DEPARTMENT OF MINES OF CANADA

MINES BRANCH

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THE CANADIAN MINERAL INDUSTRY

IN

1933

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MARCH 1934

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MINES BRANCH — DEPARTMENT OF MINES

THE CANADIAN MINERAL INDUSTRY DURING 1933

	Product	Article Number	Author
I METALS:	Aluminium	(1)	Wilson, A.W.G.
	Antimony	(2)	Buisson, A.
	Beryllium & Beryl	(3)	Spence, H.S.
	Bismuth	(4)	Buisson, A.
	Cadmium	(5)	Buisson, A.
	Cobalt	(6)	Robinson, A.H.A.
	Copper	(7)	Wilson, A.W.G.
	Gold	(8)	Robinson, A.H.A.
	Iron Ore	(9)	Robinson, A.H.A.
	Lead	(10)	Buisson, A.
	Manganese	(11)	Buisson, A.
	Molybdenum	(12)	Eardley-Wilmot, V.L.
	Nickel	(13)	Robinson, A.H.A.
	Platinum	(14)	Buisson, A.
	Radium & Uranium	(15)	Spence, H.S.
	Selenium	(16)	Wilson, A.W.G.
	Silver	(17)	Buisson, A.
	Titanium	(18)	Robinson, A.H.A.
	Zinc	(19)	Buisson, A.
II NON-METALS:	Arsenic	(20)	Robinson, A.H.A.
	Asbestos	(21)	Wilson, A.W.G.
	Barite	(22)	Spence, H.S.
	Bentonite	(23)	Spence, H.S.
	Bituminous Sand	(24)	Wilson, A.W.G.
	Chromite	(25)	Robinson, A.H.A.
	Corundum	(26)	Eardley-Wilmot, V.L.
	Diatomite	(27)	Eardley-Wilmot, V.L.
	Feldspar	(28)	Spence, H.S.
	Fluorspar	(29)	Spence, H.S.
	Garnet	(30)	Eardley-Wilmot, V.L.
	Graphite	(31)	Spence, H.S.
	Grindstones	(32)	Eardley-Wilmot, V.L.
	Gypsum	(33)	Cole, L.H.
	Iron Oxides	(34)	Wait, E.H.
	Lithium Minerals	(35)	Spence, H.S.
	Magnesite	(36)	Goudge, M.F.
	Magnesium Sulphate	(37)	Cole, L.H.
	Mica	(38)	Spence, H.S.
	Moulding Sands	(39)	Freeman, C.H.
	Phosphate	(40)	Spence, H.S.
	Pyrites	(41)	Wilson, A.W.G.
	Salt	(42)	Cole, L.H.
	Silica	(43)	Cole, L.H.
	Sodium Sulphate	(44)	Cole, L.H.
	Sulphur	(45)	Wilson, A.W.G.
	Talc & Soapstone	(46)	Spence, H.S.
	Volcanic Dust	(47)	Eardley-Wilmot, V.L.
III STRUCTURAL MATERIALS:	Cement	(48)	Buisson, A.
	Granite	(49)	Cole, L.H.
	Kaolin (China Clay) & Ball Clay	(50)	Frechette, H.
	Lime	(51)	Goudge, M.F.
	Limestone (General)	(52)	Goudge, M.F.
	Limestone (Structural)	(53)	Goudge, M.F.
	Marble	(54)	Goudge, M.F.
	Whiting Substitute	(55)	Goudge, M.F.
IV FUELS:	Coal	(56)	Robinson, A.H.A.
	Coke	(57)	Robinson, A.H.A.
	Natural Gas	(58)	Wait, E.H.
	Oil Shale	(59)	Swinnerton, A.A.
	Peat	(60)	Robinson, A.H.A.
	Petroleum	(61)	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, New York.

ALUMINIUM IN 1933

Production:

1933: 15,900 long tons
1932: 17,500 " "
(Data published by the United States Bureau of Mines.)

Exports:

1933: Valued at $6,301,974
1932: " " 3,903,386

Imports:

1933: Valued at $2,813,388
I932: " " 3,403,989

Ores Mined and Producing Localities:

The primary ore of aluminium is bauxite; this ore has not been found in Canada in commercial quantities. All our requirements for the production of primary metal are supplied usually from the United States, but occasionally from British Guiana. A small re-export of bauxite from Great Britain and Germany is included in import statistics. Imported ores are previously subjected to a preliminary treatment; where the ore is to be used for the production of artificial aluminous abrasives it is merely calcined to remove excess water; where it is to be used for the production of aluminium metal it is first calcined and then treated by a chemical process to produce nearly pure aluminium oxide. The aluminium oxide used in Canada as a source of metal is prepared in the United States from British Guiana bauxites. For the production of metallic aluminium it is also necessary to import both natural and artifical cryolite, a fluoride of aluminium and sodium; the only commercial source of natural cryolite is on the west coast of Greenland, the mining operations being under the indirect control of the Danish Government; artifical cryolite is imported also to be used in conjunction with the natural mineral.

Important Developments.

Aluminium metal and alloys are being used for very many industrial purposes, where their lightness combined with high tensile strengths and non-corroding properties make them desirable. Among the latest applications are structural shapes and sheet metal for railway cars and automobiles, roofing sheets, and shipping barrels; aluminium paints for covering and preserving containers of all kinds, including tank cars, oil storage tanks and water tanks; aluminium foil, specially prepared, offers a new and very efficient insulating covering for hot or cold pipe lines, refrigerator linings, furnace jackets, and similiar applications.

General Situation, Market Conditions, etc.:

Metallic aluminium is produced in Canada in two plants, both located in the Province of Quebec, and both operated by the Aluminium Company of Canada; all ores are imported, and most of the metal produced is exported. Market conditions throughout the year were such that the production of metal during the year 1933 was substantially lower than in the previous year in nearly all operating plants throughout the world. While world production shows a decline of about 10% from that of 1932, Canadian production only declined about 3.8%; production increased in Switzerland and Great Britain.

Published quotations show a uniform price in the United States throughout the year of 22.9 cents per pound for metallurgical ingot 98-99% pure, and 23.3 cents per pound for mill ingot; Canadian prices per hundred pounds are reported to have varied between $19.00 and $21.00, according to the kind of metal sold.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (A.W.G.W.)

ANTIMONY IN 1933

Production:

No antimony ore, concentrates, or antimony regulus was produced in 1933.

Exports:

None recorded.

Imports:

Metallic antimony	1933:	626,854	lb.	valued at	$32,796
	1932:	631,204	"	"	37,180
Antimony salts	1933:	85,999	"	"	6,629
	1932:	51,144	"	"	6,955

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.

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 lead bullion is exported to the United States for further treatment.

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

Important Developments and Prospective Producing Localities:

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.L.A., was not operated in 1933.

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 alloys for storage-battery plates, bearing and babbitt metals, solder, rubber goods, paints, and fixtures.

The price of antimony in 1933 averaged 6.528 cents per pound, as against 5.592 cents in 1932.

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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BERYLLIUM AND BERYL IN 1933

Production:

There is no present production of beryl in Canada, and the only recorded output has been a small trial shipment of about two tons made to Germany in 1927; this came from the deposit in Lyndoch township, Ont., mentioned below. In view of the increased interest in recent years in beryllium metal (of which beryl is the sole commercial source), a synopsis of information on Canadian occurrences and of what is officially known on the beryl situation is presented in this year's annual review.

Exports:

1933: None recorded.

Imports:

1933: None recorded.

Ores Mined and Producing Localities:

Nil.

Important Developments and Prospective Producing Localities:

Beryl, a silicate of aluminium and beryllium containing up to 14 per cent of beryllium oxide (5.4 per cent of beryllium), is a mineral whose occurrence is confined to granite pegmatite dykes. It is not infrequently met with in such dykes operated for feldspar or mica, but only comparatively rarely in important tonnage quantity; it is often found in particular abundance in pegmatites rich in lithium minerals.

Probably the most important occurrence of beryl recorded in Canada lies in Lyndoch township, Renfrew county, Ontario. This has been known for many years, but not until 1926 was any serious attempt made at development. Operations were short-lived and only a few tons of beryl crystals were secured. During 1930-32, further mining and prospecting were conducted, both at the original discovery point and along the strike of the pegmatite, which was found to extend for several miles; its beryl content, however, appears to be mainly localized in a few pockety aggregations of limited extent. The beryl occurs in the form of individual crystals, up to about 6 inches in diameter, more or less thickly disseminated in massive feldspar or quartz, and is readily separable by cobbing from its matrix. Mining to date has been limited to about ten feet in depth, and further work is required to prove up the deposit. Associated minerals include rose quartz of rather pale colour, and small amounts of zircon, columbite, and radioactive euxenite.

In southeastern Manitoba, beryl has been found to occur in some of the pegmatites of the Pointe-du-Bois region, where there has been considerable prospecting in recent years, chiefly for tin and lithium minerals. One of the occurrences to which attention has been directed is on the Huron claim, adjoining the Silver Leaf lithium mine and 15 miles east of Pointe-du-Bois, where scattered beryl crystals occur in a pegmatite carrying also small amounts of uraninite, tantalite, and monazite. Beryl is also stated unofficially to occur on several other adjacent properties, which, together with the Huron claim, are at present under the control of the Winnipeg River Tin Mines, Ltd., who have recently announced plans for their development. Beryl in the form of scattered crystals also occurs in this district at the following points: south shore of Shatford Lake; on the Buck and Jack Nutt claims, near Bernic Lake; on the Rush and Stannite groups, near Rush Lake; on the Captain claims, near Greer Lake; and in several pegmatities near Cat Lake. There has been no production from any of the properties mentioned above, which must be regarded as still in the indefinite prospect stage. A little Manitoba beryl, as well as other associated pegmatite minerals, including rose quartz, has been sold for cutting and polishing for jewelry and ornamental purposes.

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General Situation, Market Conditions, etc.:

There is nothing in the present beryl situation to particularly encourage attempts to develop the known deposits in this country. One of the principal world sources of beryl is the United States, where the mineral is recovered as a by-product of mining operations for feldspar, mica, and lithium minerals, in amounts considered ample to meet the present demand. Important amounts are thus produced in some of the New England states, and in South Dakota. Occurrences are also known in several of the western states, upon some of which development work has recently been undertaken. The mineral also occurs in a number of other countries, including India, South Africa, Brazil, Madagascar, Scandinavia, France, Portugal, Spain, and Russia. India alone recorded a production of nearly 300 tons in 1932, and in various of the other countries mentioned there is intermittent production of by-product mineral. It appears, therefore, that, contrary to prevailing belief, there is no prospect of any immediate or prospective shortage of beryl supplies. The demand, also, is far less than is sometimes asserted, in spite of the progress made in developing cheaper methods of producing beryllium metal and its field of usefulness in alloys, principally of copper. For the immediate present, a few hundred tons of beryl annually will probably be amply sufficient to supply the available market. It is noteworthy that prices offered for the mineral have taken a decided drop, quotations f.o.b. New York varying from $20 to $35 per short ton in 1933, as against $60 in 1929 , minimum content 10 per cent of beryllium oxide.

Beryllium is one of the newer rare metals to have become of technical importance in the engineering field. Development of commercial methods of production is of recent date, and is due largely to research in Germany and the United States. Available until a year or two ago only at prohibitive prices, the metal and its master alloys of copper, iron, and nickel are now quoted at figures that make possible a more extended commercial use of the element.

The Department of Mines, Ottawa, has published the following report on beryl: "Notes on Beryllium and Beryl" (Mines Branch, Memorandum Series No. 40, 1930).

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Department of Mines, Ottawa,
March 1934 (H.S.S.)

BISMUTH IN 1933

Production:

1933:	78,303 lb.	valued at	$81,442
1932:	16,855 "	" "	7,340

Exports:

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

Imports:

	Metallic bismuth	Bismuth salts
1933:	180 lb. valued at $198	Valued at $25,255
1932:	5 " " " 9	" " 21,229

Ores Mined and Producing Localities:

Refined bismuth was produced in Canada for the first time in 1928. The production reported above includes metallic bismuth produced at Trail, British Columbia, and the bismuth contained in silver-lead-bismuth bullion produced at Deloro, Ontario.

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 1928, from the lead-zinc ores of British Columbia.

In Ontario, the Deloro Smelting & Refining Company, 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 lead bullion is exported to the United States for refining.

In British Columbia, the Consolidated Mining & Smelting Company 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 remained fixed at 85 cents per pound throughout the year 1932 and up to July 1933, after which it was successively increased to $1.05 in July, $1.20 in September, and $1.30 in November, which last price still rules.

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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March 1934. (A.B.)

CADMIUM IN 1933

Production:

1933: Valued at $78,733
1932: " " 26,824

(Quantities are not being published by the Dominion Bureau of Statistics).

Exports:

None recorded. Canadian production of cadmium is believed to be 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, being present in small amounts in most zinc ores and in some lead ores.

The cadmium recovery plant of the Consolidated Mining and Smelting Company, at Tadanac, B.C., first started production early in 1928 and has been treating the residues from the zinc refinery.

The zinc refinery of the Hudson Bay Mining & Smelting Company, 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.

Important Development and Prospective Producing Localities:

No new development.

General Situation, Market Conditions, etc.:

The possibilities of increased world 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% pure and better, and as a sulphide.

The price has been characterized in past years by some remarkable fluctuations but remained fixed at 55 cents per pound throughout 1931,1932,and 1933. The American product is protected by a duty of 15 cents per pound.

The world production is estimated at 1,000 tons in 1931,as against 2,000 tons in 1930 and 1,800 tons in 1929.

The chief producing countries are:The United States,Canada,Mexico, Australia, and Poland.

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Department of Mines, Ottawa,
March 1934. (A.B.)

COBALT IN 1933

Production:

1933: 459,247 lb. valued at $594,944
1932: 490,631 " " " 587,957

Exports:

Metallic cobalt, cobalt alloys, etc., valued at $552,450 against $589,334 in 1932.

Imports:

1933: Oxide of cobalt 764 lb. valued at $601
1932: Not separately recorded.

Ores Mined and Producing Localities:

Practically all the cobalt that has been produced in Canada has come from Cobalt, Gowganda, and South Lorrain in northern Ontario. At first, it was all obtained as a by-product of silver production; later, a certain amount of ore was mined chiefly or solely for its cobalt content.

Final recovery of the cobalt in commercial form is done in part in Canada and in part abroad. The only cobalt-recovery plant now operating in Canada is that of the Deloro Smelting and Refining Company, Ltd., at Deloro, Ontario, which produces cobalt metal, oxides, and salts.

In 1932, test shipments totalling 69 tons of ore containing 18 to 20 per cent cobalt were made from deposits of cobaltite of unknown but apparently small extent found 40 miles north of Minaki, near the extreme western boundary of Ontario.

The nickel-copper ores of Sudbury, Ontario, also carry minute quantities of cobalt, but this insofar as is known is not recovered separately.

Important Developments and Prospective Producing Localities:

Nil.

General Situation, Market Conditions, etc.:

Owing to the depletion of the mines at Cobalt and to low prices of silver and cobalt, decline in production continued in 1933; apart from some small individual operators and lessees, the O'Brien mine at cobalt and the Miller-Lake O'Brien at Gowganda were the only cobalt producing mines in operation during the year.

A further substantial increase in the price of silver or in the demand for cobalt would undoubtedly bring about a resumption of operations on some of the old mines, but it is very unlikely that any increase in production that might result would be sufficient to restore to Canada her old importance as a producer of cobalt.

The Belgian Congo, where cobalt is found in association with copper, is now the world's chief producer.

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Department of Mines, Ottawa,
March 1934 (A.H.A.R.)

COPPER IN 1933

Production:

1933: 149,968 tons valued at $21,631,457
1932: 123,840 " " " $15,294,058

Exports:

	Pounds	Value
Copper fine, in ore, matte, blister copper, in bars, etc....	247,487,800	$16,646,941
Wire and cable, and other manufactures.....		271,005
		$16,917,946

Imports:

Copper in bars, rods, blocks, pigs, ingots, scrap, tubing and wire.....	847,446	135,273
Copper mfrs., crude precipitate of anodes, sub-acetate, sulphate and rollers.....		455,436
		$590,703

Ores Mined and Producing Localities:

British Columbia produces low-grade ores which require concentrating before smelting; concentrates are either exported as such or are first smelted, the resulting blister copper being exported for refining; Manitoba copper-zinc ores are concentrated to separate the two metallic sulphides present; the copper concentrates are smelted, and the resulting blister is shipped to Quebec for refining; Ontario copper-nickel ores are processed within the province for the production of either matte or blister copper; one firm ships nickel-copper matte to Norway for refining, the other produces blister copper that is refined in Ontario; Quebec sulphur-copper-zinc ores are concentrated for the separation of pyrites, copper-bearing concentrates, and zinc-bearing concentrates; one company exports copper concentrates; the bulk of the Quebec production of copper-gold ores is smelted and refined within the province.

Important Developments and Prospective Producing Localities:

There have been no important new developments during the year; many mines producing and shipping concentrates only suspended operations during 1931; in British Columbia the Britannia greatly curtailed the production of copper-bearing concentrates during the first three quarters but was gradually increasing the output during the last quarter; in Manitoba the Sherritt-Gordon mine continued inactive; in Ontario production was doubled; in northern Quebec several properties capable of production were idle, and copper production at the mines controlled by Noranda was curtailed somewhat; in southern Quebec at the Eustis mine production was virtually normal.

All smelting plants continued in operation: in British Columbia the smelter at Anyox maintained capacity production, except for a short shut-down during a strike; in Manitoba the mill and smelter of the Hudson Bay Mining Company continued in operation; in Ontario production in the Sudbury area was considerably curtailed during the first part of the year but the latter half was a period of great activity; in Quebec the Noranda smelter continued in operation throughout the year.

The refinery at Copper Cliff, Ontario, was in operation throughout the year, production being partly curtailed during the first half year, but during the second half production was greatly expanded; the refinery at Montreal East was also operated throughout the year somewhat below capacity.

Production of copper in British Columbia and in Quebec shows a decline below that of the previous year; but the production of Canada as a whole increased 21.1% above that of 1932; during the first half year production was very low, improvement began during the third quarter and was especially marked during the last three months of the year.

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At the close of the year it was evident that the Canadian copper industry had entered a period of renewed activity, not only because of increases in production recorded during the last quarter, but also because of the announcement of plans for the re-opening of idle properties, especially in Quebec. The Aldermac mine was re-opened for the production both of pyrites and copper concentrates; the Normetal Mining Corporation, Limited, was organized to take over and re-open the property formerly called the Abana, plans being made to double the mill capacity, and to extend the development work; Waite-Amulet Mines, Limited, was formed by the amalgamation of Amulet Mines and Waite-Ackerman-Montgomery Mines, a union planned to facilitate the mining and milling of ore bodies on both properties at lower costs.

The new year is being entered without any large accumulation of unsold metal in the refineries, over and above that usually required to meet the requirements of customers.

Exploration for new properties and development work on prospects practically ceased owing to general economic conditions.

