MINES BRANCH

DEPARTMENT OF MINES

OTTAWA, CANADA

THE CANADIAN MINERAL INDUSTRY IN 1931

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		Article Number	
I METALS:	Antimony	(1)	Buisson, A.
	Bismuth	(2)	Buisson, A.
	Cadmium	(3)	Buisson, A.
	Cobalt	(4)	Robinson, A.H.A.
	Copper	(5)	Buisson, A.
	Gold	(6)	Robinson, A.H.A.
	Iron ore	(7)	Robinson, A.H.A.
	Lead	(8)	Buisson, A.
	Manganese	(9)	Buisson, A.
	Molybdenum	(10)	Eardley-Wilmot, V.L.
	Nickel	(11)	Robinson, A.H.A.
	Platinum	(12)	Buisson, A.
	Radium	(13)	Spence, H.S.
	Selenium	(14)	Buisson, A.
	Silver	(15)	Buisson, A. & Eardley-Wilmot, V.L.
	Titanium	(16)	Robinson, A.H.A.
	Zinc	(17)	Buisson, A.
II NON-METALS:	Arsenic	(18)	Robinson, A.H.A.
	Asbestos	(19)	Wilson, A.W.G.
	Barite	(20)	Spence, H.S.
	Bituminous Sands	(21)	Ells, S.C.
	Chromite	(22)	Spence, H.S.
	Corundum	(23)	Eardley-Wilmot, V.L.
	Diatomite	(24)	Eardley-Wilmot, V.L.
	Feldspar	(25)	Spence, H.S.
	Fluorspar	(26)	Spence, H.S.
	Garnet	(27)	Eardley-Wilmot, V.L.
	Graphite	(28)	Spence, H.S.
	Grindstones	(29)	Eardley-Wilmot, V.L.
	Gypsum	(30)	Cole, L.H.
	Iron Oxide	(31)	Wait, E.H.
	Lithium	(32)	Spence, H.S.
	Magnesite	(33)	Frechette, H.
	Mica	(34)	Spence, H.S.
	Moulding Sands	(35)	Freeman, C.H.
	Phosphate	(36)	Spence, H.S.
	Pyrites	(37)	Wilson, A.W.G.
	Salt	(38)	Cole, L.H.
	Silica	(39)	Cole, L.H.
	Sodium Sulphate	(40)	Cole, L.H.
	Talc & Soapstone	(41)	Spence, H.S.
	Volcanic Dust	(42)	Eardley-Wilmot, V.L.
III STRUCTURAL MATERIALS:	Cement	(43)	Buisson, A.
	Granite	(44)	Cole, L.H.
	Kaolin (China Clay & Ball Clay)	(45)	Frechette, H.
	Lime	(46)	Goudge, M.F.
	Limestone (General)	(47)	Goudge, M.F.
	Limestone (Structural)	(48)	Goudge, M.F.
	Marble	(49)	Goudge, M.F.
	Whiting substitutes	(50)	Goudge, M.F.
IV FUELS:	Coal	(51)	Haanel, B.F.
	Coke	(52)	Buisson, A. & Strong, R.A.
	Natural Gas	(53)	Wait, E.H.
	Oil Shale	(54)	Swinnerton, A.A.
	Peat	(55)	Buisson, A.
	Petroleum	(56)	Wait, E.H.

NOTE: The figures of production are preliminary figures, as published by the Dominion Bureau of Statistics. Imports and exports are taken from the "Trade of Canada," Dominion Bureau of Statistics, and cover the calendar year. The market quotations are obtained chiefly from the Engineering & Mining Journal, N.Y.

ANTIMONY IN 1931

Production:

No antimony ore, concentrates, or antimony regulus was produced in 1931, with the exception of a small test shipment of 25 tons of antimony ore shipped to Liverpool, England.

The silver-lead-bismuth bullion obtained as a by-product in the treatment of the silver-cobalt-nickel arsenic ores at Deloro, Ontario, contains small quantities of antimony but the bullion is exported to the United States for further treatment.

The Consolidated Mining & Smelting Co. produce some impure antimony as a by-product in connexion with their silver refining operations at Trail, B.C. However, it is being allowed to accumulate at the smelter until the necessary equipment for treating it is installed.

Exports:

Nil.

Imports:

Metallic antimony	1931:	919,724	lb.	valued at	$56,458
	1930:	1,303,560	"	" "	87,027
Antimony salts	1931:	49,195	"	" "	3,245
	1930:	21,146	"	" "	3,691

Ores Mined and Producing Localities:

No antimony ores or refined antimony have been produced since 1917 when shipments of 361 tons of ore valued at $22,000 were made. Small experimental shipments were made in 1925,1926, 1927 and 1931. Small amounts of refined antimony as well as antimony ores were, previous to 1917, produced intermittently for a number of years in the Maritime Provinces.

Important Developments and Prospective Producing Localities:

The only property operated in 1931 was the old Lawrence mine which has been intermittently under development since September 1928 by the Lake George Mines,Ltd., under management of A.D.Taylor, M.P.

General Situation, Market Conditions, etc.:

Antimony is dependent for its market upon general industrial activity and especially upon automobile manufacture, because it is used largely in storage-battery plates, bearing and babbit metals, solder, rubber goods, and paints and fixtures. The price of antimony in 1931 averaged 6.720 cents per pound, as against 7.667 cents in 1930.

While Bolivia and Mexico are important producers of antimony the bulk of the production comes from China and market conditions are more or less governed by the existing conditions in that country.

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BISMUTH IN 1931

Production:

Refined bismuth was produced in Canada for the first time in 1928. The production reported below includes metallic bismuth produced at Trail, B. C., and the bismuth contained in silver-lead-bismuth bullion produced at Deloro, Ontario, and exported for treatment in foreign smelters. No metallic bismuth was made in 1930.

1931 -	118,207	lb.	valued	at	$157,650
1930 -	12,732	"	"	"	6,366
1929 -	194,329	"	"	"	307,114
1928 -	14,002	"	"	"	5,067

Exports:

The exports of bismuth are not recorded separately, although most, if not all, of the Canadian production is believed to be exported.

Imports:

1931 -	125	lb.	valued	at	$ 50
1930 -	2,273	"	"	"	2,330

Ores Mined and Producing Localities:

No bismuth ore as such has ever been mined in Canada, although a small amount of bismuth has been obtained as a by-product annually in the treatment of the silver ores from northern Ontario and, since December 1928, from the lead-zinc ores of British Columbia.

In Ontario, the Deloro Smelting & Refining Co. of Deloro, from the treatment of the silver-cobalt-nickel-arsenical ores of Cobalt and adjoining areas, obtain an impure bismuth and also a lead bullion which contains bismuth, as well as some gold and silver. This bullion is exported to the United States for refining.

In British Columbia, the Consolidated Mining & Smelting Co. of Canada completed in the latter part of 1928 a plant for the electrolytic treatment of bismuth residues obtained from the electrolytic treatment of lead bullion.

Important Developments and Prospective Producing Localities:

Nothing to report.

General Situation, Market Conditions, etc.:

The price of bismuth at New York in ton lots in 1931 was $1.25 per lb. for January and February, $1.40 for March, $1.50 for April and May and remained fixed at $1.15 from June to the end of the year.

For many years the American price has been maintained a little below the European parity, plus duty.

Most of the bismuth imported is used to manufacture pharmaceutical products; a small proportion is used in the making of so-called fusible alloys.

As the consumption of bismuth is still relatively small and the uses limited in number, any slight fluctuation in production would have a noticeable effect on the price of this commodity.

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CADMIUM IN 1931

Production:

1931 ---	(not given)	valued at	$180,958
1930 ---	(not given)	" "	337,871
1929 ---	773,976 lb.	" "	675,294
1928 ---	491,894 "	" "	341,374

Exports:

Cadmium is exported chiefly to Europe with small amounts to the Orient.

Imports:

None recorded.

Ores Mined and Producing Localities:

Cadmium is obtained as a by-product in the production of zinc, and in some cases of lead and being present in small amounts in most zinc ores and in some lead ores.

The recovery plant of the Consolidated Mining & Smelting Co., at Tadanac, B.C., first started production early in 1928 and has been treating accumulated zinc residues, as well as the current output from the zinc refinery.

Important Developments and Prospective Producing Localities:

The zinc refinery of the Hudson Bay Mining & Smelting Co., at Flin Flon, northern Manitoba, which started operating in the latter part of 1930, is now producing small quantities of cadmium residues in the form of cadmium sponge. It has been reported that two new zinc refineries will eventually be erected in eastern Canada — one by the Consolidated Mining & Smelting Company in association with Ventures Ltd., and the other by the Noranda Mines Ltd., in association with the British Metals Corporation Ltd., and the Nichols Copper Co. of the United States. It is possible that these plants may eventually produce cadmium residues, and may find it necessary to erect the necessary recovery plants, should market conditions justify such a course.

General Situation, Market Conditions, etc.:

The possibilities of increased production of cadmium are great, but the market is rather restricted. During the last few years the market has been more buoyant, owing to the fact that the use of this metal for plating purposes has developed rapidly. Cadmium is being employed by colour makers to a greater extent than formerly owing to the increased use of "Cadmopone". It is also used in the manufacture of fusible alloys, as an ingredient of special amalgams, and salts of cadmium find application in the arts, medicine, dyeing, etc.

Cadmium is marketed mainly in metallic form 99.5 per cent pure and better, and as a sulphide. The price has been characterized in past years by some remarkable fluctuations but in 1931 the price of cadmium remained fixed at 55 cents per pound from February to the end of the year. The American product is protected by a duty of 15 cents per pound.

The world's production was estimated at 1,900 tons in 1930, 1,800 tons in 1929 and 1,500 tons in 1928. The chief producers are: The Anaconda Company in the United States; the Electrolytic Zinc Co. of Australia; the Consolidated Mining & Smelting Co. of Canada, and the American-Geische A.G., in Upper Silesia.

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COBALT IN 1931

Production:

1931 - 521,051 lb. valued at $ 651,179
1930 - 694,163 " " " 1,144,007

Exports:

Metallic cobalt, cobalt alloys, etc., valued at $735,225

Imports:

Cobalt ores	nil.
Oxide of cobalt, tin, and copper, n.o.p.	233,217 lb. valued at $58,640

Ores Mined and Producing Localities:

All the cobalt produced in Canada comes from the silver-cobalt-arsenic mines at Cobalt, Gowganda, and South Lorrain in northern Ontario. Formerly, it was all obtained as a by-product of the working of these mines primarily for silver, but recently with the depletion of the richer silver-bearing portions of the deposits, the fall in the price of silver, and increased demand for cobalt, considerable amounts of silver-free and low-silver cobalt ore that was formerly left in the mines as unprofitable was mined, to a considerable extent by lessees. These cobalt ores are in part exported as such, in part treated in Canada. The only Canadian company producing cobalt metal, oxides, and salts, etc., is the Deloro Smelting and Refining Company Ltd., with works at Deloro, Ontario.

The nickel-copper ores of Sudbury, Ontario, are also known to carry small amounts of cobalt (about 0.1%), but neither company returns nor Government records show any production from this source.

Important Developments and Prospective Producing Localities:

None.

General Situation, Market Conditions, etc.:

Due to decreased demand and a sharp drop in the price paid for cobalt ores during the year, it is estimated that Canada's production of that metal in 1931 had a value little more than half that of 1930. The chief producer was the Mining Corporation of Canada, whose output was sold to the Deloro Smelting and Refining Co. under a contract made at the beginning of the year at prices higher than those now obtaining. This contract is said to have terminated on December 31st. With continued low prices for silver, cobalt production in Canada will likely show a further large decrease in 1932.

The price of cobalt at Canadian works remained fixed at $2.50 per pound for 97 to 99% Co throughout 1930 and 1931.

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COPPER IN 1931

Production:

1931 --	146,577	tons	valued at	$24,185,119
1930 --	151,739	"	"	" 37,948,359
1929 --	124,060	"	"	" 43,415,251
1928 --	101,348	"	"	" 28,598,249

Exports:

Copper in ore, matte, blister, pigs, etc.:-
1931 -- $17,155,713
1930 -- 31,354,544

Imports:

Copper in blocks, pigs, scrap, bars, etc.:-
1931 -- $ 2,630,724
1930 -- 8,603,060

Ores Mined and Producing Localities:

About 23 per cent of the output was derived from the low-grade copper ores of British Columbia, all of which require concentration before smelting; about 15 per cent came from the copper-zinc ores of northern Manitoba; about 38 per cent came from the nickel-copper ores of the Sudbury district, Ontario; the copper-zinc ores of Rouyn and adjoining areas, Quebec, contributed 24 per cent; with also a small amount of copper concentrates from the treatment of cupriferous pyrites of Eustis, Quebec, which are shipped to United States smelters.

Important Developments and Prospective Producing Localities:

In western Quebec, large bodies of copper-zinc ore have been developed at the Horne (Noranda), Waite, Amulet, Aldermac and Abana mines; a few other promising smaller properties have also been actively explored in this same area, during the past few years, but in 1931 production was mainly from the Noranda property, with a small contribution from the Aldermac mine.

The Noranda smelter which started production in 1927 is now operating at the rate of over 2,000 tons of ore and concentrates a day. A second reverberatory furnace and additional converters were put into operation in December 1929, after the new crushing unit connected with number 4 shaft of the Horne mine had been completed. The capacity of the smelter was thus increased to 35,000 tons of blister copper a year. A new 200-ton unit of the concentrator was completed in August 1930, bringing the capacity up to 1,000 tons a day. Development work on the bottom or 2500-foot level of the Horne has proven a massive sulphide ore-body with a width of over 200 feet, with good values in gold and copper. This enormous mass lies in the same zone as the "H" orebody and together they constitute one of the largest masses of sulphides found on this continent. Important discoveries of gold ore have been made and Noranda is now a large producer of gold as well as of copper. The Aldermac completed in the fall of 1931 the erection of their 500-ton mill, the first unit (250 tons) of which started operations in December. The ore contains in addition to copper high percentages of iron pyrites which it is hoped will find a market in the sulphite pulp industry.

The very low prices for copper and zinc have necessitated a cessation of operations for the present at several properties.

The copper refinery of the Canadian Copper Refiners, Ltd. with a capacity of 75,000 tons a year was completed in January 1931 and began turning out its first wire-bars about the middle of April. This refinery is handling the blister copper of Noranda Mines Ltd. and of Hudson Bay Mining & Smelting Company. The Canada Wire & Cable Company completed the erecting of a copper manufacturing plant adjacent to the new refinery at Montreal East, and began operations at the end of May.

In Ontario, the intensive development campaign carried on these last few years by the International Nickel Company and to a lesser degree by the Falconbridge Nickel Mines, Ltd. has not only increased the known ore reserves, but also, in the case of International Nickel, has proven the existence of large deposits of nickel ore with high content in copper and metals of the platinum group.

International Nickel's very large program of extension of the plants for mining, smelting and refining reached completion in 1931. The new concentrator can handle 8,000 tons of ore daily; the bulk of the charge fed to the smelter is crude ore. The copper and nickel are now separated at the new smelter, the copper going to the new copper refinery at Copper Cliff with a capacity of 120,000 tons of refined copper a year, and the nickel to the enlarged nickel refinery at Port Colborne with an annual capacity of over 43,000 tons of electrolytic nickel and 18,000 tons of nickel in oxide.

The smelter of Falconbridge Nickel Mines Ltd. was blown in early in 1930 and operated until October when both the mine and smelter were closed down to permit the refinery at Kristiansand, Norway, to catch up with production. During this period the smelter was enlarged from a daily capacity of 250 tons to 450 tons of ore. The smelter has operated throughout 1931 at half capacity.

The Eugene Phillips Electrical Works are using refined copper obtained from Copper Cliff at their manufacturing plant at Brockville. The company installed a new copper-rod rolling mill and other equipment during the summer of 1931.

In northern Manitoba, the first 1000-ton unit of the 3000-ton concentrator of Hudson Bay Mining & Smelting Co. started operations in August 1930. The company's copper smelter and zinc refinery were completed in the early fall of 1930, and both started producing in November of that year. The copper smelter started with a nominal capacity of 15,000 tons per year, but was producing at the rate of about 25,000 per year by the fall of 1931.

The first unit of the Sherritt-Gordon concentrator was completed early in 1931. This so-called 600-ton unit has treated close on to 900 tons of ore per day.

The Mandy mine, situated a few miles east of the Flin Flon, was under development in 1930, but was idle during 1931.

In British Columbia, the Anyox mines and smelter of Granby Consolidated Mining, Smelting & Power Co. were operated at full capacity throughout the year. The company's Copper Mountain mine and concentrator at Allenby ceased operations in November 1930, due to the low price of copper. The Britannia mine and 6000-ton mill were operated to full capacity up to January 1931 at which date curtailment of output was started. The company started in September the extension of its main haulage tunnel on the 4100-foot level at Britannia Beach, to reach ore shown by deep diamond drilling. The copper refinery at Trail has been idle for several years.

In the Northwest Territories during 1930 an important discovery of Bornite was made north of Great Bear Lake by Dominion Explorers, Ltd. and a number of copper showings were located between Great Bear Lake and the mouth of Coppermine river by Northern Aerial Exploration Co. These discoveries were followed up by further exploration during 1931, with very interesting results.

General Situation, Market Conditions, etc.:

The price of copper in 1931 was 9.838 cents per pound in January and steadily declined to a minimum of 6.558 cents in November. The average for the year was 8.116 cents as against 12.982 cents in 1930.

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GOLD IN 1931

Production:

1931 -- 2,691,219 oz. valued at $55,715,120
1930 -- 2,102,068 " " " 43,453,601

Exports:

Gold-bearing quartz, dust and bullion	valued at	$17,682,563
Gold coins (Canadian)	" "	920
Gold coins (Foreign)		37,439,464
Gold bullion	" "	31,887,899

Imports:

Coins	" "	1,646,990
Bullion in bars, etc.	" "	391,003
Manufactures of gold	" "	31,878
Gold fringe	" "	9,506
Articles of gold and silver	" "	672,951

Ores Mined and Producing Localities:

The chief source of the gold produced in Canada is the gold-bearing quartz deposits of the Porcupine and Kirkland Lake districts in Ontario, which are responsible for over 75 per cent of the output. In Quebec, which is now the second largest producing province, the chief source of gold is the rich copper-gold ores of Noranda mine; with smaller contributions from gold-quartz mines. In British Columbia the output is chiefly from essentially gold-silver mines; with smaller amounts (less than 15 per cent in all) from base-metal mines and from placers. Manitoba's output is now chiefly derived from copper-zinc-gold ores supplemented by considerable amounts from straight gold-quartz mines. Gold is also recovered from gold-quartz deposits in Nova Scotia and from placers in Yukon.

Important Developments and Prospective Producing Localities:

In 1931, gold production showed increases in all parts of Canada except British Columbia and Nova Scotia, and gold is now Canada's chief mineral product.

Ontario now produces 78 per cent of Canada's gold or 2,085,818 ounces; in Kirkland Lake area, the output was increased some 220,685 ounces, due largely to increased milling capacity at the Lake Shore and Teck-Hughes mines; plans are underway to carry the workings at the latter to a depth of over 6,720 feet.

The Porcupine camp increased its production during the year by 103,168 ounces, due chiefly to the continuous operation of the new Dome mill. The new 2000-ton mill at the McIntyre mine also started production and was operated successfully throughout the greater part of the year. It is proposed to carry the workings of the McIntyre to a depth of about 6,000 feet.

In northwestern Ontario, the Howey mill operated continuously, operating costs being reduced to $2.60 a ton, probably a record for a straight gold mine in Canada operating under similar conditions. Small mills were also in operation during the year at the Minto and Parkhill mines in the Michipicoten district; and a 100-ton mill is now under construction at the Moss mine, west of Port Arthur. Development work was continued at the Ashley property

in Bannockburn township; this development and the milling tests have been highly satisfactory, and construction of a new 150-ton mill will be started in the spring of 1932. Promising discoveries have been made in Swayze township and other parts of the province.

In Quebec, gold production increased from 141,747 ounces in 1930 to 300,877 ounces in 1931, due chiefly to the Noranda mines, but also to increases from the Siscoe and Granada-Rouyn mines, on both of which developments have been favourable, and whose mills have been in continuous operation. The Beattie property in Duparquet township gives promise of being developed into a large low-grade gold mine and promising new discoveries in Pascalis and neighboring townships have extended the known gold-fields.

