followed by active staking of claims in the townships of Bannockburn, Argyle, Hincks, and Montrose.

World Output.—The following statement of output by the leading gold-producing countries, for 1915 (year of maximum world production), for 1919 (first post-war year), also for 1922 and subsequent years, has been abstracted chiefly from annual reports of the Director of the United States Mint. It will be noted that Canada now holds second place among the gold-producing countries of the world, having overtaken the United States (exclusive of the Philippine Islands) in 1930. The Province of Ontario, as deducted from the table, now produces 82 per cent. of Canada's gold.

OUTPUT BY LEADING GOLD-PRODUCING COUNTRIES AND STATES
(Millions of Dollars)

Source	1915	1919	1922	1923	1924	1925	1926	1927	1928	1929	1930*
World	470.0	365.9	319.4	367.8	393.4	393.3	400.0	401.7	408.4	403.0	423.7
Transvaal	188.0	172.2	145.1	189.1	197.9	198.4	205.8	209.3	214.0	215.2	221.5
Canada	19.0	15.9	26.1	25.5	31.5	35.9	36.3	38.3	39.1	39.9	43.6
United States	101.0	60.3	47.3	50.2	50.6	48.0	46.3	43.8	44.3	42.5	42.4
Ontario	**8.5**	**10.5**	**20.7**	**20.1**	**25.7**	**30.2**	**30.9**	**33.7**	**32.6**	**33.5**	**35.9**
Russia (U.R.S.S.)	26.3	11.0	3.0	5.2	19.8	21.9	20.5	21.9	24.8	17.3	17.9
Mexico	6.6	15.2	15.5	16.2	16.5	16.3	16.0	15.0	14.5	13.5	......
Oceania†	49.0	26.1	18.8	18.1	16.5	14.0	13.5	14.2	13.1	12.1	......
Rhodesia	18.9	12.3	13.5	13.4	13.0	12.0	12.3	12.0	11.9	11.6	11.3
California	21.4	17.4	14.7	13.4	13.2	13.1	11.9	11.7	10.6	8.5	9.1
Australia	......	......	15.9	14.9	14.2	11.7	10.9	11.6	10.6	8 3	......
West Australia	25.0	15.2	11.1	10.4	10.0	9.1	9.0	8.4	8.1	7.8	8.6
India	11.5	10.5	9.0	7.9	8.2	8.1	7.9	7.9	7.8	7.5	6.8

*Preliminary estimates from various sources. †Includes Australia and New Zealand.

Maximum World production..........................470.0 million dollars in 1915.
Maximum U.S. production...........................101.0 " " "
Maximum Transvaal production.......................221.5 " " 1930

31,730,704 (tons milled) — 10,719,760 fine oz
@ 6.635 [illegible]
Dividends — £8,644,309
1931 — 10,874,145 oz — " £8535861 —
1st 1/4 1931 — World output — 5,154,194

VALUE OF TOTAL PRODUCTION (GOLD AND SILVER) BY MINES OF THE PORCUPINE AREA

Year	Hollinger	Dome	McIntyre	Vipond	Porcupine Crown and Northcrown	Coniaurum	West Dome Lake	Ankerite	March	Night Hawk Peninsular	Schumacher (a)	Paymaster	Rea and Newray
1910....	$31,194	$4,355	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1911....	6,000	4,277	.....	$5,160	.....	.....	.....	.....	.....	.....	.....	.....	.....
1912....	909,181	737,499	$77,657	16,259	.....	.....	.....	.....	.....	.....	.....	.....	.....
1913....	2,488,022	1,242,625	236,299	.....	Crown $326,803	.....	.....	.....	.....	.....	.....	.....	Rea $18,858
1914....	2,719,355	1,059,238	549,166	73,628	Crown 685,135	.....	.....	.....	.....	.....	.....	.....	Rea 125,255
1915....	4,206,015	1,530,287	750,812	246,053	Crown 602,436	.....	$102,880	.....	.....	.....	$48,236	.....	.....
1916....	5,073,401	2,153,820	1,218,073	176,686	Porcupine 578,322	.....	16,814	.....	.....	.....	225,301	.....	.....
1917....	4,261,938	1,480,174	1,710,204	209,738	Porcupine 377,904	.....	44,434	.....	.....	.....	198,605	.....	Newray 1,447
1918....	5,752,371	82,127	1,578,444	82,868	Porcupine 124,474	.....	103,745	.....	.....	.....	92,842	.....	Newray 1,516
1919....	6,722,266	1,290,301	1,978,014	.....	Porcupine	.....	23,910	.....	.....	.....	.....	.....	.....
1920....	6,219,665	2,020,568	2,223,083	.....	Porcupine 71,529 Northcrown 97,301	.....	47,169	.....	.....	.....	.....	.....	.....
1921....	9,051,276	2,290,264	1,827,761	.....	Northcrown 7,943	.....	.....	.....	.....	.....	.....	.....	.....
1922....	12,274,114	4,178,936	2,021 811	.....	Northcrown	.....	.....	.....	.....	.....	.....	$2,800	.....
1923....	10,446,412	4,374,144	2,550,129	23,876	Northcrown	.....	.....	.....	.....	.....	.....	.....	.....
1924....	13,433,063	4,307,624	3,604,874	596,803	.....	.....	60,642	.....	.....	$268,518	.....	.....	.....
1925....	15,749,109	4,365,923	3,721,499	565,379	.....	.....	287,758	.....	.....	196,947	.....	.....	.....
1926....	14,829,655	3,940,053	3,862,074	631,636	.....	.....	220,758	$140,588	$11,055	111,154	.....	63,551	.....
1927....	14,539,538	4,031,575	3,965,210	667,724	.....	.....	(b)35,252	359,005	19,839	166	.....	135,025	.....
1928....	10,706,235	3,915,051	4,201,808	694,426	.....	$220,534	.....	289,960	133,879	.....	.....	183,271	.....
1929....	9,455,290	3,590,537	4,295,491	820,667	.....	635,485	155,797	71,684	256,303	.....	.....	.....	.....
1930....	10,260,950	774,943	4,688,787	919,676	.....	738,941	15,546	461	306,261	.....	.....	.....	.....
Total...	159,135,050	47,374,321	45,061,196	5,730,579	2,871,847	1,594,960	1,114,705	861,698	727,337	566,885	564,984	384,647	147,076

(a) Purchased by the Hollinger in 1922. (b) Total value of bullion in 1927 was $87,919. Figures shown in above table allow for a deduction of $52,667 due to an erroneous return made in 1925.