General Situation, Market Conditions, etc.;

Owing to the special revenue tariff of 4 cents per pound, sales of Canadian copper in the United States practically ceased; concentrates shipped to the United States, chiefly from British Columbia, but also from Quebec, were treated in transit, the recovered metal being practically all offered for sale in other markets. New York prices reached a low of 4.775 cents per pound in January; in March a slight improvement was noted; prices continued to rise until August when a monthly average of 8.768 cents per pound was reached; subsequently, the price has been fractionally lower, and the average for the year was 7.025 cents per pound. Most of the Canadian copper production was shipped to Great Britain, the balance going to many other countries including both contintental Europe and Japan. Sales were, for the most part, on the London market; London prices in terms of Canadian currency were slightly higher than New York prices, and show a steady rise between the January average of 5.709 cents and the July average of 9.1508 cents per pound; during the latter half of the year the monthly average prices show fractional decline, but the average for the year was 7.437 cents per pound.

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GOLD IN 1933

Production:

1933:	2,947,618 oz.	valued at	$60,932,670
1932:	3,044,387 "	" "	62,933,063

Exports:

Gold-bearing quartz, dust, nuggets, etc.,	valued	at	$2,299,650
Gold coins (Canadian).....	"	"	10
Gold coins (foreign).....	"	"	5,963,887
Gold bullion.....	"	"	56,003,138
Jewellers' sweepings (gold, silver, and platinum)	"		502,506

Imports:

Coins.....	"	"	810,562
Bullion in bars, etc.....	"	"	35,316
Manufactures of gold and silver.....	"	"	17,729
Gold fringe.....	"	"	4,554
Articles of gold and silver.....	"	"	485,467

Ores Mined and Producing Localities:

The chief sources of the gold produced in Canada in 1933 were the gold-bearing quartz deposits of the Porcupine and Kirkland Lake districts in Ontario. The Lake Shore mine at Kirkland Lake was Canada's largest gold producer in 1933. The Hollinger, at Timmins, came second; and the Noranda, in Quebec, third. Other large producers in Ontario in 1933 were McIntyre, Teck-Hughes, Dome, Wright-Hargreaves, Coniaurum, Vipond, Buffalo-Ankerite, Sylvanite, Toburn, Kirkland Lake Gold, and Ashley, all in either the Porcupine or Kirkland Lake areas and the Howey in northwestern Ontario. There was also an important recovery of gold from the copper-nickel ores of the Sudbury district.

In Quebec, the second largest gold-producing province, the Noranda gold-copper mine was the chief producer, but important contributions to production were also made by the Siscoe, Beattie, O'Brien, and Granada – all gold-quartz mines.

British Columbia's chief producers were the Pioneer, Premier, Bralorne, Cariboo Gold Quartz, and Reno, among the gold-quartz mines; important amounts were also recovered in this province from base-metal mines and from placers.

Manitoba's output was derived chiefly from the copper-zinc-gold ore of the Flin Flon mine, with smaller amounts from the San Antonio and Central Manitoba gold-quartz mines. That of Saskatchewan – which was first credited with any considerable gold output in 1933 – came also from the Flin Flon mine, through which the interprovincial boundary between Saskatchewan and Manitoba passes.

Yukon's output was as usual almost all placer gold; the small amount from Alberta entirely so. That from Nova Scotia was from gold-quartz operations.

Important Developments and Prospective Producing Localities:

As a consequence of the continued high price for gold the search for gold deposits and the development of discovered occurrences in all parts of the Dominion were never more intensive. A number of new gold mills have been brought into production, others are under construction, still others are being planned and some of the older operators have added considerably to their milling equipment.

In Ontario important additions to milling capacity were made on the Howey and Wright-Hargreaves mines during the year, and towards its end, the new 200-ton mill on the Macassa mine was put into production. Among new mills now either under construction, or the construction of which has been definitely announced for the immediate future are: a 500-ton mill on the Young-Davidson property in the Matachewan area; and mills of smaller capacity at the Central Patricia, Pickle Lake; at the Northern Empire, Beardmore; at the St. Anthony, Sturgeon Lake; at the Jackson-Manion, Woman Lake; and at the Little Long Lac, near Longlac. It is not unlikely that favourable developments in the Swayze camp will result in mill construction in that area also in 1934.

In Quebec, prospecting and development were very active in the northwestern part of the province. About midsummer the new 600-ton (later increased to 800 tons) mill on the Beattie mine in Duparquet township, was put into production and during the latter half of the year the new 100-ton mill on the Greene Stabell mine in Dubuisson township. Milling capacity was increased at the Siscoe mine in Dubuisson township and at the Bussieres mine in Louvicourt township. A 50-ton mill was reported to be under construction by Sullivan Consolidated Mines, Ltd., early in 1934. There was also some revival of interest in the placer deposits of southeastern Quebec during the year.

In British Columbia, the Pioneer mine in Bridge River area ousted the Premier from first place among the province's gold producers. At Bralorne mine, also at Bridge River, milling capacity was increased from 120 to about 200 tons a day; and development work during the year put in sight sufficient ore to keep the mill running at its increased capacity for 4 or 5 years. A 25-ton flotation mill was put into operation at Surf Point on Porcher island; and the capacity of the Reno mill in Sheep Creek camp was being increased towards the end of the year. At the Cariboo Gold Quartz mine, at Barkerville, the present small mill will be replaced by a larger plant as soon as mine developments afford more information as to the size and type of plant that will ultimately be required. Increases in output from a number of presently producing properties as well as the building of several small new mills is forecast for 1934.

In Manitoba, a new 75-ton mill began producing during the second half of the year on the Oro Grande property; and increased milling capacity from 160 to 300 tons for the San Antonio mine is announced for 1934. A 50-ton mill was completed at Island Lake, but is awaiting the development of adequate ore reserves before being put into operation. Developments at God's Lake are reported to be extremely promising; and new finds in the Central Manitoba area are being actively developed.

Production of placer gold both in Yukon and British Columbia did not differ greatly from 1932. The operations of the McLeod River Mining Corporation's dredge on McLeod River, in Alberta, produced only a small amount of gold during the year.

General Situation, Market Conditions, etc.:

The outstanding feature of gold mining in 1933 was the continued high price for this metal, which recorded still further advances after the United States went off the gold standard in April.

Due to the higher price of gold the dollar value received for their output by Canadian gold miners increased from $71,479,373 in 1932 to (it is estimated) $84,301,875 in 1933; volume of production, however, declined from 3,044,387 ounces to about 2,947,618 ounces, or about 3.2%. Decreases in output were confined to the provinces of Ontario (where the decrease was about 5.5%) and Quebec (about 4.5%) and to Yukon (2.7%); and was doubtless due to some of the mines taking advantage of the opportunity afforded by the high price of gold of treating without decrease of profit material formerly of little or no commercial value. British Columbia, on the other hand, increased its output about 19% and Manitoba and Saskatchewan combined about 6.4%. Activity in the exploration and development of gold-bearing deposits was never greater in the history of Canadian gold-mining than it is at present, and would appear to presage a considerable increase in output in 1934 over that of 1933. A somewhat better outlook for base metal mines, many of which in Canada produce more or less gold, would tend to confirm such a forecast. On the other hand it is impossible to foretell how far these tendencies favourable to increased output will be offset by the treatment of ore of, on the average, lower gold content.

The world's gold production in 1933 as estimated by the American Bureau of Metal Statistics is 24,737,000 ounces.

Publications:

Gold in Canada, 2nd edition, 1933, Mines Branch report No.734.
Gold Occurrences of Canada, Summary Account, 2nd edition, No. 2309, Geological Survey, 1933.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934. (A.H.A.R.)

IRON ORE IN 1933

Production:

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

Exports:

Mostly bog ores for gas purification.

Imports:

	Tons	Value
French Africa	21,627	$42,706
United States	176,261	343,395
Sweden	3,335	4,971
Spain	4,480	9,675
Total	205,703	$400,747

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. A merchant furnace making pig iron is also operated intermittently at Port Colborne, Ontario. The Sydney furnaces procure almost all their ore from their own mines at Wabana, Newfoundland, but 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:

None in 1933. The often discussed proposal to establish an iron and steel industry based on the use of local raw materials, in British Columbia - with government assistance - was again brought up during the year; but since the provincial election has again become dormant.

General Situation, Market Conditions, etc.:

Pig iron production in Canada in 1933 showed an increase of about 59 per cent over that in 1932 but Canadian furnaces are still being operated much below their full capacity. Bounties on the production of pig iron from local ore are offered by three Canadian provinces - Ontario, Quebec, and British Columbia - but no domestic ore was used in Canadian furnaces in 1933.

There are no large known bodies of high-grade iron ore in Canada that could be made tributary to present 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 of foreign origin.

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March 1934 (A.H.A.R.)

LEAD IN 1933

Production:

1933: 132,165 tons valued at $6,321,729
1932: 127,974 " " " 5,409,704

Exports:

	Quantity	Value
Lead in ores, etc.	7,600,000 Lb.	$267,805
Lead in pigs, and refined lead	284,329,400	4,922,514

Imports:

Lead in all forms, valued at $1,473,515

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 and silver-lead-zinc mines in the Kootenay district 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; 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:

In British Columbia, the Sullivan mine and the 6000-ton a day concentrator at Kimberley of the Consolidated Mining & Smelting Company were operated throughout the year. Improved metallurgical methods of treatment, introduced in 1931, have increased the recovery by about 10 per cent. The electrolytic lead refinery at Trail has a capacity of 475 tons of refined lead a day, or 170,000 tons a year.

The Monarch mine, near Field, with important ore reserves and a 300-ton concentrator, resumed operations in the latter part of 1933.

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.

The Stirling copper-lead-zinc property in Cape Breton, Nova Scotia, completed in the early summer of 1930 the construction of a new 250-ton concentrator, which was in operation only for a short time. The property is still idle.

General Situation, Market Conditions, etc.:

The average price of pig lead at Montreal in 1933 was 3.705 cents per pound as against 3.511 cents in 1932. The average price of pig lead at New York was 3.869 cents as against 3.180 cents in 1932.

Despite unfavourable conditions the world's production of lead in 1933 amounted to approximately 1,327,000 tons as against 1,289,000 tons in 1932, which figures are much below the record-breaking tonnage of 1,935,000 tons in 1929.

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

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934. (A.B.)

MANGANESE IN 1933

Production:

1933: None reported.
1932: " "

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:

1933: Nil.
1932: 100 tons valued at $1,920

Imports:

1933: Manganese oxide 34,342 tons valued at $293,910

Ores Mined and Producing Localities:

The manganese ores which have been mined in eastern Canada are pyrolusite, manganite, psilomelane, and bog manganese. These, with the exception of the bog manganese, 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 manganite.

Important Developments and Prospective Producing Localities:

No new development in 1933.

General Situation, Market Conditions, etc.:

The price of manganese ore at North Atlantic ports for 46 to 48 per cent manganese, Brazilian, per unit, averaged about 18 cents in 1933; for chemical grades 80 per cent MnO_2, the price was $50 to $60 throughout the years 1932 and 1933.

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.

The Department of Mines, Ottawa, has published the following report: "Manganese Deposits of Canada" (Geological Survey, Economic Series No. 12).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (A. B.)

MOLYBDENUM IN 1933

Production:

Nil.

Exports:

1933: Nil.
1932: 12 cwt. valued at $270

Imports:

Calcium molybdate for use in the manufacture of steel alloys
1933: 7,082 lb. valued at $3,414
1932: 14,219 " " " 5,365

Ores Mined and Producing Localities:

There was no production in 1933.

Important Developments and Prospective Producing Localities:

The Phoenix Molybdenite Corporation, Ltd., of Toronto, intermittently continued prospecting their Bagot property in Renfrew county, Ontario. More mining machinery was moved on to the property from the old Renfrew Molybdenum Mines, Ltd., of Mount St. Patrick, in Brougham township, Ontario.

Active prospecting was carried on at the Bain property in Masham township, Quebec. The molybdenite is intimately associated with pyrrhotite and other sulphides in a pyroxenite gangue. As a result of a magnetometer survey which indicated the presence of hitherto unknown ore bodies, prospecting, under the management of H. H. Claudet, of Ottawa, revealed along the strike of the main vein, a nice lens of high grade molybdenum ore. This series of deposits is one of the most promising of the numerous molybdenite prospects in eastern Canada.

Towards the latter part of the year prospecting work was also conducted on the old Chisholm property on lot 5, concession XIV of Sheffield township, Ontario; also by the Tory Hill & Marmora Mica Company near Tory Hill in Glamorgan township, Ontario. The old mill at the Chisholm mine has been overhauled and some ore was said to have been treated.

A little prospecting for molybdenite was undertaken in British Columbia by R. A. Howard near Malakwa station; also by Alex Mcleod on a property near Butedale, British Columbia.

General Situation, Market Conditions, etc.:

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 fuselage tubing. Straight carbon-molybdenum steels possess advantages that far offset the slight cost of the alloy addition. A substantial outlet has been developed in the acid resisting nickel-molybdenum-iron alloys containing as much as 20% molybdenum. The increased use of molybdenum in cast iron continued to be one of the most important commercial developments of the former metal in the United States, and it is said that the consumption for this purpose has doubled every year since 1929. One reason for this is the low cost of small additions of molybdenum which greatly increase the hardness and the strength of plain cast-iron. It has recently been found that malleable cast iron wears much better if 0.20% molybdenum is added. 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. A considerable amount of molybdenum wire and sheet is used in the radio industry. Molybdenum oxide is being used as a catalyst in connexion with hydrogenation of oils. The pure metal has been employed as an insert in connexion with the placing of carbide tips on cutting tools.

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Until recently the use of molybdenum for various purposes was growing more rapidly in Europe than in the United States. This increased demand is shown by the exports from the United States which in 1930-31 were about 30% of the domestic (U.S.) production, but the ratio of export to domestic consumption was 3 to 1 in 1932-33, a reversal of two years ago. During the last quarter of 1933 there was an appreciably increased domestic demand which greatly stimulated production in the United States.

The United States produces about 90% of the world's total molybdenum, principally by the Climax Molybdenum Company, Colorado; Norway about 8%; and the remaining 2% comes from Australia, Korea, Russia, and French Morocco. The Knaben molybdenite mine is the only Norway producer, their 1933 output being 443 tons of concentrates against 329 tons in 1932. The Knaben concentrator was completely destroyed by fire in February 1934, but a new mill is expected to be ready in 6 months. The Climax production in 1933 yielded 2,482 tons of metallic molybdenum against 957 tons for the previous year. A French company has erected recently a mill and started operations at Azagut, Morocco. During the latter part of the year the old workings at Deepwater and Glenn Innes, New South Wales, were reopened and a few tons of concentrates were shipped.

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 ferro-molybdenum as an addition agent is said to be on the increase but the price remained steady at $1.00 per pound of contained molybdenum. The price of 85 per cent molybdenite concentrates is about 40 cents per pound of contained molybdenite. The duty on ore or concentrates into the United States is 35 cents per pound on the metallic molybdenum contained therein.

There was, towards the latter part of the year, an appreciable increase in the enquiries for Canadian molybdenite. These, however, call for regular tonnages of a consistent grade of concentrates over fairly long periods. It is somewhat doubtful if such a regular supply can be maintained from any single deposit. Conditions would therefore be improved if several properties could be worked together and the ores sent to a conveniently situated mill. Co-operation, rather than competition, amongst prospective Canadian molybdenite producers appears to be essential.

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).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1934 (V.L.E.W.)

NICKEL IN 1933

Production:

1933:	41,632	tons	valued at	$20,130,480
1932:	15,164	"	" "	7,179,862

Exports:

Nickel in matte	19,163	tons	valued at	$6,862,502
Nickel, fine	21,046	"	" "	13,173,273
Nickel in oxide	3,832	"	" "	2,760,193

Imports:

Nickel in bars, rods, sheets, etc., valued at $1,051,913

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. A small amount is also 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 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 mines, 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. The first is much the larger, being in a position to mine, concentrate, and smelt 8,000 tons of ore a day; the capacity of the Falconbridge Company's plant is now about 600 tons of ore a 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 and Prospective Producing Localities:

The most important development in the nickel industry in 1933 was the remarkable increase in nickel sales that began in the first half of the year – an increase that enabled the International Nickel Company to change a small operating loss in the early months into a substantial profit for the year as a whole, as against a total net loss of $135,344 in 1932, and increased production from about 20 per cent to 40 per cent of plant capacity. The Falconbridge completed early in 1933 the new 250-ton concentrator, a two-unit sintering plant and a few additions and improvements to the smelter. They operated profitably throughout the year practically at full capacity.

In British Columbia, during the second half of the year a start was made on what is reported to be a programme of intensive exploration and development of nickel-bearing pyrrhotite deposits situated on Emory Creek, near Hope, in Yale mining division.

General Situation, Market Conditions, etc.:

The general situation and outlook as regards nickel were better at the end of 1933 than at any time since 1929. During the year ore smelted increased 92%; matte produced 116.7%; matte exported 98.8%; and matte treated in Canada 534.6% as compared with 1932, and there is every reason to expect the improvement shown in 1933 will continue during 1934. While improvement in the situation is to be attributed largely to a general quickening in industrial activity, a second important factor is the growing familiarity with and confidence in nickel alloys on the part of fabricators. Among the many varied new uses to which nickel is being put, notably rapid expansion is being made

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in the production of nickel cast irons, of stainless steels, and of monel metal kitchen equipment for the modern home.

The sales of nickel in 1933 amounted approximately to 46,000 tons, as against 29,000 tons in 1932. Of the total supplies available in 1933, International Nickel contributed about 36,800 tons, Falconbridge 4,600 tons, the balance being refined in works in Germany and France.

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Department of Mines, Ottawa,
March 1934 (A.H.A.R.)

PLATINUM GROUP METALS IN 1933

Production:		Quantity		Value
	Platinum	1933: 24,786	oz.	$ 857,590
	"	1932: 27,343	"	1,099,393
	Palladium, etc.	1933: 31,009	"	645,044
	" "	1932: 37,613	"	901,890

Exports:			
	Platinum in concentrates	29,228	oz.	$1,168,565
	Platinum scrap	189	"	5,439

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

Imports:

Platinum retorts, crucibles, sheet, wire, and other metallic products, valued at $73,974 as against $38,408 in 1932.

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 a notable amount of these metals.

The Acton refinery located at Acton, England, and owned by the International Nickel Company, is an 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 was enlarged in 1932 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.

The price of refined platinum opened the year 1933 at a fixed rate of $26 an ounce. This price was gradualllly raised to a maximum of $38 in November. The average price for the year was $30.993 as against $36.455 in 1932.

In 1931 an agreement between the world's largest producers resulted in the formation of Consolidated Platinum, Ltd., which company now buys and resells all new platinum and promotes the use of platinum through intensive research and a market development programme.

The world's production is estimated by the London Mining Journal (Feb. 17, 1934) at about 180,000 ounces of platinum.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March, 1934 (A.B.)

RADIUM AND URANIUM MINERALS IN 1933

Production:

During 1932-33 about 74 tons of high-grade pitchblende ore were mined by Eldorado Gold Mines, Ltd., at LaBine Point, Great Bear Lake, Northwest Territories, and shipped out by water, via Great Bear and MacKenzie Rivers to rail at Waterways, Alberta, and thence to the Company's refinery at Port Hope, Ontario. Arrangements have been effected to ship out further consignments by air during the closed season.

Exports:

Crude minerals, nil. Radium and uranium compounds not recorded separately.