A falling off of about 14,000 ounces in British Columbia's gold production is accounted for by decreased production from the Premier, the contraction in base metal production and the closing down of the Nickel Plate mine in 1930. These decreases were only partly offset by increased output from the Pioneer, Union, and Reno mines and from placers. Developments have been exceptionally favourable at the Pioneer mine where a new shaft is now being sunk to 3,000 feet and milling capacity is being increased from 100 to 300 tons daily. A 100-ton mill is also being erected on the adjacent Lorne mine.

In Manitoba, gold production increased from 23,189 ounces in 1930 to 102,969 ounces in 1931, due chiefly to the continuous operation of the Hudson Bay smelter treating copper-zinc-gold ores from the Flin Flon and Sherritt-Gordon mines. The Central Manitoba mine also operated continuously producing from $30,000 to $40,000 worth of gold a month; a pilot mill of 10-ton capacity, now being increased to 50 tons, was built at the Gem mines; and a 150-ton mill is now under construction at the San Antonio mine.

Yukon output, which is practically all placer gold increased about 9,000 ounces, to 44,306 ounces; and that of Nova Scotia, which was only 1,272 ounces in 1930 was still less in 1931.

General Situation, Market Conditions, etc.:

The outlook for the Dominion as a whole is for a continuing increase in output in 1932, but at a lower rate than in 1931.

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IRON ORE IN 1931

Production:

Ore for iron-making has not been mined in Canada for a number of years.

Exports:

Mostly bog ores for gas purification and titanium ores.

Imports:

	Tons	Value
Newfoundland	230,851	$ 440,301
United States	551,166	1,233,254
French Africa	26,403	44,888
Total	808,420	$1,718,443

Ores Mined and Producing Localities:

The three iron-making centres in Canada are: Sydney, Nova Scotia, on the Atlantic coast, and Hamilton and Sault Ste. Marie in the inland province of Ontario. The Sydney furnaces procure almost all their ore from their own mines at Wabana, Newfoundland, but do, however, often import also from Europe or North Africa small amounts of special ores for mixing for the production of certain special grades of pig iron. All the United States ore imported is used in the Ontario furnaces, which depend entirely on the United States Lake Superior region for their supply.

Important Developments and Prospective Producing Localities:

There are no large known bodies of high-grade iron ore in Canada that could be made tributary to Canadian furnaces. There are, however, two very large partly developed, but unequipped deposits of low-grade ore in Ontario. The Algoma Steel Corporation's New Helen mine in the Michipicoten district has proved reserves variously estimated at 60,000,000 to 80,000,000 tons of low-grade rather sulphury iron carbonate that requires roasting to fit it for use in the blast furnace. A similar ore was formerly worked by the same company at their Magpie mine, also in the Michipicoten district, but this is not at present profitable. In the Sudbury district, Moose Mountain Ltd. have developed some 33,000,000 tons of proved and probable ore consisting of low-grade siliceous magnetite carrying in its natural state about 35% of iron. For a number of years it was attempted to work the Moose Mountain ore by a process of magnetic separation and sintering, but in spite of the exceptionally high grade of the finished product it was found impossible to bring costs down to the point where a profit could be made in competition with available natural ores. Consequently, the attempt was abandoned and the large and costly plant dismantled.

General Situation, Market Conditions, etc.:

Three Canadian provinces, British Columbia, Ontario and Quebec, offer bounties on the production of pig iron from local ores, but no Canadian ore is now being used in Canadian furnaces. The proposed diamond-drilling of iron-ore occurrences on the Mattagami river in northern Ontario, by the Ontario Government, in 1930, was subsequently abandoned. It is possible that in the future sinter obtained as a by-product of the burning of pyrite by the Freeman process, will provide a certain amount of Canadian material for use in Canadian blast furnaces.

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LEAD IN 1931

Production:

1931 --	133,670	tons	valued at	$ 7,260,060
1930 --	166,447	"	"	" 13,102,635
1929 --	163,261	"	"	" 16,544,248

Exports:

	Quantity Lb.	Value $
Lead in ores,etc.....	4,421,700	176,964
Lead in pigs and refined lead....	216,425,800	4,482,812

Imports:

Lead in pigs,blocks,bars,etc., valued at $561,068.

Ores Mined and Producing Localities:

The greater part of the lead produced in Canada comes from the Sullivan lead-zinc mine at Kimberley, where concentrates are produced that are treated in the refinery at Tadanac, B.C. Considerable production is obtained during prosperous times from numerous silver-lead amd silver-lead-zinc mines in the Kootenay districts and other parts of British Columbia. The Yukon output is from silver-lead ore from the Mayo district; that of Ontario was derived from galena at the Galetta mine in Carleton county; and Quebec's output was lead concentrates from the Notre-Dame-des-Anges lead-zinc mine; the Galetta and Notre-Dame-des-Anges mines have both suspended operations.

Important Developments and Prospective Producing Localities:

The Consolidated Mining & Smelting Co. have enlarged the capacity of their electrolytic lead refinery at Tadanac, B.C., to 425 tons per day; they have also converted the concentrating plant at Trail into a custom mill. They are now able to treat the whole output of their Sullivan mine at the Kimberley concentrator, the capacity of which is 6,000 tons per day, as well as all custom ores offering, and no longer find it necessary to sell any part of their output as lead concentrates or bullion.

The opening up of a large body of high grade milling lead-zinc ore at the Monarch mine, near Field, B.C., was followed by completion in November 1929 of a 300-ton concentrator,which continued in operation until the early fall of 1930. Development work in 1930 added considerably to the known ore reserves. The cessation of operations in 1930 was due to the drop in price of silver,lead and zinc. The concentrates produced have been shipped to the United States.

There are in British Columbia several promising mines equipped with up-to-date milling plants, which are only awaiting better market conditions to resume operations. There are also properties such as the Reeves-McDonald,at the Pend d'Oreille river; the Ferguson at the Ingenika river and the Emerald in the Sibola area, which have not as yet been brought to the producing stage and which are potential producers.

In Quebec, development work was carried on, as in recent years, by the Federal Lead & Zinc Company, on their property in Gaspe peninsula.

In Nova Scotia, the British Metal (Canada) Corporation did not operate during 1931. The Company had been developing the Stirling copper-lead-zinc property in Cape Breton and had completed in the early summer of 1930 the new 250-ton concentrator, which was in operation only for a short time.

General Situation, Market Conditions, etc.:

The average price of lead at Montreal in 1931 was 4.168 cents per pound as against 5.496 cents in 1930. The average price of lead at New York was 4.243 cents as against 5.517 cents in 1930.

Despite unfavourable conditions the world's production of lead in 1931 amounted to approximately 1,525,000 tons as against 1,830,000 tons in 1930, which latter figure was only 5 per cent below the record-breaking tonnage of 1,935,000 tons in 1929.

The Department of Mines, Ottawa, has recently published the following report: "Lead and Zinc Deposits in Canada", (Geological Survey, Economic Series No. 8).

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March, 1932. (A.B.)

MANGANESE IN 1931

Production:

1931 -- 117 tons valued at $2,893
1930 -- 273 " " " 1,356

The production of manganese ore in Canada has been small and irregular and has been confined mainly to Nova Scotia and New Brunswick, with occasional shipments from British Columbia.

Exports:

Nil.

Imports:

Manganese oxide 23,745 tons valued at $243,059.

Ores Mined and Producing Localities:

The manganese ores which have been mined in eastern Canada are pyrolusite, manganite, psilomelane, and bog manganese. These were mostly ores with a high manganese content and fairly free from deleterious constituents. They were obtained mainly from New Ross in Lunenburg county, Loch Lomond, Cape Breton Island, and Aylesford, Kings county, all in Nova Scotia; from Dawson Settlement Bog and from Turtle Creek, Albert county, and from Markhamville, Kings county, both in New Brunswick.

In British Columbia, the first shipment was made from a bog manganese deposit located near Kaslo, Ainsworth mining division. Shipments have also been made from deposits near Cowichan Lake, Vancouver Island; these latter shipments are a mixture of secondary oxides, principally pyrolusite, psilomelane and magnetite.

Important Developments and Prospective Producing Localities:

At the Turtle Creek manganese deposit in Albert county, New Brunswick, a few hundred tons of ore were mined and stored during the spring of 1931, but no shipments made. No other development of importance was done in New Brunswick during 1931.

General Situation, Market Conditions, etc.:

The price of manganese ore at North Atlantic ports was for 46 to 48 per cent manganese, Brazilian, per unit, 25 cents, from January to March, 24 cents for April and 23 cents from May to end of the year; for chemical grades 80 per cent MnO_2, the price was $60 per ton from January to August and $50 to $60 from September to the end of the year.

The United States Tariff Act of 1930 provided for a continuance of the duty of 22.4 cents per unit on manganese ores down to 10 per cent of metallic manganese.

From the producers standpoint, according to the Engineering and Mining Journal, the international situation want from bad to worse, due mostly to the heavy exports from Russia by the Soviet Ore Trust and also to the large production from British India, the Gold Coast in Africa and Brazil.

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March, 1932. (A.B.)

MOLYBDENUM IN 1931

Production:

Nil. (About 12 tons of ore for testing.)

Exports:

Nil. (About 1,000 pounds of concentrates resulting from above tests.)

Imports:

Nil.

Ores Mined and Producing Localities:

There was no production in 1931 other than a trial shipment from Bagot township, Renfrew county, Ontario.

Important Developments and Prospective Producing Localities:

There was no further work done on the Molybdenite Reduction Company's property south of Amos, Abitibi county, Quebec, since the Hollinger Consolidated Gold Mines Ltd. dropped their option in June 1930. It is the opinion of some engineers who have examined the property that possibilities of finding commercial ore in the extensive vein system in which the molybdenite occurs, is still quite encouraging.

The Dalhousie Mining Co.Ltd., Victoria, B.C. early in the year closed down operations on their Alice Arm property, Skeena Mining Division, B.C. Up to the end of 1930 very good ore was encountered in several quartz veins but later work indicated that the molybdenite was not of commercial grade at 125 to 150 feet from the portals of the tunnels. A car lot of the ore sent in 1930 to the Mines Branch, Ottawa, for testing indicated that good concentrates could be made.

The Phoenix Molybdenite Corporation, Ltd. of Toronto, have been prospecting their Bagot property in Renfrew county, Ontario. They continued the old shaft down to 50 feet and deepened the old trenches along a length of over 100 feet. Cross stringers of fairly high grade molybdenite ore were encountered. Mining machinery was installed which was purchased from the old Renfrew Molybdenum Mines, Ltd. of Mount St.Patrick, in Brougham township, Ont. Twelve tons of partly selected ore, running about 5.0 per cent MoS_2 were shipped in the fall of 1931 to the Mines Branch, Ottawa, for testing. Good results were obtained indicating an 85.0 per cent MoS_2 concentrate and a recovery of 94 per cent. About half a ton of the concentrates was shipped to Montreal and exported.

General Situation, Market Conditions, etc.:

Since the bulk of molybdenum produced is used in alloy steel manufacture, the decrease in the United States output of the alloy, amounting to about 46 per cent below that of 1930 naturally had its effect on the consumption of molybdenum. However, as in the previous year, the output of molybdenum steels still showed a proportional gain over other steels. Molybdenum is chiefly used in combination with other alloying metals, particularly nickel, chromium and vanadium. Chrome-molybdenum steel is said to be superior to chrome-vanadium steel for aeroplane fusilage tubing. Straight carbon-molybdenum steels possess advantages that far offset the slight cost of the alloy addition. A substantial outlet has recently been developed in the acid resisting nickel-molybdenum-iron alloys containing as much as 20 per cent molybdenum. The increased use of molybdenum in cast iron was probably the most important commercial

development of the former metal in the United States. Recent tests by the United States War Department have shown that molybdenum can be economically substituted for tungsten in high-speed tools, equal benefits being obtained by using slightly under one third the proportion of molybdenum to that of tungsten. Molybdenum has not been hitherto considered a serious competitor of tungsten for this purpose, and greater use of the former metal in tool steels is predicted. A considerable amount of molybdenum wire and sheet is used in the radio industry. A new development in the chemical field is the use of molybdenum oxide as a catalyst in connection with the hydrogenation of oils. The uses of molybdenum for various purposes is however said to have grown more rapidly in Europe than in the United States.

The Climax Molybdenum Co.,Colorado, who furnish 75 per cent of the world output erected a 5000-ton crushing plant in 1930. Huge reserves of ore are estimated, but it is low grade being less than 1 per cent MoS_2. The Molybdenum Corporation of America, at Questa, New Mexico, is the next largest producer. The average ore being treated in their new mill runs over 5.0 per cent MoS_2 and the total metallic molybdenum content of their concentrates in 1930 was about 300 tons.

The United States 1931 production amounted to about 3,000 tons of molybdenite concentrates averaging 85.93 per cent MoS_2 and containing 1,578 tons of metallic molybdenum arbitrarily valued at $1,577,000 against 1,800 tons of this metal valued at $2,068,000 in 1930. The United States produces about 90 per cent of the world's total molybdenum, Norway about 7 per cent and the remaining 3 per cent comes from Australia, Korea, Russia and French Morocco. The Knaben molybdenite mine was the only Norway producer in 1931 with an output of 200 short tons of concentrates against 330 tons in 1930.

Molybdenum is usually introduced into the steels as calcium molybdate, the price of which was reduced towards the end of 1930 from 95 to 85 cents per pound of molybdenum contained and has remained unchanged. The use of ferromolybdenum as an addition agent is said to be on the increase but the price remained steady at $1.00 per pound of contained molybdenum. Prices of 85 per cent molybdenite concentrates are about 40 cents per pound of contained molybdenite.

The Department of Mines,Ottawa, has published the following report: "Molybdenum; metallurgy and uses; and the occurrence,mining and concentration of its ores" (Mines Branch Report No.592 (1925).

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Department of Mines,Ottawa.
March,1932. (V.L.E-W.)

NICKEL IN 1931

Production:

1931 - 65,666,320 lb. valued at $15,267,453
1930 -103,768,857 " " " 24,455,133

Exports:

Nickel in matte	33,287,600	lb.	valued at	$6,048,508
Nickel, fine	27,132,700	"	" "	7,140,420
Nickel oxides	3,108,300	"	" "	992,637

Imports:

Nickel in bars, rods, sheets, etc., valued at $1,735,681

Ores Mined and Producing Localities:

Nickel produced in Canada has its source almost entirely in the nickel-copper ores of the Sudbury district in Ontario, though there is also a small amount recovered as a by-product from the silver-cobalt-nickel ores of the Cobalt district. The known reserves of nickel ore around Sudbury are by far the largest in the world, being now estimated at well over 200,000,000 tons, carrying perhaps, on the average, about 3% nickel and 2% copper though the grade varies greatly in different mines. Ore from Creighton mine, for example, carries about 5% nickel, while some of the ore in the lower levels of the Frood mine carries as much as 20% copper. The largest individual ore-body, that of the Frood, has been only partly explored as yet, but over 125,000,000 tons of ore are already indicated.

Production and developed reserves in the Sudbury district are entirely in the hands of two companies, International Nickel Company and Falconbridge Nickel Company, of which the first is much the larger, being in a position to mine, concentrate and smelt 8,000 tons of ore a day while the capacity of the Falconbridge Company's plant is 450 tons per day. Five mines in the district are equipped for large scale operations: Frood, Creighton, Levack, Garson of International Nickel, and the Falconbridge Mine of the Falconbridge Company. In addition to smaller mines, International Nickel also has three large mines in reserve, viz., Crean Hill, Murray, and Stobie.

Important Developments:

The program of expansion commenced by International Nickel in 1924, which has involved the expenditure of some $55,000,000 was completed in 1931, and that company is now in a position to supply some 140,000,000 pounds of nickel and 200,000,000 or more pounds of copper as soon as the market demands it.

General Situation, Market Conditions, etc.:

Owing to the world wide business depression, the plants of the International Nickel Company are now reported to be working at only about 25% of their capacity. The Falconbridge smelter operated throughout the year; but about one-half of the nickel produced is still held in storage. Improvement in the demand for nickel depends entirely on increased industrial activity throughout the world. The Falconbridge Company is reported to have contracted for the sale of its full output in 1932.

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PLATINUM GROUP OF METALS IN 1931

Production:

	Quantity	Value
Platinum	44,745 oz.	$1,595,830
Palladium, rhodium, etc...	46,918 "	1,217,717

Exports:

Platinum in concentrates.	14,202 oz.	$1,135,388
Platinum scrap	81 "	2,070

Note: Precious metals in copper-nickel matte are not included.

Imports:

Platinum retorts, crucibles, wire and other metallic products, valued at $54,428 as against $122,851 in 1930.

Ores Mined and Producing Localities:

With the exception of a few ounces of platinum obtained from the black sands of British Columbia, and a small production obtained as an impure residue in the refining of gold at Trail, B.C., all the Canadian platinum and allied metals are obtained from the treatment of the Sudbury nickel-copper matte.

Important Developments and Prospective Producing Localities:

The successful development of the Frood and Frood Extension copper-nickel mines near Sudbury has added considerably to the Canadian production of metals of the platinum group, as the ores of these mines contain high values in these metals.

The Acton refinery located at Acton, near London, England, and owned by the International Nickel Company, is a new and efficient plant designed to treat precious metal residues. In order to provide refining capacity for the large output of platinum metals from the Frood mine, this refinery has been enlarged to a capacity of 300,000 ounces per year of platinum group metals.

General Situation, Market Conditions, etc.:

Russia is believed to still rank first in importance as a source of metals of the platinum group, with Canada as a close second. The next important producers are South Africa and Colombia.

Refined platinum, which began the year 1931 at a price of $36 an ounce, showed a gradual decline to a minimum of about $25 in May. The price increased to an average of $37 for June and remained at a fixed price of $40 from July to the end of the year.

An amalgamation of the world's producers, under the name of Consolidated Platinums, Limited, was formed in October to buy and resell all new platinum and to promote the use of platinum through intensive research and a market development program.

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RADIUM-BEARING MINERALS IN 1931

Production:

About 20 tons of high-grade pitchblende was mined on the property of Eldorado Gold Mines, Ltd., at Great Bear Lake, N. W. T., and was shipped out to rail at Waterways, Alberta; this is being transferred to the laboratories of the Mines Branch, in Ottawa, for experimental purposes.

Exports:

Nil.

Imports:

Salts of radium for medical and scientific purposes have been imported from time to time. The annual values of these importations are:

1928 - $17,597	1930 - $46,012
1929 - 40,687	1931 - 207,735

Ores Mined and Producing Localities:

Radium-bearing minerals were mined at two localities: (a) Echo Bay, Great Bear Lake, N. W. T., where important discoveries of pitchblende, the chief commercial ore of radium, were made in 1930. The work during 1931 consisted chiefly of prospecting operations along several known veins, in the course of which about 20 tons of hand-picked, high-grade ore was recovered. (b) Wilberforce, Ont., where operations were under way throughout most of the year upon a deposit of uraninite, a form of pitchblende that occurs in pegmatite dykes. A considerable amount of underground development work was done, in the course of which several veins carrying disseminated uraninite were found. A small tonnage of mill rock was mined, and a mill was erected in the latter part of the year; this is expected to come into operation early in 1932.

Important Developments and Prospective Producing Localities:

Small amounts of radioactive minerals have been found in Ontario and Quebec when working pegmatite dykes for either mica or feldspar. Practically all of these occurrences have proved to be of no commercial value, the minerals being either too low in radium content to be considered as a source of the element or being present in only mineralogically interesting amounts.

In 1929, however, development was started on an occurrence of uraninite in a pegmatite dyke near Wilberforce, in Haliburton county, Ontario, and this work disclosed a vein-like deposit containing large crystals and small nodules of uraninite scattered through a gangue of calcite and fluorite. A car-load shipment of the ore, sent to the Mines Branch Ore Dressing Laboratories for test late in 1929, yielded 4.56 pounds of uraninite, equivalent to 2.56 pounds of uranium oxide (U_3O_8), per ton. Further development work upon the property was commenced by the owners, the Ontario Radium Corporation, in March, 1931, in the hope of proving up a commercial ore-body. The name of the company was changed late in the year to International Radium and Resources, Ltd.

Nothing of importance developed during the year in connection with the uraninite occurrences near Pointe du Bois, Manitoba (mentioned in the 1930 Review). The uraninite occurs sparsely disseminated in local zones in a pegmatite dyke that has been worked for feldspar, and which also carries small amounts of beryl and tantalite.

The prospecting work conducted in 1931 on the property of Eldorado Gold Mines, Ltd., at Echo Bay, Great Bear Lake, fully confirmed the importance of the pitchblende veins discovered there in 1930. There is little doubt that extensive pitchblende mineralization exists in this area, and the deposits are believed to be the most important source of radium ore at present known.