VALUE OF TOTAL PRODUCTION (GOLD AND SILVER) BY MINES OF THE PORCUPINE AREA—*Continued*

Year	Porcupine United	David-son	Preston and Clifton	Scottish Ontario	Porcupine Pet	Porphyry Hill	Gold Reef	Tommy Burns	De Santis	Hughes	Miscel-laneous	Total Value (c)
1910												$35,549
1911												11,437
1912												1,740,596
1913			Preston			$4,200						4,316,807
1914			Preston $15,212		$5,000							5,231,989
1915					5,551	2,036	$1,547					7,495,853
1916												944,241
1917							588	$289				8,285,321
1918		$15,579										7,833,966
1919		27,089										10,041,580
1920		11,246										10,690,561
1921												13,177,244
1922			Clifton 1,664									18,479,325
1923			Clifton 8,331								(*d*) $2,756	17,405,648
1924			Clifton 5,270									22,266,894
1925												24,886,615
1926									$146	$30		23,810,700
1927				$5,893							(*e*) 217,350	23,976,577
1928				6,795							(*f*) 140	20,352,099
1929	$44,285										47,701	19,373,240
1930	56,912										61,930	17,822,365
Total	101,197	53,914	30,477	12,688	10,551	6,236	2,135	289	146	30	329,877	266,680,783

(*c*) A record of total exchange premiums received in addition to the above amounts shows the following: 1920, $1,265,664; 1921, $1,238,211; 1922, $189,022; 1923, $207,742; 1924, $172,721; 1925, $2,607 discount; 1926, nil; 1928, $2,810.55; 1929, $87,173; and 1930, $20,912. (*d*) Huddlestone and Cline. (*e*) Includes "highgrade" recovered from W. P. Wilson. (*f*) Blue Quartz.

VALUE OF TOTAL PRODUCTION (GOLD AND SILVER) BY MINES OF THE KIRKLAND LAKE AREA

Year	Lake Shore	Teck-Hughes	Wright-Hargreaves	Tough-Oakes Burnside	Kirkland Lake	Sylvanite	Argonaut (a)	Barry-Hollinger	Canadian Associated Goldfields	Lucky Cross	Gold Hill	Ontario-Kirkland	Swastika	Total Value (b)
1913	.....	.....	$1,127	$66,632	.....	.....	.....	.....	.....	$14,006	.....	.....	$7, 172	$88,937
1914	.....	.....	.....	117,644	.....	.....	$5,204	.....	.....	.....	.....	.....	.....	122,848
1915	.....	.....	.....	555,539	.....	.....	.....	.....	.....	.....	.....	.....	.....	555,539
1916	.....	.....	.....	711,625	.....	.....	.....	.....	.....	.....	.....	.....	.....	711,625
1917	.....	$66,722	.....	342,831	.....	.....	.....	.....	.....	.....	.....	.....	.....	409,553
1918	$416,414	80,570	.....	139,683	.....	.....	.....	(c) 10,114	.....	.....	.....	.....	.....	646,781
1919	263,354	169,590	.....	.....	$56,263	.....	2,631	.....	.....	.....	.....	.....	.....	491,838
1920	503,735	247,757	.....	.....	286,901	.....	26,863	.....	.....	.....	.....	.....	.....	1,065,256
1921	495,276	322,919	468,751	.....	242,417	.....	513	.....	.....	.....	.....	.....	.....	1,529,875
1922	471,341	596,495	762,753	107,481	224,396	.....	.....	.....	.....	.....	.....	$10,082	.....	2,172,458
1923	547,600	1,117,963	754,979	12,174	223,102	.....	72,512	.....	.....	.....	.....	.....	.....	2,728,331
1924	1,098,572	1,023,025	1,088,725	47,547	46,512	.....	152,072	.....	.....	.....	.....	.....	.....	3,456,453
1925	1,958,720	996,943	1,913,401	263,064	.....	.....	214,183	56,978	.....	.....	.....	.....	.....	5,403,289
1926	2,775,000	1,601,209	2,150,844	309,709	126,999	.....	143,387	86,263	.....	.....	.....	.....	.....	7,193,411
1927	3,375,053	2,781,962	2,151,916	153,215	473,673	$429,424	127,448	175,692	$34,595	.....	(d) $865	.....	.....	9,703,843
1928	4,073,965	4,948,896	1,838,510	82,316	414,596	738,146	32,430	111,767	17,700	.....	12,784	.....	.....	12,271,110
1929	6,090,189	5,048,420	1,734,728	.....	352,789	689,465	9,959	151,758	.....	.....	.....	.....	.....	e14,089,233
1930	7,854,444	5,398,231	2,432,888	.....	533,851	794,459	.....	217,836	.....	.....	.....	.....	.....	17,231,709
Total	29,923,663	24,400,702	15,298,622	2,909,460	2,981,499	2,651,494	787,202	810,408	52,295	14,006	13,649	10,082	7,172	79,872,179

(a) Exclusive of copper values. (b) Exchange premiums received in addition to the above valuations were as follows: 1920, $110,424; 1921, $121,425; 1922, $19,590; 1923, $37,812; 1924, $24,028; 1925, $231 discount; 1926, $595 discount; 1928, $2,810.55; 1929, $70,283; and $15,791 in 1930. (c) Patricia mine, afterwards called Barry-Hollinger. (d) Samples shipped in 1923 and 1926 not heretofore reported. (e) Contains $11,925 miscellaneous (estimate of highgrade)