Imports:

Small amounts of radium salts for medical and scientific purposes are imported, the annual value of such importations for the last five years being:

1929	$40,687	1932	$45,108
1930	46,012	1933	8,374
1931	207,735		

Imports of uranium salts not recorded separately.

Ores Mined and Producing Localities:

All of the ore mined in 1933 came from the deposits at Great Bear Lake, most of the production being from the Eldorado property at LaBine Point. In addition to Eldorado shipments, a small tonnage of ore is stated unofficially to have been taken from the property of Bear Exploration and Radium near Contact Lake, and from claims of Consolidated Mining and Smelting Company adjoining the Eldorado holdings.

Important Developments and Prospective Producing Localities:

GREAT BEAR LAKE:

Prospecting, and development work on previously-made discoveries, in the Great Bear Lake field continued actively during the year, much of the interest being centred on the silver possibilites of the region. Most of the pitchblende discoveries reported have been made in connection with operations for silver, the two minerals often being associated. The Eldorado deposits continue to dominate the situation. While reports of further pitchblende discoveries have appeared in the press from time to time, official confirmation of their possible economic importance is lacking.

Eldorado Gold Mines, Ltd., continued to push exploration and development work on their No. 2 vein at LaBine Point, where pitchblende occurs on the hanging wall of a strong break carrying important values in native silver over widths stated to be as high as 20 to 30 feet. All work is now underground, the development programme being designed to confine the main workings as far as possible to the silver-bearing ground, with cross-cuts to the pitchblende vein as required to furnish a steady supply of ore for the Port Hope refinery. This system results in lowering the radium emanation hazard to the men, as well as in reducing the amount of picking of mixed ore. The 50-ton silver concentrator on the property went into operation towards the end of the year, provision also being made in it for making a pitchblende concentrate. Shipment of a first small consignment of such concentrate has recently been announced in the press (Jan. 13th, 1934).

ONTARIO:

The uraninite property of International Radium and Resources, near Wilberforce, in Cardiff township, was idle throughout the year. Some prospecting was conducted on adjacent ground, resulting in the discovery of further deposits of essentially similar type. The uraninite of the district carries a considerable amount of thorium, which prejudicially affects its value as a possible source of radium, owing to the difficulty of separating the two elements in commercial practice.

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Canada Radium Mines continued its development programme on its property at Cheddar, south of Wilberforce, and carried its shaft to 250 feet, from which cross-cutting of a system of parallel veins, said to carry radio-active minerals, is projected. Precise information is lacking regarding the nature of the minerals claimed to be present, or the amount found.

General Situation, Market Conditions, etc.:

The Eldorado Company's radium refinery at Port Hope, Ontario, which started operations in January, continued in full operation throughout the year. Delivery of the initial production of radium has been made to the Ontario Government, for use in its cancer treatment centres, either as element or emanation. The acquisition by the National Research Council, in Ottawa, of a radium standard now enables the necessary certificates of purity to be issued in Canada, and obviates the earlier inconvenience and delay entailed in sending the output to England for measurement. Chemical and physical tests made during the year have established that the radium is essentially free from thorium.

In addition to radium, the Port Hope plant produces important amounts of uranium salts, chiefly yellow and orange sodium uranate, and black oxide. Most of the output of these compounds, which are used extensively in the ceramic trade, has been exported to Great Britain.

The Department of Mines, Ottawa, has published the following reports dealing with radium-bearing minerals in Canada:

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

The Pitchblende and Silver Discoveries at Great Bear Lake, Northwest Territories (Mines Branch Report No. 727-3, Investigations of Mineral Resources, 1931).

Method of treating Great Bear Lake Pitchblende; Methods Employed in Radium Measurements; Precautions for Workers in the Treating of Radium Ore (Mines Branch Report No. 728, Investigations in Ore Dressing and Metallurgy, 1931).

Great Bear Lake - Coppermine River Area, MacKenzie District, N. W. T. (Geological Survey Summary Report, 1931, Pt. C).

Rare-Element Minerals in Canada (Geological Survey, Economic Series No. 7).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.S.S.)

SELENIUM IN 1933

Production:

1933: 26,090 pounds valued at $53,745

Exports:

Not reported separately.

Imports:

None recorded.

Ores Mined and Producing Localities:

Selenium, although fairly widely distributed, is not very abundant in nature; it occurs in assocation with sulphur and 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; in Canada it is recovered during the refining of blister copper produced in Manitoba,Ontario,and Quebec.

It was produced for the first time in Canada in 1931 at the new copper refinery of the Ontario Refining Company, at Copper Cliff,Ontario,where a considerable amount is still being refined annually.

Important Developments and Prospective Producing Localities:

Selenium occurs in association with tellurium in the refinery slimes of the Canadian Copper Refiners, Ltd., at Montreal East, Quebec. This latter company have been storing the residues for future treatment and will probably begin production in 1934.

General Situation, Market Conditions, etc.:

A nominal price for selenium, 99.5% pure, of $1.80 to $2.00 per pound has prevailed for several years.

Canada is now in a position to produce selenium in notable quantities but 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 and pottery industries, both as a colouring agent, and to neutralize objectionable oxides; the most important development is probably the photo-electric cell or electric eye which is finding many industrial applications; selenium cells also play an important part in television; it is being used in stainless steel for screws and bolts, developing improved cutting and threading qualities; a large potential market, at present inactive, exists in certain rubber-compounding industries.

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Department of Mines, Ottawa,
March 1934 (A.W.G.W.)

SILVER IN 1933

Production:

1933:	15,201,265 oz.	valued at	$ 5,751,064
1932:	18,347,907 "	" "	5,811,081

Exports:	Quantity	Value
Silver in ore and concentrates	3,362,354	$ 1,093,464
Silver bullion	10,738,729	3,759,387

Imports:	
Unmanufactured silver bullion	$ 674,138
Sterling and other silver	73,666
Silver coin	12

Ores Mined and Producing Localities:

In NOVA SCOTIA, a very small quantity of silver is derived from the gold quartz ores.

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

In ONTARIO, the production is 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 the Sudbury district.

In MANITOBA, silver is derived from the copper-zinc ores of the Flin Flon and Sherritt-Gordon mines im 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 is obtained mainly as a by-product from the treatment of lead-zinc ores from the Sullivan mine in the East Kootenay district. Important contributions are also made from the mines on Wallace Mountain, near Beaverdell; from the silver-gold-bearing pyrites of the Premier mine, near Stewart; from the low-grade copper ores of Britannia mine, near Vancouver, and of the Granby Company's mines near Anyox.

The YUKON production is derived from the argentiferous lead ores of the Mayo district.

Important Developments and Prospective Producing Localities:

QUEBEC: Development work at the Noranda mine during the last two years has increased considerably the known ore reserves. These ores have the following approximate silver content: siliceous gold ores 0.29 oz. per ton; concentrating sulphide ore 0.36 oz. per ton; and direct smelting sulphide ore 0.90 oz. per ton.

ONTARIO: The silver mines of Cobalt and adjoining areas, have in recent years been showing a gradual falling off in production, accentuated under the unprecedented low price of silver, but the recent noticeable improvement in the price of silver will stimulate production and has awakened interest in several silver properties, some of which will probably be producing in 1934.

The silver refinery of the Ontario Refining Company, at Copper Cliff, is contributing substantially to the amount of silver produced in Canada, the output being dependent on the activity in the copper industry, being a by-product in the refining of blister copper.

MANITOBA: The copper-zinc ores of Flin Flon and Sherritt-Gordon contain small quantities of gold and silver, which are recovered in the refining of the blister copper produced from these ores. The Flin Flon property was operated at full capacity throughout the year. The Sherritt-Gordon 900-ton concentrator remained idle in 1933, but with the improvement in the metal market

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hopes are entertained for an early resumption of operations. Small quantities of silver are also obtained from the treatment of gold ores in eastern Manitoba. The Manitoba silver production in 1933 amounted to 1,101,554 ounces, as against 1,036,497 ounces in 1932.

BRITISH COLUMBIA: The output as compared with that of 1932 showed a small decline in quantity, but an increase in value owing to a higher price for silver. The production was 6,732,792 ounces valued at $2,547,204.

The Sullivan silver-lead-zinc mine and the Premier gold-silver mine were, by far, the principal producers, but an increase was made by the Beaverdell silver camp, and contribution was made by the Base Metal (Monarch) silver-lead-zinc mine, which resumed operations in September.

The curtailment of operations at the copper mines, these last two years, has contributed substantially to the decline in production.

YUKON TERRITORY: Production in 1933, mainly from the Mayo district high grade silver-lead ores, but including a small amount from North West Territories, ores shipped to Trail, amounted to 2,243,617 ounces, as against 3,053,188 ounces in 1932. Unless new discoveries are made and the improvement in the price of silver is more permanent, a noticeable decline in production is in the offing.

NORTHWEST TERRITORIES: Important discoveries of silver-bearing ores made during the last three years in the vicinity of Echo Bay, and along the Camsell River, Great Bear Lake district, have been followed up by intensive exploration and development. The Eldorado 50-ton concentrator was completed in the late fall and started operations early in December. The mill is equiped to produce pitchblende as well as silver concentrates. The Bear Exploration & Radium, Ltd., are proceeding with the erection of a 25-ton concentrator. Consolidated Mining & Smelting Company as well as a few other companies have been doing exploration work during the year. The White Eagle Company, which has been developing claims on the Camsell River, have recently been unofficially reported to have discovered some very rich silver ore. The indications are that the Great Bear Lake district will in the near future take much prominence as an important silver producer.

General Situation, Market Conditions, etc.:

The price of silver in New York in 1933 averaged 34.727 cents per fine ounce as against 27.892 cents in 1932 and 28.700 cents in 1931. From an average of 25.400 cents in January, the price gradually improved to a maximum average of 43.550 cents in December.

The world's production of silver, as given by the American Bureau of Metal Statistics, was 161,360,000 ounces as against 169,232,000 ounces in 1932.

Silver has been a serious economic problem for over a hundred years and recent economic developments have again focussed attention to this serious problem. So many factors are involved that a prediction as to the future price or production is almost futile. One of the big problems is what will happen in the Far East - India and China - and until the volume of trade, internal and external, recovers substantatially, there is no particular reason to assume that the demand from these sources will show any great expansions.

By executive order, dated December 30, 1933, President Roosevelt has provided for the purchase by the United States Treasury until December 31, 1937, of domestic silver mined subsequent to that date to the extent of at least 24,421,410 ounces annually, on the statutory basis of $1.29 an ounce, but 50 per cent of each lot of metal will be retained by the Mint, as seigniorage and to cover service charges so that the seller will receive 64½ cents an ounce for his metal.

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Department of Mines, Ottawa,
March, 1934. (A.B.)

TITANIUM IN 1933

Production:

1933: None reported.
1932: " "

Exports:

1933: None reported.
1932: " "

Imports:

Not separately recorded.

Ores Mined and Producing Localities:

Ilmenite carrying from 18 to 25 per cent 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 the ilmenite 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:

Nil in 1933.

General Situation, Market Conditions, etc.:

Insofar as is known, no active steps are at present being taken to establish a titanium-using industry in Canada, though from time to time enquiries as to the possibilities of Canadian ilmenite deposits are received by the Department of Mines, and several years ago the establishment of a plant in the province of Quebec for the production of titanium white from Ivry ore was mooted. Until such a plant is established there appears to be little likelihood of extensive development of Canadian deposits, since abundant and cheap raw material from British India, Senegal, Norway, and United States of somewhat higher grade than the Canadian product is available to foreign manufacturers.

The most important use of titanium is in the manufacture of titanium white, a material that competes as a pigment with white lead and lithopone, and the use of which is increasing rapidly. The next most important use is for the production of ferro-titanium, an iron-titanium alloy used in the metallurgy of steel. The mineral rutile (natural TiO_2) is used to some extent as a refractory colouring material in the ceramic industry.

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

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (A.H.A.R.)

ZINC IN 1933

Production:

1933: 98,843 tons valued at $6,346,682
1932: 86,142 " " " 4,144,454

Exports:

	Quantity		Value
Zinc ore (zinc content of)	4,163	tons	$ 135,249
Metallic zinc	86,727	"	4,990,705
Zinc scrap, dross and ashes	3,151	"	47,060

Imports:

Zinc in all forms	1,273,431

Ores Mined and Producing Localities:

About 75 per cent of the zinc produced in Canada during 1933 came from the Sullivan lead-zinc mine near Kimberley, B. C. The balance of the production was obtained from the Flin Flon copper-zinc mine at Flin Flon, Manitoba, the Base Metal (old Monarch) silver-lead-zinc mine near Field, B. C., and the Britannia copper mine on Howe Sound, B. C.

Important Developments and Prospective Producing Localities:

In BRITISH COLUMBIA, the Consolidated Mining & Smelting Company have in recent years increased 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. 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, or 145,000 tons a year.

The Monarch mine, near Field, which was equipped in 1929 with a modern 300-ton mill, and which had been idle for the last two years, resumed operations in August, and is now producing at the monthly rate of 1,500 tons of lead and 1,125 tons of zinc, in the form of concentrates which are exported. Development work at this property had increased considerably the known ore reserves.

The mines of the Slocan district were nearly all idle throughout the year.

In MANITOBA, the Hudson Bay Mining and 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 plants have been operated at full capacity during the last three years, and are producing at the annual rate of about 22,000 tons of zinc.

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. The mine and mill were closed down in May 1932. With the improved metal market, it is hoped that operations will soon be resumed at this property.

In ONTARIO, the Treadwell Yukon Company, 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, and has since been idle. The Amulet property was amalgamated with the adjoining Waite-Ackerman-Montgomery property late in 1933, and both properties, now known as the Waite-Amulet Mines, Ltd., will probably be producing in 1934.

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The Normetal (Abana) has been re-opened and will probably be producing early in 1934.

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 Company and by Noranda Mines, Ltd., has been postponed indefinitely due to the low price and surplus world's 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 1933 was 4.488 cents per pound as against 3.724 cents in 1932. The St. Louis price was 4.029 cents as against 2.876 cents in 1932.

It has been estimated that the world's production of zinc for 1933 approximated 1,097,933 tons as against 876,403 tons in 1932.

Canada in 1930 became the fourth largest producer of slab zinc, and is now contributing about 9 per cent of the total and surpassing both France and Germany.

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

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (A.B.)

ARSENIC IN 1933

Production:

1933:	Valued at	$56,534
1932:	" "	98,714

Exports:

1933:	934,400	lb.	valued at	$33,778
1932:	1,788,600	"	" "	65,287

Imports:

White arsenic	164,642	lb.	valued at	$5,674
Arsenic, sulphide of	27,694	"	" "	3,117
Arsenate of soda	390	"	" "	101
Arsenate of lead	498,673	"	" "	44,256
Arsenate of lime	287,420	"	" "	17,426

Ores Mined and Producing Localities:

All the white arsenic (As_2O_3) at present produced in Canada is made by the Deloro Smelting and Refining Company, Ltd.,at Deloro, Ontario, who also manufacture arsenical insecticides, from arsenical silver-cobalt-nickel ores from Cobalt and surrounding districts in northern Ontario.

Gold-bearing arsenical concentrates are produced at the Beattie gold mine in Quebec, and at the Bralorne gold mine in British Columbia, the product in both cases being shipped to the United States for the recovery of gold and arsenic.

Important Developments and Prospective Producing Localities:

Important developments in arsenic production in Canada in 1933 were the putting into operation of the mill on the Beattie mine in Quebec and the proving of large ore reserves on the Bralorne mine in British Columbia. All the output of the Beattie and a portion of that of the Bralorne mine are shipped in the form of auriferous arsenical flotation concentrates to the Tacoma smelter in the state of Washington, where they are treated for the recovery of both gold and arsenic.

Active exploration of the gold-producing possibilities of auriferous mispickel deposits lying southwest of Sudbury, will, if successful, provide a new potential source of arsenic in Ontario.

Arsenopyrite deposits associated with more or less gold are also known to occur in a number of localities in the provinces of Ontario, British Columbia, and Nova Scotia.

General Situation, Market Conditions, etc.:

Actual and potential world production of arsenic as a by-product of the treatment of other ores and metals is in excess of world demand, consequently the price is low and practically no mining is done primarily for the winning of arsenic. In the case of Canadian concentrates shipped to Tacoma, no payment is made for the contained arsenic; but to offset this to some extent, it is understood, that a favourable smelting rate is conceded on the gold content.

The chief uses of arsenic are in the manufacture of insecticides, weed-killers, cattle dips, and glass. Minor uses are in pigments, antiseptics, preservatives, and medicines.

The Department of Mines, Ottawa, has published the following report: "Arsenic Bearing Deposits in Canada" (Geological Survey Economic Series No.4).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (A.H.A.R.)

ASBESTOS IN 1933

Production:

1933:	158,367 tons	valued at	$5,211,177
1932:	122,977 "	" "	$3,039,721

Exports:

	Tons	Value
Asbestos	78,701	$3,998,377
Asbestos sand and waste	70,296	991,417
Manufactures of asbestos		73,044

Imports:

Asbestos packing	79 tons	$ 54,148
Asbestos brake and clutch linings		165,994
Asbestos in any form other than crude, and all manufactures of, n.o.p.		233,966
		$454,108

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 and Prospective Producing Localities:

No new asbestos properties were reported as opening during the year. Exploration on the property of the largest producer has developed very large reserves of relatively high-grade ore, sufficient to insure production for many years to come; the abandonment of open pit mining and the introduction of a caving system has materially lowered mining costs. Just at the end of the year it was announced that Turner and Newall Company of London had acquired a sixty per cent interest in all the factories and other properties of the Keasbey Mattison interests, both in the United States and in Canada; this includes the Bell Asbestos mine at Thetford. This firm controls many fabricating plants in Great Britain, producing properties in South Africa, and has long been a dominating factor in European markets; their entry into the United States manufacturing field and the acquisition of one of the important producing properties in Quebec are developments of major importance in this industry.

General Situation, Market Conditions, etc.:

Since 1929 the asbestos industry has passed through a drastic period of decreasing sales and lowering prices; there have been corresponding declines in production and in exports; the economic situation in the United States, the chief market for Canadian asbestos, was a dominant factor in this decline; the position was further aggravated by the development of keen competition with foreign producers and the consequent decreases in sales in Europe. Apparently the end of this long decline was reached about the middle of the first half of the year, because business picked up during the third quarter; the improvement was marked during the last quarter of the year and the total production and exports for the year greatly exceeded that of 1932. Most of the production was exported to the United States, but there is also reported a small improvement in the amount of business done with European importers.

Most of the sales throughout the year were based on the newly accepted Quebec Standard classification; according to the Dominion Bureau of Statistics prices for Crude No. 1 fibre ranged from $400 per ton in January to $450 in December; Crude No. 2 from $200 to $225; spinning fibres from $80 to $125; magnesia and compressed sheet fibres $80 to $90; on other grades the prices throughout the year were fairly constant, ranging from a mininum of $10 per ton for shorts to a maximum of $60 per ton for high-grade shingle stock.

The Department of Mines, Ottawa, has published a report on "Chrysotile Asbestos in Canada," by J. G. Ross (Mines Branch Report, English No. 707, 1931, French No. 708, 1933).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (A.W.G.W.)