Work was conducted in the Ore Dressing Laboratories of the Mines Branch during 1931 on a small trial shipment of the Great Bear Lake ore, and good progress was made on the problem of developing a process for the extraction of its contained radium.

The Department of Mines, Ottawa, has published the following reports:

The Wilberforce Radium Occurrence (Mines Branch Report No. 719, Investigations of Mineral Resources in 1929).

Radium-Bearing Minerals from Great Bear Lake, N. W. T. (Mines Branch Memorandum Series No. 48, 1931).

Occurrence of Pitchblende and Silver Ores at Great Bear Lake, N. W. T. (Mines Branch Memorandum Series No. 51, 1931).

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March, 1932. (H. S. S.)

SELENIUM IN 1931

Production:

Selenium was produced in Canada for the first time in 1931, the production amounting to 21,500 pounds of refined metal valued at $40,850.

Exports:

Not given separately.

Imports:

None recorded.

Ores Mined and Producing Localities:

Selenium, although fairly widely distributed, is not very abundant in nature. It is found occasionally associated with sulphur and more frequently accompanies the sulphides of heavy metals in the form of selenides. It is recovered from the slime or residue produced in the refining of copper.

It was produced for the first time in Canada at the new copper refinery of the Ontario Refining Company, at Copper Cliff, Ontario.

It also occurs in the slime produced at the new copper refinery of the Canadian Copper Refiners, Ltd., at Montreal East, Quebec, but this latter company have not as yet undertaken the recovery of the metal; they are however storing the residues for future treatment.

Important Developments and Prospective Producing Localities:

Nothing to report.

General Situation, Market Conditions, etc.:

The nominal price for selenium during 1931 was $1.80 to $2.00 per pound.

Canada is now in a position to produce selenium in notable quantities and the output is at present restricted to a narrow market.

Further research as to new uses will, no doubt, create a wider market for this relatively new commercial product.

The chief use at present is in the glass industry, both as a colouring agent, and to neutralize objectionable colours; a large potential market should exist in the rubber compounding industry; the most important development is probably the photo-electric cell or electric eye which is finding many industrial applications; these selenium cells also play an important part in television.

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SILVER IN 1931

Production:

1931 --	20,558,216 oz.	valued at	$ 6,140,739
1930 --	26,443,823 "	" "	10,089,376
1929 --	23,143,261 "	" "	12,264,308

Exports:

	Quantity	Value
Silver in ore and concentrates	4,017,182 oz.	$1,168,261
Silver bullion	14,649,185 "	4,230,998

Imports:

Unmanufactured silver bullion	---	$ 467,404
Sterling and other silver	---	115,127
Silver coin	---	260

Ores Mined and Producing Localities:

In Nova Scotia, a very small quantity of silver was derived from the gold quartz ores in Guysborough county.

In Quebec, the production was mainly obtained as a by-product from the treatment of the gold and copper ores of the Rouyn and adjoining areas in western Quebec.

In Ontario, the production was mostly obtained from the silver-cobalt-nickel arsenical ores of Cobalt, Gowganda, and South Lorrain; from the gold ores of Porcupine, Kirkland Lake and a few other less important areas; and as a by-product from the treatment of the nickel-copper ores of Sudbury.

In Manitoba, silver was derived from the copper-zinc ores of the Flin Flon and Sherritt-Gordon mines in northern Manitoba and from the gold-silver ores of eastern Manitoba.

British Columbia is the leading silver producing province in the Dominion. In this province the silver was obtained mainly as a by-product from the treatment of lead-zinc ores from the Sullivan mine at Kimberley. Important contributions were also made from the mines on Wallace Mountain, near Beaverdell, and the Prosperity mine, near Stewart, where occasionally the ores run as high as several thousand ounces of silver per ton;from the silver-gold bearing pyrites of the Premier mine, near Stewart; from the low-grade copper ores of Britannia mine,near Vancouver;and the Granby Company's mines near Anyox.

The Yukon production was derived from the argentiferous lead ores from the Mayo district.

Important Developments and Prospective Producing Localities:

Quebec: Development work at the Noranda mine during 1931 has increased considerably the known ore reserves. These ores have the following approximate silver content: siliceous gold ores, 0.26 oz. per ton; concentrating sulphide ore, 0.35 oz. per ton; and direct smelting sulphide ore 0.91 oz. per ton.

Ontario: The silver mines of Cobalt and adjoining areas are showing a gradual falling off in production,which is accentuated under the unprecedented low price of silver. The new silver refinery of the International Nickel Company contributed substantially to the amount of refined silver produced, but the output dropped in proportion with the curtailment in the smelting of nickel-copper ores.

Manitoba: The Hudson Bay Mining & Smelting Company completed its copper smelter and zinc refinery in August 1930 and the Sherritt-Gordon concentrator was completed in the spring of 1931. The completion of these plants has resulted in a production of 837,000 ounces as against 95,000 ounces in 1930 and 3,000 ounces in 1929.

British Columbia: The output showed a decline of about 32 per cent from that of 1930. The Sullivan and Premier mines were forced to curtail to some extent and the Prosperity mine closed down early in 1931. The curtailment of operations at the copper mines also contributed substantially to the decline.

Yukon Territory: The situation did not show any notable change, but unless new discoveries are made and improvement is shown in the price of silver a noticeable decline is in the offing.

Northwest Territories: Important discoveries of silver bearing ores were made during the summer in the vicinity of Echo bay, Great Bear lake. Some of the ores appear to be very high grade, while the balance will require concentration before shipment. Additional prospecting and development work is planned for the season of 1932.

General Situation and Market Conditions:

The price of silver was the lowest on record being an average of 28.70 cents an ounce compared with 38.15 in 1930 and 53.0 cents in 1929. Towards the end of September there was, however, a slight appreciation, owing to the suspension of the gold standard in many countries, particularly by Great Britain. The highest and lowest quotations during 1931 were 37.25 cents and 25.75 cents.

The world's computed silver production in 1931 is 196 million ounces against 248 million in the previous year, This decrease was due more to reduced production from base metal (lead, zinc and copper) mines, which yield about 70 per cent of the total silver output, than to the low price of the metal itself. In addition, secondary silver due to Indian Government sales are estimated as 35 million ounces. Demonetization of Siamese coinage yielded about 20 million ounces to which must be added 4.5 million ounces sold by the Mexican Government. This totals in all 255.5 million compared with 318.3 million ounces in 1930.

According to Messrs. Handy & Harman there was even a greater decrease in the absorption of silver; Indian consumption being 40 per cent less (57 million ounces) and China 52 per cent less (59 million ounces). Consumption for coinage purposes is practically limited to Germany which probably absorbed 25 million ounces. Industrial consumption improved, but this only absorbs 16 per cent of the world's supplies.

The main factor causing the low prices during the last two years has been the sales by the Indian Government, necessitated in order to support the rupee based on gold. As this necessity no longer exists it is believed that there will be no sales by India in 1932, and it is possible therefore that the supply of secondary silver will be very small. In addition to this, drastic curtailment of the output of the base metal mines is expected to reduce by 50 per cent the normal output of 70 per cent of the world's silver production. These factors indicate marketing during 1932 of only about 150 million ounces, or 100 million less than 1930. The depreciated value of Sterling (and consequently of the rupee) is another important factor in that it has caused large shipments of gold from India. It is expected that the profit realized will be invested in purchases of silver, more particularly so if it is calculated that there will be a future rise in value. It is impossible to predict what will happen in China, but a rise is considered more than possible.

Many plans have been suggested along the lines of bi-metallic or re-valorization schemes, but so far these have been devoid of practical results. Whether these materialize or not, it is expected that the average price of silver will be appreciably higher in 1932.

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TITANIUM IN 1931

Production:

In 1931, 1,509 tons of ilmenite valued at $10,261 were shipped from the Baie St. Paul district, Quebec, to the United States.

Exports:

See above statement.

Imports:

Not separately recorded.

Ores Mined and Producing Localities:

Ilmenite carrying from 18 to 25% titanium, occurs in large bodies at Ivry in Terrebonne county, and at St. Urbain in Charlevoix county, Quebec, and occasionally small quantities are mined and shipped from these places for export to the United States. Small shipments have also been made to England for experimental purposes. Most of that exported to the United States has been used for the manufacture of ferro-titanium at Niagara Falls, N. Y. Ilmenite shipped from the General Electric Company's mine at St. Urbain has gone to the same company's works at Lynn, Mass., and, as it is rutile-bearing, it is presumably for its rutile content that it has been mined. The General Electric Company's deposit at St. Urbain is the only known deposit of rutile of commercial grade in Canada.

Important Developments and Prospective Producing Localities:

None.

General Situation, Market Conditions, etc.:

By far the largest use of titanium at the present time is in pigments; next, in ferro-alloys, chiefly ferro-titanium, for use in the metallurgy of iron and steel. The titanium-pigment industry is rapidly becoming of great importance, but the amount of titanium ore used in it is small compared with supplies available in many parts of the world. Three companies produce titanium pigments in the United States; the Titanium Pigment Co. of New York, which is also the chief factor in the industry in Europe; the Commercial Pigments Corp. of Baltimore; and the Vanadium Corp. of America early in 1931 entered the titanium pigments field, through their subsidiary the Southern Mineral Products Corp., with a plant in Virginia.

Canada has at present no titanium industry but a Canadian company, Titanium Ltd., has secured control of the Ivry ilmenite deposits for the purpose of utilizing material from them in the manufacture of titanium-white. No plant has yet been erected in Canada however.

It is also of interest to note that one of the largest industrial corporations in the United States, not heretofore interested in titanium, had a representative investigating titanium deposits in eastern Canada during the past summer.

The published price quotations for ilmenite are nominal so far as Canadian producers are concerned. The world's chief sources of supply are now British India, Senegal, and Norway. A potential source of cheap ilmenite is the waste sludge obtained in the purification of bauxite for the production of aluminium.

The Department of Mines, Ottawa, has published the following report: "Titanium," (Mines Branch report No. 579).

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ZINC IN 1931

Production:

1931 --	118,623	tons valued at	$ 6,059,249
1930 --	133,822	" " "	9,635,166
1929 --	98,634	" " "	10,626,778

Exports:

	Quantity		Value
Zinc ore (zinc content of)	Nil		Nil
Metallic zinc	119,009	tons	$5,554,511
Zinc scrap, dross & ashes	547	"	10,018

Imports:

Spelter	11	"	1,073
Zinc sheets & plates, blocks, etc....	2,209	"	284,810
Zinc white, etc.....	14,058	"	1,318,917
Zinc, manufactures of, n.o.p.....	---		122,131

Ores Mined and Producing Localities:

Almost all the zinc produced in Canada during 1931 came from the Consolidated Mining & Smelting Co.'s plant at Trail, B.C., which secured its ore, in the form of concentrates, from the company's Sullivan mine at Kimberley, and, to a smaller extent, from the independent mines in the Kootenay district, B.C.

Important Developments and Prospective Producing Localities:

In British Columbia, the Consolidated Mining & Smelting Company further increased during 1930 the capacity of their zinc plant at Trail by the completion of a new slag-fuming plant which recovers the zinc formerly lost in the slag from the lead furnaces. In addition to the current slag production, there is a large quantity of slag from former operations stored and awaiting re-treatment. A large addition known as the zinc re-treatment plant was also completed in 1930 and herein are treated the mixed oxides of lead and zinc. These additions have increased the capacity of the works to a total of about 400 tons of zinc a day.

Development work at the Monarch mine, near Field, has increased considerably the known ore reserves. The mill, which started operations in November 1929 was in continuous operation until October of that year and contributed a substantial tonnage of concentrates all of which went to the United States.

The mines of the Slocan district were nearly all idle throughout the year; there were no new developments of importance during the year.

In Manitoba, the Hudson Bay Mining & Smelting Company completed their concentrator and the zinc refinery in the fall of 1930 and the first shipment of refined zinc was made early in December of that year.

The Sherritt-Gordon had its new concentrator in operation in the spring of 1931, but operations were confined as much as possible to producing copper concentrates, until the price of zinc shows some improvement.

In Ontario, the Treadwell Yukon Co.Ltd. which had carried on for several years extensive development at the Errington mine, in the Sudbury basin ceased all operations in December 1931. The concentrator was closed down in November 1930 due to the collapse of the metal market, and also to the fact that the pilot mill had answered its purpose.

In western Quebec, the Amulet concentrator was in operation for a few months in 1930 but did not operate in 1931.

The property of Lyall & Beidelman in Gaspe peninsula was again under development.

In Nova Scotia, the Stirling new mill completed in 1930 operated only a short time and has been idle since the fall of 1930.

The proposed construction of zinc refineries in eastern Canada by the Consolidated Mining & Smelting Co. and by Noranda Mines Ltd., has been postponed indefinitely due to the low price and surplus world production of zinc at the present time. These proposed plants would provide the Sherritt-Gordon, Errington, Noranda, Waite, Amulet, Abana and others with a market for their zinc concentrates.

General Situation, Market Conditions, etc.:

The average price of zinc at Montreal for 1931 was 3.961 cents per pound as against 5.084 cents in 1930. The St.Louis price was 3.64 cents as against 4.556 cents in 1930.

It has been estimated that the world's production of zinc for 1931 approximated 1,113,000 tons as against 1,565,000 tons in 1930, and 1,620,000 tons in 1929. Canada in 1930 became the fourth largest producer of slab zinc, contributing about 8 per cent of the total and surpassing both France and Germany.

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March, 1932. (A.B.)

ARSENIC IN 1931

Production:

1931: (not given) lb. valued at $150,993
1930: 4,524,220 " " " 129,527

Exports:

1931: 3,092,500 lb. valued at $116,044
1930: 2,335,600 " " " 86,825

Imports:

White arsenic	167,015	lb.	valued at	$5,824
Arsenic, sulphide of	10,412	"	"	" 1,347
Arsenate of soda	704	"	"	" 202
Arsenate of lead	1,248,460	"	"	"116,996
Arsenate of lime	821,509	"	"	" 42,107

Ores Mined and Producing Localities:

All the white arsenic at present produced in Canada is made by the Deloro Smelting and Refining Co. Ltd., at Deloro, Ont., who also manufacture arsenical insecticides, from arsenical silver-cobalt-nickel ores from Cobalt and surrounding districts in northern Ontario. Export of arsenical concentrates from the Nickel Plate Mine at Hedley, B. C., ceased with the closing down of that mine in 1930.

Important Developments and Prospective Producing Localities:

Deposits of mispickel, in places associated with more or less gold, are known at a number of localities in Nova Scotia, Ontario, and British Columbia, but at present prices the arsenic content of these is no inducement to attempt their exploitation.

General Situation, Market Conditions, etc.:

Arsenic is usually recovered in the form of white arsenic (As_2O_3) in America, chiefly as a by-product in the smelting and refining of other ores and metals. Its chief use is in the manufacture of insecticides, weed-killers, glass, and cattle dips. Arsenic compounds are also used to some extent as pigments for various purposes; as antiseptics and preservatives; as medicines; and for other minor purposes.

The price of white arsenic remained steady throughout the year at 4 cents per pound, a price that is believed to be very little above the average cost of production. To meet commercial requirements it must be white in colour and contain not less than 99 per cent as As_2O_3. It should have about the fineness of flour and not be lumpy. As supplied in carload lots to insecticide manufacturers, etc., it is usually packed in barrels containing about 550 pounds each; for the retail trade it is put up in packages of from 1 to 10 pounds weight.

The Department of Mines, Ottawa, has published the following report: "Arsenic bearing deposits in Canada" (Geol. Surv. Economic Series No. 4).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (A. H. A. R.)

ASBESTOS IN 1931

Production:

1931 - 164,297 tons valued at $ 4,812,886
1930 - 242,114 " " " 8,390,163

Exports:

	Tons	Value
Asbestos	70,903	$3,929,317
Asbestos sand and waste	88,535	1,245,326
Manufactures of asbestos		111,241
		$5,285,884

Imports:

Asbestos packing	69	63,455
Asbestos in any form other than crude		554,364
		$ 617,819

Ores Mined and Producing Localities:

Canadian asbestos, which is of the chrysotile or serpentine variety, is all obtained from the Eastern Townships, Quebec.

Important Developments:

No new developments of asbestos properties were reported during the year. The plant of the Asbestos Manufacturing Co., at Lachine, Que., was purchased by Prolac Limited, of New York. This company proposes to manufacture a full line of short fibre asbestos products such as sidings and corrugated sheathing, shingles, millboard, wallboard, walltile, composition black-boards, and similar products.

General Situation and Market Conditions:

The general industrial depression which began late in 1929 still continued to affect the asbestos industry through decreases in sales and a lowering of prices. The situation in the United States, the chief market for Canadian asbestos, very seriously affected sales and production of the Canadian companies; the situation was further aggravated by the development of keen competition not only among Canadian producers themselves, but also with foreign producers. Canada still maintains her position as the world's principal producer of asbestos, but the revival of the Russian industry and the expansion of the Rhodesian industry are reducing the proportion of world sales of long fibre which falls to Canadian producers. It is to be noted that adverse conditions have caused Canadian mills to materially improve their commercial practices; one of the most important happenings of the year was the establishment of a uniform standard classification to designate and name, or mark, each quality of fibre produced by Quebec mines. The use of this uniform classification will undoubtedly tend to improve the trade relations which exist between producers and purchasers of asbestos products.

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Department of Mines, Ottawa,
March, 1932. (A.W.G.W.)

BARITE IN 1931

Production:

1931	--	16 tons	valued at	$ 363
1930	--	66 "	" "	1,484

Exports:

Not separately classified in trade records, but probably nil.

Imports:

1931	--	1,686 tons	valued at	$32,712
1930	--	1,949 "	" "	35,945

Ores Mined and Producing Localities:

As in 1930, production was confined to a single deposit at Lake Ainslie, Nova Scotia, operated by an old-established paint firm to supply its own requirements.

Important Developments and Prospective Producing Localities:

No important developments were reported. Some prospecting work was conducted during the latter part of the year upon an old property near Perth, in Lanark county, Ontario, where a narrow vein of barite has been opened up for a considerable distance.

General Situation, Market Conditions, etc.

Production of barite in Canada has shown a gradual decline in recent years, the 1931 output reaching a new low level.

While a number of deposits are known, chiefly in Ontario and Nova Scotia, mining and grinding costs plus freight rates to domestic consuming centres render profitable production problematical in the face of high-grade imported material from Germany and the United States.

Enquiries reached the Mines Branch during 1930 and 1931 regarding the possibility of Canada supplying ground barite for export to Trinidad, where considerable tonnages are used in drilling oil wells, the barite serving to overcome gas pressures by increasing the weight of the mud column in the hole.

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (H.S.S.)

BITUMINOUS SAND IN 1931

Production:

Production of bituminous sand and separated bitumen in Canada is, as yet, unimportant. Prior to 1927, approximately 2,000 tons had been shipped for use in connection with laboratory investigations and for demonstration purposes. During 1927 further shipments aggregating upwards of 3,000 tons were used for demonstration purposes at Edmonton and at Jasper, Alberta, chiefly for surfacing roads and walks. Shipments in 1929 were 1,036 tons and in 1930, 792 tons, all of which was used for surfacing roads and walks.

During 1931 approximately 6,700 gallons of separated bitumen—involving consumption of approximately 525 tons of bituminous sand—was produced by R. C. Fitzsimmons, International Bitumen Company. In addition, the McMurray Oil and Asphaltum Company shipped 1,015 tons of bituminous sand.

Exports:

It is altogether unlikely that foreign export of bituminous sand, or various hydrocarbons which may be derived therefrom, will be possible for some years.

Imports:

Nil.

Producing Localities:

The deposit of bituminous sand extends along the Athabaska river and certain of its tributaries between the 23rd and 26th base lines, Province of Alberta. Shipments have been made from Sec. 32, Tp. 88, R. 8; Sec. 14, Tp. 89, R. 9; Sec. 8, Tp. 89, R. 9; Sec. 24, Tp. 95, R. 11 and Sec. 1, Tp. 97, R. 11.

Important Developments and Prospective Producing Localities:

Up to the present time principal activity has been directed toward field exploration, demonstration work, and laboratory studies. Results of investigations by the Department of Mines will be found in Summary Reports of the Mines Branch and in several separate reports, such as "Bituminous Sands of Northern Alberta," by S. C. Ells, 1926 (Report No. 632), and "Use of Alberta Bituminous Sand for Surfacing of Highways," by S. C. Ells (Report No. 684).