DIVIDENDS AND BONUSES PAID BY ONTARIO GOLD MINING COMPANIES, 1912–1930

Year	Porcupine						Kirkland Lake					Total
	*Hollinger Consolidated	Porcupine Crown	Dome Mines†	Rea	McIntyre	Vipond	Tough-Oakes	Lake Shore	Teck-Hughes	Wright-Hargreaves	Sylvanite	
	$	$	$ c.	$	$ c.	$	$	$	$	$ c.	$	$ c.
1912	270,000											$270,000 00
1913	1,170,000											1,170,000 00
1914	1,170,000	240,000										1,410,000 00
1915	1,560,000	240,000	400,000 00	12,000			132,875					2,344,875 00
1916	3,286,000	240,000	800,000 00				265,750					4,591,750 00
1917	738,000	120,000	300,000 00		541,542 45							1,699,542 45
1918	1,230,000				543,042 45			100,000				1,873,042 45
1919	1,722,000				364,028 30			100,000				2,186,028 30
1920	2,214,000		416,886 00		546,042 45			80,000				3,256,928 45
1921	3,198,000		478,947 75		546,042 45			120,000				4,342,990 20
1922	3,198,000		715,000 00		546,042 45			80,000		412,500		4,951,542 95
1923	3,198,000		1,430,001 00		548,542 45			160,000		206,250		5,542,793 45
1924	3,198,000		1,906,668 00		774,125 00			380,000		206,250		6,465,043 00
1925	4,378,800		1,906,668 00		798,000 00			600,000		550,000		8,233,468 00
1926	5,805,600		1,906,668 00		798,000 00			1,000,000	474,714 40	893,750		10,878,732 40
1927	6,396,000		1,191,667 50		798,000 00	67,500		1,400,000	713,571 60	1,237,500		11,804,239 10
1928	5,412,000		953,334 00		798,000 00			2,000,000	2,860,286 40	825,000		12,848,620 40
1929	3,198,000		953,334 00		798,000 00			2,200,000	2,866,286 40			10,015,620 40
1930	3,444,000		953,334 00		798,000 00			3,000,000	2,872,286 40		65,590	11,133,210 40
Total	54,786,400	840,000	14,312,508 75	12,000	9,197,408 00	67,500	398,625	11,220,000	9,787,145 20	4,331,250	65,590	105,018,426 95

*Includes $160,000 paid by the Acme in 1915, before amalgamation with the Hollinger. †Does not include repayment of capital of $476,667 in 1922.

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Nickel-Copper Industry

During the period the International Nickel Company of Canada, Limited, at Sudbury brought practically to completion the huge plant extension undertaken in 1928. In addition, other establishments such as the Ontario Refining Company and the Canadian Industries, Limited, completed their plants as indicated below. The discovery by diamond-drilling in 1927 of the rich ores in the Frood mine below 2,000 feet in depth greatly influenced the development policy of the International company. Since this rich deposit was partly owned by the Mond Nickel Company and it appeared that economies could be effected by working the deposit as a unit, a plan of amalgamation of the two companies was proposed late in 1928 by Lord Melchett on behalf of the Mond company. Upon this amalgamation being effected at the close of that year extensive plans of development were made. These included an increase in the capacity of the Mond plant at Coniston from 2,700 tons per month to 6,300 tons, and at Sudbury the construction of a concentrator of 8,000 tons capacity per day, bins of 6,000 tons capacity, roasters, 5 reverberatory furnaces and 8 converters. The maximum capacity of the plants will be 140 million pounds of nickel and 200 to 240 million pounds of copper per annum.

Owing to the completion of the construction work, and also to the general business depression throughout the world and its resulting effect on the market for nickel and copper, some reductions in staff were made and output was curtailed during the year, 1930. On June 1 production from the Creighton mine was reduced from 100,000 tons of ore per month to 50,000 tons and again on November 1 this output was dropped to 35,000 tons. On June 1 the Garson output was reduced from 30,000 tons to 20,000 tons per month. The Frood mine which had in the meantime been developed to a capacity of 110,000 tons of ore per month was reduced on November 1 to 75,000 tons. The Levack mine was idle during the year except for development work and surface construction. A new head frame and rock house was erected at this mine to replace that destroyed by fire in December, 1929. Despite these curtailments the month of October established a record for matte produced by the International Nickel Company. On Nov. 1 one reverberatory out of five active units was closed.

The table following gives the record of mining and smelting operations for the last pre-war year, for the war year of maximum output, and for the past four years:—

NICKEL-COPPER MINING AND SMELTING

Schedule	1913	1918	1927	1928	1929	1930
Ore raised.....tons	784,697	1,643,040	1,305,917	1,457,910	1,991,910	2,115,139
Ore smelted..... "	823,403	1,559,892	1,350,214	1,476,704	2,033,457	2,359,154
Bessemer matte produced.. "	47,150	87,184	81,848	91,313	132,030	166,703
Nickel content of matte.... "	24,838	45,886	39,623	43,393	58,095	61,112
Copper content of matte... "	12,938	23,843	25,969	29,704	46,315	70,800
Matte exported..... "	.....	.....	33,541	39,310	28,402	34,550
*Matte refined in Canada.. "	.....	5,334	39,942	67,866	109,818	139,635

*Refining in Canada began at Port Colborne, Ontario, in 1918, and at Deschênes, Quebec, in 1920. The plant at the latter place closed down in July, 1924.

The Falconbridge Nickel Company blew in its 250-ton smelter on February 1, 1930, and closed down temporarily November 1 in order to allow the refinery in Norway to absorb the supplies of matte accumulated. The smelter resumed

operations in February, 1931, on a 300-ton basis, some alterations having been made during the shut-down.

The refinery which is located in Southern Norway about 300 miles from Oslo, was practically rebuilt and started again in April, 1930. It produces 8 and 2½ metric tons of nickel and copper, respectively, per day. No precious metals have as yet been recovered from the slimes which are accumulating. Products are mostly marketed in England, France and Italy. Of the matte treated in the refinery, 70 per cent. comes from Ontario, and the balance from Norway on a customs basis. The company is known as the Falconbridge Nikkelverk, and the address is Kristiansand South.