BARITE IN 1933

Production:

1933: 20 tons valued at $60 (test shipment)
1932: — —

Exports:

Not separately classified in trade records, but presumably nil.

Imports:

1933: 1,587 tons valued at $28,255
1932: 1,292 " " " 22,989

Ores Mined and Producing Localities:

Nil. For a number of years previous to 1932 a small annual production was reported from a deposit at Lake Ainslie, Nova Scotia, operated by a paint company to supply its own requirements, but advice states that these operations have now been abandoned.

Important Developments and Prospective Producing Localities:

The only concern active in barite during the year was Canada Night Hawk Mines, Ltd., which took over the old Premier Langmuir property on Night Hawk River, Northern Ontario, in 1931, and has since proceeded with further underground development of the deposit and installation of new grinding and separating equipment in the mill. The main tunnel has been driven in 180 feet and a shaft was sunk to a depth of 60 feet at the portal, with a second drift of 100 feet at the bottom. Both drifts have disclosed vein widths of 3 to 5 feet. A small tonnage of ore was mined during 1933 and used for test mill runs, but no shipments were made.

A few tons of barite were shipped during the year from the Crydermann property, in Penhorwood township, and from a deposit in Yarrow township, both in Northern Ontario, the material being sent to Toronto for test purposes.

General Situation, Market Conditions, etc.:

Outside of the development noted above, there has been little activity in barite in Canada for many years past, and the country's requirements are met almost entirely by imported material. While a number of deposits are known, mining and grinding costs plus freight rates to consuming centres have combined to make profitable production doubtful in the face of high-grade imported material from the United States and Germany.

Interest in the possibilities of Canadian barite for export to Trinidad, for use in oil-drilling, to which reference has been made in previous reviews, was maintained during 1933, and a thorough survey of the situation was made by private interests in collaboration with the Department of Trade and Commerce and the Trinidad authorities. This survey included a field examination of deposits in Eastern Canada for their ability to furnish adequate supplies of ore. Nothing definite has been announced regarding the outcome of the investigation.

No lithopone or barium chemicals, for which barite serves as the raw material, are manufactured in Canada. Imports of such products in 1933 included 11,387,409 pounds of lithopone, valued at $406,598 and 552,801 pounds of blanc fixe valued at $11,390.

Reports indicate that the amount of ground barite, used as such for pigment loader and filler purposes in the paint, rubber, paper, and other trades, has been steadily decreasing, a growing preference being shown for more efficient substitutes. Many of the known Canadian deposits carry a hard, crystalline barite that does not yield as white a ground product as the softer grades used in the production of the imported material.

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In 1933, quotations in the United States were $6 to $6.50 per ton for the best grades of crude ore (minimum 95 per cent barium sulphate), and $23 per ton for prime bleached and floated powder.

A new technical development is the growing use of barium metal in the lamp, radio, and spark-plug field. Research has also demonstrated its usefulness in alloys with magnesium, nickel, and other metals, and the formation of a corporation in the United States to manufacture stainless steel, using barium, has recently been announced.

The Department of Mines, Ottawa, has available the following report on barite: "Barium and Strontium in Canada" (Mines Branch Report No. 570, published in 1922).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.S.S.)

BENTONITE IN 1933

Production:

1933: 55 tons valued at $1,363
1932: 7 " " " 176

Exports:

Not separately classified in trade records, but probably nil.

Imports:

Not separately shown in trade records. Stocks of ground bentonite of United States origin are, however, known to be held at certain Canadian distributing centres, and there is also importation of clay of bentonitic type in either the untreated or activated state, for use in the refining of mineral oils and gasoline, as well as in the clarifying of vegetable oils, packing-house products, etc., and for the reclaiming of used crank-case oil. Much of this type of clay is sold under various trade-names, a practice which often causes confusion in determining its correct classification.

Ores Mined and Producing Localities:

Bentonite occurrences are known in many sections of the Canadian west, the more important deposits being situated in Alberta and British Columbia. While attention was first actively directed to the material about twelve years ago, when a trial shipment from an occurrence at Rosedale, Alta., was sent to England for experimental purposes, there has been little attempt at development, and production has been confined to two deposits, one at Princeton, B.C., and the other near Edson, Alta. The Princeton material is shipped to Vancouver for grinding and has been utilized chiefly in oil and gasoline refining and as an admixture for concrete and cement. That from Edson is employed by an Edmonton concern in the manufacture of a variety of cosmetic products.

Important Developments and Prospective Producing Localities:

Erection was undertaken during the year of a plant at Edson, Alta., for the preparation of ground bentonite from the material of the nearby deposits on McLeod River, but no production was reported. It is also stated that production of activated clay is contemplated by certain western interests, but nothing definite regarding such a development has yet been announced.

General Situation, Market Conditions, etc.:

Bentonite is a term applied to clays of varying mineral composition, but alike in possessing certain physical properties and characteristics that distinguish them from clays of ordinary type. Bentonite clay of the more highly colloidal type is distinguished by its gel-like nature and excessive stickiness when wetted, its ability to form fairly stable dispersions or suspensions in water, and high filtering or adsorptive (bleaching) power. The last property may often be enhanced by acid treatment (so-called 'activating').

The possession of the above properties has led to the employment of bentonite for a wide variety of uses, chief among which are for oil and gasoline refining, the clarifying of vegetable oils and packing-house products, foundry work, in the ceramic industry, and in concrete mixtures.

The chief world source of bentonite is the United States, where in certain of the western states, notably Wyoming, South Dakota, California, and Utah, several companies have been actively engaged for some years past in production, both for domestic consumption and export, and also in research upon industrial applications for the material. A considerable proportion of the clay produced is marketed in the acid-treated, or activated, form, for use in clarifying or filtering (bleaching).

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The Canadian consumption of bentonite is not accurately known; it is probably sufficient, however, to warrant the development of a domestic source of supply for the home market, and also, possibly, for export to British possessions. There is little doubt that deposits exist entirely adequate to take care of present and prospective demand. In this connection, it is of interest to note that the National Research Council, at Ottawa, undertook during the year a systematic investigation of a number of Canadian clays to determine their relative bleaching quality, both in the crude and activated state.

The Department of Mines, Ottawa, has published the following reports on bentonite: "Bentonite" (Mines Branch Report No. 626, which report is now out of print); "Possible Industrial Applications for Bentonite" (Mines Branch Report No. 723-2).

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Department of Mines, Ottawa,
March 1934 (H.S.S.)

BITUMINOUS SAND IN 1933

Production:

1933: 466 tons of bituminous sand valued at $1,662.00
1932: 343 " " " " " " $1,372.00
No production of separated bitumen reported.

Exports:

Nil.

Imports:

Nil.

Producing Localities:

Deposits of bituminous sand occur on both sides of the Athabaska River between the 23rd and the 26th base lines, in the northern part of the Province of Alberta; exposures may be seen along both sides of the Athabaska River and along the banks of several of the tributaries which enter the main river in this area. In past years shipments of bituminous sands have been made from the following locations: 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. Between the years 1927 and 1930 about 2,000 tons had been shipped for laboratory investigations and about 3,000 tons for the construction of demonstration pavements and road surfaces.

Important Developments:

While there are no important developments to record, three firms are continuing efforts to develop commercial operations and the production recorded herein has arisen out of their activities. Available markets are restricted at the present time because there is no refinery available and bituminous products that can be made by present methods do not reach standard specifications.

General Situation:

The Department of Mines has been conducting an extensive investigation of these deposits of natural asphalt. In addition to field explorations, which covered a period of about ten field seasons, extensive laboratory studies of the bituminous sands and of the separated bitumen have been made. The results obtained from these investigations have drawn attention to the extent of the deposits and to the possibilities for development; private capital is now studying the situation and it is expected that commercial developments will follow in a few years' time. The principal products that will be obtained by commercial exploitation of these deposits will be motor fuels, other liquid hydrocarbon compounds, and certain solid products.

Publications:

Bituminous Sands of Northern Alberta, Mines Branch report No. 632, 1926.
Use of Alberta Bituminous Sand for Surfacing Highways, Mines Branch report No. 684, 1927.
Estimated Cost of Producing Solid and and Liquid Hydrocarbons from Bituminous Sand, Mines Branch report No. 727, pp 140–145, 1933.
Various progress reports in annual reports of the Mines Branch since 1914.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (A.W.G.W.)

CHROMITE IN 1933

Production:

1933: 30 tons valued at $ 343
1932: 78 " " " 1,113

Until 1932 no commercial production of chromite in Canada had been reported since 1923, when 3,558 tons of 48% Cr_2O_3 concentrates, valued at $52,650, were sold. This production came from the Coleraine district, Eastern Townships, Quebec, from which the small 1932 shipment also was derived.

Exports:

Nil

Imports:

The imports of chrome ore are not separately recorded.

Bichromate of soda	1,858,424 lb.	valued at	$87,558
" " potash	113,607 "	" "	9,013
Chrome fire brick		" "	38,431

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:

There were no developments of special interest in connexion with chromite in Canada in 1933.

Among Canadian chromite occurrences that might become productive should demand for that mineral become insistent enough are deposits near Obonga Lake in Ontario - 26 miles south of Collins station on the Canadian National railway. These were found in 1928 and considerable exploratory work has been done on them indicating a grade of ore carrying from 12 to 36% chromite. Concentration would therefore be necessary to produce a commercial product.

Considerable work was also done in 1929, 1930, and 1931, on chromite deposits on Scottie Creek, about 20 miles north of Ashcroft, British Columbia, in the hope of delimiting ore bodies of present commercial grade. Trial shipments of some 150 tons of ore were made from here in 1929. Occasional small shipments of chromite have also been made in the past from Cascade near Grand Forks, British Columbia.

Indications of chromite associated with nickeliferous pyrrhotite are reported at Shebandowan Lake, in Ontario, and at Emery Creek, near Hope, in British Columbia.

General Situation, Market Conditions, etc.:

There was no material change in the general situation as regards chromite in Canada in 1933. Competition of cheaply produced, higher-grade ore in foreign countries has reduced Canadian production, which in 1917, in war time, was 36,725 tons, valued at $499,682, to nil in 1923 tol931, 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 17,297 short tons in 1932. The remainder is obtained chiefly from New Caledonia, India, Cuba, Greece, Jugo-slavia, Russia, and the Union of South Africa.

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Department of Mines, Ottawa,
March 1934 (A.H.A.R.)

CORUNDUM IN 1933

Production:

Nil.
1921: 403 tons graded grain, valued at $55,965, and none since.

Exports:

Nil.

Imports:

Not recorded - approximately 40 tons of grain.

Ores Mined and Producing Localities:

Nil, except as samples.

Important Developments and Prospective Producing Localities:

Corundum is found near Craigmont, Ontario, and several mines have been operated in the past. The Madawaska Minerals, Ltd., of Toronto, who are primarily engaged in prospecting for beryl near Quadville, Lyndoch township, Renfrew county, Ontario, shipped towards the end of the year to the Mines Branch Ore Testing Laboratories 400 pounds of blue corundum ore. This was obtained from lot 12, concession 12, Dungannon township, Renfrew county. The pure blue corundum is exceptionally high quality and is required for the manufacture of a special type of fused alumina abrasive. The tests are not yet completed.

General Situation, Market Conditions, etc.

The competition from artifical abrasives has been the main cause of the decline in consumption. For the past ten years, however, natural corundum has been used for the manufacture of the artificial abrasive, oxide of aluminium, the corundum for which is 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 manufacturer, in the United States, the General Abrasive Company, Niagara Falls, New York, which now uses about 125 tons annually. During 1930, this company erected an aluminous abrasive plant at Niagara Falls, Ontario, under the name of Lionite Abrasives, Ltd., but so far no corundum has been used in their Canadian plant.

Before the depression the United States consumption was normally between 2,000 and 3,000 tons annually of which about 50% was for abrasive wheels, 30% for lens and optical glass grinding, and under 10% for artificial abrasives. The demand from the optical trade has proportionately increased very slightly, for which purpose corundum is now almost entirely used in Canada. All the Canadian imports are South African, ground and re-exported by United States crushing mills. The 1933 imports of uncrushed corundum into the United States are estimated to be about 1,100 tons against 189 tons valued at $8,258 in 1932.

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 1934 (V.L. E.-W.)

DIATOMITE IN 1933

Production:

1933: 1,809 tons valued at $37,508
1932: 1,496 " " " 29,509

Exports:

About 95 per cent of the shipments were exported to United States.

Imports:

1933: 4,000 tons (unofficial estimate, about 10 per cent being from Soviet Russia and the balance from California, United States)
1932: 3,800 tons (unofficial estimate)

Producing Localities:

The International Diatomite Industries, Ltd., head office 60 East 42nd St., New York City, continuously operated their deposits at New Annan, south of Tatamagouche in northeastern Nova Scotia where the material is calcined and pulverized. They also shipped 6 or 7 car lots of calcined diatomite from their deposits at Little River, Digby Neck, Nova Scotia. A car lot was shipped to Toronto as a result of a trial run by the Diatomite Products, Ltd., Martin Siding, Muskoka, Ontario. A few tons were also shipped from the Dominion Diatomite Company's plant near Novar, Muskoka. The B. C. Refractories, Ltd., continued mining on a small scale from their deposits at Quesnel, British Columbia.

Important Developments and Prospective Producing Localities:

The production of diatomite during 1933 constituted an all time record.The bulk of the output was maintained, as in former years, by the International Diatomite Industries, Ltd., mainly from their deposits in Rhude and Gard ponds south of New Annan, Nova Scotia. The crude diatomite is calcined at a mill situated close to the ponds and is now pulverized and air-separated at a small plant at Tatamagouche Station. The finished product is largely used for battery box manufacture, for which purpose the diatomite is exceptionally well suited. As a result of research and experiments, a high quality filter-aid has been produced and plans are under way to erect a plant for the commercial manufacture of this product. The company also increased their output from their plant at Little River, Digby Neck, Nova Scotia, where the largest known diatomite deposits in eastern Canada are located. During the summer they had prospecting parties in the field examining the numerous lakes and swamps in the Cobequid Mountains in northern Nova Scotia, as well as in the southern portions of Digby Neck. Aerial photographs made by the Department of National Defence during the summer, for mapping purposes, clearly show the hitherto unrecorded lakes and swamps in the Cobequid Mountains. These swamps are attractive prospecting areas.

There was considerable activity in the Muskoka region of Ontario. Diatomite Products, Ltd., completed its large plant which is equipped with a vertical 8-hearth furnace, air flotation system, filter, etc. They made a trial shipment of the processed diatomite obtained from the Slocombe Lake mud cleaned out of the storage dam, but ceased further production pending alterations and other changes. The Dominion Diatomite Company made some alterations in the mill near Novar, the chief of which were a number of small vertical furnaces to replace the former large cylindrical calciner. Small shipments were made to Toronto and most of the diatomite was made into silver polish by the Gliscenclene Products Company. Prospecting has been continued at Spence Lake, Muskoka Falls, by the Air-Lite Silica Company, Toronto; also on a deposit near Gravenhurst by a syndicate. A few cases of silver polish have been put up by Emile Enrico, using the diatomite obtained from his farm near Stoneleigh.

The B. C. Refractories, Ltd., continued operations and shipped a few car lots of diatomite to their Vancouver plant from Quesnel in the Cariboo district, British Columbia, where the largest known deposits in the Dominion occur. A few tons of crude diatomite were shipped in January 1934 from

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the same area by G. H. Turner for house insulation locally. Coast Quarries, Ltd., Vancouver, British Columbia, shipped to the Mines Branch, Ore Dressing Laboratories, Ottawa, a ton of crude diatomite mud from Burnaby Lake in the outskirts of Vancouver City. Experiments in order to make a commercial filter-aid from the diatomite were not successful, but the calcined material may be suitable for other uses. The property is now leased by H. H. Hind, Vancouver.

General Situation, Market Conditions, etc.:

The general situation and market conditions appear to be much the same as in 1932, though there are improvements along some lines. Several enquiries for Canadian diatomite have been made from the British Isles; the demand for battery box diatomite has increased and diatomite as a filter-aid for use in large cleaning establishments is becoming popular. Some companies in Toronto and vicinity are manufacturing diatomite insulating bricks and insulation pads, while other firms are contemplating in the near future the manufacture of diatomite insulation, refractory, and building products. The largest individual use for diatomite in Canada is as a filter-aid in sugar refineries.

Deposits containing diatomite are very common in some parts of Canada, particularly in the Muskoka district of Ontario and in Nova Scotia. Those which are fairly extensive and which contain high quality diatomite are rare. The outlet for the average type of material is likely to depend on the success obtained by the manufacturers of diatomite insulation and building products. Owing, however, to foreign competition and to the, at present, comparativly small Canadian demand, only the highest quality diatomite can now be successfully marketed. When properly prepared, the best quantity Canadian diatomite can, for any of its varied uses, hold its own against the imported material from any source.

Towards the latter part of the year diatomite activity in the United States appreciably increased and the 1933 sales of about 15 producers are estimated to be slightly over 100,000 tons. Nearly all these producers reported an increase, are optimistic concerning the future of diatomite, and expect a further sales increase in 1934.

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 but a new edition is expected to be published during the year.)

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (V.L. E.-W.)

FELDSPAR IN 1933

Production:

1933:	10,569	tons	valued at	$104,633
1932:	7,047	"	" "	81,982

Exports:

1933:	3,596	tons	valued at	$ 23,076
1932:	2,017	"	" "	15,465

Imports:

1933:	560	tons	valued at	$ 7,970
1932:	1,487	"	" "	24,875

In addition to feldspar imported in the ground state by domestic potteries, a small tonnage of crude high-soda spar is also brought in from the United States by grinders for use in blending with the Canadian product to meet special requirements.

Ores Mined and Producing Localities:

Most of the feldspar mined in Canada is of the high-potash variety. Deposits of soda-rich spar are relatively uncommon and often carry a high proportion of objectionable impurities. Until a couple of years ago, there was a small annual production of high-soda spar from a deposit in Aylwin township, Que., the material being used in scouring-soap compounds; this mine was closed down in 1931.

Most of the 1933 production came from mines in the Perth district, in Ontario, and the Buckingham district, in Quebec. Small tonnages were also shipped from the Hybla and Parry Sound districts, in Ontario. A proportion of the best grade spar mined in the Buckingham district, Que., is utilized for dental purposes.

Important Developments and Prospective Producing Localities:

Most of the 1933 output was derived from established mines. One new property was opened up in the Buckingham district, Que., and is being actively developed. An examination was made by American interests of a large feldspar occurrence in Harrison township, Parry Sound district, Ont., looking to the possibility of shipping on a large tonnage scale by water to Cleveland, but no developments have been reported.

Announcement was made toward the end of the year of a contract secured by a Winnipeg syndicate to furnish important tonnages of spar to a grinding mill at Warroad, Minnesota, the source of supply being the Pointe du Bois district, southeastern Manitoba.

Of interest, as bearing on a possible new trend in the industry, was the formation of a syndicate (the Nepheline Company, of Toronto) to develop what are claimed to be extensive deposits of syenite in Methuen township, Peterborough county, Ont. The rock consists of a mixture of nepheline and soda-feldspar, with minor amounts of impurities which it is intended to remove by magnetic separation. A test carload was shipped to the United States during the year and cleaned magnetically, the product made being submitted to the glass trade and various ceramic laboratories in the United States, Canada, and Great Britain, for report as to the suitability of the material for ceramic purposes. Reports are stated to have been entirely favourable and if the projected development materializes it may result in the substitution of this product for considerable tonnages of feldspar. The only present world source of nepheline is Russia, where it is produced as a by-product from the concentration of phosphate rock.