Laboratory and demonstration work by the Department of Mines has included: (a) Analyses of representative samples of bituminous sand and of separated bitumen. (b) Investigation of distillation and separation methods designed for the recovery of hydrocarbons, and work on sulphur compounds in the different fractions. (c) Development and demonstration of a drilling system suitable for core drilling through bituminous sand. (d) Construction of heating and mixing equipment and the laying of demonstration wearing surfaces for streets and highways.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (S.C.E.)

CHROMITE IN 1931

Production:

No production of chromite reported. In 1929, 126 tons of chromite ore were shipped to Trail, B. C., with a view to finding an efficient method of concentration. In 1923, 3,558 tons of 48 per cent Cr_2O_3 concentrates, valued at $52,650, were produced.

Exports:

None.

Imports:

The imports of chrome ore are not separately recorded. Some ore is imported for use in the iron, steel, and paint industries. During 1931, the following chromium products were imported: bichromate of soda 1,610,696 lb., valued at $114,793; bichromate of potash 130,116 lb., valued at $11,656; chrome firebrick, valued at $48,230.

Ores Mined and Producing Localities:

The principal chromite deposits are situated in the Coleraine district, Quebec, and are regarded as capable of producing large quantities of low-grade ore.

Important Developments and Prospective Producing Localities:

In 1928, a discovery of chromite was reported in the Obonga Lake region, in Ontario, 26 miles south of Collins station, on the Canadian National Railway. The deposit was actively explored by the owners, Consolidated Chromium Corporation, during 1930, and five chromite-bearing zones are reported to have been found. The chromite occurs in vein-like bodies, in which the grade of ore ranges from 12 to 36 per cent chromite. This content indicates that the ore is too low grade to be shipped without concentrating. A shaft has been sunk to a depth of 350 feet on one of the most promising zones, and a considerable amount of underground development has been completed. This company has since gone into liquidation.

Promising indications of chromite are reported to have been disclosed by diamond-drilling operations on copper-nickel deposits in the Shebandowan Lake region, Ontario.

General Situation, Market Conditions, etc.:

Competition of cheaply produced, higher-grade ore in foreign countries has reduced production, which in 1917 in war time was 36,725 tons, valued at $499,682, to nil, notwithstanding the fact that the world consumption of chromite has more than doubled since 1914. This increased consumption is due to the development of high-grade alloy steels, the growing use of chromite refractories, and the wider use of chromium plating in the automobile industry.

Nearly half of the world's supply of chromite is derived from Rhodesia, which produced 205,631 metric tons in 1930. The remainder is obtained chiefly from New Caledonia, India, Cuba, Greece, Jugoslavia, Anatolia, Russia, and the Transvaal.

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Department of Mines, Ottawa,
March, 1932. (H. S. S.)

CORUNDUM IN 1931

Production:

1921 - 403 tons graded grain valued at $55,965.
No production since.

Exports:

Nil.

Imports:

Not recorded—approximately 40 tons of grain.

Ores Mined and Producing Localities:

Nil.

Important Developments and Prospective Producing Localities.

Corundum is found near Craigmont, Ontario, and several mines have been operated in the past. The Madawaska Syndicate, of Toronto, who are primarily engaged in prospecting for beryl near Quadville, Lyndock township, Renfrew county, Ontario, took out a few hundred pounds of hand-picked corundum as samples from near the old Jewelville mines.

General Situation, Market Conditions, etc.:

The competition from artificial abrasives has been the main cause of the decline in consumption. During the last few years, however, natural corundum has been used for the manufacture of the artificial abrasive, oxide of aluminium, the corundum for which is at present obtained from South Africa. In 1928, there was a decline in this use, as this method was abandoned by the Canadian manufacturer and is now employed by only one in the United States, who now uses less than 150 tons annually. During 1930, this latter company, the General Abrasive Co., Niagara Falls, N. Y., erected an aluminous abrasive plant at Niagara Falls, Ont., under the name of Lionite Abrasives, Ltd., but so far no corundum has been used in their Canadian plant. One Canadian grinding wheel manufacturer used about one ton during the year. The United States consumption is normally between 2,000 and 3,000 tons annually of which about 50 per cent is for abrasive wheels, 30 per cent for lens and optical glass grinding, and under 10 per cent for artificial abrasives. The demand from the optical trade has very slightly increased, for which purpose corundum is now mainly used in Canada. All the Canadian imports are South African, ground and exported by United States crushing mills. Reports from these mills indicate that sales were mainly from 1930 stocks and some did not import from South Africa during the year. In the past trouble was encountered due to the erratic and incomplete shipments from South Africa, but in 1931 the latter found difficulty in disposing of their stocks since the United States is by far their largest purchaser; they only imported 720 tons against 2,794 tons in 1930. The South African total sales of crystal, boulder, and grain corundum were 1,129 short tons against 2,853 tons in the previous year.

Apart from the business depression, the consumption of corundum in the United States proportionately decreased in 1931, due to the development of the high-speed wheel, particularly for

snagging purposes in which at the high speeds the artificial abrasive, being tougher and freer cutting than corundum, has a better life.

The average price of crude South African crystal corundum is $58.00 per ton f.o.b. United States ports; graded grain at crushing mills is about $125.00 per ton.

The Department of Mines, Ottawa, has published the following report: "Abrasives: Products of Canada, Part II - Corundum and Diamond" (Mines Branch Report No. 675).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (V.L.E-W.)

DIATOMITE IN 1931

Production:

1931 -- 1,624 tons valued at $33,070
1930 -- 554 " " " 13,247

Exports:

Over 90 per cent of the shipments were exported to the United States.

Imports:

Recorded imports 850 tons valued at $25,788. The greater portion of the imports of this material is recorded under miscellaneous items or as partially made up products; it now totals about 3,600 tons.

Producing Localities:

The International Diatomite Industries Ltd.,Montreal, a Canadian reorganization of the Oxford Tripoli Sales Co.,continuously operated their deposits at New Annan,south of Tatamagouche in northeastern Nova Scotia where the material is calcined,a small proportion of which was then shipped to the Oxford Tripoli Sales Co.'s plant at Haverstraw,N.Y.,for final treatment. They also shipped a few car lots of calcined material from their deposits at Little River,Digby Neck, N.S. There were a few small shipments amounting to about 50 tons from near Baysville in the Muskoka district of Ontario for use in the manufacture of insulation bricks. The B.C.Refractories Ltd. continued mining on a small scale from their deposits at Quesnel,B.C. sending the raw product to their Vancouver plant.

Important Developments and Prospective Producing Localities:

The International Diatomite Industries Ltd. control the more important known deposits in Nova Scotia and in New Brunswick. New grinding equipment was installed and a new warehouse erected at Tatamagouche railway station and operations were carried on at full capacity throughout the year at their calcining plant and deposits near New Annan, 10 miles to the south. Their three fold increase in production over 1930 is largely attributed to the suitability of the calcined material as one of the chief ingredients used in the manufacture of a certain popular type of battery box. For this purpose the New Annan diatomite at present ranks foremost on this continent, having amongst other good qualities an exceptionally low manganese content of 0.005 per cent and under. The company expect to further increase their production in 1932. The Digby Neck deposits were only operated spasmodically, being handicapped by a wet season. Consequently plans are now underway to make changes in the drying and calcining equipment and a substantial increase in output is also expected from this plant in the near future.

The Diatomite Products Ltd.,Toronto, intermittently carried on with the erection of the large and up to date treatment plant near the railway track at Martin Siding,Muskoka,Ont. It is expected that construction work will soon be completed and that they will be producing before the fall of 1932. The storage dam beside the mill is capable of holding about 20,000 tons of wet sludge. This has now been almost completely filled by means of pumping the liquid diatomite mud through an 8 inch wooden pipe line from their deposit in Slocombe lake, a little over a mile to the northwest.

The Dominion Diatomite Co.(late Diatomite Syndicate) Huntsville,Muskoka,Ont.,completed the erection of their treatment plant at their deposit 5 miles west of Novar. They ran intermittently during the latter part of the year,but changes are being made,after which regular production is expected.

About 50 tons of crude white diatomite were mined by H.B. Bailey of Toronto from a deposit on the Muskoka river, a few miles south of Baysville. This was shipped to the Bailey Firebrick plant at Brampton and made into insulation bricks.

Some prospecting work was done by the Spence Lake Diatomite Ltd. on their deposit near Muskoka Falls, Ont.

Owing to the business depression, only about a car lot of diatomite was mined by the B.C.Refractories Ltd. from their deposit north of Quesnel, B.C., and sent to their Vancouver plant. Three or four car lots were sold mainly as a concrete admixture and the balance for insulation. These diatomite deposits near Quesnel are the largest known in the Dominion and the product is suitable for all purposes except filtration.

General Situation, Market Conditions, etc.:

The uses are mainly as a filter medium; as insulators against heat, cold and sound; for abrasive purposes such as metal polishes and powders; and in fillers for paint, rubber; also as an absorbent; as a carrier for catalysts,etc. The demand for diatomite as an addition agent to concrete, which was quite active a year or two ago, considerably diminished in 1931. This however is largely due to business conditions, and only about 300 tons or 8 per cent were used for this purpose in Canada. Filtering consumed 2,300 tons or 62 per cent, and insulation 750 tons or 20 per cent of the total used.

The use of diatomite as one of the principal ingredients in asphaltum battery boxes is still popular and the increased production of the Nova Scotia material is almost entirely due to this outlet. Several Canadian battery box manufacturers are now using diatomite with good results. Another development of interest is the manufacture by some Canadian firms of insulation bricks and insulation tiles made from all Canadian material, several car lots of which are now in use. There is a large potential market within the Dominion for diatomite insulation products.

Approximately 95 per cent of the diatomite used in Canada is imported, 86 per cent being from the United States. By far the greater part of this material is produced by the Johns-Manville Co., New York (Celite Products Co.) from their deposits at Lompoc,California. There are about 16 producers in the United States and their 1931 shipments are estimated at about 90,000 tons against about 125,000 tons in 1930.

The production of Canadian diatomite has been steadily increasing for the past 6 years but in 1931 trebled the previous year and is 50 per cent higher than the record of 1,017 tons in 1898. Over 130 deposits are known throughout the Dominion and her present consumption of imported material and far greater potential consumption, should act as a stimulant for future producers of best quality Canadian diatomite.

The present price in Canada varies from $25 to $35 per ton for concrete admixture; $35 to $75 for insulation and filtration; up to $200 in small lots for material suitable for polishes; imported insulation bricks vary from $110 to $140 per 1000 according to grade and density.

The Department of Mines,Ottawa,has published the following report: "Diatomite: Its Occurrence,Preparation and Uses" (Mines Branch Report No.691. Out of print)

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Department of Mines,Ottawa.
March,1932. (V.L.E-W.)

FELDSPAR IN 1931

Production:

1931	--	18,881 tons	valued at	$189,850
1930	--	26,796 "	" "	268,469

Exports:

1931	--	10,975 tons	valued at	$ 88,913
1930	--	21,183 "	" "	165,482

Practically the whole of the exports of Canadian feldspar finds a market in the United States, most of it being consigned to grinding mills at Rochester, N.Y. The duty on crude spar entering the United States, which, under the 1930 Tariff Act, was set at $1 per ton, was reduced late in the year to 50 cents per ton. Ground spar is taxed 30 per cent ad valorem.

Imports:

1931	--	1,877 tons	valued at	$37,297
1930	--	3,177 "	" "	53,341

Ores Mined and Producing Localities:

Feldspar mined in Canada is principally the high-potash variety, known as microcline. Soda feldspar (albite) is known to occur, but there is a limited demand for this grade for export. There is a small production, however, of a soda-rich feldspar, used in scouring-soap compounds, from a mine in Aylwin township, Que., and domestic mills use a small tonnage for blending purposes.

The principal producing districts in 1931 were the Perth and Verona areas, in Ontario, and the Buckingham area in Quebec. A proportion of the best grade spar mined in the Buckingham district is utilized for dental purposes.

Important Developments and Prospective Producing Localities:

There were no new developments of consequence during 1931, and no important new properties were opened up. Production in the Hybla district, Ontario, where until recently considerable tonnages of spar were produced, practically ceased in 1931.

General Situation, Market Conditions, etc.:

Production of feldspar in 1931 was lower by 7,915 tons than in 1930, and amounted to only half the 1929 output.

Both of the two domestic grinding mills, that of Frontenac Floor and Wall Tile Company, at Kingston, Ont., and that of Canadian Flint and Spar Company, at Buckingham, Que., were in operation throughout the year.

The price level for No.1 grade spar averaged about $7.50 per ton for the year.

Changes in the industry in recent years have resulted in most of the production now being derived from a few major operators. It has become increasingly difficult for small, independent operators to market their product with the grinding mills, owing to the poor grade of material often shipped as a result of ignorance of the high standard of purity now demanded and the consequent preference of grinding interests to draw their supplies from large, dependable operators or to operate their own mines. Only about a half-dozen properties were worked during the year, the total output being divided about equally between Ontario and Quebec.

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March, 1932. (H.S.S.)

FLUORSPAR IN 1931

Production:

1931 -- 40 tons valued at $ 620
1930 -- 80 " " " 1,240

Exports:

None recorded.

Imports:

1931 -- 3,215 tons valued at $ 31,257
1930 -- 12,652 " " " 160,995

(In addition 13 tons of hydrofluosilicic acid valued at $3,264 were imported; in 1930 the imports were 5 tons valued at $1,353.)

Ores Mined and Producing Localities:

The only localities where fluorspar has ever been produced on an important scale are the Madoc district, Ontario, and near Grand Forks, B.C. A number of properties were opened up in the Madoc area during the war, but only desultory mining has been conducted in recent years and production has amounted to only a few tons. The 40 tons reported as mined in 1931 came from one of the Madoc properties.

The Rock Candy mine of the Consolidated Mining and Smelting Company, near Grand Forks, B.C., contains the largest known deposit of fluorite in Canada. The mine is operated intermittently, the last occasion being in 1929, when nearly 18,000 tons were produced.

Important Developments and Prospective Producing Localities:

None.

General Situation, Market Conditions, etc.:

No remarks.

Issued by Mines Branch,
Department of Mines, Ottawa.
March, 1932. (H.S.S.)

GARNET IN 1931

Production:

1925 - to date no production.
1924 - 360 tons shipped from stock.
1923 - 1,250 " valued at $100,000.

Exports:

Nil. Samples only.

Imports:

Not separately recorded, but probably about 100 tons.

Ores Mined and Producing Localities:

Practically the whole of the Canadian abrasive garnet output up to the present has been obtained from the deposit of the Bancroft Mines Syndicate, situated some 18 miles east of Bancroft, Ontario.

Important Developments and Producing Localities:

A small amount of prospecting work was carried out and mining equipment was installed by the Labelle Nickel & Garnet Co. of Montreal on their garnet deposit at Labelle, Que., 100 miles north of Montreal. Owing to depressed business conditions, no further prospecting was carried out by the Langlade Garnet Ltd., Quebec (late Langlade Garnet Syndicate) at Langlade, Baudin township, Abitibi county, Que. The erection of a treatment plant is, however, still being considered.

During December 1931, a two ton sample of ore from River Valley, northwest of North Bay, Ontario, was shipped to the Mines Branch Ore Testing Laboratories, Ottawa, for concentration tests. The ore consists of about 25 to 30 per cent garnet of good quality in the form of crystals ranging from half an inch to 4 inches in diameter which occur in a wide zone of mica schist. Future work on the property depends on the results of the tests. Some prospecting work in the nature of a 40 foot shaft and underground cross-cutting was done on a 30 foot band of garnetiferous horneblende schist which outcrops on the sea shore at Chegoggin point, Yarmouth county, Nova Scotia.

The Madawaska Syndicate of Toronto who during the past year have been prospecting the beryl deposits at Quadville, Ontario, have acquired an interest in the Bancroft garnet mentioned above, and consider operations when business conditions improve and if the garnet outlook becomes more satisfactory.

General Situation and Market Conditions:

About 80 per cent of the world's production is used for making abrasive coated papers and cloths and almost all the balance for glass surfacing. Garnet is not used as loose grain for polishing wheels. A very small quantity is employed in grinding wheels of low temperature bonds only, such as in a few of those used for glass cutting. Attempts have been made from time to time to use inferior garnet, or waste products from concentration, for the sand-blasting of soft metals, but do not appear to have met with success in competition with silica sand. About 8 years ago, garnet coated papers largely took the place of sand and emery papers in the wood working industries, but during the past few years the artifical abrasive coated papers have increasingly made inroads into the garnet paper

production. In many instances garnet cloth has been entirely replaced by the artificial aluminous abrasive cloth. The finer grades have been successfully employed in the United States glass grinding and bevelling industries for which purposes the peak in the demand was reached in 1930. In the past year, there was a substantial decrease in this use owing to the closing down of some glass plants as well as to the substitution of fine sand to save expense, also to the return of the use of emery.

The world's best garnet continues to be obtained from mines in New York state, but their 1931 production was under 40 per cent of that of two years ago. The production of fines for glass surfacing, which in 1930 almost equalled that of the high grade garnet used for abrasive papers, was reduced by 60 per cent. This is mainly supplied by a producer in New Hampshire. The total United States production (three producers) for 1931 is estimated to be about 3,700 tons and sales about 3,200 tons against 5,003 tons sold in 1930. The value of the high grade is about $85 per ton against $40 - $50 per ton for the glass surfacing fines. There has been a steady drop in United States production since the peak year of 9,000 tons in 1923.

The decrease in garnet consumption was due to the general depression and to the substitution of artifical abrasives for garnet. This proportional substitution was about 10 per cent greater in 1931 than in 1930. The glass surfacing industry only absorbed about one-third of that of the previous year.

During 1930, the Carborundum Co. took over the Abrasives Ltd., Brantford, Ont., the only Canadian abrasive coated paper manufacturer. Later the Brantford plant was absorbed by the Canadian Durex Abrasives Ltd., Toronto, who remodelled the Brantford plant and started production on February 1, 1931. They are now making a full line of products consisting of almost 100 different types of coated papers and cloths, of which about 20 are garnet. As they have no crushing or sizing plant, all the abrasive grain is imported in the graded form. The Canada Sandpapers Ltd., Preston, Ont., started production in July 1931. Their annual consumption of garnet grain will probably be from 50 to 100 tons.

The Department of Mines, Ottawa, has published the following report: "Abrasives: Products of Canada, Technology and Application, Part III - Garnet", (Mines Branch report No. 677).

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (V.L.E-W.)

GRAPHITE IN 1931

Production:

1931	-- 548	tons	valued at	$32,149
1930	-- 1,535	"	" "	96,392

Exports:

1931	-- 951	tons	valued at	$ 44,606
1930	-- 2,417	"	" "	127,291

Imports:

Graphite imports, including crucibles, were valued at $116,852 as against $116,233 in 1930.

Ores Mined and Producing Localities:

At one time Canada had a small but fairly active graphite industry, with a number of concentrating and refining mills engaged in the production of flake graphite for the crucible trade. The deposits and mills were situated in the Bancroft and Perth districts in Ontario, and in the Buckingham, Guenette, and St.Remi districts in Quebec. All of these plants have been forced to discontinue operations, owing to the competition in the world market, of more cheaply mined, foreign graphite.

A single deposit of an exceptional grade of graphite, unsuitable for crucibles, but in high demand for lubricants and foundry work, has been operated for many years near Calabogie,Ont., by the Black Donald Graphite Company, and this concern is the only producer at the present time.

Important Developments and Prospective Producing Localities:

It is understood that nothing has been done in connection with the reported prospective development of a graphite deposit found two years ago at Mussel Inlet, on the Pacific coast, and which was referred to in last year's review. The discovery of an apparently large graphite deposit near Glendale, Cape Breton, Nova Scotia, was made during the summer of 1931.

General Situation, Market Conditions,etc.:

The graphite industry on the American continent continued in a depressed state during 1931, producers finding it impossible to operate in competition with imported material — chiefly from Madagascar and Ceylon. The crucible and foundry trades, also, have been working at very much reduced capacity, owing to the present trade situation, and more graphite is being offered than these trades can possibly absorb. In addition, the life of crucibles is now many times what it used to be, owing to improvements in the technique of manufacture and to the addition to the mixtures of strengthening materials, as well as to the growing adoption of oil-fired and electric furnaces for the melting of metals.

As already stated, the graphite produced at Calabogie,Ont., is not of a grade suitable for crucibles, and it is, and always has been, utilized chiefly in lubricants and foundry work, for which purposes it is admirably adapted on account of its high quality.