Total nickel produced in Ontario, that is, the metal content of all nickel-bearing substances in 1929 and 1930 was as follows:—

Nickel	1929		1930	
	Quantity, lb.	Value	Quantity	Value
		$		$
Metallic	25,260,177	6,821,814	57,478,651	15,485,381
Electrolytic	45,444,585	11,818,000		
In nickel-copper matte exported	28,136,095	5,064,497	41,956,123	7,552,102
In oxide (Port Colborne)	11,204,577	3,347,983	4,225,620	1,389,973
In speiss residues (Deloro)	36,538	6,577	234	42
In oxides, salts, etc. (Deloro)	193,940	56,590	104,659	27,205
In ore exported			3,570	431
Total	110,275,912	$27,115,461	103,768,857	$24,455,134

The details of copper production in 1929 and 1930 follow:—

Copper	1929		1930	
	Quantity	Value	Quantity	Value
	lb.	$	lb.	$
Content of Port Colborne converter*	70,835,430	11,880,306	114,934,859	13,878,421
In nickel-copper matte exported	16,988,515	2,534,777	11,709,866	1,170,987
In Cobalt ores exported	26,731	3,098	36,214	4,778
In Ontario ore treated at Noranda smelter	100,028	18,005	53,531	6,949
In lead-zinc-copper concentrate exported	955,387	172,992	994,229	129,071
Total	88,816,091	14,609,178	127,728,699	15,190,206

*Of this copper 55,096,354 pounds were exported and the remainder was regarded as electrolytic for the year 1930.

Heavy Chemicals.—In the first separation of nickel and copper sulphides into copper "tops" and nickel "bottoms," large quantities of nitre cake are necessary, and to provide for this the Canadian Industries, Limited, have established an acid plant comprising three units, each of 50 tons capacity, or a total of 150 tons per day; a nitre cake plant which started in July where the sodium sulphate from Saskatchewan is treated with sulphuric acid for the production of nitre cake; and also a storage plant for the sodium sulphate. Thus Copper Cliff has become an important centre for the manufacture of heavy chemicals. Canadian Industries also operates the original acid plant at Coniston, which was built in 1925 by the Mond Nickel Company.

Copper Refining.—The Ontario Refining Company which is owned by the International Nickel Company, American Metal Co., Consolidated Mining and Smelting Company, and Ventures, Ltd., has constructed a copper refinery at Sudbury, at present the largest of its kind in the British Empire and capable of producing 10,000 tons of electrolytic copper per month. The first refined copper was produced on July 14. Output to the end of 1930 was 25,377 tons. In connection with the copper refinery, a gold and silver refinery to recover these metals is nearing completion. Provision is also made for the preliminary treatment of the rich platinum metal residues recovered at Port Colborne and at Sudbury. These are finally treated and refined at Acton, near London, England, in a plant owned by the company.

Silver-Cobalt

The price of silver which declined throughout 1930, dropped on Dec. 30 to 30¾ cents per ounce. The average New York price for the year was 38.154 cents per fine ounce. The lowest figure in all history was recorded on Feb. 16, 1931 when the New York price fell to 25¾ cents. Despite low prices the Ontario output of silver was greater in 1930 than in the previous year Production or shipments from all sources totalled 10,481,772 fine ounces valued at $3,994,169 as against 8,711,643 ounces worth $4,630,820 in 1929. While the increase in output amounted to 20.3 per cent. there was a falling off in the value of 13.8 per cent.

This increased production may be accounted for principally by the keen demand for the associated metal cobalt and to the profitable return to the operators. Many lessees operated old mines during the period. Twenty-nine properties made shipments from the Cobalt area of which only four, namely, Agaunico, Mining Corporation, O'Brien and Nipissing were operated by the owning companies; the remainder representing the activities of lessees. The O'Brien mine was the largest shipper, the bulk of its output coming from the Cross Lake property. In South Lorrain, the Frontier, Keeley, and Lorrain Trout Lake made shipments; while at Gowganda, Castle-Trethewey, Miller Lake-O'Brien and Morrison were in the list of shippers. There was also a small shipment from the White Reserve mine near Maple mountain in the Montreal River silver area.

Production and shipments for 1929 and 1930 from Ontario are shown in the subjoined table:—

SILVER PRODUCTION, 1929 AND 1930

Source	1929		1930	
	Fine Ounces	Value	Fine Ounces	Value
		$		$
Sales of bullion by the reduction companies, smelters and mines	7,166,459	3,823,599	8,436,688	3,217,242
Contained in silver-Cobalt concentrates and residues exported	808,081	416,381	624,118	239,211
Contained in crude gold bullion	257,106	134,366	299,545	109,850
Recovered by nickel-copper refineries	473,645	247,593	1,067,154	407,161
Contained in copper ore and in copper-lead-zinc concentrate	52,568	27,336	54,267	20,705
Total	8,753,859	4,649,275	10,481,772	3,994,169

Since the discovery of silver at Cobalt in 1903 the silver contents of shipments from this camp and outlying silver areas, as reported by the operators, have been as follows:—

SILVER SHIPMENTS BY CAMPS, 1904–1930

Year	Average price, cents per ounce (New York)	Silver Content in Troy Ounces					
		Total Ounces	Cobalt	Casey Township	South Lorrain	Gowganda	Montreal River and Maple Mountain
1904	57.221	206,875	206,875	.....	.....	.....	.....
1905	60.352	2,451,356	2,451,356	.....	.....	.....	.....
1906	66.791	5,401,766	5,401,766	.....	.....	.....	.....
1907	65.237	10,023,311	10,023,311	.....	.....	.....	.....
1908	52.864	19,437,875	19,424,251	500	13,124	.....	.....
1909	51.502	25,897,825	25,658,683	26,185	194,955	.....	18,002
1910	53.486	30,645,181	29,849,981	92,544	221,133	471,688	9,835
1911	53.340	31,507,791	29,989,893	114,789	933,912	468,687	510
1912	60.835	30,243,859	28,605,940	253,824	834,119	549,976	.....
1913	57.791	29,681,975	28,105,505	825,108	248,992	502,370	.....
1914	54.811	25,162,841	24,155,699	499,643	108,199	399,300	.....
1915	49.684	24,746,534	24,280,366	223,939	.....	242,229	.....
1916	65.061	19,915,090	19,008,517	445,900	77,280	383,393	.....
1917	81.417	19,401,893	18,327,258	.....	10,000	1,064,635	.....
1918	96.772	17,661,694	16,807,407	143,901	72,188	638,198	.....
1919	111.122	11,214,317	10,314,689	171,278	4,586	723,764	.....
1920	100.900	10,846,321	10,402,249	.....	8,253	433,352	(a) 2,467
1921	62.654	8,261,931	7,673,535	1,101	328,886	258,292	117
1922	67.528	10,711,127	9,239,147	1,028	1,284,307	170,651	(b) 15,994
1923	64.873	10,377,846	7,259,858	.....	2,955,646	160,761	1,581
1924	66.781	9,935,902	6,704,787	.....	2,633,058	598,057	.....
1925	69.065	10,707,235	6,252,115	.....	3,099,964	1,355,156	.....
1926	62.107	10,543,473	6,262,249	.....	3,044,584	1,236,640	.....
1927	56.370	8,543,513	4,482,543	.....	2,319,356	1,741,614	.....
1928	58.176	6,745,401	3,934,020	.....	1,133,952	1,677,429	.....
1929	52.993	7,781,429	4,823,529	.....	876,006	2,081,894	.....
1930	38.154	9,196,055	5,298,232	.....	1,756,609	2,139,997	1,217
Total	.....	407,405,253	360,098,598	2,799,740	22,159,109	17,298,083	49,723