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General Situation, Market Conditions, etc.:

Feldspar production in 1933 showed a 50% increase over 1932, which gave the lowest recorded output in thirty years. Exports continued at a low level, most of the production being for domestic consumption. This is in strong contrast to the situation that existed up to a few years ago, when a large proportion of the output was consigned to grinding mills in the United States. Only one mine was worked on an important scale in Ontario and three in Quebec. As in the preceding year, the total output was about equally divided between the two provinces.

Both of the two grinding mills, that of Frontenac Floor and Wall Tile Company, at Kingston, Ont., and of Canadian Flint and Spar Company, at Buckingham, Que., were in operation throughout the year. In addition a spar grinding unit is operated by the Bon Ami Company at its Montreal plant, to supply its own requirements.

The price level for No. 1 grade crude spar averaged about $5.50 (nominal) per ton for the year. Ground spar sold at around $16 per ton f.o.b. mills.

The Department of Mines, Ottawa, has available a new report: "Feldspar" (Mines Branch Report No. 731, published in 1932).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.S.S.)

FLUORSPAR IN 1933)

Production:

1933: 73 tons valued at $1,064
1932: 32 " " " 464

Exports:

1933: None recorded.
1932: " "

Imports:

1933: 2,219 tons valued at $21,165
1932: 1,009 " " " 22,965

(In addition, 9 tons of hydrofluosilicic acid, valued at $2,062 were imported, as against 10 tons valued at $1,901 in 1932.)

Ores Mined and Producing Localities:

Occurrences of fluorspar in Canada are comparatively rare, the only localities where the mineral is known to occur in important quantity being the Madoc district, in Ontario, and near Grand Forks, British Columbia. Previous to the war, a single property at Madoc produced a small tonnage, and during the war years a number of other deposits were opened up in this district and actively worked, but in recent years output has been on a very small scale. The Rock Candy mine of the Consolidated Mining and Smelting Company, near Grand Forks, British Columbia, contains by far the largest known deposit of fluorspar 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.:

Fluorspar is a mineral that enjoys a fairly wide distribution throughout the world, and important deposits occur in a number of countries. Among the leading producers are the United States, Germany, Great Britain, France, and Spain.

The principal use for fluorspar is as a flux in the metallurgical and ceramic industries. About 80% of the production is used in open-hearth steel making, and the recent depressed state of the steel industry has caused a corresponding decline in fluorspar consumption. The foundry, glass, and enamel industries consume the bulk of the remainder, while the mineral is also used in the manufacture of hydrofluoric and hydrofluosilicic acids. Fluorspar is added to the charge in cement plants recovering potash, in order to facilitate the volatilization of potassium salts.

Prices in the United States market of the various industrial grades of fluorspar at the end of the year were as follows:

Domestic per net ton: 85% CaF_2 and not over 5% SiO_2 washed gravel $15; No. 2 lump $15.50; ground fluorspar 95 to 98% CaF_2 and not over 2½% SiO_2 $30 to $34. Foreign per gross ton: 85% CaF_2-5% SiO_2 gravel $20.25 to $20.75, duty paid Atlantic ports.

Fluorspar entering the United States pays an import duty of $8.40 per long ton.

The Department of Mines, Ottawa, has published the following report: "Fluorspar Deposits of Canada" (Geological Survey of Canada, Economic Series No. 6, 1929).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.S.S.)

GARNET IN 1933

Production:

Nil.

Exports:

Nil. Samples only.

Imports:

Not separately recorded, but probably about 75 tons.

Ores Mined and Producing Localities:

Nil.

Important Developments and Producing Localities:

Some prospecting work was intermittently carried out by the Labelle Nickel & Garnet Company of Montreal on their garnet deposit 3 miles south west of Labelle, Quebec, 100 miles north of Montreal; also by E. McNicoll, Montreal, on a deposit ½ mile southeast of Labelle. About 500 pounds of the ore from the latter were sent to the Mines Branch Ore Testing Laboratories, Ottawa, for concentration tests. About 250 pounds of ore containing very small garnets were also sent to the Ottawa Laboratories by the Montreal Garnet Products Company from their property 4 miles southwest of Labelle. A little prospecting work was undertaken by A. G. Chew, on a deposit near River Valley, northwest of North Bay, Ontario, and small samples were submitted to prospective users. No further work was undertaken by the Nordemac Abrasives, Ltd., on the garnetiferous horneblende schists that outcrop on the sea shore at Cheggogin point, Yarmouth county, Nova Scotia.

General Situation, Market Conditions, etc.:

About 85 per cent of the world's production is used for making abrasive coated papers and cloths and almost all the balance for glass surfacing. 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. About 10 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 artificial 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 to a small extent been successfully employed in the United States glass grinding and bevelling industries, for which purposes the peak in the demand was reached in 1930. Since that time there has been a 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, and also to the return of the use of emery.

The world's best garnet continued to be obtained from mines in New York state. Fines for glass surfacing are mainly supplied by a producer in New Hampshire. The total United States production (three producers) for 1933 is estimated to be about 2,400 tons and sales about 2,900 tons as against 1,950 tons valued at $147,350 sold in 1932. The value of the high grade is about $80 per ton as against $40-$50 per ton for the glass surfacing fines. Until last year there has been a steady drop in United States production since the peak year of 9,000 tons in 1923.

Owing to better business conditions in the last quarter of 1933, garnet sales in the United States substantially increased; on the other hand, the demand for the artificial abrasives, which are competitors of garnet, increased proportionately more. Some sand-paper manufacturers give the garnet grain a preliminary heat treatment, thereby increasing its adhesive ability and strength when glued onto the paper or cloth. It is claimed by some that this treatment has caused a slight increase above the normal for sales of garnet coated products.

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Owing to the relatively small demand for garnet and because of the large potential supply in the United States, only the highest quality Canadian abrasive garnet deposits with good transportation facilities should be considered. This calls for clear, deep red, walnut-size or larger garnets, which break into sharp and angular grains free of embedded impurities. Concentrates of such type of garnet grain should be 85 per cent pure and preferably not less than 1/8 inch in size.

There are two sand paper manufacturers in Canada. The Canadian Durex Abrasives, with a plant at Brantford, are 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 forms. The Canada Sandpapers, Ltd., Preston, Ontario, who started production in July 1931, are now also making a full line of these abrasive coated products.

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 1934 (V.L.E.-W.)

GRAPHITE IN 1933

Production:

1933:	405	tons	valued at	$18,367
1932:	346	"	"	18,483

Exports:

1933:	987	tons	valued at	$40,115
1932:	907	"	"	41,146

Imports:

Graphite imports, including crucibles, were valued at $100,253 in 1933, compared with $102,343 in 1932.

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 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 has been the only producer for several years past.

Important Developments and Prospective Producing Localities:

Outside of the Black Donald operations, little interest has been shown in flake graphite production for a number of years. Several enquiries have reached the Mines Branch, however, regarding low-grade, amorphous graphite, deposits of which occur in New Brunswick and Nova Scotia, and a sample was received during the year from an occurrence near Saint John, N. B., for concentration test in the Mines Branch ore dressing laboratories. The Canadian deposits of this type of graphite are of rather low grade, and owing to the difficulty and cost of removing the finely-divided impurities, it is doubtful whether they possess any commercial importance.

General Situation, Market Conditions, etc.:

Conditions in the graphite industry remain substantially as outlined in last year's review, 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, 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 1934 (H.S.S.)

GRINDSTONES, PULPSTONES, AND SCYTHESTONES IN 1933

Production:

1933: 499 tons valued at $21,919 (Data based on Mines Branch
1932: 328 " " " 15,735 Survey.)

Exports:

1933: Manufactured grindstones valued at $2,840
1932: " " " " 7,541

Imports:

1933: Imports 1,351 tons (mostly pulpstones), valued at $79,131
1932: " " " " " 87,483

Producing Localities:

The Read Stone Company was the only Maritime producer of these products. They sold 3 or 4 pulpstones from stock. Although they quarried the same amount of rock as in 1932, their grindstones sales were about 20% less. The majority of these stones were shipped from Stonehaven, Bay of Chaleur, New Brunswick, some (the largest stones) from Quarry Island, Pictou county, Nova Scotia, and a few from Woodpoint, New Brunswick.

There was an appreciable increase in the pulpstones produced and sold by J. A. & C. H. McDonald, Ltd., Vancouver, from their quarry on Newcastle Island opposite Nanaimo, on Vancouver Island, British Columbia.

The Read Stone Company and A. E. Smith, Shediac, New Brunswick, produced a total of about 124 tons of scythestone material, half of which was in the form of finished stones sold in Canada and the remainder as crude blocks exported to a United States scythestone manufacturer.

Important Developments and Prospective Producing Localities:

No important developments.

General Situation, 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. The price of Canadian natural grindstones is $44 per ton and about $66 per ton for pulpstones.

There has always been a demand for good pulpstones and about half a million dollars worth are normally used annually in the 50 Canadian pulp mills. Less than 1% of the stones used in Canadian mills is now produced in Canada. The situation remained much the same as in 1932 when the sales of Canadian pulpstones decreased, since there was a curtailment of pulp and paper output and many of the pulp mills were closed down or operating part time; also keen competition caused severe price cutting and specifications have become so strict that many types of stones cannot live up to them. The United States pulpstone production in 1932 of about 1,200 tons was about 30% less than in 1931, but there was an appreciable increase in the sales of both grindstones and pulpstones during 1933. Canada took 93% of their total tonnage exports of these types of stones. There were 7 producers of pulpstones, 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 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 four years been made in Canada by one concern and over 100 stones are now in use in Canadian mills. In 1932 another manufacturer offered a fused alumina segmental stone of somewhat similar design. These have not yet been assembled in Canada, but a few are being used in Canadian mills. (Mines Branch report No. 673).

The Department of Mines, Ottawa, has published the following report: "Abrasives: Products of Canada, Part I - Siliceous Abrasives"

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (V.L. E.-W.)

GYPSUM IN 1933

Production:

1933:	376,885	tons	valued at	$ 611,846
1932:	438,629	"	"	" 1,080,379

Exports:

1933:	287,938	tons	valued at	$ 358,084
1932:	373,113	"	"	" 484,226

Imports:

1933:	769	tons	valued at	$ 21,520
1932:	1,610	"	"	" 35,980

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 South Atlantic states.

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

Important Developments and Prospective Producing Localities:

On account of the continued falling off of the building industry, both in the United States and in Canada, the gypsum industry throughout the greater part of 1933 showed a steady decrease, with, however, a slight upward tendency during the last quarter.

The several large companies operating in Canada carried on under reduced production, still maintaining, however, their endeavours to reduce operating costs so that while their sales duringthe year are considerably below the previous years, their financial standing has not been impaired.

A company called Gyproc Products, Ltd., has been formed in England to take over the business carried on by Gypsum, Lime and Alabastine, Canada, Ltd., in the United Kingdom and to carry on the business of manufacturing gyproc wallboard and all combinations having gypsum as a base.

The Canadian Gypsum Company, the Canadian subsidary of the United States Gypsum Company, have added the property of the Iona Gypsum Company, Iona, Nova Scotia, to their Canadian holdings. They now have quarries and calcining plant at Iona, Nova Scotia, quarries at Windsor, Nova Scotia, quarries and plant at Hillsborough, New Brunswick, and mine and plant at Hagersville, Ontario.

The Atlantic Gypsum Products Company, Boston, Massachusetts, with quarries at present at Walton, Nova Scotia, and Chaticamp, Nova Scotia, has opened up a new deposit of high-grade gypsum at Aspy bay, Dingwall, Cape Breton, Nova Scotia, which has been under development for some time. A dock built by the Canadian government is being used for shipments. This dock is part of a breakwater, the channel and harbour development being recently completed.

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.

Some development work was done during the year on the Charleswood gypsum occurrence a few miles to the southwest of Winnipeg, Manitoba. Gypsum was reported from this locality a few years ago and this year a shaft was put down in order to thoroughly test the area. A good grade of gypsum was encountered in this shaft at a depth of 20 feet from the surface, but work was stopped before it was definitely proved whether the occurrence was a solid deposit of gypsum or only isolated boulder masses.

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

The use of anhydrite in England for the manufacture of sulphuric acid, ammonium sulphate, and special plasters is rapidly increasing. Canada is fortunate in having extensive deposits of this material favourably situated for commercial exploitation, the material from which has been proven by tests carried out by the Department of Mines to be of excellent grade for the above purposes. At the present time the small production of anhydrite in Canada is used principally as a fertilizer for the peanut crop, but it is quite probable that when conditions are more favourable Canadian anhydrite may be used for the manufacture of special plasters, similar to the material now being marketed in England.

General Situation, Market Conditions, etc.:

The use of gypsum products in the building trades has made rapid strides in past years because of its lightness, durability, fire-resisting, insulating, and acoustic properties, and tiles, wallboards, blocks, and special insulating and acoustic plasters have been developed. As the gypsum industry is so closely dependent on the construction activity in the country, the decrease of 44% in the value of building contracts awarded in Canada during the year as compared with 1932 is at once reflected in the production of gypsum. With the larger proportion of the crude gypsum quarried in Canada being shipped to the United States for the manufacture of gypsum products, industrial conditions in that country also have an important bearing on the industry.

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 reports: "The Gypsum Industry of Canada" (Mines Branch Report No. 714); "Anhydrite in Canada" (Mines Branch Report No. 732).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (L.H.C.)

IRON OXIDE MINERAL PIGMENTS IN 1933

Production:

1933:	4,327	tons	valued at	$52,250
1932:	5,240	"	"	46,161

Exports:

1933:	Iron oxide, ochres, etc.,	1,288	tons	valued	at	$73,139
1932:	" " " "	785	"	"	"	55,306

Imports:

1933:	Ochrey earths, oxides, etc.,	3,568	tons	valued	at	$609,202
1932:	" " " "	3,571	"	"	"	657,930

Ores Mined and Producing Localities:

Ochreous iron oxide, sold uncalcined and used chiefly for use in the purification of illuminating gas, constitutes the major production of ores under the heading of iron oxide pigments. The calcined form of ochreous iron oxide is produced for use in the manufacture of paints, while a smaller proportion of iron oxides in the form of umbers and siennas is also produced in both the raw and calcined state, for use as pigments in paint manufacture.

The major part of the production has, for many years, come from the vicinity of Three Rivers, Quebec, at Red Mill and Pointe du Lac. In recent years a deposit has been opened near Les Forges, Quebec. A deposit near Ste. Anne de Beaupre, Quebec, was exhausted in 1930 and the plant was removed to the deposit at Les Forges.

A small production of iron oxide from British Columbia has been reported since 1923 and is used chiefly for gas purification.

Important Developments and Prospective Producing Localities:

There were no important developments during 1933. The industry is a comparatively small one and the figure of production varies but little from year to year. The present producing localities have met the requirements of the domestic pigment trade for the cheaper grades for many years past. Should the demand increase, there are other prospective deposits which could be drawn upon; two of these are located in Saguenay county, Quebec, in the townships of Iberville and Bergeronnes respectively, and were investigated and sampled in 1929-1930 by the Quebec Bureau of Mines. A deposit in Lynch township, Quebec, has been a producer in the past.

In Nova Scotia there are various beds of ochres and umbers which have been worked in the past to a small extent. In Alberta and British Columbia are several known deposits of ochre, some of which have commercial possibilities, but due to their present inaccessibility and also to the limited market, they have had little development.

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 1934 (E.H.W.)

LITHIUM MINERALS IN 1933

Production:

Nil.

Exports:

Nil.

Imports:

There are believed to be no imports of lithium minerals. Lithia salts are not recorded separately.

Ores Mined and Producing Localities:

The principal commercial lithium ores are amblygonite, a fluo-phosphate of lithium and aluminium; spodumene, a silicate of these two elements; and lepidolite, or lithia mica. The lithia content of these minerals ranges from around 4 to 5 per cent for lepidolite, to 8 to 10 per cent for amblygonite. Zinnwaldite, another variety of lithia mica, common in the tin-bearing areas of Saxony and Czechoslovakia, has served as raw material for the recently-developed lithium industry in Germany.

The only important, known occurrence of lithium minerals in Canada is in southeastern Manitoba, where there is an extensive development of pegmatite dykes carrying possibly commercial amounts of spodumene, lepidolite, and amblygonite. Attention was first drawn to this area in 1925, when the Silver Leaf property near Pointe-du-Bois, on the Winnipeg River, was opened up. Several trial shipments were made from this deposit. Subsequently a number of other dykes in the same general region were prospected and found to be lithium-bearing, but while there have been frequent reports of projected developments in connection with these occurrences, nothing of importance has yet materialized. Among such projects has been a proposal to establish a lithium-extraction plant at or near the deposits, using local hydro-electric power. The last recorded shipment was in 1928.

Important Developments and Prospective Producing Localities:

None.

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 and California.

The principal use of lepidolite, as such, is in the glass industry, as an ingredient of heat-resistant, flint and opal glasses. Its lithia content being low in comparison with that of spodumene and amblygonite, the latter minerals are usually preferred as raw material for the manufacture of lithia salts and chemicals. The recent development in Germany, however, of a process whereby lithia mica (zinnwaldite) is decomposed by heating with potassium sulphate, has resulted in the establishment of an important industry in that country. Products made are lithium salts and the metal. Increasing amounts of metallic lithium are now being used, recent research having shown that it possesses valuable properties both as an alloy and for the de-gassing of copper.

Reports state that there was a marked decline during the year in the price quotations in the United States for lithium minerals, lepidolite dropping from $50 to $20 per ton, and amblygonite from $50 to $35.

A report containing a section on the lithium deposits of Manitoba (Memoir No. 169) was published by the Geological Survey, Department of Mines of Canada, in 1932.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.S.S.)

MAGNESITE IN 1933

Production:

Magnesite: Nil.

Magnesitic dolomite 1933: Valued at $360,128
1932: " " 262,860

Exports:

Products made from magnesitic dolomite are exported chiefly to Great Britain and the United States.

Imports:

	Tons	Value
Magnesite, caustic and dead burned	1,403	$43,229
Magnesia pipe covering	—	35,062
Magnesite refractory brick	—	246,855

Products and Producing Localities:

No magnesite, within the strict meaning of the term, is being produced in Canada at the present time. A magnesitic dolomite which is composed of an intimate mixture of magnesite and dolomite and which, when properly processed, can be used in place of magnesite for many purposes, is being quarried and processed at Kilmar, Argenteuil County, Quebec. It is marketed in the caustic and in the dead-burned state and also as a finely ground refractory cement.

Important Developments and Prospective Producing Localities:

There have been no important developments during 1933. From time to time the deposits of earthy hydromagnesite in British Columbia near Atlin and north of Clinton have attracted attention but the powdery nature of the deposits constitutes a drawback to their successful utili zation and most of the deposits are small. Large deposits of siliceous magnesite were discovered in 1932 in the Cranbrook area of British Columbia but no development has taken place to date.