Madagascar and Ceylon now hold a controlling position over the world graphite supply, and it is considered out of the question that the Canadian flake industry can hope,under present conditions,to become re-established in the face of competition from these sources. All graphite crucibles used in Canada are imported either from Great Britain or the United States.

The Department of Mines,Ottawa, has published the following report: "Graphite" (Mines Branch Report No. 511,1920).

Issued by the Mines Branch,
Department of Mines,Ottawa.
March, 1932. (H.S.S.)

GRINDSTONES, PULPSTONES AND SCYTHESTONES IN 1931

Production:

1931 - 343 tons valued at $12,924 (official returns
1930 - 830 " " " 62,021 incomplete)

Exports:

1931 - exports valued at $10,776
1930 - " " " 11,674

Imports:

1931 - imports (mostly pulpstones) valued at $118,998
1930 - " " " " " 241,570

Producing Localities:

The Read Stone Company was the only Maritime producer of grindstones and pulpstones. Their grindstone production, which was about 10 per cent less than 1930, was maintained partly from their deposits on Quarry Island, Pictou county, Nova Scotia. These crude blocks as well as waste blocks from Woodpoint and Quarryville, New Brunswick, were shipped to their Stonehaven and Dorchester, New Brunswick, plants to be made into finished grindstones. The Stonehaven quarry in northern New Brunswick remained closed down. The Read Company, who in the past have been producing pulpstones from Folly Point, Beaumont, New Brunswick, did not quarry in 1931, but finished off at their Dorchester plant about a car lot of pulpstones from blocks quarried in previous years. There was no pulpstone production by the Miramichi Company, Quarryville, near Newcastle, New Brunswick. By far the largest pulpstone production was maintained by J. A. & C. H. McDonald, Ltd., Vancouver, British Columbia, from their quarry on Newcastle Island opposite Nanaimo on Vancouver Island, British Columbia, the product from which is mainly used by local mills.

Important Developments and Prospective Producing Localities:

No important developments.

General Situation and Market Conditions, etc.:

The demand for all but the largest sized grindstones is very limited, owing to the increasing use of artificial stones and to foreign competition and it is expected that the Canadian output in 1932 will be still further decreased. The price of Canadian natural grindstones is $40 per ton and about $80 per ton for pulpstones.

There has been a steadily increasing demand for good pulpstones and over half a million dollars worth are used annually in the 60 Canadian pulp mills. Less than 10 per cent of the stones used in Canadian mills are produced in Canada. The sales of Canadian pulpstones, however, proportionately decreased in 1931 since there was a curtailment of pulp and paper output and some of the older pulp mills closed down. The United States pulpstone shipments of about 2,100 tons were 50 per cent less than in 1930. There were six producers, the greatest output being, as in former years, from the Opekiska district in West Virginia.

The stones for the modern pulp mills are now mainly

of the large magazine type. The increased rate of speed calls for a more exacting and durable wheel than used in former years. The new artificial pulpstone made of silicon carbide segments is gradually but surely replacing the natural stone. Recent improvements in the manufacture of this stone have practically eliminated all its former disadvantages, and it is expected that it will make appreciable headway in future years. It has for the past three years been made in Canada by one concern and over 100 stones are now in use in Canadian mills. During the year another manufacturer offered a fused alumina segmental stone of somewhat similar design; a few of these were assembled in Canada.

The Department of Mines, Ottawa, has published the following report: "Abrasives: Products of Canada, Part I - Siliceous Abrasives" (Mines Branch Report No. 673).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (V.L.E-W.)

GYPSUM IN 1931

Production:

1931 -	854,329	tons valued	at	$2,099,381
1930 -	1,070,968	" "	"	2,818,788

Exports:

1931 -	621,851	tons valued	at	$ 792,150
1930 -	726,662	" "	"	990,659

Imports:

1931 -	11,692	tons valued	at	$ 138,483
1930 -	17,725	" "	"	222,066

Ores Mined and Producing Localities:

The materials produced are the hydrous calcium sulphate, commonly known as gypsum, the partly dehydrated material known as plaster of Paris or wall plaster, and the anhydrous calcium sulphate known as anhydrite. Gypsum is marketed in the crude lump form, ground, as 'land plaster' and 'terra alba,' or ground and calcined as plaster of Paris and wall plaster. An increasing proportion of the calcined material each year enters into the manufacture of wallboard, gypsum blocks, insulating material, acoustic plaster, etc. Anhydrite is used mainly as a fertilizer for the peanut crop in the southern Atlantic states.

Nova Scotia is the largest producer of gypsum in Canada, followed by New Brunswick, Ontario, Manitoba, and British Columbia.

Important Developments and Prospective Producing Localities:

There were a number of important developments in the industry during the year.

Gypsum, Lime and Alabastine, Canada, Limited, while still continuing their numerous lines of gypsum products, have developed during the year several new commodities, having gypsum as their main constituent, notably a gypsum wallboard with a surface finished in reproduction of the graining of wood, and also a precast acoustic tile.

The Canadian Gypsum Company, Limited, the organization which represents the co-ordinated interests in Canada of the United States Gypsum Company of Chicago, on February 1st placed in steady production their newly erected gypsum wallboard plant at Hillsborough, New Brunswick. This same company, on November 1st, also opened its new plant at Hagersville, Ontario. The gypsum for this plant is being obtained through a vertical shaft from a mine of the usual room-and-pillar type, and standard mining methods are employed for the winning of the crude material. The Hagersville plant of this company consists of a modern fireproof calcining mill, warehouse, board plant, and block plant. The opening of this mill is of considerable interest to the gypsum industry since it marks the first time in Canada that complete calcination has been carried out in a continuous rotary calcining kiln.

No other new properties were opened up during the year and prospecting for new gypsum properties has been practically at a standstill. There are, however, a number of localities in the Maritimes where gypsum deposits of good grade can still be found, and the ones more favourably situated with respect to transportation and markets will eventually become producers as conditions warrant.

Extensive deposits are known in northern Ontario and with the extension of the Temiskaming and Northern Ontario Railway to Moosonee, these deposits may in time become producers.

The deposits in Alberta, although situated at a distance from markets and railway transportation, are of good grade. There are also several known deposits in British Columbia which may be operated when conditions warrant their exploitation.

General Situation and Market Conditions:

The use of gypsum in the building trades is making rapid strides because of its lightness, durability, fire-resisting, insulating, and acoustic properties, and tiles, wallboards, blocks, and special insulating and acoustic plasters are being developed. Since the gypsum industry is so closely dependent on the construction activity in the country, the decrease of 30 per cent in the value of building contracts awarded in Canada during the year as compared with 1930 is at once reflected in the production of gypsum. With the larger proportion of the production of gypsum in Canada being shipped to the United States in the crude state for manufacture into gypsum products, industrial conditions in that country also have an important bearing on the industry.

One gratifying feature of the industry is the export trade in gypsum products that is being developed, and one of the Canadian companies is already exporting its products to over thirty different countries and is reputed to be the largest gypsum products exporter in America.

The industry on the whole is in good condition, and is looking forward with confidence to the future.

The Department of Mines, Ottawa, has published the following report: "The Gypsum Industry of Canada" (Mines Branch Report No. 714).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (L. H. C.)

IRON OXIDE MINERAL PIGMENTS IN 1931

Production:

1931: 5,520 tons valued at $49,205
1930: 6,596 " " " 83,873

Exports:

Iron oxides, ochres, etc., 742 tons valued at $50,951

Imports:

Ochrey earths, oxides, etc., 4,836 tons valued at $697,688

Ores Mined and Producing Localities:

Materials produced under this heading include:- ochreous iron oxide sold uncalcined for the purification of illuminating gas; ochreous iron oxide, calcined, called metallic oxide, used in the manufacture of paint; umber, uncalcined and calcined; and sienna calcined and uncalcined.

The major part of the production has, for many years, come from near Three Rivers, Quebec, while a smaller production since 1923 came from a deposit near St. Anne de Beaupré, east of Quebec City. This latter deposit was exhausted in 1930, at which time the plant was removed to a new deposit near Les Forges, about 10 miles north-west of Three Rivers. Production has also been reported in past years from Lynch township, Labelle county and Iberville township, Saguenay county. A small production from British Columbia has been reported since 1923.

Important Developments and Prospective Producing Localities:

There has been no outstanding development in the mineral pigments industry during the year 1931 and the production figure has remained practically constant for several years past.

The present producing localities have met the requirements of the domestic pigment trade for the cheaper grades for many years past but there are other prospective producing localities, particularly in the low lying ground bordering the lower St. Lawrence Gulf. In 1929 and 1930, the Quebec Bureau of Mines systematically sampled two deposits of iron oxide in Saguenay county. One of these lies in Bergeronnes township, while the other is in Iberville township, near the mouth of the Little Romaine river. Both of these deposits had been worked previously, in a small way, for a pigment to be used in making paper and for paint for local use. The Little Romaine ochre deposit is the larger and has a Fe_2O_3 content of 86 per cent, while the Bergeronnes deposit averages 91 per cent Fe_2O_3. The ochre at both deposits does not form a continuous band but occurs in pockets separated from one another.

In British Columbia, a deposit of mineral pigment located near the Big Bend of the Fraser river, 8 miles from Quesnel, received some attention during the year, and the owner was contemplating the installation of a plant for drying and grinding the material.

General Situation, Market Conditions, etc.:

The demand within the country for these products is fair. Most of the higher grade oxides, ochres, and umbers used in the paint trade are imported from Europe and, even in the case of some of the cheaper grades, European oxides compete with the domestic products due to the fact that the former do not require calcining to produce the desired colour.

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (E. H. W.)

LITHIUM MINERALS IN 1931

Production: Various small shipments of spodumene and lepidolite have been reported since 1925, but there was no active production during 1931.

Exports: The six tons produced in 1925 were exported to England for a special test to determine whether the material was suitable for the recovery of lithia salts. In 1928 a trial shipment is stated to have been made to Italy.

Imports: Lithia salts are not recorded separately.

Ores Mined and Producing Localities: The principal lithium ores of commerce are lepidolite, amblygonite and spodumene.

The only locality at which lithium ores have been produced in Canada lies about 100 miles northeast of Winnipeg, Man., where the Silver Leaf Mining Co., in 1925, opened up a property about 10 miles northeast of Pointe-du-Bois. The principal minerals found in this deposit are lepidolite, spodumene, and montebrasite (a variety of amblygonite). The Company has not been active in recent years, and its deposits are reported to have been taken over in 1931 by a Winnipeg syndicate (Mineral Reduction Processes Ltd.), interested in the recovery of lithium, etc., from ores of this type.

Important Developments and Prospective Producing Localities:

While the district above mentioned is still in the prospect stage, it is worthy of note that the Silver Leaf is the first and only property in Canada from which actual shipment of lithium minerals has been made. Sufficient work has been done on the Silver Leaf property to indicate the existence of a considerable ore body, and there is little question that this deposit could be made to yield moderate tonnages of lepidolite and spodumene, as well as, perhaps, amblygonite.

Outside of occurrences of mineralogical interest only, there is only one other district in Canada in which lithium minerals are known to occur, namely Wakefield township, Quebec, where the Leduc mine, worked in the past for tourmaline, carries lepidolite crystals up to 2 feet in diameter.

General Situation, Market Conditions, etc.:

There is no present market in Canada for lithium ores; so, unless an extraction plant for the recovery of lithia salts is erected, any production will have to find a market either in the United States or Europe. The American market is at present adequately supplied from the large deposits in South Dakota.

The principal use of lepidolite is in the glass industry, where ground lithium is used as an ingredient of heat-resistant, flint and opal glasses. The lithia content of lepidolite is usually too low for it to serve as a raw material in the manufacture of lithia salts and chemicals. For the latter purpose, spodumene and amblygonite are generally used. The amount of such salts used is, however, distinctly limited and does not appear to be increasing materially, despite the known large deposits of lithium ores in the United States.

During 1930-31, intermittent experimental work has been conducted in a plant at Winnipeg designed for the recovery of lithium, potash, etc. from the ores of the Pointe-du-Bois region. Extraction is effected by volatilization, using an oil-fired furnace, with recovery in a washing chamber, followed by tank-evaporation.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (H. S. S.)

MAGNESITE IN 1931

Production:

Calcined and dead-burned magnesite:
1931 -- 11,411 tons valued at $295,579
1930 -- 13,336 " " " 336,162

Exports:

Calcined and dead-burned magnesite:
1931 -- 1,610 tons valued at $45,257
1930 -- 1,851 " " " 48,536

Imports:

Magnesite	1,787 tons valued at	$ 40,628
Magnesia pipe covering..	" "	126,210
Magnesite firebrick	" "	152,435

Products and Producing Localities:

The product is sold by producers as crude, caustic calcined, and dead-burned magnesite, and as prepared magnesite refractories.

Practically all the Canadian production is from the townships of Grenville and Harrington in Argenteuil county, Quebec.

Several hydromagnesite deposits have been worked to some extent in British Columbia during recent years.

Important Developments and Prospective Producing Localities:

The only known magnesite deposits of proved commercial value in Eastern Canada are situated within a small area in the two townships of Quebec mentioned above.

Hydromagnesite occurs in fairly large deposits in several parts of British Columbia and the Yukon Territory. This material though somewhat similar in composition to hard rock magnesite is powdery in form and requires a different method of treatment to prepare it for the market.

General Situation and Market Conditions, etc.:

During the war Canadian magnesite commanded a ready market in the United States at a high price; but, later, with the discovery of deposits in that country, the reappearance of European magnesite on the market, and the imposing of duty by the American Government, the demand for the Canadian product fell off and the Canadian output dropped rapidly to less than three thousand tons in 1922. Due to improvements in methods of processing and to the production of prepared grades for specific purposes, the output again increased markedly in 1927, 1928 and 1929. In 1929 it had reached 18,809 tons valued at $491,170. Statistics for 1930 and 1931 appear above.

The Department of Mines, Ottawa, has published the following report: "The Magnesite Deposits of Grenville District, Quebec". (Geol. Survey Memoir No. 98).

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (H.F.)

MICA IN 1931

Production:

	1931		1930	
	lb.	Value $	Lb.	Value $
Rough cobbed	.....	.....	44,330	1,142
Thumb-trimmed	46,956	5,292	8,096	8,281
Splittings	37,465	14,397	77,530	35,601
Scrap	2,417,718	32,994	2,211,022	50,980
	2,502,139	52,683	2,340,978	96,004

Mica is marketed in various forms, including rough-cobbed, thumb-trimmed, splittings, scrap, mica plate and mica powder. The production by classes is shown above.

Exports:

1931 - $51,497: 1930 - $86,537

Exports of mica include thumb-trimmed, rough-cobbed, splittings, mica plate and scrap.

Imports:

All classes, 1931 - $92,294: 1930 - $102,775

Ores Mined and Producing Localities:

Practically all of the mica produced in Canada is of the amber variety (phlogopite). White mica (muscovite) exists, and small amounts have been mined in the past in Quebec, Ontario, and British Columbia; cost of production, however, proved too high for profitable operation of the deposits.

Mica is produced almost exclusively from mines in the Ottawa region of Ontario and Quebec. The Quebec deposits lie principally between the Lievre and Gatineau rivers, and the Ontario deposits in the Perth-Kingston district. The mine of the General Electric Company, near Sydenham, Ont., was one of the world's most important mica mines: it has been closed down for some years. Production for some years past has been confined to two or three properties.

Important Developments and Prospective Producing Localities:

A mica-grinding plant was erected in 1930 by Messrs. Blackburn Bros. at their mine in Templeton township, Que., and in 1931 it produced a small tonnage of dry-ground mica for the roofing and rubber trades.

General Situation, Market Conditions, etc.:

The market for Canadian mica continued dull throughout the year. Sheet mica, especially the larger sizes, was difficult to sell, the slackened demand being caused, in part at least, by stocks coming on the London market from Madagascar, Africa, and other sources. These supplies show evidence of increasing, in which case Canadian producers may find continued difficulty in disposing of their larger sizes.

Scrap mica sales, for the production of ground mica, showed a slight increase over 1930.

Prices of mica are subject to considerable fluctuations. The following figures, however, give an approximate indication of the ruling prices for trimmed Canadian amber mica at the close of the year:

1 x 1	inches	20	cents	per	lb.	2 x 3	inches	40	cents	per	lb.
1 x 2	"	25	"	"	"	2 x 4	"	55	"	"	"
1 x 3	"	35	"	"	"	3 x 5	"	90	"	"	"

The Department of Mines, Ottawa, has published the following report: "Mica;" (Mines Branch report No. 701).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (H. S. S.)

MOULDING SANDS IN 1931 FOR USE IN FERROUS AND NON-FERROUS FOUNDRIES

Production:

1931 -- Figures will not be available until about June 1932.
1930 -- 43,642 tons valued at $31,768

Small quantities not entered in production statistics, have been produced by foundries for their own use from near by deposits or by small operators, such as farmers for local foundries.

Exports:

Nil.

For a period of approximately 25 years, considerable moulding sand was shipped from the vicinity of Ruthven and Leamington, Ontario, to United States points including Cleveland, Toledo and Detroit, being sold in competition with American sands. This exportation discontinued about 1906 due to depletion of deposits.

Imports:

The greater amount of moulding sand consumed in Canada is imported, chiefly from the United States. No definite record of the amounts imported is available since there is no single customs classification covering this item. It is estimated that 75 per cent of our consumption is imported. Moulding sands as well as other sands and gravels, and sands, silica, for glass and carborundum manufacture and for use in steel foundries, enter Canada duty free.

Producing Localities:

Every province, with the exception of New Brunswick and Prince Edward Island, is producing commercially. At one time there was a small production in Kent and Westmorland counties near Moncton in New Brunswick. Near Charlottetown, Prince Edward Island, local sand has found a limited application.

In Nova Scotia deposits are being worked or have been worked in the following counties, viz.:- Colchester, Cumberland, Hants, Inverness, Kings and Pictou.

In Quebec deposits are being worked or have been worked in the following counties, viz.:- Argenteuil, L'Assomption, Missisquoi, Portneuf and St.Hyacinthe.

Ontario is the leading province in this industry with the greatest development in Welland and Wentworth counties from Niagara Falls to and around Hamilton. Deposits also are being worked or have been worked in the following counties, viz.:- Brant, Bruce, Durham, Essex, Kent, Leeds, Lennox and Addington, Middlesex, Norfolk, Peterborough, Prince Edward, Stormont, and Thunder Bay district.

In Manitoba deposits are being worked at Melbourne, Molson and Mile 80 (Wye) on the Greater Winnipeg Water District Railway.

In the following provinces in the places enumerated some foundries are using local supplies, viz.:- Saskatchewan — Humboldt, Moose Jaw, Prince Albert, Regina and Saskatoon; Alberta — Calgary, Edmonton, Lethbridge and Medicine Hat; British Columbia — Cranbrook, Kamloops, Nanaimo, Penticton and Victoria.

Important Developments and Prospective Producing Localities:

The Mines Branch completed in 1931 the field work covering present known deposits of moulding sands and certain other sands in Canada which may ultimately be used as moulding sands. The outstanding feature of the investigation is the large number of deposits

supplying the requirements of local foundries only. Some of the products of some of these deposits should find a wider market. It is also apparent that there are other places suitable for prospecting. Recently a grade of sand preferably suitable for medium to heavy weight castings has been obtained from Edmonton, Alberta.

General Situation, Market Conditions, etc.:

The general situation at present offers hope for considerable improvement. An increasing number of foundries are realizing the fact that Canada possesses deposits of moulding sand which can be utilized in their plants. Very few foundry-men are aware that local supplies have been used so extensively. No doubt if some of these deposits are better exploited, the amount of foreign sands used will be reduced. Due to the cheapness of the commodity and high freight charges, the use of any particular sand is confined to a limited area.

The industry gives only seasonal occupation as the foundries usually receive their supplies in the summer and autumn months.

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (C.H.F.)

PHOSPHATE IN 1931

Production:

1931: None reported.
1930: 40 tons valued at $760.

Exports:

Nil.

Imports:

1931: 141,722 tons valued at $619,079
1930: 47,206 " " " 297,522

Ores Mined and Producing Localities:

Most of the small production of phosphate in Canada for the last ten or fifteen years has consisted of apatite recovered from old waste dumps or secured during mining operations for mica in the Ontario-Quebec mica-phosphate fields. The output is taken principally by the Electric Reduction Company, at Buckingham, Que., and is presumed to have been used as a source of phosphorus.