(*a*) Includes 885 ounces from Silver Islet, Lake Superior.
(*b*) Silver Islet, Lake Superior.

Dividends.—Following is a statement showing dividends and bonuses paid in 1930 by silver mining companies, also gross dividends to the end of 1930. The figures do not include dividends paid by private companies such as the O'Brien:—

DIVIDENDS AND BONUSES PAID BY SILVER MINING COMPANIES

Company	Dividends and Bonuses paid		
	To end of 1929	During 1930	To end of 1930
	$ c.	$ c.	$ c.
Nipissing Mining Company, Limited	30,678,297.25	370,000.00	31,048,297.25
Other companies in earlier years	66,422,984.04	.....	66,422,984.04
Total for all silver companies	97,101,281.29	370,000.00	97,471,281.29

Lead—Zinc—Copper

This group is made up of the Kingdon Mining, Smelting and Manufacturing Co. at Galetta, producing pig lead; the Treadwell Yukon, 17 miles west of Sudbury, exporting three grades of concentrates; copper, lead, and zinc and containing gold and silver; and the Potter Doal property near Matheson shipping copper pyrite ore carrying gold and silver to the Noranda smelter. Two silver-cobalt properties at Cobalt, namely the O'Brien and Mining Corporation produce small quantities of copper in the concentrate product of their mills, while the Deloro Smelting and Refining Company recovers a small amount of lead in the form of a crude base bullion which is exported to the United States for treatment.

The output of copper, lead and zinc, from the above group was as follows:

		Quantity	Value $
Lead	lb.	2,193,856	116,031
Zinc	lb.	3,527,894	127,004
Copper (at Noranda)	lb.	53,561	6,949
" (in exports)	lb.	1,030,803	133,896

Precious metals recovered, in addition to the above, were: gold 1,152.4 ounces and silver 192,801 ounces. A portion of this gold and silver has already been grouped with the gold mines.

Chromite

The property owned by the Consolidated Chromium Corporation situated at Obonga Lake, 25 miles south of Collins Station and 25 miles west of Lake Nipigon, Thunder Bay District, was operated steadily throughout the year on development work. Concentration tests on experimental shipments have been carried on at Kellogg, Idaho. During 1930 two tons were shipped for this purpose.

Another occurrence is at Shebandowan lake, paralleling a nickel-copper deposit, and located on the property of J. G. Cross of Port Arthur. All that is known about its size was revealed by three diamond-drill holes which penetrated bunches, stringers and veins of chromite before reaching the nickel-copper ore. The chromite zone was variable in width, and the ore granular in character. Some of the veinlets assayed as a high as 35 percent. chromic oxide.

Iron Ore, Pig Iron, Steel and Coke

Iron and Steel.—No Ontario iron ore has been smelted since 1925. The following is a table of iron and steel statistics for the past five years:—

IRON AND STEEL STATISTICS, 1926–1930

Schedule	1926	1927	1928	1929	1930
Foreign ore smelted.....short tons	948,154	1,019,971	1,242,937	1,491,278	1,036,054
Limestone for flux..... " "	218,996	217,748	324,550	342,776	234,309
Coke charged..... " "	503,871	487,825	736,746	767,420	542,094
Pig iron produced..... " "	545,737	515,366	822,952	861,682	598,687
Value of pig iron produced.....$	9,805,300	9,663,108	15,468,110	17,408,512	.....
Steel made.....short tons	534,732	635,173	885,414	1,007,784	715,854
Value of steel made.....$	16,710,365	18,695,950	30,436,098	32,393,052	.....

Coke.—Statistics for the past five years, as collected by the Dominion Bureau of Statistics, are shown in the following table:—

Coke	1926	1927	1928	1929	1930
Production.....short tons	1,074,058	1,260,355	1,434,358	1,624,884	1,489,415
Imports..... " "	869,000	649,165	912,795	1,123,761	993,753
	1,943,058	1,909,520	2,347,152	2,748,645	2,483,168
Deduct exports..... " "	30,152	46,578	7,447	2,010	317
Apparent consumption.... " "	1,912,906	1,862,942	2,339,705	2,746,635	2,482,851

Included in the 1930 output were 140,059 tons of breeze, of which 45,388 tons were sold. The average yield of coke in Canada in 1930 for each short ton of coal carbonized was 1,451 pounds.

Non-Metallics

Abrasives.—Natural abrasives were not produced in Ontario during 1930. In former years grinding pebbles were gathered on the shore of Lake Superior near Rossport, and sold to the cement-producing companies, where they found a use as a grinding medium. The introduction of steel balls destroyed the small market available.

Actinolite.—The production in 1930 totalled 34 tons having a selling value of $437 or $12.50 per ton. This material is used for roofing purposes and is marketed in the ground form mixed with mica.

Barytes.—All Ontario deposits of this mineral have been inactive during the past few years. The product to be marketable must be ground to a fine mesh and be perfectly white in colour. It is consumed mostly in the paint trade.

Beryl.—The only economic deposit of beryl in Ontario is situated in Lyndoch township, Renfrew county, and has not yet been developed. A small experimental shipment of a few tons was made in 1927 to Germany, but since that time the deposit has lain dormant. This shipment was not reported until 1929 and was included in production for that year.