General Situation, Market Conditions, etc.:

The deposits of magnesitic dolomite in Argenteuil County, Quebec, are ample to supply magnesia products for domestic requirements and for a large export trade. No other deposits of magnesitic dolomite or of magnesite are known in the earsten part of North America and consequently the Quebec deposits are favourably situated to supply the large markets for magnesia products in Eastern Canada and the Eastern United States.

The recent trend in the making of magnesia products has been largely toward the production of highly refractory materials such as are used for lining the bottoms of steel furnaces. Finely ground refractory cement is also a recent product. Caustic-calcined magnesia was formerly much in demand for stucco material, but very little is now used for this purpose; it is, however, being used for the construction of floors and for floor tiles.

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

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (M.F.G.)

NATURAL MAGNESIUM SULPHATE IN 1933
EPSOM SALTS

Production:

1933: 80 tons valued at $2,000
1932: None recorded.

Exports:

None recorded.

Imports:

1933: 2,135 tons valued at $49,868
1932: 2,192 " " " 47,679

Ores Mined and Producing Localities:

The material produced in this industry is hydrous magnesium sulphate or Epsom Salts. There are two methods of extraction: (1) evaporation of brines, (2) removal as hydrous crystals and afterwards purifying by means of solution and recrystallization.

The total production for the year was made from the deposit at Basque, British Columbia, 15 miles west of Ashcroft, which was formerly known as the Basque Chemical Company property and is now operated by H. P. Callander and associates of Winnipeg.

Important Developments and Prospective Producing Localities:

The deposit at Basque, British Columbia, which had not been operated since 1923, was again operated in a small way during 1933. A small experimental mill has been erected at Ashcroft, British Columbia, and the crude material is hauled in trucks from the deposit to the mill. The process consists of dissolving the crude salts in an 8-foot tank, and settling out the entrapped sand in this and two smaller cylinders. The clear solution is then raised to the first floor of the building and crystallized in a series of small wash tubs. The mother liquor then goes back into two wooden vats and is used again in dissolving a fresh batch of crude salt. The recovered purified crystals from the wash tubs are passed through a centrifuge and an oil fired rotary dryer, after which they go through a revolving cylindrical screen where three grades of crystals are obtained ready for the market. The material thus produced is of medicinal purity.

Production from a lake near Clinton, British Columbia, was reported in 1920, and none since. There is also a lake containing Epsom Salts near Kruger mountain in southern British Columbia, and it is possible that some of the alkali deposits of Saskatchewan and Alberta may in time become producers.

General Situation, Market Conditions, etc.:

The greater part of the imports of this material is used for industrial purposes, the tanning industry taking the larger proportion. About 20 per cent goes to the drug trade.

Experiments have recently been carried out by the National Research Council for the recovery of magnesium sulphate from the waste material from asbestos recovery in the province of Quebec and if this develops it will form a serious competition with the natural product from Western Canada.

The Department of Mines has published the following report: "Magnesium Sulphate in British Columbia" (Mines Branch Investigations of Mineral Resources 1924, No. 642).

Issued by the Mines Branch ,
Department of Mines, Ottawa,
March 1934 (L. H. C.)

MICA IN 1933

Production:

	1933		1932	
	Lb.	Value	Lb.	Value
Knife trimmed	8,591	$ 3,923		
Thumb trimmed	51,881	8,397	2,019	$ 1,254
Splittings	73,150	27,096	3,350	2,014
Scrap	1,575,875	8,666	612,980	3,560

Sheet mica is marketed in various forms, depending on the amount of preparation the mine-run material receives. The production by classes is shown above. Scrap mica, representing the waste material from mining operations or that from trimming establishments, is sold to grinding mills for the preparation of mica powder.

Exports:

1933: $46,213 1932: $31,113

Included under exports are thumb-trimmed, knife-trimmed, rough-cobbed, splittings, mica plate and scrap.

Imports:

1933: $33,506 1932: $71,749

Ores Mined and Producing Localities:

Canada produces almost exclusively the phlogopite variety of mica, termed in the trade 'amber mica.' 'White mica,' or muscovite, exists, but attempts to mine this variety have usually proved unprofitable, and the production has been negligible.

The productive mica region lies for the most part within a radius of about one hundred miles from the city of Ottawa, the northern portion of the field lying principally between the Gatineau and the Lievre Rivers, in Quebec, and the southern portion in the Perth-Kingston district, in Ontario. In recent years, few of the large number of mines opened up in this territory have been in active operation, and in 1933 only one property was worked.

Important Developments and Prospective Producing Localities:

There have been no mining developments of any consequence in the industry for several years past. A small shipment of white mica of scrap grade is reported to have been made during the year from a deposit near Armstrong, B. C., and sent to a mill at Vancouver for grinding. Re-opening of an old white mica mine near Bergeronnes, in Saguenay county, Que., was also reported, with the production of a few tons of mine-run mica. A small and long inactive mica-grinding mill at Bancroft, Ont., was taken over by Lucknow, Ont., interests, who announced plans for rehabilitating the plant.

General Situation, Market Conditions, etc.:

The year saw a marked improvement from the depressed condition that has existed in the trade for the past four or five years, and dealers report an active demand for amber mica of all classes. This improvement is reflected in the largely increased volume of sales over 1932. Thus far, the demand has been met chiefly from stocks on hand, but these are rapidly becoming exhausted and 1934 should see a resumption of mining on an active scale.

The increased demand for Canadian mica may be attributed in part to depletion of stocks held by manufacturers, but the chief cause is believed to be a material falling-off in supplies of mica coming on the market from Madagascar. Madagascar is the only other important world source of amber

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mica, and competition of more cheaply-produced mica from that country has been an important factor in the depression that has ruled in the Canadian industry for some time past. Should the Madagascar production continue to fall, Canadian operators will stand to benefit correspondingly and this country will be in a position to regain its former rank as the leading producer of amber mica.

The mica-grinding plant erected in 1930 at the Blackburn mine, in Templeton township, Que., was in intermittent operation during the year and produced a small tonnage of mica powder.

The Department of Mines, Ottawa, has available the following report: "Mica" (Mines Branch Report No. 701, published in 1930).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.S.S.)

MOULDING SANDS IN 1933 FOR USE IN FERROUS AND NON-FERROUS FOUNDRIES

Production:

1933: Figures not yet available.
1932: 8,493 tons valued at $5,355

Small quantities not tabulated in the official production records are produced in nearly all the provinces by many foundries for their own use from nearby deposits; or by small operators such as farmers for local foundries.

Silica sands without clay bond which are used in steel foundries are not included in the above production figures. Such sands are dealt with under "SILICA."

Exports:

Nil.

For a period of approximately 25 years large quantities of moulding sand were shipped from the vicinity of Ruthven and Leamington in Essex county, Ontario, to United States points including Cleveland, Detroit, Saginaw, Sandusky, and Toledo. These shipments ceased about 1906 with the exhaustion of the then known deposits. Shipments were also made about 1916 from a deposit near Metchosin on Vancouver Island to three localities in California. All these sands were sold in competition with American sands.

Imports:

The importation of natural bonded moulding sand is more than our production. The greatest part of this importation is from the United States with small quantities from Great Britain and France. No definite record of the amount imported is available since there is no single customs classification covering this item. It is estimated that about 75 per cent of our consumption of such sands 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 the former province. Near Charlottetown in the latter province a local sand has found limited application.

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

In Quebec, deposits are being worked or have been worked in the following counties:- Argenteuil, Joliette, L'Assomption, Mississquoi, 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:- 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 Brandon, Melbourne, St. Ouens, and Mile 80 (Wye) on the Greater Winnipeg Water District Railways.

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In the following provinces some foundries are using or have used supplies from or near the places enumerated as follows:- Saskatchewan - Humboldt, Moose Jaw, Pilot Butte, Prince Albert, and Saskatoon; Alberta - Calgary, Edmonton, Leduc, Lethbridge, and Medicine Hat; British Columbia - Cranbrook, Holmwood, Metchosin, Nanaimo, New Westminster, Penticton, and Victoria.

Important Developments and Prospective Producing Localities:

Shipments of moulding sands to Edmonton were made from a deposit at Leduc, Alberta; within the last 3 years a grade of moulding sand not commonly available before in the west, suitable chiefly for medium to heavy weight castings, has been obtained from Edmonton. Larger shipments than in 1932 were made from a recently developed deposit about 2 miles south of New Westminster, British Columbia. A small initial shipment from a deposit near St. Ouens, Manitoba, was also made.

A good prospective producing locality for moulding sand suitable for medium to heavy weight castings exists about one mile southeast of Langham, Saskatchewan.

For several years past the Mines Branch has been conducting a general investigation into the "Natural Bonded Moulding Sands of Canada" with particular reference to available data concerning all known deposits; mechanical analytical tests on large scale samples from such deposits were made by methods adopted by a Joint Committee on Moulding Sand Research under the auspices of the American Foundrymen's Association. The Mines Branch, Department of Mines, Ottawa, had representation on this committee. Outstanding features shown by this investigation are the large number of deposits from which supplies have been used for local foundries and the probabilities of replacing imported material with Canadian sands.

General Situation, Market Conditions, etc.:

During 1931 and 1932, according to returns of production from the Dominion Bureau of Statistics, it is evident that the industry has suffered considerably from the general lag in business. For these 2 years the production has been less than any other similar period since 1916 when records of production began to be kept. Very few foundrymen are aware that local supplies have been so widely used by other foundrymen. No doubt if some of these deposits were better exploited the amount of fairly similar foreign sands used would be reduced. Due to the cheapness of the commodity and higher freight rates than for ordinary sands and gravels, the use of any particular moulding sand, unless it is favourably known, is confined to a limited area.

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

The Department of Mines, Ottawa, has published the following report: "Preliminary Report on Moulding Sands of Eastern Canada" (Mines Branch Report No. 710, Investigations of Mineral Resources, 1928, pp. 47-52).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (C.H.F.)

PHOSPHATE IN 1933

Production:

1933: 105 tons valued at $ 805
1932: 1,316 " " " $12,333

Exports:

Nil.

Imports:

1933: 18,351 tons of phosphate rock valued at $ 74,527
1932: 65,533 " " " " " " $346,907

Ores Mined and Producing Localities:

Most of the small production of phosphate in Canada during the last decade has consisted of apatite, recovered from old waste dumps or representing by-product material secured during mica-mining operations in the Ontario-Quebec mica-phosphate region. The material has chiefly been utilized by the Electric Reduction Company, at Buckingham, Quebec, in the manufacture of phosphorus. The slight revival of interest manifested in apatite in 1932, when some of the old workings on the Lievre River, Quebec, were re-opened and 1,300 tons shipped, was not maintained in 1933, and no mining for the mineral alone was reported.

A further tonnage of sedimentary phosphate is stated to have been shipped to its Trail plant during the year by the Consolidated Mining and Smelting Company, from deposits in the Crow's Nest district, British Columbia, for further test work on methods of concentrating this class of rock (see section below).

Important Developments and Prospective Producing Localities:

Between 1926 and 1930, the Consolidated Mining and Smelting Company undertook a very comprehensive investigation of low-grade sedimentary phosphate beds in the Crow's Nest 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 was mined at several points near Crow's Nest. The rock proved difficult to concentrate, however, and mining was discontinued. Supplies of ore are now obtained from higher-grade deposits in Idaho and Montana. The Company has recently added a large complete fertilizer unit to its Trail plant, this having a rated 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.

During the year, samples of apatite-bearing rock from a new and hitherto unreported locality near Benjamin River, New Brunswick, reached the Mines Branch. While the rock contained considerable apatite in the form of smallish crystals, the sample furnished was insufficient for a useful test as to grade, and no data are as yet available on the nature or extent of the deposit. The occurrence is of interest as being in a section not hitherto known to carry apatite. The sample indicated that some form of concentration would have to be employed to recover the apatite.

General Situation, Market Conditions, etc.:

It seems unlikely that Canadian apatite deposits, while they are known to contain important reserves, can be successfully exploited at the present time, owing to their usually pockety nature, high cost of mining, and the difficulty in maintaining a uniform shipping product. The mineral breaks up readily in mining, with the production of a high proportion of fines, which it is difficult to recover without their grade becoming seriously impaired by admixed impurities. For the production of a uniform product, some form of

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concentration would have to be employed and while this probably would not present any technical difficulties, the cost is likely to be above the economic limit. This limit is set by the laid-down cost of imported rock, which is stated to be currently around $11 per ton at eastern points. Apatite, while differing in physical character from sedimentary phosphate rock, possesses no superiority over the latter for most purposes, and has to compete with it on a grade for grade basis.

The domestic demand for crude phosphate is met chiefly by material imported from the United States. In the east, supplies are drawn principally from the southern states, Florida, and Tennessee, while, as stated above, rock for the Trail fertilizer plant is obtained from Idaho and Montana. In 1932, cargoes of Moroccan phosphate, also, were delivered to two eastern factories. Imports fell off very materially in 1933, the quantity being 47,182 tons below the 1932 figure, a reduction of nearly 72%.

The Department of Mines, Ottawa, has available the following report: "Phosphate in Canada" (Mines Branch Report No. 396, published in 1920).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.S.S.)

PYRITES IN 1933

Production:

1933: Ore containing 57,373 tons of sulphur, valued at $510,299
1932: Ore containing 53,172 tons of sulphur, valued at $470,014

Exports:

1933: Ore containing 15,347 tons of sulphur, valued at $121,280
1932: Ore containing 17,455 tons of sulphur, valued at $ 89,568

Imports:

None recorded.

Ores Mined and Producing Localities:

By-product pyrites was produced in the treatment of copper-pyrites ores at the Eustis and Aldermac mines in Quebec, and at the Britannia mine in British Columbia.

Important Developments and Prospective Producing Localities:

There have been no important new developments during the year. Some structural changes were made in the Freeman flash roasting plant, installed in the St. Lawrence mill of the Consolidated Paper Corporation, Ltd., in Three Rivers, Quebec, which have greatly improved its operation. This unit had been in continuous operation for two months at the end of the year; at present it is supplying all the sulphur dioxide and much of the steam required for the operation of the sulphite plant, utilizing flotation concentrates produced at the Eustis mine, near Sherbrooke, Quebec.

General Situation, Market Conditions, etc.:

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. The United States Bureau of Mines reports the importation of 29,970 tons of pyrites from Canada but does not indicate the grade of the ore; shipments were received both from Quebec and British Columbia.

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Department of Mines, Ottawa,
March 1934 (A.W.G.W.)

SALT IN 1933

Production:

1933:	280,114	tons	valued at	$1,939,873
1932:	263,543	"	"	1,947,551

Exports:

1933:	5,335	tons	valued at	$ 43,461
1932:	5,627	"	"	36,248

Imports:

1933:	135,620	tons	valued at	$ 651,237
1932:	102,033	"	"	595,954

Ores Mined and Producing Localities:

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

During the year 1933, salt was produced in southern Ontario; at Malagash, Nova Scotia; Neepawa, Manitoba; and from Simpson, Saskatchewan. Ontario salt is obtained from brine wells, as is also the salt produced in Manitoba and Saskatchewan, and the Malagash salt is recovered by mining rock salt as well as recovery by evaporation from brines produced by leaching of salt from the waste piles of the mine.

Important Developments and Prospective Producing Localities:

There were no new developments in the Ontario field with the exception that the Warwick Pure Salt Company, Limited, was incorporated by Dominion charter on 6th July, 1933, to take over the operations at Warwick, Ontario, 25 miles east of Sarnia, formerly run by Moses Schikiransky and partners. This company plans the construction of a plant.

In Nova Scotia, the Malagash Salt Company showed a substantial increase in production.

The Neepawa Salt Company of Neepawa, Manitoba, added to the capacity of their plant and maintained steady production throughout the year.

The Simpson Oil and Gas Company, at Simpson, Sask., erected a small open pan unit and commenced operations at the rate of 5 tons of coarse salt per day. Their product finds a ready market locally. The source of their raw material is a brine obtained in a drill hole which was drilled for oil to a depth of 3,435 feet.

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 in time may be commercially exploited.

In a well drilled for oil near Goutreau, New Brunswick, south of Moncton, extensive beds of rock salt were encountered a number of years ago, between depths of 1,300 and 1,800 feet. A second well penetrated 890 feet of salt formation, some of the salt beds being 150 feet thick. So far these beds have remained unexploited, but further prospecting may be 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, 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 and one of the salt beds had a thickness of over 480 feet and ran over 90 per cent sodium chloride in the crude sample. The apparent great thickness of salt formation in this locality may possibly be due to the steep angle of pitch of the beds.

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General Situation, Market Conditions, etc.:

The production, except for small exports, is sold in Canada, principally to the dairy, meat-curing, canning, fisheries, and chemical industries, and as table salt for household use. The production during 1933 showed an increase over the preceding year, and taken for 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 sixteen years the only producing district was in Ontario, which is unfavourably 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 for this use been curtailed in recent years, such a condition is probably 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 with encouraging results in Nova Scotia for the past few years to determine the effect of salt with a mixture of clay as a surface veneer on gravel highways, in order to decrease if not entirely eliminate the dust nuisance and heavy maintenance cost of such roads. 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 acid sodium 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 1934 (L.H.C.)

SILICA IN 1933

Production:

1933:	185,807	(tons of silica sand valued at)	$ 298,497
		(tons of quartz " ")	
	923,000	silica bricks " "	29,139
1932:	189,132	(tons of silica sand valued at)	$ 276,147
		(tons of quartz " ")	
	93,000	silica bricks " "	4,304

Exports:

None recorded.

Imports:

1933:	4,370	tons	of silex	valued at	$ 82,823
	2,277	"	" flint	" "	26,615
	64,114	"	" silica sand	" "	160,131
			silica bricks	" "	147,901
1932:	6,186	tons	of silex	valued at	$ 167,997
	1,926	"	" flint	" "	16,075
	59,176	"	" silica sand	" "	162,869
			silica bricks	" "	122,952

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, sodium silicate, etc., also for sand blasting 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, quartzite is crushed to about 8 mesh. Some quartz is also crushed to make silica sand.

Silica sand is generally prepared from a friable sandstone by crushing, washing, drying, and screening to recover different grades of material according to the industry for which it is required. For example, for the manufacture of glass the material should range between the 20 and 100 meshes. Silica sand is also being prepared from a friable quartz and from vein quartz.

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 air-floated material 250 mesh or finer.

Quartz is produced in Quebec and Ontario; and quartzite is quarried in Nova Scotia, Quebec, Ontario, Manitoba, and British Columbia. Silica sand is obtained from Nova Scotia, Quebec, and Manitoba, and silex is prepared at one plant in the province of Quebec.

Important Developments and Prospective Producing Localities:

The Ottawa Silica and Sandstone Company, Templeton, Quebec, is producing sand of different grades for the glass industry, steel foundries, and for sand blast, etc.

The Canadian Kaolin Silica Products, Ltd., from their property at Lac Remi, Quebec, is making regular shipments of silica sand to the glass companies and others in the Montreal district.

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The National Silicates, Ltd., a subsidiary company of the Philadelphia Quartz Company of Philadelphia, Pennsylvannia, in association with G. F. Sterne & Sons of Brantford, Ontario, have erected and put in operation at Toronto a plant for the manufacture of silicate of soda and intend employing Canadian sand in their process.