During 1931, some of the old apatite workings near High Falls, on the Lievre river, Quebec, where active mining for the mineral was conducted about forty years ago, were re-opened, and a small tonnage is reported to have been taken out for shipment to Buckingham.

Important Developments and Prospective Producing Localities:

Between 1926 and 1930, the Consolidated Mining and Smelting Company undertook an investigation of low-grade sedimentary phosphate beds in the Crowsnest district, British Columbia, in order to determine whether the material could be concentrated to serve as raw material for the manufacture of superphosphate. A large number of claims were taken up, and phosphate rock has been mined at several points near Crowsnest. The Company has added a large complete fertilizer unit to its Trail plant: this will have a capacity of nearly 300 tons per diem of phosphatic fertilizer. By making triple, instead of ordinary superphosphate, the freight costs on the fertilizer are very materially reduced.

Due to the operations of the Consolidated Mining and Smelting Company, at Trail, B. C., and of the new plants of Canadian Industries, at Beloeil, Que., and at Hamilton, Ont., the domestic production of phosphatic fertilizers is expected to show a very material increase.

General Situation, Market Conditions, etc.:

There is little of interest to Canada in the general world phosphate situation. The American domestic production of sedimentary phosphate is being faced with competition from the northern Africa deposits, and it is reported that Moroccan phosphate has been sold on the Atlantic seaboard at a lower price than the same grade of Florida phosphate.

Occasional enquiries reach the Mines Branch from the United States and Europe regarding available supplies of apatite, but there is no indication that a serious demand for this class of phosphate is imminent, the price apparently being an obstacle.

The Department of Mines, Ottawa, has published the following report: "Phosphate in Canada" (Mines Branch Report No. 396).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (H. S. S.)

PYRITES IN 1931

Production:

1931 - 63,293 tons of ore containing 31,771 tons of sulphur, valued at $246,097.
1930 - 53,453 tons of ore containing 29,690 tons of sulphur, valued at $234,942.

Exports:

1931 - 52,985 tons of ore containing 26,613 tons of sulphur, valued at $207,688.
1930 - 53,593 tons of ore containing 26,592 tons of sulphur, valued at $236,587.

Imports:

None recorded.

One Ontario firm imports a small quantity of pyrites from New York state for use in an acid plant.

Ores Mined and Producing Localities:

By-product pyrites is produced at the Eustis and Aldermac mines in Quebec, and at the Britannia mine in British Columbia.

Important Developments and Prospective Producing Localities:

One of the most important developments of the year has been the perfecting of the Freeman flash roasting process for burning pyrites to produce sulphur dioxide for use in the absorption plants of sulphite pulp mills and the installation of a commercial plant in the St. Lawrence mill of the Consolidated Paper Corporation, Ltd., in Three Rivers, Que. A new ore-dressing mill has recently been erected at the Aldermac mine in the Rouyn area, especially designed to produce pyrites concentrates for use by this process.

General Situation and Market Conditions:

There is no general market in Canada for lump pyrites, although one acid plant still imports a small tonnage annually. While the Freeman process of flash roasting, especially designed for the treatment of by-product flotation fines recovered in the treatment of copper ores, opens a prospective market for this class of ore, still it is not to be assumed that the mining of pyrites will be stimulated. Ample supplies of pyrites fines are already available at strategic points to care for any demand which may arise in the immediate future.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (A.W.G.W.)

SALT IN 1931

Production:

1931	-- 259,047	tons	valued at	$1,904,149
1930	-- 271,695	"	"	" 1,694,631

Exports:

1931	--- 6,125	tons	valued at	$ 55,110
1930	-- 8,758	"	"	" 74,397

Imports:

1931	-- 130,895	tons	valued at	$ 751,938
1930	-- 128,385	"	"	" 660,903

Ores Mined and Producing Localities:

Common salt (sodium chloride) is obtained in two forms, in solution in a saturated brine from which the salt is extracted by evaporation, and in lump or solid form by direct mining.

During the year 1931, salt was produced in southern Ontario, and at Malagash, Nova Scotia. Ontario salt is obtained from brine wells, while Malagash salt is recovered by mining rock salt, and by recovery by evaporation from brines produced by the leaching of salt from the waste piles of the mine. A small recovery of salt was also made from brine obtained from a deep drill hole at Simpson, Saskatchewan.

Important Developments and Prospective Producing Localities:

At Waterways, Alberta, the Alberta government, through the Alberta and Great Waterways Railway, in 1928, encountered salt formations at depths of 670 feet to 883 feet. This occurrence may in time be commercially exploited.

At Simpson, Saskatchewan, the Simpson Oil and Gas Company drilled a well on L.S.D.2, Sec.9, Tp.29, Range 25, west of the 2nd meridian for the purpose of testing for gas and oil. At a depth of 3,435 feet they encountered salt formation and a flow of brine, analyses of which showed 19 to 23 per cent solids of which 90 per cent was sodium chloride. A small experimental evaporator was erected and plans made to put in a commercial sized unit.

At Neepawa, Manitoba, a well drilled a number of years ago encountered a salt brine at depth, and an endeavour is now being made to organize a company with a view to future development.

In a well drilled for oil near Gautreau, New Brunswick, south of Moncton, extensive beds of rock salt were encountered between 1,300 and 1,800 feet. A second well penetrated 890 feet of salt formation, some of the beds being 150 feet thick. So far these beds have remained unexploited, but further prospecting is being carried on to determine their extent, and it is probable that this district will become a producer when conditions warrant.

Near Amherst, Cumberland county, Nova Scotia, a well recently put down by the Imperial Oil Company in a search for oil and gas encountered 3,200 feet of alternating beds of salt, anhydrite, dolomite, limestone, and shale, the salt constituting 45 per cent of the whole. The first salt bed was penetrated at a depth of 920 feet from the surface. The apparent great thickness of salt formation in this locality is possibly due to the steep angle of pitch of the beds.

In Nova Scotia, at the Malagash deposit, active production has been maintained, and the successful operation of this deposit has greatly stimulated the prospecting for salt in the Maritime Provinces.

An interesting development during the past year in this industry is the production for the first time in Canada of 'smoked salt' used for curing meats. The process employed by the Canadian Industries, Ltd., for manufacturing smoked salt consists very briefly in producing smoke at controlled temperatures from genuine hickory wood saw-dust and passing this smoke, together with vacuum pan salt of high purity, through a rotary cylinder equipped with high voltage electrical wires. The particles of smoke are thus electrically precipitated on the salt crystals, producing a product of uniform appearance and pleasing aroma. The use of such salt does away with the old "smokehouse" and cures and smokes the meat in one operation.

General Situation, Market Conditions, etc.:

The production, except for small exports, is sold in Canada principally to the dairy, meat-curing, fisheries, and chemical industries, and as table salt for household use. The production showed a decrease during the past year, but taken over a period of years the market for salt in Canada is steadily increasing, and the industry is in a sound condition.

A large tonnage of salt is still imported duty free for use in the fisheries. This is due to the fact that until the past fifteen years the only producing district was in Ontario, which is unfavorably situated with respect to the market offered by the Atlantic and Pacific coast fisheries. The production from Malagash has materially aided the fishing industry in the Maritime Provinces, and while the demand for salt has been curtailed, such a condition is only temporary. Until, however, a deposit on the west coast of Canada is found and exploited, the Pacific coast fisheries will be dependent to a large extent on imported salt and considerable importations of salt can therefore be expected.

Experiments have been carried on in Nova Scotia for the past few years to determine the effect of salt used on gravel highways to decrease, if not to eliminate dust, and if the producers of salt are successful in proving its value for such a purpose a greatly increased tonnage will result.

An increasing demand for salt for the chemical industries may reasonably be expected, since at present, with the exception of caustic soda, soda ash, sodium sulphate, and sodium acid sulphate, practically all of the sodium products used in Canada are imported.

The Department of Mines, Ottawa, has published the following report: "Salt Industry of Canada" (Mines Branch Report No.716).

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (L.H.C.)

SILICA IN 1931

Production:

1931 --	194,474	(tons of silica sand valued at)	$299,796
		(" " quartz " ")	
--	900,000	silica bricks " "	35,746
1930 --	226,200	(tons of silica sand valued at)	$418,127
		(" " quartz " ")	
	2,418,000	silica bricks " "	97,379

Exports:

None recorded.

Imports:

1931 --	6,358	tons of silex valued at	$141,818
	2,616	" flint " "	23,653
	107,712	" " silica sand "	235,191
	----	silica bricks "	234,909
1930 --	5,040	tons of silex valued at	$111,473
	3,878	" " flint " "	37,811
	164,349	" " silica sand "	352,796
	----	silica bricks "	315,039

Ores Mined and Producing Localities:

The materials produced in this industry are:—

Quartz for smelter flux and ferro-silicon; Quartzite for ferro-silicon and silica brick; Silica sand for the manufacture of glass, carborundum, etc., and for use in the steel foundries; Silex, the finely pulverized silica used in ceramics and the paint industry.

Quartz and quartzite in sizes from 2 to 6 inches are used in the manufacture of ferro-silicon and as a smelter flux. For silica brick it is crushed to about 8 mesh.

Silica sand is prepared from a friable sandstone by crushing, washing, drying, and screening, to recover all material between the 20 and 100 meshes.

Silex is the washed sand or pure quartz crushed and ground in some form of ball mill, then either air or water-floated to recover the fine flour. The ceramic industry requires 150 mesh or finer while the paint trade requires water-floated material 250 mesh or finer.

Quartz is produced in Quebec and Ontario; and quartzite is quarried in Nova Scotia, Quebec, Ontario, and British Columbia. Silica sand is obtained from Nova Scotia, Quebec, and Manitoba.

Important Developments and Prospective Producing Localities:

The Ottawa Silica and Sandstone Company, formerly the Ottawa Silica Supply Company at East Templeton, Quebec, is producing sand of different grades for the glass industry, steel foundries, and for sand blast, etc. At Guigues, Quebec, 12 miles north of Ville Marie, on the east side of Lake Temiskaming, a deposit of silica sandstone has been opened up, and approximately 400 tons of sand prepared and shipped during 1930. This sand was supplied to steel foundries, for sand blast, and for water filtration plants.

The silica sand deposits on Black island, Lake Winnipeg, Manitoba, were operated on a small scale. The sand is employed in the manufacture of glass bottles, etc., by the Mid West Glass Company at Winnipeg, Manitoba. At present the sand is used in the crude state but it is hoped that a washing, drying, and screening plant will shortly be installed.

There are numerous deposits of silica throughout Canada, which might be suitable for commercial production whenever the market warrants. The situation of these deposits with respect to the markets is at present an important factor.

General Situation, Market Conditions, etc.:

In the use of silica for a flux, the smelters endeavour to obtain their material from the nearest possible source, and in many cases they prefer a siliceous ore containing small values in the precious metals. For the manufacture of ferro-silicon and silica brick the market for the finished product limits the quantity of silica required. The demand for silica sand of a high grade is large and, if it were not for the large quantities of Belgian sand being brought into Montreal as ballast at a comparatively low cost, there would be an opportunity for a number of sand plants in Canada, provided sand sufficiently low in iron could be produced. An encouraging feature of the industry is the increasing use of Canadian sand for sand blasting and the prospects are for a still further use of Canadian material for this purpose. The market for silica sand and silex is steadily increasing and the prospects for the Canadian producers are bright.

The Department of Mines has published the following reports:

Silica in Canada, Part I, Eastern Canada (Mines Branch Report No. 555)
" " " " II, Western " (" " " No. 686)

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (L.H.C.)

NATURAL SODIUM SULPHATE IN 1931
(Glauber's Salt and Salt Cake)

Production:

1931 -- Shipments valued at $419,497
1930 -- " " " 293,847

Exports:

An appreciable portion of the Canadian production was exported during the year to various points in the United States, but since the exports were made by only two companies, the figures are not available for publication.

Imports:

1,000	tons of Glauber's salt	valued at	$ 10,838
8,661	" " salt cake	" "	97,215
14,258	" " nitre cake	" "	175,648

Ores Mined and Producing Localities:

The material mined is either hydrated sodium sulphate, known as Glauber's salt, or anhydrous sodium sulphate, known to the trade as salt cake. It occurs as crystals, or in the form of saturated brines in many lakes throughout western Canada.

Production was all from the province of Saskatchewan, the principal shippers being the Natural Sodium Products, Ltd., Dunkirk, Sask.; the Horseshow Lake Mining Co., Ormiston, Sask., the Sodium Corporation, Alsask, Sask., and the Whiteshore Salts and Chemicals, Ltd., North Battleford, Sask.

Important Developments and Prospective Producing Localities:

One new plant was under construction during the year, a pilot plant being erected on the shore of Whiteshore lake by the Canadian Salines, Ltd. This plant is now ready for operation and, if the process employed is successful, will have a capacity of 50 tons of dried salts per day of 24 hours.

The Natural Sodium Products, Ltd., at Dunkirk, had construction under way for the addition of another drier similar to the one already installed.

The Horseshoe Lake Mining Company unfortunately had to cease operations during the summer, due to the curtailment of operations of the metallurgical works at Copper Cliff, Ont., which took their output. They hope, however, that conditions will improve so that they will be able to resume operations during 1932.

The investigation of the deposits in Western Canada by the Mines Branch, Department of Mines, has proven up tonnages of hydrous sodium and magnesium salts in excess of 120,000,000 tons. The nature of the salts is such that a vast amount of research and experimental work in semi-commercial and commercial plants has been necessary to devise proper methods of harvesting and drying the salts. Rapid advances have been made by the pioneers in the industry, and the prospects for the future are decidedly promising. There are many deposits in the Prairie Provinces and in British Columbia which can produce sodium sulphate, but on account of high freight rates to the markets, only those close to railroads can be considered as possible producers at present.

It is decidedly encouraging to note the progress made in this industry in the past ten years. The investigation of these deposits was started by the Mines Branch in 1921. At the present time there are four plants which are capable of producing 250 tons of dried salts per day, the equivalent of 60,000 tons of new freight

per year, and the development of these sodium sulphate deposits has been one of the major factors which has made possible the erection of the plant for separating nickel from copper at Copper Cliff, Ontario.

General Situation and Market Conditions, etc.:

There was a substantial increase in the production of salt cake during the year in spite of the closing down of one of the larger producing companies. This can be attributed to the steady demand from Copper Cliff during the first months of the year and the increased markets obtained with the pulp and kraft paper companies.

It would appear, that the development of the natural sodium sulphate deposits of Western Canada, has at last been placed on a sound basis and that as years go on the production will steadily increase and prove a valuable asset to the mineral industry of the country.

The Department of Mines, Ottawa, has published the following report: "Sodium Sulphate of Western Canada" (Mines Branch Report No.646).

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (L.H.C.)

TALC AND SOAPSTONE IN 1931

Production:

1931 --	11,806	tons of ground talc valued at	$122,044
		Block soapstone " "	34,439
1930 --	11,841	tons of ground talc " "	136,048
		Block soapstone " "	50,168

Exports:

1931 --	7,851	tons of ground talc valued at	$ 83,765
1930 --	8,512	" " " " " "	98,855

Imports:

1931 --	2,670	tons valued at	$49,452
1930 --	4,799	" " "	85,779

Ores Mined and Producing Localities:

Most of the talc produced is ground at mills situated at or near the mines, and is marketed as three grades, according to fineness. Powdered talc is produced chiefly at Madoc, Ontario, where two mines and two mills have been in operation for a number of years. There has also been an intermittent production from deposits near Victoria, Vancouver Island, and near Keefers and D'Arcy, in British Columbia. The Victoria and D'Arcy material is a rather impure talc, which finds employment in the roofing trade. The Keefers talc is of a superior grade, and has been successfully employed in paper, soap and paints.

Soapstone was produced for the first time in 1922, the material being taken out in block form and consigned to kraft paper mills for furnace linings; this stone came from a deposit at Robertson, Quebec. Other deposits have since been opened up in the same district. Soapstone also occurs near Vermilion bay, Lake of the Woods region, Ont., where a plant was installed in 1926 for the production of cut soapstone; this plant has been idle for several years. A company was also formed some years ago to develop a soapstone deposit at Wabigoon, Lake of the Woods region, Ontario, but never came into operation. Soapstone is stated to be of fairly widespread occurrence in the Port Arthur - Kenora region.

Important Developments and Prospective Producing Localities:

Deposits of high-grade massive talc (steatite) occur near Vermilion Summit, on the Alberta-British Columbia divide, and a syndicate was incorporated in 1927 for the purpose of mining this material for lava purposes. It is understood that western interests have since taken over certain of the holdings, and are planning to develop them. Diamond-drilling on one group of claims carrying an unusual black talc was conducted in 1930.

General Situation, Market Conditions, etc.:

There was little change in the general tone of the talc industry during 1931, but there was a considerable decrease in the value of the soapstone produced.

The commercial utilization of the soapstone dust from the sawing benches at the Quebec quarries has been considered, and a small grinding mill to treat quarry waste and make roofing, foundry, and other grades of talc was installed by the Quebec operators in 1929.

The Department of Mines, Ottawa, has published the following reports: "Talc and Soapstone" (Mines Branch Report No.583), and "Talc Deposits of Canada", (Geol. Surv. Economic Series No.2).

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (H.S.S.)

VOLCANIC DUST IN 1931

Production:

1931 - 128 tons valued at $2,560
1930 - 242 " " " 4,840

Exports:

Not separately recorded.

Imports:

Included under pumice, pumice stone, lava and calcareous tufa, valued at $34,542 against $36,089 in 1930. United States exports of volcanic dust into Canada decreased slightly in 1931.

Ores Mined and Producing Localities:

Volcanic dust beds up to 30 feet thick are being worked by the Van-Kel Cleansers, Ltd., Swift Current, Sask., from deposits near Waldeck, a few miles east of Swift Current. The Old Sol Manufacturing Co., Winnipeg, Man., did not produce from their deposit adjoining the Van-Kel to the west.

Important Developments and Prospective Producing Localities:

The Swift Current producer did not ship any raw material from their quarry to their plant, since they had sufficient in their warehouse to supply their year's requirements. The local material is being successfully used as a concrete admixture; to some extent in the form of a calcimine; and as a cleanser. It is gradually making headway against strong foreign competition. Early in 1931 there was a noticeable increase in demand for these volcanic dust products.

A small syndicate was formed in 1930 to develop a compact volcanic dust deposit owned by G. G. Groome at Williams Lake, central British Columbia. A road was made into this property and further development work was done which indicated a fairly large tonnage of cream coloured as well as some white material. Chutes and ore bunkers were also erected.

General Situation, Market Conditions, etc.:

Volcanic dust is mainly used in the manufacture of cleansers, scouring powders, abrasive soaps, and for glass bevelling, but latterly in the United States there has been an increasing demand for its use as an admixture in cement and plasters and more recently as a road surfacing material. There is a large output from Kansas and Nebraska in the United States and several producers report an increase during the year. Some producers of lump pumice, mainly in California, are successfully utilizing their fines, particularly in cement and acoustic plasters. The total United States output is now about 60,000 tons annually.

The Department of Mines, Ottawa, has published the following report: "Siliceous Abrasives" (Mines Branch Report No. 673).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1932. (V.L.E-W.)

CEMENT IN 1931

Production (sales):-

1931 --	10,161,658	bbls.	valued at	$15,826,243
1930 --	11,032,538	"	"	" 17,713,067
1929 --	12,284,081	"	"	" 19,337,235

Exports:

1931 --	114,064	"	"	" 124,267
1930 --	198,736	"	"	" 212,071
1929 --	234,111	"	"	" 252,955

Imports:

Portland and hydraulic or water lime 38,392 bbls. valued at $143,491 as against 143,436 bbls. valued at $569,848 in 1930. Cement n.o.p. and manufactures of, valued at $13,243 as against $34,672 in 1930.

Materials Used and Producing Localities:

The chief raw materials used in the manufacture of cement are limestone and clay. The chief product is Portland cement for the production of which there are 12 operating plants having an aggregate rated annual capacity of about 14 million barrels. The large excess capacity over production is due to the fact that plants were built to take care of an anticipated demand which has not materialized. In the east the plants are operated throughout the year at a percentage of the rated capacity, while in the west the plants are operated to capacity and only part of the year, owing to the extreme cold weather.

If business justified such a course all plants could operate throughout the year because most plants are now equipped with stock houses sufficient to take care of the natural contraction of sales during the winter season.

In addition to the plants manufacturing Portland cement, there is one plant in Nova Scotia capable of making cement from blast furnace slag and one in Manitoba making puzzolan or natural rock cement.