Calcite.—There are several large deposits of pure white calcium carbonate in Ontario. This mineral in a finely ground condition may displace the imported whiting in some industries. A plant having a yearly capacity of 12,000 tons has recently been built in Montreal to produce whiting from native crude minerals. The market for imported whiting which enters into a variety of industries such as the manufacture of linoleum, oil cloth, putty, cold water paints, crayons and scouring media, is quite large. The imports to Canada during the fiscal year ending March 31, 1930, totalled 17,898 tons valued at $207,394, while the imports of whiting substitute has been estimated at around 7,000 tons during the same period. The difference between ground calcite and imported whiting is entirely of a physical nature, since their chemical composition is identical. The grain of ground calcite is angular or crystalline in structure, while that of true whiting is amorphous with much higher absorptive capacity for oil and water.

Diatomite.—A trial shipment of crude diatomite (10 tons) was made in 1930 by R. Morrow of Muskoka Falls to Geo. Bailey, 321 Albany Avenue, Toronto, where experimental insulating materials such as brick, and plates for electric stoves, are being made. The shipment, taken from a lake bottom in Draper township, was valued at $140 which covered only mining and transportation charges. Two other diatomite properties in Muskoka are being developed, namely at Martin's Siding and Novar. Production from the first mentioned, Diatomite Products, Limited, is expected in 1931. Construction work and machinery installation are well advanced, and the company plans to produce 20 tons of finished product daily. Diatomite is a hydrous type of silica in the form of countless microscopic siliceous skeletons of diatoms, which may be of either fresh water or marine origin. In addition to its use as an insulator, diatomite is employed as a filtering material, as a filler, as a fine polish, and for many other uses.

Feldspar.—Production of crude feldspar dropped from 21,737 tons in 1929 to 9,722 tons in 1930. This decrease was due to a falling off in exports to the United States, and is accounted for in part by the imposition of a tariff of $1.00 per long ton on crude spar going into that country, effective June 30, 1930. The valuation for 1930, namely $102,871, includes $34,666 which was the calculated value added to the spar ground in Ontario. Canadian consumption of ground spar is approximately 10,000 tons per year. The grinding plant at Kingston, Ontario, is operated by the Frontenac Floor and Wall Tile Company to supply its own needs, and also to market a surplus. With the addition of a new grinding mill at Buckingham, Quebec, Canadian requirements can be met without importing ground spar from the United States. A further protection for the Canadian industry was the placing of a protective duty of 15 per cent. ad valorem in July, 1930, on imports of ground feldspar.

Graphite.—The only producer of this mineral in Ontario in 1930 was the Black Donald Graphite Company, Ltd., of Calabogie from its property on lots 17, 18 and 19, concession III of Brougham township, Renfrew county. During the year the sales totalled 1,338 tons valued at $86,543 as against 1,288 tons worth $90,522 in 1929. Crude ore mined was 3,970 tons and ore milled totalled 4,060 tons from which 1,338 tons of refined were sold in flake, dust and amorphous grades.

Gypsum.—Gypsum, Lime and Alabastine, Canada, Limited, formerly known as the Canada Gypsum & Alabastine, Limited, was the only producer of gypsum in Ontario. The crude mined totalled 102,789 tons of which 78,182 tons were calcined, from the two plants, Lythmore and Caledonia. The material marketed during the past five years is shown in the table below:—

GYPSUM SALES, 1926–1930

Grade	1926	1927	1928	1929	1930
Crushed.....tons	37,769	29,832	20,675	23,533	25,130
Fine ground..... "	1,110	621	1,134	497	1,190
Calcined sold..... "	3,098	856	4,133	5,269	3,515
Calcined used in products..... "	48,010	52,689	59,869	71,048	65,111
Total sold or used.....tons	89,987	83,998	85,811	100,347	94,946
Total value.....$	496,059	500,688	553,271	832,689	776,069

This company which produces wall board, insulex and other building materials has developed the industry greatly and now has a considerable export trade.

Iron Pyrites.—Only 140.61 tons of pyrites worth $1,645 were shipped in 1930 from Ontario. The property known as the Caldwell mine, near Flower Station on the K. & P. branch of the C. P. Ry. has been shipping small quantities of pyrites for a number of years. In addition, sulphuric acid is produced by Canadian Industries, Ltd., at Copper Cliff and Coniston from sulphur fumes. The sulphur content of this acid along with that of the iron pyrites amounted in 1930 to 7,275 tons worth $73,835 as against 4,579 tons valued at $51,516 in 1929. The key map which appears as a frontispiece to this Bulletin shows the Sudbury area as a new centre of the heavy chemical industry.

A recent development which offers encouragement to pyrite producers is the invention by Horace Freeman of Shawinigan Falls, Quebec, of a new type of pyrites burner which, in 1930, came into commercial use at the Three Rivers, Quebec, plant of the Canada Power and Paper Company. The furnace, with a capacity of 20 tons of pyrites per day, supplies the total acid requirements of the sulphite wood pulp mill. By this method a cool moist gas is produced containing 11 to 12 per cent. sulphur dioxide, and free from dust and traces of sulphur trioxide. The waste heat from pyrite burning is passed through tubular boilers and the steam generated is used for plant heating. In addition the iron oxide residue constitutes an important by-product.

Lignite.—The investigation being conducted by the Ontario Department of Mines into the lignite deposit in the Moose River basin was continued throughout the year 1930. Drilling operations indicate that between five and six square miles are underlain by the lignite seam. A shaft was sunk to the bottom of the lignite seam and several tons were mined and shipped for testing purposes. These tests showed the lignite to be less mature than Saskatchewan lignite and to contain approximately 50 per cent. moisture.

A deep hole was drilled to the granite, which was reached at a depth of 1,027 feet. No sign of oil or gas was encountered but much geological information was obtained in respect to structure, thickness and character of the sedimentary formations. An interesting development is the discovery of high grade fire clays and ball clays overlying the lignite seam, or occurring as partings within it.

The Temiskaming and Northern Ontario railway was extended during the year to the crossing of the Moose River, and passes through the lignite field.