Silica Products of Canada, Ltd., incorporated under Quebec Provincial charter, has erected a milling plant for silica products at Lake Bouchette, Roberval county, Quebec, situated at mileage 161 from Quebec on the Canadian National railway line running from Quebec to Chicoutimi. Their raw material is vein quartz, and the mill, for which they claim a capacity of 100,000 tons per year, is built to turn out silica sand and silex.

The Lake Bar Sand and Gravel Company, Winnipeg, Manitoba, produced a high grade silica sand from their loosely consolidated deposits on Black Island, Manitoba. This material is being used by the Dominion Glass Company at their Redcliff, Alberta, plant.

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, and since both these industries showed an improvement in 1933 over the previous year the consumption of silica for these uses increased materially.

The demand for high-grade silica sand remained steady and while there are still large quantities of Belgian sand being brought into Montreal as ballast at a comparatively low cost, it is gratifying to note the willingness of the consumers of this grade of silica to use the Canadian product whenever suitable Canadian material is offered. The Canadian producers of silica sand are steadily improving their position and each year sees an increasing use of their products.

The use of Canadian sand for sand blasting is increasing and the prospects are promising for a still further use of Canadian material for this purpose.

The Department of Mines has published the following reports: "Silica in Canada, Part I, Eastern Canada" (Mines Branch Report No.555, 1923). "Silica in Canada, Part II, Western Canada" (Mines Branch Report No.686, 1928). "The Suitability of Certain Canadian Sands for Use in Sand-blasting" (Mines Branch Report No. 727-1 published in 1931).

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March 1934 (L.H.C.)

NATURAL SODIUM SULPHATE IN 1933

(Glauber's Salt and Salt Cake)

Production:

1933: Shipments valued at $485,416
1932: " " " $271,736

Exports:

An appreciable proportion of the Canadian production was exported during the year to various points in the United States, but quantities are not separately recorded in the published trade records.

Imports:

1933:	895	tons of Glauber's salt	valued at	$13,237
	2,595	" " salt cake	" "	34,371
	574	" " nitre cake	" "	15,989
1932:	903	tons of Glauber's salt	valued at	$11,027
	4,433	" " salt cake	" "	51,925
	824	" " nitre cake	" "	16,432

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 (Glauber's salt) or in the form of saturated brines in many lakes throughout western Canada.

Production was all from the province of Saskatchewan, the principal producers being the Natural Sodium Products, Ltd., Dunkirk, Sask.; the Sodium Corporation, Alsask, Sask.; Horseshoe Lake Mining Co., Ormiston, Sask.; and the Dominion Sodium Refineries, Ltd., Fusilier, Sask.

Important Developments and Prospective Producing Localities:

The natural Sodium Products, Ltd., at Dunkirk, Sask., put in operation their second drier installed last year and have been running both units at full capacity. They started in the latter months of the year on the erection of a new power plant, consisting of a 500 H.P. English Diesel engine with generator, so that with their present Diesel of 225 H.P. they will have an abundance of power. They expect to expand to a still greater capacity and hope to have all construction work completed by April 1934.

The Sodium Corporation at Alsask, Sask., completed and placed in operation during the year an entirely new dehydrating plant, at the same time operating their present plant to capacity. When this new plant is operating to full capacity they expect to be able to turn out from 150 to 200 tons of dried salts per day.

The Dominion Sodium Refineries, Ltd., at Fusilier, Sask., have made some radical changes both in their power plant and mill which have greatly increased their capacity and improved the quality of product.

The Horseshoe Lake Mining Company at Ormiston, Sask., resumed operations in August in order to supply the demand for sodium sulphate occasioned by the re-opening of the nitre cake plant at Copper Cliff, Ont., and steady shipments were made for that purpose during the balance of the season.

During February of the past year a company called Metallics and Non-Metallics, Ltd., was incorporated under Dominion charter for the purpose of exploiting the deposit of sodium sulphate known as Ingebright Lake, 40 miles north of Maple Creek, Sask. This company controlled patents on a new method of dehydrating Glauber's salt and during the year they erected at Hull, Que., a full sized unit, based on their patents, for the purpose of proving the

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feasibility of the process. The results of the tests made in this plant were evidently sufficiently encouraging to the officers of this company to justify their dismantling this experimental plant with a view to re-erecting it permanently at the deposit as soon as proper financial arrangements could be made. They hope to start construction at the deposit early in 1934.

Another company, Gladmar Chemicals, Limited, obtained a Dominion charter in December 1933, for the purpose of developing and exploiting Sybouts Lake, 9 miles south of Gladmar, Sask. Some crystal had been harvested from this deposit in 1932 and placed in a stock pile, and a small mill and other buildings erected.

Activity has been quite marked during the past year in this industry, and many enquiries have been received by the department asking for information on various phases, from methods of harvesting and dehydrating to marketing problems.

It is decidedly encouraging to note the progress made in this industry in the past few years. The investigation of these deposits was started by the Mines Branch in 1921 and over 120,000,000 tons of hydrous salts were proven up in the few deposits examined in detail. At the present time the four producing plants are capable of producing 550 tons of dried salts per day. The development of these sodium sulphate deposits has been one of the major factors that has made possible the erection of the plant for separating nickel from copper at Copper Cliff, Ont., by the Orford process.

General Situation, Market Conditions, etc.:

There was a substantial increase in the production of natural sodium sulphate during the past year due to the increased demand from the paper trade and the re-opening of the nitre cake plant at Copper Cliff, Ont.

It is quite probable, as time goes on, that the product from these western deposits will find a rapidly extending market, as the by-product material from the manufacture of hydrochloric acid is each year decreasing in volume due to the manufacture of hydrochloric acid synthetically. This increased market will probably not be confined to Canada, since with the steady improvements being made in methods of refining, thus bettering quality of product and reducing costs of production, and with improved facilities for shipment via Churchill, Man., the possibilities of the product from these deposits competing in European and other foreign markets look decidedly promising.

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 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).

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Department of Mines, Ottawa,
March 1934 (L.H.C.)

SULPHUR IN 1933

Production:

Deposits of elemental sulphur of commercial grade have not been found in Canada.

Exports:

Nil.

Imports:

Brimstone, or sulphur, crude or in roll or flour
1933: 140,810 tons valued at $2,529,920
1932: 104,995 " " " 2,023,085

Ores Mined and Producing Localities:

Nil.

Important Developments:

Nil.

General Situation, Market Conditions, etc.:

Canada imports all its requirements of elemental sulphur from the States of Texas and Louisiana. According to trade journals sulphur was quoted at $18.00 per long ton, f.o.b. cars at the mines; the price per long ton at Atlantic ports was $22 - $25; the prices at consumers' plants in Canada vary according to location, reaching a maximum of about $37.00, the difference being due to transportation costs.

While Canada has no domestic supplies of elemental sulphur, certain industries which require sulphur dioxide gas for processing have been able to obtain the necessary supplies from other sources. One of these is pyrites (see article No. 41), the other is from the waste gases of certain metal smelting industries.

Pyrites has for years been an important source of sulphur for use in the production of heavy chemicals (sulphuric, nitric, and hydrochloric acids, sodium sulphate, and soda ash chiefly); recently a successful process has been developed for utilizing it in the sulphite pulp industry, one of the largest sulphur importing industries.

Metallurgical industries treating sulphide ores of copper, nickel, lead, or zinc necessarily produce large quantities of sulphur dioxide gas from roasting or oxidizing operations; until recently all these gases were wasted. Some years ago plants to absorb a portion of these waste gases were installed at Copper Cliff, Ontario, and at Tadanac, British Columbia. At the first mentioned plant the gas is used for the manufacture of high-grade sulphuric acid, the capacity of the units installed being about 150 tons per day of fuming acid; this acid finds a market in numerous industries. In British Columbia the acid made is used chiefly for the manufacture of fertilizers, but a certain proportion is used for other purposes.

The Dominion Bureau of Statistics does not report the equivalent amount of sulphur recovered from these gases seperately. Should market conditions warrant it, this recovery could be greatly increased.

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March 1934 (A.W.G.W.)

TALC AND SOAPSTONE IN 1933

Production:

1933:	15,169	tons of ground talc valued at	$143,014
		cut soapstone " "	43,593
1932:	12,103	tons of ground talc, " "	112,287
		cut soapstone " "	46,751

Exports:

1933:	10,725	tons of ground talc, valued at	$116,950
1932:	7,806	" " " " " "	85,790

Imports:

1933:	2,149	tons valued at	$48,650
1932:	1,900	" " "	$49,774

Ores Mined and Producing Localities:

Nearly all the talc produced in Canada is obtained from an important deposit of foliated, white talc, at Madoc, Ontario, where two mines have been in operation for a number of years. Each mine operates its own mill at or near its property, the ground product being marketed as three grades, according to fineness. Most of the output goes to the textile, cosmetic, paper, rubber, and roofing trades. A large proportion of the production is exported, chiefly to the United States but also to Great Britain (in part for re-export).

In Eastern Canada, the only other production of ground talc (in part soapstone powder) is from a soapstone quarry near Broughton, in the Eastern Townships, Quebec, where the off-colour, grey dust from the sawing benches is disposed of to the roofing trade. Plans are also being considered for the installation here of a grinding unit to treat the material from a band of soft grey talc encountered during quarrying operations. Samples of this talc, analyzed in the Mines Branch laboratories, proved to have a very low lime content and it is thought that the material might have value for ceramic purposes.

In British Columbia, there is a small, intermittent production of ground, grey talc of roofing grade. A grinding plant in Vancouver ground a small tonnage of imported, Manchurian talc during the year.

The Broughton soapstone quarry, in Quebec, was in operation throughout the year, and now supplies practically all of the sawn blocks and bricks used by the kraft-pulp mills in Eastern Canada. Shipments are made as far west as Dryden, Ontario. In addition to producing furnace stone, this company also fashions soapstone monuments, stoves, mantels, and other interior trim, as well as a variety of turned ornamental objects.

No new developments have been reported in connection with occurrences of soapstone in the Lake of the Woods region, Ontario, where several deposits are known and where one quarry was opened in 1926 and operated for a couple of years.

Important Developments and Prospective Producing Localities:

Some interest was shown during the year in several occurrences of talc and soapstone in the Thetford region, Quebec, but no developments have been reported. While talc of good quality is stated to occur, the deposits in many cases proved to be too small for successful operation.

Nothing of importance appears to have developed as yet in connection with the discovery of soapstone near Hope, British Columbia, mentioned in last year's review.

General Situation, Market Conditions, etc.:

While there have been no important developments in the talc industry during the year, it is noteworthy that the domestic production showed a 25 per cent increase over 1932. Both of the Madoc mills operated at capacity

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and reported a greatly increased volume of business, with full contracts ahead toward the close of the year. Production of block soapstone showed a decrease of about 7 per cent in value.

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

"Talc and Soapstone" (Mines Branch Report No. 583).

"Talc Deposits of Canada" (Geol. Surv. Economic Series No. 2).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.S.S.)

VOLCANIC DUST IN 1933

Production:

1933:	---	tons	valued at $	----
1932:	180	"	"	" 3,600

Exports:

Not separately recorded.

Imports:

Included under pumice, pumice stone, lava, and calcareous tufa, valued at $18,113 as against $22,391 in 1932. United States exports of volcanic dust into Canada remained steady.

Ores Mined and Producing Localities:

Volcanic dust beds up to 30 feet thick and situated near Waldeck, a few miles east of Swift Current, Saskatchewan, have for the past few years been worked by the Van-Kel Cleansers, Ltd.

Important Developments and Prospective Producing Localities:

The material of the Swift Current producer has been successfully used as a cold water calcimine, as a cleanser, as a glass and metal polish, as a hand cleanser, and as a sweeping compound.

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; also to a small extent as an insecticide carrier and as a general filler, particularly in linoleum. There is a large output from Kansas and Nebraska in the United States and most of the 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 for 1932 was 53,214 tons valued at $235,204 which was 23% less in quantity than the record year 1931. There were about 16 producers in 1933, nearly all of whom reported an increase. The total sales are believed to be approximately equal to those for 1931.

The University of Saskatchewan have been experimenting with volcanic dust as a ceramic glaze and results so far have been very successful.

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

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Department of Mines, Ottawa,
March 1934 (V.L.E-W.)

CEMENT IN 1933

Production: (sales):

1933:	3,007,432 bbls.	valued at	$4,536,935
1932:	4,498,721 "	"	6,930,721

Exports:

1933:	52,531 bbls.	valued at	$47,369
1932:	53,333 "	"	38,921

Imports:

Portland and hydraulic or water lime 19,119 bbls. valued at $37,768 as against 21,351 bbls. valued at $58,092 in 1932. Cement n.o.p. and manufactures of, valued at $4,971 as against $6,883 in 1932.

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 14,000,000 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 only part of the year. 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 Company re-opened in the early summer of 1933 its Hull plant, which had been idle for over a year.

General Situation, Market Conditions, etc.:

The production of cement in 1933 was about 21 per cent of the total rated capacity (approximately 14,000,000) of the milling plants, as against 32 per cent in 1932, 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:-

	1932	1933
Quebec	$1.43	$1.40
Ontario	1.43	1.45
Manitoba	2.27	2.28
Alberta	2.06	2.01
British Columbia	2.12	1.95

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Department of Mines, Ottawa,
March 1934 (A.B.)

GRANITE IN 1933
(Building, Monumental, and Crushed)

Production:

1933:	360,398 tons	valued at	$ 748,470
1932:	490,822 "	" "	$1,110,582

Exports:

1933:	964 tons	valued at	$ 12,997
1932:	2,133 "	" "	$ 41,172

These data also include exports of marble.

Imports:

1933:	Valued at	$ 91,730
1932:	" "	$136,372

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, Manitoba, 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, for permanent ballasting of railway road beds, and for heavy aggregate in large concrete construction. Owing to the heavy curtailment of operations of this nature during the past year the production of granite for this purpose shows a large decrease.

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. The low ebb of building construction during the past year has seriously affected this part of the industry with the result that a number of the smaller producers have been forced to close down until such time as business shows a decided improvement. The construction of the bridge from Quebec to the Island of Orleans has afforded an outlet for some of the stone from these districts.

The curbstone and paving block industry has also been extremely quiet throughout the year.

Granite for monumental purposes is produced in the Maritime Provinces as well as in Quebec, Ontario, Manitoba, and British Columbia, and this material finds a small but steady market. At the same time there is still an appreciable amount of foreign stone, principally black, being imported for this use, and a quarry of similar material in Canada would find a ready market for its product. A start was made during the year to meet the foreign competition by the opening up of a quarry of "black granite" in Nova Scotia in the district south of Antigonish and a number of trial samples were placed on the market.

Another interesting development during the year was the opening up of a quarry of grey granite in Manitoba 100 miles directly east of Winnipeg on the Winnipeg-Kenora highway. The stone from this quarry is medium to fine grained grey and very uniform in texture and approximately 9 carloads were shipped to Winnipeg and other centres both east and west where the blocks were used both for monumental dies and bases. A number of trial blocks of a dark red granite were also quarried a few miles west of the above grey quarry and it is possible that next year regular shipments will be made from this locality also.

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

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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 heavy falling off during the past year of building generally throughout Canada, the demand for dimensioned granite has naturally decreased.

Small amounts of granite were imported during the year from the United States and Europe for monumental purposes, but prospecting for similar stone 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 granites and the greys seem to be in most demand for monuments, with a consequent falling off in the requests for red granite.

In the building trade, while very quiet during the year, the tendency has been to employ the coloured granites to a greater extent than heretofore in the form of thin polished slabs for trim for buildings in which the main colour scheme needs some contrasting colour to relieve it.

Any upward turn in the building industry should immediately be reflected by an improvement in the granite industry, and the coming year should therefore show a marked increase in the use of dimensioned stone if any large construction projects develop.

Canadian granites are suitable for all the purposes for which granite is used, and with consistent advertizing 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.

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March 1934 (L.H.C.)

KAOLIN (CHINA CLAY) AND BALL CLAY IN 1933

Production:

None reported.

Exports:

1933: Clay unmanufactured 9,769 cwt. valued at $1,522
1932: " " 3,031 " " " $ 895
(These exports probably consisted of ball clay.)

Imports:

1933: China Clay 509,068 cwt. valued at $210,067
1932: " " 346,270 " " " $154,125

No data covering the importation of ball clay are available. Ball clay may be included in the import figures for china clay.

Producing and Prospective Producing Localities:

The only place where china clay has been produced commercially in Canada is near St. Remi d'Amherst. There a group of open pits and mines were operated for several years, but these workings were closed in 1923 and have not been re-opened since. At present a nearby property is under development.

Deposits of high-grade, white-burning clays occur on the Mattagami, Abitibi, and Missinabi Rivers in northern Ontario. Some of these clays may be classed as ball clays and others as china clays. (See Geological Survey Summary Report, 1926, Part C, p. 16; article by W. S. Dyer, Canadian Mining and Metallurgical 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. (See Mines Branch Report No. 690, p. 25.)

Ball clays of high bond strength occur in extensive deposits in southern Saskatchewan, about 60 miles south of Moose Jaw. Shipments have been made from the vicinity of Readlyn and Willows to potteries in Ontario and the United States. (See Mines Branch Report No. 468; Geological Survey Summary Report, 1930, Part B, p. 31; American Ceramic Society Journal, 1929, p. 360.)

Near Williams Lake, British Columbia, is a deposit referred to in the report of the Minister of Mines of British Columbia, 1926, as consisting of "silicate of alumina". This material, if not a true kaolin, is similar to it. Some trial shipments made to Vancouver were used as a fireclay.

General Situation:

There is a large steady demand for various grades of china clay in Canada, for use in the manufacture of paper and rubber as well as in the ceramic industry.

Ball clays are used in the ceramic industry as a bonding clay in the manufacture of porcelain and similar compounded bodies. While the market in Canada is not large, it is growing and there are also good prospects of developing a profitable export market in the United States.

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (H.F.)

LIME IN 1933

Production:

Quicklime	263,860	tons valued at		$1,931,925
Hydrated lime	55,612	"	"	" 399,445

Exports:

10,389 tons valued at $192,029

Imports:

431 tons valued at $6,502 (All from the United States; data are unrevised export figures supplied by the U.S. Department of Commerce.)

Products and Producing Localities:

Lime is manufactured in every province of Canada except Prince Edward Island, though production in Saskatchewan is intermittent and on a very small scale. Both high-calcium and dolomitic limes are produced in Nova Scotia, New Brunswick, Ontario, and Manitoba, but only high-calcium limes in Quebec, Alberta, and British Columbia. Ontario produces about half of the total Canadian output of lime and Quebec is the next largest producing province.

The products are quicklime and hydrated lime. Quicklime is sold in lumps, in pebble form, and in a finely pulverized state. Hydrated lime, a specially prepared slaked lime, in the form of a very fine powder, is sold in 50-pound multi-walled bags, and at the present time about 17% of the total lime produced is marketed in the hydrated form.

Important Developments and Prospective Producing Localities:

The St. John Lime Company, producing high-calcium and dolomite quicklimes and hydrated limes, commenced production in 1933 at Brookville, New Brunswick.

Limestones suited to the manufacture of lime are abundant throughout Canada, and should the demand arise there are many deposits, in addition to those being worked, where suitable rock can be obtained.