Important Developments and Prospective Producing Localities:

The Canada Cement Co. took over, during 1929, the plant of National Cement Co. located in Montreal East so that now the Canada Cement Co. have a virtual monopoly of the cement production in Quebec and Ontario.

General Situation, Market Conditions, etc.:

The production of cement in 1931 was about 73 per cent of the total rated capacity (approximately 14,000,000) of the milling plants, as against 79 per cent in 1930, and 82 per cent in 1929, this latter the highest ever reported. The average selling price per barrel, f.o.b. plant was as follows:-

	1929	1930	1931
Quebec.....	$1.38	$1.44	$1.44
Ontario	1.43	1.47	1.41
Manitoba	2.35	2.32	2.33
Alberta	2.19	2.18	2.05
British Columbia.....	2.18	2.21	2.03

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (A.B.)

[illegible]

Production (Tons):-

1921 -- [illegible]
1920 -- [illegible]
1929 -- [illegible]

Exports:

1921 -- [illegible]
1920 -- [illegible]
1929 -- [illegible]

Imports:

[illegible]

Materials and Production Capabilities:

[illegible]

Important [illegible] Capabilities:

[illegible]

Economic Situation and Capabilities:

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Issued by the Bureau [illegible],
Department of [illegible],
[illegible]

GRANITE IN 1931

(Building, Monumental and Crushed)

Production:

1931 -- 1,217,942 tons valued at $2,871,410
1930 -- 1,851,132 " " " 3,379,951

Exports:

Not separately listed; included with marble.
1931 -- total 2,938 tons valued at $ 52,058
1930 -- " 1,768 " " " 21,913

Imports:

1931 -- Valued at $167,299
1930 -- " " 264,888

Ores Mined and Producing Localities:

The stone quarried in this industry consists of granite and other related igneous rocks used for building, decorative, monumental or constructional purposes. Producing properties are situated in a number of localities in the provinces of Nova Scotia, New Brunswick, Quebec, Ontario, and British Columbia.

Important Developments and Prospective Producing Localities:

A large proportion of the granite production in Canada enters into the construction of foundations for highways and for permanent ballasting of railway road beds. The provinces of Quebec, Ontario, and British Columbia are the big producers for this purpose.

The province of Quebec furnishes the largest proportion of granite for building purposes, the Stanstead, Scotstown, and St. Sebastien districts being the biggest producers of this class of stone. Quebec province is also a large producer of granite paving blocks and curbstones, while Ontario also produces these products. An interesting development in the industry this past year in several of the districts in the province of Quebec was the large number of small operations that were commenced, principally for the preparation of curbstones. The falling off during the year of building operations dealing with public or institutional structures seriously curtailed the operations of many of the bigger granite producers and in consequence they were in many cases obliged to release a large proportion of their regular employees. These men, rather than be idle, leased or worked on a royalty basis, small areas of granite for the production of curbstone. In this way, working with hand derricks and drills, and with trucks or teams, the men, working in groups of two or more, according to the size of operations, were at least able to make a bare living wage. This condition of affairs was well illustrated in the Stanstead area, where in 1930, there were 14 firms operating, while last year there were at least 40 different operators. With the advent of renewed activity in building operations, these small operators will probably close down and the men will return to the bigger companies where the returns are larger, surer, and freer from worry.

Granite for monumental purposes is produced in the Maritime provinces as well as in Quebec, Ontario, and British Columbia and this material finds a steady market. At the same time there is still an appreciable amount of foreign stone being imported for this use, and a quarry of similar material in Canada would find a ready market for its product.

With the large extent of county in Canada underlain by granite, the prospects of finding deposits of stone suitable for the several uses are decidedly promising.

General Situation, Market Conditions, etc.:

Granite is employed for building construction mainly in the larger buildings such as public and semi-public structures and institutions. With the falling off during the past year of building generally throughout Canada, the demand for dimensioned granite has naturally decreased.

There was an appreciable amount of granite imported from the United States and Europe for monumental purposes, but prospecting for similar material in Canada is brisk, and it is possible that in time this importation will be replaced by Canadian material. Like many other products, the demand for a certain class of stone for monumental purposes varies, so that one type of stone which may have a steady market for a number of years, will in time be completely superseded by an altogether different type. At the present time the so-called black granite seems to be in most demand for monuments, with a consequent falling off in the requests for red granites.

While there is apparently a falling off in the demand for coloured granites for monumental purposes, there is a growing market for these types of stone in the form of thin polished slabs for trim for buildings in which the main colour scheme needs some contrasting colour to relieve it.

The grey granites of the Stanstead and other areas in the province of Quebec are increasing in popularity for building purposes, and its utilization for the whole of the exterior stonework on the new head office building of the Sun Life Assurance Company at Montreal is proving a good advertisement for the stone from these areas.

Canadian granites are suitable for all the purposes for which granite is used, and with consistent advertising to enable the Canadian products to become better and more widely known, there is no reason why this industry should not have a promising future.

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (L.H.C.)

KAOLIN (CHINA CLAY) AND BALL CLAY IN 1931

Production:

There has been no production of china clay since 1923, though small shipments were made to the Mines Branch for testing purposes in 1927 and 1928.

Small shipments of crude ball clay have been made from time to time, but no regular productions maintained.

Exports:

1931:	Clay unmanufactured	8,015 cwt.	valued at	$4,161
1930:	" "	9,688 "	" "	5,900

Imports:

1931:	China clay	366,926 cwt.	valued at	$192,516
1930:	" "	462,245 "	" "	278,757

No data covering the importation of ball clays are available.

Products and Producing Localities:

The only place where china clay has been produced commercially in Canada is at St. Remi d'Amherst, in Quebec.

Ball clay has been shipped from the vicinity of Readlyn and Willows in southern Saskatchewan to pottery manufacturers in Ontario and the United States. So far, only crude unwashed clay has been shipped.

Important Developments and Prospective Producing Localities:

The occurrence of china clay has been reported from only a few sections of Canada.

Deposits of high-grade, white-burning clays occur on the Mattagami and Missinabi rivers in northern Ontario (See Geol. Survey Summary Report, 1926, Part C, p. 16; article by W. S. Dyer, Can. Min. and Met. Bulletin, April, 1928; Annual Report Ontario Department of Mines, Vol. XXXVIII, Part IV, 1929, and Vol. XXXIX, Part IV, 1930.)

A deposit of white-burning clay occurs on Punk island, Lake Winnipeg, Manitoba. (Mines Branch report No. 690, p. 25.)

Ball clays of good colour and high strength occur in extensive deposits in southern Saskatchewan about 60 miles south of Moose Jaw. (Mines Branch report No. 468; Geol. Survey Summary Report, 1930, Part B, p. 31; American Ceramic Society Journal, 1929, p. 360)

Near Williams Lake, B. C., is a deposit referred to in the report of the Minister of Mines of B. C., 1926, as consisting of "Silicate of Alumina." This material, if not a true kaolin, is closely allied to it. Some trial shipments have been made to Vancouver and were used as a fireclay.

General Situation, Market Conditions, etc.:

There is a large steady demand for various grades of china clays in Canada, for use in the manufacture of paper, rubber, and porcelain.

Ball clay is used in the manufacture of porcelain. While the market in Canada is not large, there are good prospects of developing a profitable export market in the United States.

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (H. F.)

LIME IN 1931

Production:

Quicklime	274,177	tons	valued at	$1,953,247
Hydrated lime	65,275	"	" "	693,878

Exports:

14,425 tons valued at $283,459 (Principally hydrated lime — to the United States.)

Imports:

8,194 tons valued at $69,498 (All from the United States; data are unrevised, export figures supplied by the U.S. Bureau of Foreign and Domestic Commerce.)

Products and Producing Localities:

Lime is manufactured in every province of Canada except Prince Edward Island; in Saskatchewan production (from dolomite boulders) is very small and is not continuous. Both high-calcium and magnesian limes are produced in Nova Scotia, New Brunswick, Ontario, and Manitoba; but only high-calcium limes in Quebec, Alberta and British Columbia.

The products marketed are quicklime and hydrated lime. Quicklime is sold in lumps and in a finely pulverized condition; lump lime is sold in bulk and in barrels; pulverized lime is marketed in 70-pound multi-walled bags. Hydrated lime, a specially prepared slaked lime in the form of a very fine powder is sold in 50-pound multi-walled bags, At present about 15 per cent of the total lime produced is sold in the hydrated form.

Ontario lime plants account for 40 per cent of the entire Canadian production of quicklime and for 52 per cent of the hydrated lime. Quebec comes next with 37 per cent of the quicklime and 16 per cent of the hydrated lime.

Forty-one companies operating 48 plants were engaged in lime production during 1931.

Important Developments and Prospective Producing Localities:

During 1931 the Canadian Gypsum Co., Ltd., a subsidiary of the United States Gypsum Co., entered the field of lime production by acquiring the plant of the Standard White Lime Co. at Guelph, Ont. Since taking over the plant, the Canadian Gypsum Co. has added 5 new kilns. National Lime, Ltd., St. Marc des Carrieres, Quebec, commenced lime production in July with the equipment formerly owned by National Lime Corporation. The plant of the Summit Lime Works in Alberta was increased by the addition of a hydrating mill.

General Situation, Market Conditions, etc.:

Conditions in the lime industry reflected the general industrial situation during 1931. Production dropped 30 per cent as compared with that of 1930 and the average prices of lime throughout Canada were at the lowest point they have been for a number of years — lump lime averaged $7.12 per ton and hydrated lime $10.63 per ton. The low prices and restricted markets have resulted in more attention being paid to cheaper methods of lime production and the possibilities of mixed-feed kilns are receiving considerable attention.

An interesting feature of the past few years has been the rapid increase in the percentage of the total lime production utilized in the processing or manufacturing of other commodities. At the present time approximately 72 per cent of the total production is used for what may be termed chemical purposes. Owing to the great variety of industries which it serves, the lime industry can rightly be termed one of the key industries of the country. Lime used for structural purposes now comprises but 20 per cent of the total output, whereas this market once consumed almost the entire production of the industry.

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (M.F.G.)

[illegible] in [illegible]

Production:

Toiletries [illegible] tons valued at [illegible]
Imported lime [illegible] " " [illegible]

Exports:

[illegible] tons valued at [illegible] (principally [illegible]
[illegible] - to the United States)

Imports:

[illegible] tons valued at [illegible] (all from the United States;
here [illegible] experts figures supplied by the [illegible] of
[illegible] are [illegible] Immaterial.)

Products and processing possibilities:

[illegible] is [illegible] in [illegible] of [illegible] except
Prince Edward Island; in Newfoundland production (from [illegible]
[illegible]) is very small and is not [illegible]. [illegible]
and [illegible] lines are produced in [illegible], [illegible]
[illegible], and [illegible]; but only [illegible] lines in [illegible],
Alberta and British Columbia.

The [illegible] for [illegible] and [illegible] lime.
Toiletline is [illegible] in [illegible] and in [illegible] [illegible]
[illegible] lime is made in [illegible] and in [illegible] [illegible] lime in [illegible]
in 7-pound [illegible]-[illegible] [illegible]. [illegible] lime, a [illegible] [illegible]
[illegible] lime in the form of a very fine [illegible] is [illegible] [illegible]
[illegible]-[illegible] [illegible]. At present there is [illegible] [illegible]
produced in [illegible] in the [illegible] [illegible].

[illegible] [illegible] [illegible] for [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] for [illegible] [illegible]
[illegible]. [illegible] [illegible] with [illegible] per cent of the [illegible] and [illegible]
[illegible] of [illegible].

[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible].

[illegible] [illegible] [illegible] [illegible]:

[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [

LIMESTONE (GENERAL) IN 1931

Production:

1931 -- 6,000,000 tons valued at $4,975,000.

These production data refer only to limestone used for crushed stone, rubble, chemical, metallurgical and agricultural purposes. Limestone used for building and ornamental stone, lime and cement is not included.

Exports:

Not separately recorded.

Comparatively small tonnages of limestone, chiefly for use in sugar refineries and for agricultural purposes, were exported to the United States.

Imports:

Not separately recorded.

Large tonnages of limestone for blast-furnace flux are imported from the United States and Newfoundland. Some of the pulp mills in northern Ontario import their limestone requirements from Michigan. These importations are due not to any lack of suitable limestone in Canada but to the fact that the foreign limestone can be obtained more cheaply owing to its more favourable location with respect to certain consuming centres.

Products and Producing Localities:

Every province of Canada except Prince Edward Island contains large deposits of limestone suitable for a wide variety of uses. In Saskatchewan the main deposits are not yet accessible but the dolomite boulders, so plentiful in many parts of the province, have been utilized from time to time for various purposes. The chief products vary in the different provinces. In Ontario, Quebec and Manitoba the major portion of the output is converted into crushed stone for use as railroad ballast, road metal and concrete aggregate. In Nova Scotia and British Columbia the chief product is flux stone and in New Brunswick agricultural limestone. The cement, lime and building stone industries utilize large quantities of limestone but their requirements are not included in the above.

Ontario leads the Dominion in limestone production, providing as it does more than half of the total output; Quebec comes next with more than one-third of the total production.

Important Developments and Prospective Producing Localities:

Limestone is very abundant in Canada and prospective producing localities are far too numerous to list. A feature of the 1931 production of limestone was the increase in the amount used for agricultural purposes, the largest increase being credited to Quebec. Despite the recognized importance of limestone to agriculture, the quantities used in Canada for this purpose are almost negligible compared with what should be used. The prospective development of the beet sugar industry in western Canada is of interest to limestone producers in that part of the Dominion, for approximately 700 pounds of limestone is required for the refining of one ton of beet sugar by the carbonation process.

General Situation, Market Conditions, etc.:

During 1931 approximately 9,300,000 tons of limestone was raised from Canadian quarries, which when fabricated into its primary products such as lime, cement and stone for various purposes, had a selling value of about $25,500,000. Approximately 180 quarries are operated for the production of limestone. Of this number, 130 are equipped with permanent plants and maintain a steady production, the remainder operate on a small scale with portable plants. There is a large diversity of products.

Issued by the Mines Branch,
Department of Mines, Ottawa.
March, 1932. (M.F.G.)

LIMESTONE (STRUCTURAL) IN 1931

Production:

1931 -- 72,000 tons valued at $1,317,000
1930 -- 91,971 " " " 1,514,848

Includes dimension stone only — rough, dressed, or carved by producers only. Value added by work in contractors' plants not included.

Exports:

No separate record is kept. Exports are very small.

Imports:

Unclassified stones valued at $184,132. Chiefly limestones, but includes sandstones and other stones except marbles and granites.

Products and Producing Localities:

The principal quarries producing dimension stone are located at St.Marc des Carrieres, Quebec (4 operators), near Queenston, Ontario (1 operator), and at Garson, Manitoba (3 operators). Small quarries are operated near Montreal, Quebec City, Hull and Roberval in the Province of Quebec and in the vicinities of Ottawa and Kingston in Ontario.

The products consist of stone in all stages of manufacture from the mill-block to elaborately carved material for ornamental purposes used on both interiors and exteriors of buildings. Waste material is utilized for crushed stone, rubble, flagging, chemical and metallurgical purposes and for lime manufacture. Data showing tonnage and value of the waste products are not included.

Important Developments and Prospective Producing Localities:

During the year the Georgian Bay Quarries, Ltd., operating near Wiarton, Ontario, and the Lake Nipigon Marble Corporation, Ltd., operating at Cooke Point, Lake Nipigon, Ontario, made trial shipments of building stone from their properties.

Ten small quarries in the Montreal district produced dressed stone to the value of $179,000 during 1930, an increase of 40 per cent over the value of that produced in the previous year. Only one of these producers uses power machinery in the sawing of the stone, all the others dress the stone by hand.

Excepting in the vicinity of the producing quarries it is not likely that many other deposits of limestone suitable for cut-stone work will be found in Canada. Limestones for this purpose must be heavily-bedded, free from irregular cracks, capable of being machined, and in addition must be of good appearance and have a high resistance to weathering agencies; deposits possessing all these qualifications are not common.

General Situation, Market Conditions, etc.:

During the past several years Canadian limestones have been used in increasing quantities in the construction of Canadian buildings while the use of imported limestone has been declining. This trend was also evident in 1931 for while the value of the production of the domestic product dropped 32 per cent from the record production of the previous year, this closely paralleling the decline in value of construction contracts, imports of limestone for building purposes declined approximately 63 per cent in value in comparison with 1930. The price range of stone in the block f.o.b. quarries is between 50¢ and $1.00 per cubic foot depending upon size and grade.

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March, 1932. (M.F.G.)

MARBLE IN 1931

Production:

1931 -- 24,307 tons valued at $725,474
1930 -- 9,307 " " " 713,452

Exports:

Not given separately, but combined with granite.
1931 -- 1,768 tons valued at $ 21,913.

Imports:

1931 -- marble valued at $339,025. A very large portion was in rough blocks and unpolished slabs; the sawing and polishing being done at various mills throughout Canada.

The major portion of these imports were supplied by United States, Italy, Belgium, and Great Britain, in the order named.

Products and Producing Localities:

From the standpoint of value, the marble quarried for the ornamentation of buildings far exceeds that for other purposes, but for tonnage of output, the marble marketed in the form of terrazzo chips, stucco dash, whiting substitute and artificial stone takes precedence.

The principal centre of marble production in Canada is at Phillipsburg, Quebec, where Wallace Sandstone Quarries, Ltd., is producing a variety of handsome, clouded-grey marbles, some of which are lined and tinted with various colours. A large marble mill is operated in conjunction with the quarry. The limestone quarried for dimension stone at St. Marc des Carrieres, Quebec, takes a good polish and yields a dark brownish grey marble, and a small proportion of the output is thus utilized.

The Winnitoba Marble Co., Winnipeg is producing two beautiful varieties of marble from the quarry on the Inwood branch of the Canadian National Railways, 100 miles north of Winnipeg. One of these marbles is a mottled gold-and-buff, the other is a mottled deep red.

Canadian Marble and Granite Works, Ltd. operate a marble quarry and mill at La Blanche station on the Lardeau branch of the Canadian Pacific Railway, 8 miles north of Kootenay lake, British Columbia. This quarry yields white and bluish grey marble.

Important Developments and Prospective Producing Localities:

There are throughout Canada many deposits of crystalline limestone and serpentine, tinted and figured in a singularly beautiful fashion. Many of them have never been investigated, others have been opened up to a depth of only a few feet. The recent large increase in use of marble in Canada coupled with the prospects of and increasing demand in the future, has awakened interest in the domestic deposits and a number are now being examined with a view to development.

The Manitoba Marble Company are preparing to develop the deposit of serpentine marble near Hole river on the east shore of Lake Winnipeg.

Several other developments are in prospect for 1932.

General Situation, Market Conditions, etc.:

The almost steady increase in value of the annual production of Canadian marble for interior decoration purposes from $450 in 1918 to $611,000 at the present, is very encouraging and shows that a substantial demand for the domestic products has been created. Grey marbles form by far the greater proportion of the output. It is only within the past four years that the more highly coloured and ornamental varieties have appeared on the market although there have been attempts in the past to market them. The present demand for highly coloured marbles favours the development of this type.

The market for Canadian marble is almost wholly confined to the Dominion. The market for some of the foreign marbles is world wide, and the prices of these marbles, to a large extent, determine prices for the domestic marbles. Naturally prices vary according to quality and rareness of colouring.

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WHITING SUBSTITUTE IN 1931

Production:

No production figures can be published as only two companies produced whiting substitute during 1931.

Exports:

Nil.

Imports:

No separate record is kept.

Products and Producing Localities:

Plants for manufacturing whiting substitute are established in Halifax, Montreal and Winnipeg. Whiting substitute is, as the name implies, a substitute for whiting. It is merely finely pulverized white marble, limestone, calcite or fresh-water marl. The pulverized product is white and of a fineness exceeding 200 mesh; some grades are ground so fine as to pass 325 mesh.

Important Developments and Prospective Producing Localities:

Several companies and individuals are investigating the possibilities of producing whiting substitute from marl and limestone deposits in various parts of Canada, and doubtless in the near future the entire Canadian requirements of this material will be produced within the Dominion. Each deposit of white marl and of white limestone free from impurities is a potential source of whiting substitute and such occur in every province except Prince Edward Island.

Closely related in uses to whiting and whiting substitute are precipitated chalk and by-product precipitated chalk. The former is manufactured by re-carbonating milk-of-lime made from high-calcium quicklime. By-product precipitated chalk is obtained in the process of manufacturing caustic soda. Neither precipitated chalk nor by-product precipitated chalk are produced in Canada although the raw materials for each are available. The extent of the domestic market for these two latter products has not been ascertained.