Natural Gas and Petroleum.—The Natural Gas Commissioner of Ontario, R. B. Harkness, has supplied the following notes:

The consumption of Natural Gas decreased from 8,583,187 M. cu. ft. in 1929 to 7,901,137 M. cu. ft. in 1930, a difference of about 680,000,000 cu. ft. The industrial depression of the year 1930 has made itself felt in the use of natural gas in industries, which probably accounts for the major portion of the decrease. The mild fall and winter of 1930 are also accountable in part. The prosperous year of 1929 has had the effect of stimulating the search for natural gas, and in the year 1930 many more wells than usual were drilled, and probably 300,000 acres of new leases were taken, principally in the eastern fields. The old Haldimand-Norfolk field, which was considered to be approaching exhaustion, has been revived by this drilling activity, and is now able to supply as much as gas it did ten years ago. Whether the promised drilling activity of the season 1931 will prove as successful as in 1930 remains to be seen.

The production of Petroleum for the year 1930 has shown a normal decline, as has each recent year. The price of oil being so low, there has been nothing to stimulate the oil men in the search for further supplies, and, unless the price of oil is materially increased, our old Ontario fields will gradually pass into history.

CRUDE PETROLEUM PRODUCTION,* 1926 TO 1930

	1926	1927	1928	1929	1930
	Barrels	Barrels	Barrels	Barrels	Barrels
Petrolia and Enniskillen township	53,485	50,172	60,547	56,284	55,130
Oil Springs	38,349	37,281	35,653	30,789	29,160
Moore township	2,438	2,015	2,148	1,230	1,576
Sarnia township	1,890	1,589	1,221	749	1,149
Plympton township	1,047	1,240	371	315	296
Bothwell	25,382	25,224	24,255	23,236	21,176
Dover West township	959	602	773	715	457
Raleigh township	676	276	.....	.....	.....
Onondaga township	361	210	87	243	231
Mosa township	7,868	7,456	7,268	6,850	7,166
Thamesville	2,376	4,139	1,006	427	447
Dunwich township (Dutton and Iona)	139	.....	.....	148	365
Tilbury East township	.....	60	736	139	149
Total quantity	136,971	139,606	134,065	121,125	117,302
Value	$376,822	$289,390	$249,981	$293,724	$235,746
Average price per barrel (35 gals.)	$2.73	$2.11	$1.86	$2.42	$2.00

*Information furnished by the Imperial Oil Refiners, Limited, of Sarnia, and others.

Salt.—The production of salt and brine in Ontario, totalling 245,793 tons of all grades valued at $1,568,250, was the highest in value since the year 1923. As compared with the previous year the record shows an increase in value for a decrease in tonnage. The number of plants decreased from 7 to 6. During March the Kincardine Salt Company's plant at Kincardine was taken over by the Canadian Industries, Ltd The statistics of production by grades and values for the past five years follows:—

SALT SOLD OR USED, 1926 TO 1930

Schedule	1926	1927	1928	1929	1930
Table and Dairy ..... tons	50,461	53,467	56,214	54,138	49,467
Fine ..... "	47,202	47,202	51,055	49,869	52,604
Coarse ..... "	31,192	25,216	26,730	22,632	21,085
Land ..... "	3,965	5,790	3,621	1,919	245
Other Grades (pressed blocks) ... "	6,505	6,518	7,083	5,560	7,655
Total Salt ..... "	139,325	138,185	144,703	134,118	131,056
Brine (salt equivalent) ..... "	113,020	115,995	135,138	168,327	114,737
Total sold or used ..... "	252,345	254,180	279,841	302,445	245,793
Value ..... $	1,388,672	1,510,777	1,377,629	1,420,424	1,568,250

Talc.—This industry has not changed greatly during the five years up to and including 1929. Production from the two operating companies near Madoc, namely, the Geo. H. Gillespie Co. and the Canada Talc, Ltd., has ranged from $174,000 to $180,000 per annum. In 1930 the value was lower and amounted to $133,213 for 11,664 tons as against $179,187 for 14,925 tons in the previous year. The product in the ground state ranges in price from $9.00 to $18.00 per ton, depending on grade, and is marketed in Canada and the United States. No soapstone was mined during the period. The deposit at Eagle Lake in Kenora district was not operated.

Structural Materials

The value of Canadian construction contracts awarded for 1930, reported by *McLean Building Review* was $456,999,600 as compared with $576,651,800 in 1929. Ontario contracts in 1930 amounted to $175,459,600. Building costs have been fairly stable during the past few years. Prices of materials are considerably below the peak of 1920, and a greater drop was recorded in 1930 than in any year since 1922.

VALUE OF ONTARIO CONSTRUCTION CONTRACTS, 1926 TO 1930

Classification	1926	1927	1928	1929	1930
	$	$	$	$	$
Residential	52,084,100	57,580,800	64,628,600	59,211,000	44,427,000
Business	38,808,200	81,328,100	58,700,200	82,949,000	52,636,400
Industrial	21,126,900	11,922,500	25,109,800	28,247,200	12,787,400
Engineering	29,910,200	45,327,600	39,913,100	45,365,900	65,608,800
Total	141,929,400	196,159,000	188,351,700	215,773,100	175,459,600

Building permits in 61 Canadian cities in 1930 were valued at $166,379,325. Of this total thirty Ontario cities accounted for $69,042,946 or 41.5 per cent., as noted in the following table abstracted from *Annual Review of Building Permits in Canada in 1930*, issued by the Dominion Bureau of Statistics, Department of Trade and Commerce, Ottawa.

BUILDING PERMITS IN ONTARIO, 1920 TO 1930

Year	30 Ontario Cities, Value	Toronto Metropolitan Area, Value (*a*)	Prices of Building Materials Index No. (*b*)	Wages Index No. (*c*)
	$	$		
1920	58,636,365	30,049,413	144.0 (*d*)	180.9
1921	59,315,845	31,979,346	122.8	170.5
1922	81,396,259	36,405,625	108.7	162.5
1923	74,673,080	39,530,877	111.9	166.4
1924	57,330,141	29,636,428	106.6	169.1
1925	59,888,867	32,408,636	102.9	170.4
1926	65,373,757	31,588,124	100.0	172.1
1927	79,883,344	37,316,511	96.1	179.3
1928	104,777,566	59,817,568	98.1	185.6
1929	95,055,827	57,522,927	99.0	197.5
1930	69,042,946	38,371,587	90.9	203.2

(*a*) Includes York and East York municipalities. The municipalities of Forest Hill, North York, and Swansea together reported $3,271,730 additional in 1930.

(*b*) Applies to average index numbers for Canadian wholesale prices of building materials on the basis of 1926 = 100, as compiled by Dominion Bureau of Statistics. In 1913 the index was 67.0, dropping to a low of 60.5 in 1915.

(*c*) Average index numbers of wages in Canadian building trades as compiled by the Federal Department of Labour on the basis of 1913 = 100.

(*d*) Peak year.

Cement.—During 1930 the plants in operation were: three of the Canada Cement Company, Limited, located at Point Anne near Belleville, Port Colborne, and Lakefield; and that of the St. Marys Cement Company, Limited, at St. Marys. Production for the last pre-war year and subsequently is given in the following table:—

PORTLAND CEMENT STATISTICS, 1913, 1918, 1921, AND 1926 TO 1930

Year	No. of Operating Plants	Sales		
		Barrels (350 lbs.)	Total Value	Average Price per bbl.
		$	$	$
1913	13	3,802,321	4,105,455	1.08
1918	4	1,226,244	1,910,839	1.56
1921	5	2,723,072	6,425,266	2.37
1926	3	3,398,860	4,792,857	1.41
1927	4	3,751,786	5,144,326	1.34
1928	4	3,911,795	5,520,897	1.41
1929	4	4,624,712	6,608,246	1.43
1930	4	3,942,690	5,779,404	1.47

Stocks on hand December 31, 1929 and 1930, were 345,968 and 956,794 barrels respectively. The following information has been abstracted from the annual report of the Canada Cement Company, Limited, for the fiscal year ending November 30, 1930:—

Your company has felt the effect of the world-wide business depression of the past year, and sales, both domestic and export, have fallen below those for 1929. The decreased consumption was most marked in the smaller class of buildings and the dealer trade. Increased efficiencies and economies in production and distribution have enabled us to compensate to a considerable extent for the reduction in volume. This year another self-discharging boat, built specially for service on the Great Lakes, was purchased and put into operation to carry bulk cement from our plant at Belleville to storage and packing plants completed during the past year at Toronto and Windsor. This arrangement also is working out very satisfactorily.

Sand and Gravel.—Due mainly to the activity in road construction in Ontario during 1930, the sand and gravel production showed a slight gain in value as compared with the figures for the previous year, while the tonnage marketed showed a considerable gain in volume. Statistics of the various grades and classes of the material have not as yet been compiled but as regards origin the production for the year was as follows:—

	Tons	Value $
Land operations	1,926,137	973,011
Dredging	3,014,518	1,116,488
Provincial Highway Construction	1,131,300	565,650
Northern Development	1,764,635	130,714
Municipalities (Counties, etc.)	1,519,983	455,995
Total	9,356,573	3,241,858

Stone.—Production of stone, classified according to kind, follows for the years 1929 and 1930:—

Kind	1929		1930	
	Tons	Value	Tons	Value
		$		$
Limestone	4,380,706	3,759,357	4,079,391	3,529,754
Trap	282,813	367,590	300,122	367,313
Granite	569,978	574,771	716,470	683,319
Sandstone	10,697	69,898	5.877	28,178
Total	5,244,194	4,771,616	5,101,860	4,608,564

Classified according to use the output of 5,244,194 tons in 1929 was as follows: highways, 2,358,919 tons; railways, 2,206,107; flux, 318,910; chemical, 155,068; rubble and rip rap, 146,837; building and ornamental, 34,758; agriculture and fillers, 15,999; flag, curbing, and paving blocks, 7,598. Figures for 1930 are not sufficiently complete to give a similar classification.

Clay Products

The Ontario Department of Mines has just issued a comprehensive report on the Ceramic Industry of Ontario which appears as Part 4 of Volume XXXIX. Prof. R. J. Montgomery of the University of Toronto spent the field seasons of 1928 and 1929 visiting practically all the clay and shale working plants of the Province, and this report embodies the results of his investigations.

Production in 1930 fell off from the 1929 figures by over 20 per cent. as a direct result of restricted building owing to general business depression. Detailed production figures follow:—

HEAVY CLAY PRODUCTS MARKETED, 1930

Kind	Number or Quantity	Value
Brick—Soft mud process—Face, No.	9,739,101	194,868
Brick—Soft mud process—Common, "	30,080,392	453,192
Stiff-mud (wire cut) process—Face, "	54,958,911	1,125,351
Stiff-mud (wire cut) process—Common, "	23,936,409	360,862
Dry-press—Face, "	24,345,779	483,048
Dry-press—Common, "	4,245,955	59,152
Fancy or ornamental brick (including special shapes, embossed and enamelled brick)	264,946	23,858
Sewer	808,470	13,791
Tile, structural: Hollow blocks (including fireproofing and load-bearing tile), tons	90,218	852,366
Roofing tile, no.	.....	78,310
Floor tile (quarries), sq. feet	.....	
Tile, drain, no.	21,309,648	563,590
Sewer pipe (including copings, flue linings, etc.), tons	.....	834,361
Pottery, from domestic clay, no.	5,500,000	80,000
Haydite	.....	227,275
Total Value, $	.....	5,350,024

The value of clay products marketed for the last pre-war year (1913), for 1922, and for the past five years is given below:—

VALUE OF CLAY PRODUCTS SOLD OR USED, 1913, 1922, AND 1926-30

Year	Brick		Pottery	Drail Tile	Sewer Pipe	Haydite	Total
	Common	Face, Fancy, Building Tile, etc.					
	$	$	$	$	$	$	$
1913	3,283,894	1,162,860	52,875	292,767	600,297	.....	5,392,693
1922	2,614,120	2,899,205	88,889	368,180	973,824	.....	6,944,219
1926	768,734	3,324,526	87,600	340,403	835,206	.....	5,356,469
1927	1,063,724	3,323,867	91,300	521,957	852,187	.....	5,853,035
1928	1,154,763	3,377,648	*98,519	572,577	974,157	.....	6,177,664
1929	1,281,004	3,524,358	96,394	629,322	1,167,463	131,621	6,830,162
1930	873,206	2,771,592	80,000	563,590	834,361	227,275	5,350,024

*Includes $400 worth of other products.