General Situation, Market Conditions, etc.:

During recent years improved and cheaper methods of pulverizing and classifying the finely pulverized material have enabled whiting substitute to compete on a very favourable price basis with European chalk whiting and it is steadily finding an increased market largely at the expense of the latter commodity.

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COAL IN 1931

Production:

The production of coal in Canada in 1931 was 12,230,616 tons valued at $41,178,107, consisting of:-

Bituminous	8,857,195	tons	valued at	$33,151,152.
Sub-bituminous	471,302	"	"	1,210,717.
Lignite	2,902,119	"	"	6,816,238.

Exports:

1931 ---	359,853	tons	valued at	$1,900,122
1930 ---	624,512	"	"	3,345,998
1929 ---	842,972	"	"	4,375,328

Imports:

Coal entered for consumption:

	1930		1931	
From the United States	17,323,818	tons	12,068,211	tons
" Great Britain.....	1,144,861	"	987,442	"
" other countries	304,042	"	65,354	"
Total	18,772,721	"	13,121,007	"

Coal Mined and Producing Localities:

Bituminous coal only is produced in the provinces of Nova Scotia and New Brunswick and in the Yukon Territory. The coal produced in the province of British Columbia is all bituminous, with exception of a small quantity which is classified as lignitic. The production of coal in the province of Alberta includes bituminous, sub-bituminous and lignitic coals, while only lignite coal is produced in the provinces of Saskatchewan and Manitoba.

Important Developments and Prospective Producing Localities:

The surveying and delimitation, by diamond drilling, of the lignite deposits in the Moose River basin, south of James Bay, which were carried out by the Ontario Department of Mines during the past two years, have shown the existence of a very large tonnage of lignite coal, estimated at over 150 million tons. This fuel is of low grade, but the large tonnage available places it in a unique and important position as being the only coal deposit of economic value found in the province of Ontario. Research work is now being carried out by the Ontario Research Foundation and the Fuel Research Laboratories of the Mines Branch, Department of Mines, Ottawa, with a view to determining methods for its preparation for industrial and domestic purposes. The economic value of this coal area has been enhanced by the completion of the Cochrane-James Bay Railway, an extension of the T. & N.O., which passes through the lignite field and terminates at Moose Factory. Deposits of lignite coals have also been developed at Willow Creek and at Wallace, Alberta.

In the province of Saskatchewan the mining of lignite by the stripping and open-cut method may be mentioned as one of the principal developments. On account of the low cost of mining according to this method, and the assistance rendered by Federal railway subventions, Saskatchewan lignite is finding a steadily increasing market in Winnipeg for industrial as well as for domestic purposes. A new process for briquetting the carbonized residue produced at the carbonizing and briquetting plant of the Western Dominion Collieries, near Bienfait, has been introduced, and this plant is in operation.

The principal development at Vancouver Island is the amalgamation of the two major coal mining operations. This has been effective since September 1928. Development of other coal areas in the provinces of Alberta and British Columbia and the Yukon Territory is not warranted under existing economic conditions.

General Situation and Market Conditions:

The Fuel Board reports that the assistance provided by the Federal Government in the form of railway subventions, to assist in the movement of coal mined in Canada, has materially extended the markets of coal produced in the Maritime and Western Provinces. With this assistance 762,551 tons were moved, of which quantity, 75 per cent or 621,900 tons, it is estimated would not have found a market otherwise.

The Domestic Fuel Act, which expires this year, failed to induce operators of coke and gas plants to use Canadian coal to any great extent. Only two plants, viz. the Nova Scotia Light and Power Company, and the Quebec Power Company, have changed from imported to Canadian coal.

In Nova Scotia the general programme of erecting power plants for the generation of electricity in the Cape Breton Collieries was maintained. A new power plant was completed in 1930, in which steam is raised from the burning of refuse coal in the pulverized form. A similar plant was completed in New Brunswick in 1931, at Newcastle Wharf on Grand Lake, near Minto. The industrial retrenchment in Upper Canada, which was instituted early in 1930, reacted seriously on the Nova Scotia coal industry. The collieries of British Columbia have also seriously suffered as a result of the large decrease in the price of California crude petroleum. Nevertheless, conditions are reported as improved, compared with those existing in 1930.

Large scale coking tests carried out at the Fuel Research Laboratories of the Mines Branch, Department of Mines, and at the plant of the Montreal Coke and Manufacturing Company, on washed Princess coal mined by the Dominion Coal Company, have demonstrated that when washed, this coal will stand indefinite storage without heating and can be used as a blend, up to 35 per cent, with American coals now being used by the Montreal Coke and Manufacturing Company, without affecting the quality of the coke produced. This opens up a market of about 150,000 tons for the manufacture of coke in the Montreal Coke and Manufacturing Company's plant, in the event that a suitable price for the washed coal delivered at the plant can be arranged.

During 1931 about 35,000 tons of washed Princess coal was delivered to the coke plant of the Montreal Coke and Manufacturing Company at LaSalle, Montreal, for experimental purposes, and since its delivery has been used regularly as a blend with American coals heretofore used.

In 1930 similar tests were conducted on Michel coal obtained from the Crow's Nest Pass Coal Company by the engineers of the Division of Fuels and Fuel Testing of the Mines Branch, Department of Mines, in the experimental coke oven plant at the Fuel Research Laboratories, and in the gas plant of the Winnipeg Electric Company, Winnipeg. One thousand tons of this coal were coked in the latter plant, and as a result of these tests the gas plant of the Winnipeg Electric Company used during 1931 a quantity of Michel coal equivalent to 40 per cent of its total requirements. All of this coal was formerly purchased from the United States. It is expected that in the near future 100 per cent Canadian coal will be used in that plant.

The provinces formerly entirely dependent on supplies of coal from the United States are gradually substituting other fuels. The last few years have witnessed an increased use of Maritime coal in Quebec, and some Alberta coal was brought into Ontario. The importations and the use of substitute fuels, such as cokes, have materially reduced the consumption of Pennsylvania anthracites for domestic purposes.

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March, 1932. (B.F.H.)

COKE IN 1931

Production:

1931 -- 1,835,622 tons
1930 -- 2,385,994 "

Petroleum coke production is not included in the above data.

Exports:

1931 -- 37,038 tons valued at $454,153
1930 -- 53,979 " " " 698,211

No data available as to kinds of coke exported.

Imports:

1931 -- 685,068 tons valued at $3,712,508
1930 -- 1,061,470 " " " 5,635,212

Petroleum coke is included in the above import data.

Producing Localities:

Coke is produced chiefly by the treatment of bituminous coal; a small production is also obtained from the distillation of petroleum.

Coke is now produced in every province of the Dominion with the single exception of Prince Edward Island. Saskatchewan and Alberta produce only petroleum coke.

Important Developments and Prospective Producing Localities:

There were no new developments reported in the coke industry during 1931.

During the last few years previous to 1931, the following improvements have taken place:-

The Quebec Power Company remodeled its gas plant, installed Woodall-Duckham retorts and are now producing gas coke.

A new plant capable of treating 1,200 tons of coal per day came into operation in Montreal. This plant was erected by the Koppers Company in conjunction with the Montreal Light, Heat and Power Company and the output is designed principally for domestic consumption.

The Nova Scotia Light and Power Company remodelled their existing plant in order to produce a better grade of domestic coke. An interesting feature of this plant is the provision for using Canadian coal.

The Steel Company of Canada, Hamilton, Ontario, remodelled their coke sizing plant and are at present selling part of their output for domestic use.

No further progress appears to have been made in the proposed plans for the erection of coke plants at Port Stanley and Fort William in the province of Ontario.

General Situation, Market Conditions, etc.:

Activity in the coke market is evidenced by a greater demand for metallurgical coke and by an increasing use of coke for domestic heating.

The expanding production of both oven coke and gas coke for domestic heating has greatly lessened the dependence of the central provinces on American anthracite.

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NATURAL GAS IN 1931

Production:

1931 - 26,530,902 M.cu.ft. valued at $ 9,144,204
1930 - 29,376,919 " " " " 10,289,985

Exports:

Nil.

Imports:

1931 - 109,168 M. cu.ft. valued at $74,904.
Natural gas is dutiable at 6¢ per 1000 cu.ft. when brought into Canada.

Producing Localities:

In Alberta, the main productive area is the Turner Valley, where wet gas is stripped of its naphtha content, scrubbed, and piped to Calgary, Lethbridge and intermediate points: the Viking field supplies Edmonton and district; the Medicine Hat field, the oldest in the province, continues to supply the industrial and domestic requirements of Medicine Hat, Redcliff and district. The old Bow Island field is being repressured with the excess gas from the Turner Valley field, and this and the adjacent Foremost field are available as a stand-by. A small field at Brooks, supplies that town with their requirements. On the border between Alberta and Montana, the Range well in southern Alberta, is a potential producer of large volume, and has already supplied gas for export into Montana.

In Ontario, the chief gas fields are located in Essex, Kent, Norfolk, Haldimand, Lambton and Welland counties. The Kent or Tilbury field has been the most important and lies mainly in Tilbury East township but extends into the adjacent townships of Romney and Raleigh. A new field, which has been developed on a considerable scale during 1930 and 1931, is situated in the Brant Indian Reserve, Tuscarora township, Brant county.

In New Brunswick, a small gas field near Moncton supplies that city with natural gas for domestic and industrial purposes; the gas is also piped into Hillsboro.

Important Developments and Prospective Producing Localities:

The interest in the natural gas and oil possibilities of the south shore of the St.Lawrence, in the lowlands region, which had been evidenced in 1930 by the acquisition of considerable acreage by several influential companies, was continued in 1931 by active drilling by three operators. Wells were commenced at St.Denis in St. Hyacinthe county and at Visitation and St.Gerard in Yamaska county. These operators erected equipment to enable drilling to go to 5000 feet if necessary. At Lanoraie, Berthier county, a fourth well was drilled by the company who had previously drilled three wells in this area and had obtained a small flow of gas in each.

In Ontario, the expansion and development of gas fields which had been so much in evidence in 1930, was continued at an accelerated pace in 1931. More field work was undertaken in 1931, and the poor business conditions which prevailed during the year had no appreciable affect on the gas industry, as it entered the year better equipped, both mechanically and by experience, than ever before. New wells were brought into production in many of the older fields; in the new Brant county field alone, between 30 and 40 new wells were brought in during the year. The growing use of gas for house heating and to a lesser extent for gas refrigeration is extending production in Ontario, and the technical processes of mixing artificial and natural gas have been so perfected that it is now possible

to complete safeguards against temporary shortages, and to provide assurance against interruption. The two largest distributors and producers of natural gas in Ontario have already taken steps to adopt these measures to meet the increasing demand for their product. The present gas supply in Ontario is estimated to be sufficient to supply present day domestic requirements for 25 years and the hope exists that a sufficient surplus will be established to meet industrial requirements also. At the present time only 20 per cent of the natural gas sold in Ontario is consumed by industries.

In Alberta, the most important development during the year was the putting into effect by the Provincial Government of conservation measures in the Turner Valley field, aiming at the conservation of the natural gas which had been allowed to go to waste since the field had been brought in. This act which became effective from July 1, 1931, limited the producing wells to 40 per cent of their open flow. Further restrictive measures were proposed by a Gas Conservation Committee, appointed by the Alberta Government, which would limit the total flow of all the wells in the Turner Valley to 100 million cu. ft. a day. It was also proposed that a merger of all the operating companies in the Turner Valley field be effected, and that only about 10 or 12 of the best wells in the field be operated, the balance of about 75 to be shut in. The proposals of the Committee were not accepted by the companies and negotiations are still under way between the Provincial Government and the various companies.

During the year, further progress was made in experiments being carried out in a semi-commercial plant in Calgary for the production of benzine and other products from Turner Valley gas and the National Research Council are continuing their investigations aimed at finding uses for natural gas that is being wasted.

During the year, the city of Regina gave a franchise to a large Canadian utility company to supply natural gas to the city from the Bowdoin field in Montana.

The storage of natural gas in the depleted sands of the Bow Island field was continued during the year, and up to the end of 1931, there had been put in a total of close to 2¼ billion cu.ft. of gas from the Turner Valley field.

General Situation, Market Conditions, etc.:

The use of natural gas as a fuel continues to expand, due to its many advantages over other forms of fuels. The transmission of natural gas in pipe lines under high pressure is extending the market for natural gas and the tendency to adopt a policy of mixing artificial with natural gas will be the means of extending the life of the natural gas fields for many years. In Ontario during 1931 the expansion and developments of the natural gas industry has been marked by construction of new pipe lines to supply municipalities which have had no gas services heretofore, and by the renewal of old franchises.

The province of Alberta produces about 70 per cent of the natural gas supply in Canada. Alberta has not yet solved their problem of finding uses for the excess gas available in the Turner Valley, which unfortunately is wasted under present conditions. The Government of Alberta is endeavouring to solve the problem, which is not an easy one as the West lacks the population and industries which characterize the gas fields of southwestern Ontario, but it is hoped that with the co-operation of all parties some solution to this problem will be reached in the near future.

The Department of Mines, Ottawa, has published the following reports: "Oil and Gas in Western Canada" (Geological Survey Economic Series No.5); "Petroleum and Natural Gas Resources of Canada" in two volumes, (Mines Branch Report No.291).

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March, 1932. (E.H.W.)

OIL SHALE IN 1931

Production:

Nil.

Exports:

Nil.

Imports:

None recorded.

Producing Localities:

None.

Important Developments and Prospective Producing Localities:

No change during 1931.

The Maritime Eduction Co. of Rosevale, N.B. went into bankruptcy during 1930, and title to the plant and mining lease became vested in the National Funding Co., who hoped to obtain enough capital to start operations in the spring of 1931; they were not successful and the plant is idle. The plant of the Torbanite Products Ltd. at New Glasgow, N.S., after making a few runs, was nearly destroyed by fire in October, 1930; it is stated by the officials of the company that they intend rebuilding in the coming spring.

The Canadian Torbanite and By-Products Ltd., a subsidiary of the Oil & Nitrates, Ltd., have built a small experimental plant at McLellan Brook, about 5 miles from New Glasgow, at which some experimental work has been done.

Nova Scotia. The principal known occurrences of oil shales are found in Pictou and Antigonish counties. Of these the deposits in Pictou county are the most promising.

New Brunswick. In Albert and Westmorland counties there is a large aggregate tonnage of oil shale which may yet form the basis of a prosperous industry.

General Situation, Market Conditions, etc.:

Until quite recently, activity has been chiefly confined to field exploration and laboratory investigations. Laboratory work by the Department of Mines has included:-

1. Determination of petroleum content of representative samples from various localities.
2. Determination of important factors affecting the recovery of crude petroleum by destructive distillation and the character of the petroleum recovered.
3. Investigation of the processes designed for the distillation of oil shales.

The Department of Mines, Ottawa, has published several reports on the oil shale industry.

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PEAT IN 1931

Production:

1931 -- 1,170 tons valued at $ 5,937
1930 -- 2,847 " " " 10,932

Exports:

Nil

Imports:

Nil.

Peat Bogs Worked:

The only peat manufacturing operations carried on during 1931 were those of the Hydro Peat Company, located on a bog near St.Hyacinthe,Quebec. According to information supplied by the operators, the mechanical features of the process lived up to expectations. A considerable part of the product produced was sold locally.

The manufacturing plant at Alfred,Ontario, has not been operated since 1929, owing to difficulties which developed in connection with the ownership of the property. The only operations conducted at this plant were those involved in selling the stock of peat fuel on hand. During 1929 approximately 1,760.74 tons of peat fuel, 756.42 tons of peat humus, and 28.43 tons of peat screenings were sold from the Alfred plant.

Important Developments and Prospective Producing Localities:

At the present time considerable interest is being taken in the possibility of producing peat litter and peat insulation blocks and sheets from Canadian moss peat.

It has been reported that a small peat plant has been started in Edmonton by Carlson & Son for the purpose of manufacturing insulation material. The raw material will be obtained from the bogs in the district. The project is understood to be an experimental one, subject to expansion.

There are a large number of peat bogs scattered over Central and Eastern Canada, containing material suitable for the manufacture of fuel or of insulating materials and litter and many of these favourably situated with respect to possible markets.

General Situation, Market Conditions, etc.:

Owing to the large number of moderately priced substitute fuels on the market, the market for peat fuel is practically confined to those localities where wood is used. It is still in small demand for open fireplaces.

The Department of Mines,Ottawa, has published numerous reports on Peat, amongst which are "Facts About Peat", (Mines Branch Report No.614), and "Peat ,Its Manufacture and Uses", (Mines Branch Report No.641).

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PETROLEUM IN 1931

Production:

1931 -- 1,537,000 bbls. valued at $4,260,685
1930 -- 1,522,220 " " " 5,033,820

Exports:

			Value
Oil, petroleum, crude	16,277,182	gal.	$ 677,378
" coal, & kerosene, refined..	504,364	"	52,328
" gasoline and naphtha.....	5,500,606	"	889,827
" mineral, n.o.p.....	885,122	"	185,177
Wax, mineral.....	9,469	cwt.	31,092
			$1,835,802

Imports:

1931 - Petroleum and its products valued at $40,013,852
1930 - " " " " " " 65,800,224

Producing Localities:

Turner Valley, Alberta, continues to be the chief producing area in Canada accounting for about 92 per cent of the total production. During the year, the Alberta Government, to conserve the natural gas that was going to waste, put into force a measure which limited the output of the wells in Turner Valley to 40 per cent of their open flow. As a consequence, the output of crude naphtha and light crude from Turner Valley shows a slight reduction from the record production of 1930, but the total production of Alberta, including the Red Coulee, Wainwright, and Ribstone fields as well as Turner Valley, shows a slight increase.

Ontario's chief oil field is the Petrolia-Oil Springs area, which has been in production since 1861. The Bothwell and Mosa townships fields are also important producers.

In New Brunswick, the producing area is confined to the Stoney Creek field, about 9 miles southeast of Moncton. The production is relatively small and does not vary much from year to year. In 1931 the production amounted to 6,577 barrels.

In Manitoba, Saskatchewan and British Columbia, several wells drilled or being drilled have given showings of oil, but no commercial production has as yet been obtained.

Important Developments and Prospective Producing Localities:

Drilling activity in the Turner Valley field fell off considerably during the year 1931. Only seven or eight wells were being drilled as compared with three or four times this number during the previous two years. This was due to the general business depression which continued throughout 1931 and also to the unsatisfactory conditions prevailing in the oil industry in general, such as low prices, over production, and poor markets. Another factor which had a tendency to curtail drilling in the Turner Valley was the proration policy which the Alberta Government adopted and which was put into effect on July 1, 1931. The Gas Conservation Committee's proposals, which were submitted to the various operators in the field, were rejected, and in November 1931, the Alberta Government put into effect an order which prevents any new wells being drilled to the producing limestone in Turner Valley. Any wells previously started were allowed to be completed. Drilling in future is to be allowed only to the oil bearing strata, overlying the limestone.

Outside of Turner Valley, there has been drilling in several new fields. Towards the end of the year, crude oil was struck in wells being drilled at Keho Lake, near Lethbridge, and in the Twin River field, in southern Alberta. A well being drilled close to the border of Montana and east of Coutts struck a considerable flow of gas and was being drilled deeper. This well is on the Sweet Grass Hills anticline which extends into Alberta from Montana.

General Situation, Market Conditions, etc.:

Unsettled conditions in the oil industry throughout the world in 1931 had its effect on developments in Canada. The west, in particular, due to the crop failures, and general unsatisfactory business conditions, did not consume the same amount of gasoline and oil products as in previous years and importations of crude oil were considerably reduced. The two old refineries at Calgary were able to accept only about 50 per cent of their previous requirements of naphtha from Turner Valley due to the decrease in demand for gasoline and the large stock of finished gasoline on hand; a third refinery started operation towards the end of 1931. The refinery under construction at Moose Jaw, Saskatchewan, was completed early in 1932.

In Montreal East a new refinery commenced operations towards the close of the year and it is also reported that construction is about to be started on an oil refinery at Amherstburg, Ontario. Canadian consumption of gasoline is over 600,000,000 gallons per annum and the bulk of the requirements is obtained from imported crude. The tariff was recently adjusted with a view to encouraging the further expansion of oil refining in Canada.

The Department of Mines, Ottawa, has published the following reports: "Oil and Gas in Western Canada", (Geological Survey Series No.5), and, "Petroleum and Natural Gas Resources of Canada", (Mines Branch report No.291, 2 volumes).

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