General Situation, Market Conditions, etc.:

Production of lime in Canada showed a decrease in 1933 over that of the previous year, despite an increased use in chemical and metallurgical industries. These industries during the past year consumed about 75% of the total production, whereas relatively few years ago the building industry consumed the major part of the output. The prices obtained for lime in many parts of Canada were slightly lower than those obtained in 1932 and in general are the lowest in many years. Quicklime in carload lots f.o.b. plants ranged in price from $4.60 to $10.00 per ton and hydrated lime ranged from $6.50 to $14.00 per ton. The wide price range is due in large part to differences in quality of the lime and to the locations of the plants.

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Department of Mines, Ottawa,
March 1934 (M.F.G.)

LIMESTONE (GENERAL) IN 1933

Production:

1933: 2,486,359 tons valued at $1,916,441

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 above.

Important Developments and Prospective Producing Localities:

At Pugwash, Nova Scotia, the Nova Scotia Departments of Highways and Agriculture have recently commenced the production of road metal and agricultural limestone.

Following the wider realization that magnesia as well as lime is required for the best growth of many field crops, the demand for pulverized dolomite for agricultural purposes has increased, and its production for this use was commenced in several localities during 1933.

As a result of research work conducted in the laboratories of the Mines Branch a new limestone-using industry is shortly to be established in Canada, namely an industry that will produce rock wool – a highly efficient insulating material. Mines Branch investigations have resulted in the discovery of limestone of suitable composition in Ontario and rock wool of very high quality has been produced therefrom during experimental work.

General Situation, Market Conditions, etc.:

Limestone of a composition suitable for any of its numerous uses is available in Canada and is being extensively quarried, though during the past year production has greatly fallen off owing to the decrease in general industrial activity and many of the quarries were idle for the first time in many years.

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The Mines Branch, Department of Mines, Ottawa, has published the following reports dealing with limestone and its utilization:

Preliminary Report on the Limestones of Quebec and Ontario (No. 682).
" " " " Limestones of Nova Scotia and New Brunswick (No. 687).
" " " " Limestones of Gaspe Peninsula (No. 687).
" " " " Limestones of Timiskaming District, Ontario (No. 687).
" " " " Limestones of Northern and Western Ontario and of the Prairie Provinces (No. 710).
" " " " Limestones of British Columbia (No. 719).
Limestone in Industry (No. 719).
Raw Materials for the Manufacture of Rock Wool in the Niagara Peninsula of Ontario (No. 727).
Canadian Limestones for Building Purposes (No. 733).
The Limestones of the Maritime Provinces (in press).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (M.F.G.)

LIMESTONE (STRUCTURAL) IN 1933

Production:

1933: 26,101 tons valued at $170,766
1932: 36,466 " " " 455,216

Includes dimension stone marketed either in rough or finished state by the primary producers only, and does not include the value of work done on domestic building limestone in cut-stone contractors' plants.

Exports:

Not separately recorded. Exports are very small.

Imports:

1933: $ 9,876
1932: 35,716

Includes the value of all types of building stone except marble and granite, but the major portion of the imports is limestone.

Products and Producing Localities:

The principal quarry centres are as follows:- St. Marc des Carrieres, Quebec (4 operators producing grey limestone); near Queenston, Ontario (1 operator producing mainly silver-grey limestone and smaller quantities of buff and of variegated grey-and-buff); Tyndall, Manitoba (3 operators producing mottled grey, mottled buff, and mottled variegated limestone). Quarries producing smaller quantities of building stone are situated near Montreal, near Quebec City, and at Hull in the Province of Quebec; and at 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. The tonnage and value of the waste products are not included in data on production.

Important Developments and Prospective Producing Localities:

During 1933 O.Martineau & Fils opened a new building-stone quarry in the Chazy limestone at Village Belanger on the outskirts of Montreal, from which both dimension stone and rubble are being obtained.

Simcoe Marble and Stone Quarries are prospective producers of interior decorative stone from their property at Longford, Ontario, where a finely granular, grey, magnesian limestone is obtainable.

General Situation, Market Conditions, etc.:

The demand for building stone was very small during 1933 owing to the small amount of building construction undertaken in that year and many of the quarries were either not operated at all or were operated only on a very small scale, orders for stone being filled from quarried stock on hand.

Prices of stone in the mill block, f.o.b. quarry, range from 50 cents to $1.00 per cubic foot depending on size of block and grade of stone.

The Department of Mines, Ottawa, has published the following report: "Canadian Limestones for Building Purposes" (Mines Branch Report No. 733).

Issued by the Mines Branch,
Department of Mines, Ottawa,
March 1934 (M.F.G.)

MARBLE IN 1933

Production:

1933:	8,512	tons	valued at	$ 53,234
1932:	12,379	"	" "	250,706

Exports:

1933:	964	tons	valued at	$12,997
1932:	2,133	"	" "	41,172

These data also include exports of granite.

Imports:

1933: valued at $52,758
1932: " " 88,824

Marble is imported chiefly in the form of mill blocks and unpolished slabs, – the sawing and polishing being done in various mills throughout Canada. The main portion of the imports are supplied by the United States, Italy, Belgium, France, and Great Britain.

Products and Producing Localities:

Marble quarried for the purpose of sawing into slabs for the ornamentation of buildings ranks first in value but it is exceeded in tonnage by that sold for the purpose of making terrazzo chips, stucco dash, whiting substitute, and artifical stone.

The principal centre of marble production in Canada is at Phillipsburg, Quebec, where Wallace Sandstone Quarries, Ltd., is producing 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.

At Bancroft, Ontario, Maple Leaf Marble Quarries is producing several varieties of marble, the most striking of which is a clouded-grey breccia in which the bonding material is a chocolate-brown calcite. At St. Albert, Ontario, a black marble, which has had a favourable reception from the marble trade, is being quarried by Silvertone Black Marble Quarries.

In Manitoba, mottled gold-and-buff and mottled purplish red marbles are available in the quarry of the Winnitoba Marble Company, at Fisher Branch, 100 miles north of Winnipeg; and rose-coloured and mottled red marbles are available in the quarries of the Manitoba Marble Company, and of the Hudson Bay Marble and Granite Quarries, Ltd., on the Hudson Bay railway north of The Pas, but there was no production from these sources during 1933.

Canadian Marble and Granite Works, Ltd., operates 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 serpentine and of metamorphosed limestone tinted and figured in a singularly beautiful fashion. The majority of the deposits have never been investigated; others have been opened up to a depth of only a few feet.

There are prospects of a bluish green serpentine marble being produced in the near future from a deposit near Hole River on the east shore of Lake Winnipeg.

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General Situation, Market Conditions, etc.:

The Canadian market calls almost entirely for interior decorative marble and there is very little used for exterior building purposes. Grey marbles form the greater part of the output but within the past few years the colour range of Canadian marbles has been widened by the production of a number of highly coloured varieties.

The market for Canadian marbles is at present almost wholly domestic and thus production depends almost entirely on the volume of building construction in Canada. However, efforts are now being made by some Canadian producers to introduce their marbles into foreign markets. Prices depend on the quality and rareness of colouring but they are also largely governed by the prices of foreign marbles, many of which enjoy a world-wide market.

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Department of Mines, Ottawa,
March 1934 (M.F.G.)

WHITING SUBSTITUTE IN 1933

Production:

No production figures can be published as only two companies produced whiting substitute during 1933.

Exports:

Nil.

Imports:

All imports are from the United States but no separate record is kept.

Products and Producing Localities:

Whiting substitute, as the name implies, is largely used as a substitute for true whiting made from chalk, which latter material has not been found in Canada. However, because of the fact that some of its characteristics are different from those of chalk whiting, whiting substitute has a certain field of usefulness of its own. It is prepared by pulverizing white limestone or white marble to a fineness of minus 200 mesh and for some uses, to a fineness of minus 325 mesh. Plants equipped to manufacture whiting substitute are located in Halifax, Montreal, and Winnipeg, and are operated by Brandram-Henderson, Ltd., Pulverized Products, Ltd., and by Gypsum, Lime and Alabastine, Canada, Ltd., respectively.

Important Developments and Prospective Producing Localities:

There were no important developments during 1933, though several companies investigated the possibilities of producing whiting substitute from deposits of marl, calcite, and white marble in various parts of Canada. Deposits of such materials are available in every province except Prince Edward Island and, provided they are free from impurities, each deposit is a potential source of whiting substitute.

Closely related in uses to whiting and whiting substitute are precipitated chalk and by-product precipitated chalk. The former is made by recarbonating milk-of-lime made from high-calcium quicklime, and the latter is made from the waste sludge resulting from the manufacture of caustic soda. Neither precipitated chalk nor by-product precipitated chalk are at present made in Canada, although the raw materials for each are available, but during the past year two Canadian companies have been investigating the market for these products with a view to producing them.

General Situation, Market Conditions, etc.:

Whiting substitute produced in Canada is steadily finding new markets largely at the expense of chalk whiting but owing to the decrease in industrial activity during the past year, the total volume of sales showed a decrease over those of 1932.

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Department of Mines, Ottawa,
March 1934 (M.F.G.)

COAL IN 1933

Production:

1933:	Bituminous	7,968,474	tons	valued at	$27,715,954
	Sub-bituminous	554,145	"	" "	1,274,017
	Lignite	3,362,459	"	" "	6,891,216
	Total	11,885,078	"	" "	$35,881,187
1932:	Bituminous	7,714,279	"	" "	28,073,744
	Sub-bituminous	560,902	"	" "	1,329,316
	Lignite	3,463,732	"	" "	7,714,635
	Total	11,738,913	"	" "	37,117,695

Exports:

1933:	259,233	tons	valued at	$1,188,225
1932:	285,487	"	" "	1,433,036

Imports:

	1933		1932	
From the United States	9,261,010	tons	10,177,780	tons
" Great Britain	1,942,875	"	1,727,716	"
" Other countries	152	"	53,541	"
Total	11,204,037	"	11,959,037	"

Coal Mined and Producing Localities:

The provinces of Nova Scotia and New Brunswick and the Yukon Territory produce only bituminous coal. 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 lignite coals, while the provinces of Saskatchewan and Manitoba produce only lignite coal.

Important Developments and Prospective Producing Localities:

It is estimated that Canada's output of coal in 1933 was virtually the same as in 1932, preliminary figures showing a difference of only 146,165 tons between the two years; increased production in Nova Scotia, New Brunswick, and Saskatchewan was offset by decreases in British Columbia and Alberta. Gratifying progress was made, however, in extending the domestic market for Canadian coal, imports for the year 1933 showing a drop of 6.3% as compared with those in the year 1932. The increased sale of Canadian coal in Canada in 1933 was chiefly due to the continuance of the subvention paid by the Dominion Government in aid of transportation; and to demonstration by technical officers of the Dominion Department of Mines that Canadian coal can be used to advantage for many purposes for which imported coal is, or was, solely employed. It is estimated that 1,750,000 tons of Canadian coal were moved under federal government assisted rates in 1933 as compared with 1,121,279 tons in 1932. Large scale coking tests made by Mines Branch officials at the plant of the Montreal Coke and Manufacturing Company have opened up to Nova Scotia mines a market for 150,000 tons of coal formerly obtained in the United States; and similar tests on coal from the Crow's Nest Pass in British Columbia have resulted in the complete replacement of United States coal by British Columbia coal in the gas plant of the Winnipeg Electric Company at Winnipeg, Manitoba.

Early in the year the Consolidated Mining and Smelting Company of Canada transferred at reduced prices the contract for the coke requirements of its Trail plant from the Crow's Nest Pass Coal Company at Fernie, British Columbia, to the International Coal and Coke Company at Coleman, Alberta, the new contract with International being operative for three years beginning Feb. 1, 1933. As a result the Coal Creek collieries of the Crow's Nest Company were closed down for about three months, but were re-opened on July 6, working on a substantial new order from the Canadian Pacific railway. The requirements of the Winnipeg Electric Company – about 50,000 tons a year – are all filled from Michel.

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The Cassidy Colliery of the Granby Consolidated Mining and Smelting Company, on Vancouver Island, was abandoned in September, 1932, all available reserves having been exhausted.

The market at Winnipeg, Manitoba, for Saskatchewan lignite continued to increase during 1933.

For the time being, no attempt will be made by the Ontario Government to exploit the Onakawana lignites of northern Ontario.

The production of coal in New Brunswick in 1933 was the largest in the history of the province.

General Situation, Market Conditions, etc.:

During 1933 a series of coking tests on Western Canadian coals were carried out to test their suitability for the production of city gas and domestic coke, which tests were made in the new by-product coke oven of the British Columbia Electric Company. Several Vancouver Island coals and inland coals from British Columbia, together with two coals from Alberta, were selected and coked, first alone, and then blended with one another. These tests, which were conducted by the Fuel Testing Division of the Department of Mines, demonstrated the comparative quality of coke to be expected from the different coals tested, and the general conclusion drawn was that for the Vancouver market the company could produce the desired gas and coke products entirely from Canadian coals.

In addition to the above, a laboratory study of the washing characteristics of the coking bituminous coals of both Alberta and British Columbia was made at the Fuel Research Laboratories, the purpose of which study was to determine the degree to which the ash content could be satisfactorily reduced and the effect of this reduction on the coking products of these coals. The results obtained were placed in the hands of the various coal operators and it is worthy of note that a washing plant has been installed at the Michel colliery of the Crow's Nest Pass Coal Company, British Columbia, and another is contemplated by the Cadomin Coal Company, Alberta. The tests demonstrated that a number of the coals tested could be materially reduced in ash content and the coking properties improved, so that as the market develops in Western Canada it will be possible to obtain an adequate supply of native coal for the production of good quality domestic coke.

With the continued government assistance and further betterment in the general situation, the outlook is that 1934 will bring definite improvement in the coal mining industry. New Brunswick operators by careful grading, etc., are steadily increasing the demand for their output. Saskatchewan lignite is slowly but steadly displacing a certain amount of imported coal in the middle west, both for industrial and domestic use. The Crow's Nest Pass collieries hope to recover part of their at one time considerable export market in the state of Washington. In British Columbia, where imported fuel oil has for a number of years been displacing coal in increasing amounts, Mr. Galloway, the former Provincial Mineralogist, believes that much ground could be recovered by the coal producers through an aggressive educational campaign that would bring home to consumers the fact that with modern methods and equipment coal is for many purposes as efficient and as economical a fuel as oil.

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COKE IN 1933

Production:

1933: 1,794,122 tons
1932: 1,637,701 "
Petroleum coke production is not included in the above data.

Exports:

1933: 21,574 tons valued at $280,193
1932: 25,987 " " " 277,141
No data available as to kinds of coke exported.

Imports:

1933: 622,293 tons valued at $2,907,862
1932: 648,079 " " " 3,162,709
Petroleum coke is included in the above import data.

Producing Localities:

Coke was produced from coal in coke and gas plants in all provinces except Prince Edward Island and Saskatchewan.

Petroleum coke was produced at petroleum refineries in the provinces of Nova Scotia, Ontario, Manitoba, Saskatchewan, and Alberta.

Important Developments and Prospective Producing Localities:

The Montreal Coke and Manufacturing Company during 1933 substituted Sydney, Nova Scotia, coal for a considerable portion of the United States coal formerly used exclusively in its coking plant at Montreal. It is expected that Nova Scotia coal will gradually entirely supplant the imported product in this plant.

The Winnipeg Electric Company contracted during the year to take all the coal required at its coke and gas plant in Winnipeg - amounting to about 50,000 tons a year, 30,000 tons of which came previously from the United States - from the Michel colliery of the Crow's Nest Pass Coal Company.

The International Coal and Coke Company's coke ovens at Coleman, Alberta, which have been idle for some years, were put in operation to fill the company's three-year contract with the Consolidated Mining and Smelting Company of Canada, which became effective on Feb. 1, 1933.

The Crow's Nest Pass Coal Company's coke ovens at Fernie, British Columbia, which were shut down in September 1932, remained idle. All the company's orders for coke are at present being filled from the coking plant at Michel, British Columbia.

The British Columbia Electric Company has extended its new gas and coke plant at Vancouver, finished early in the year, by an addition which will add 50% to its output capacity. This increases the total gas output of the plant from 3,000,000 to 4,500,000 cubic feet daily; and the coke output to 50,000 tons a year.

General Situation, Market Conditions, etc.:

Gas and coke companies, on the whole, report a better outlook at the end of 1933 than at the beginning of the year.

According to a survey made by the Dominion Fuel Board in cooperation with the Mines Branch of the Dominion Department of Mines Canadian-made by-product coke constituted 16.1% of the total solid fuel (exclusive of wood) used for domestic heating purposes in Ontario in 1932, as compared with 8.1% in 1928. In Quebec, the second most populous province in the Dominion, the figures were 7.6% in 1932 and 4.0% in 1928; and in Manitoba 4.7% in 1932 as against 3.0% in 1928.

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NATURAL GAS IN 1933

Production:

1933: 22,706,125 M. cu. ft. valued at $8,283,944
1932: 23,420,174 " " " " " 8,899,462

Exports:

Not recorded.

Imports:

1933: 100,854 M. cu. ft. valued at $73,435
1932: 120,840 " " " " " 91,234

Producing Localities:

Alberta continues to be the leading producing area in Canada, accounting for over 65% of the total Canadian production. The Alberta production comes chiefly from the Turner Valley field, where the wet gas is first stripped of its naphtha content and the gas, after scrubbing, is piped into Calgary, Lethbridge, and intermediary points. The Viking field supplies Edmonton and district; the Medicine Hat field, the oldest in the province, supplies the industrial and domestic requirements of Medicine Hat. A small field at Brooks supplies that town with its requirements.

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 opened up quite extensively in recent years, is located 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:

In the province of Quebec, two wells were drilled which obtained gas flows, one at Ste. Angele, Nicolet county, on the south shore of the St. Lawrence, and the other on the north shore in Joliette county, seven miles from the town of Joliette. Most of the exploratory drilling for gas on both the north and south shores of the St. Lawrence River in the past few years has had for its objective the finding of a commercial supply of natural gas for domestic and industrial uses in such centres as Three Rivers, Sorel, Joliette, etc. Although a certain measure of success has been obtained, no adequate commercial supply has, as yet, been secured.

In Alberta, early in 1933 the Turner Valley Gas Conservation Board submitted an extensive report of investigations which had been undertaken during the previous year. Largely on their recommendations, the Alberta Government passed legislation to the following effect, which became effective April 15th. First, that Turner Valley wells were to be allowed to produce 40 per cent of their open flow. Second, that all gas wells were to be equipped with gas meters. Third, that restrictions on drilling to the limestone formation were withdrawn. Early in the year the Alberta Government transferred control of conservation from the Turner Valley Gas Conservation Board, which automatically passed out of existence, to the Petroleum and Natural Gas Division of the Department of Lands and Mines. The latter adopted a modified scheme of conservation under which the maximum permitted flow of the entire field was increased to about 240,000,000 cubic feet a day. In June 1933, the Imperial Oil Company put into operation in Turner Valley a new absorption plant, whose purpose was to recover naphtha that could not be recovered in the ordinary Smith separator at the well, due to the pressure of the gas from the well having fallen below the point which made the old separator recovery inefficient. The absorption plant recovers approximately 500 barrels of naphtha a day from treating 90,000,000 cubic feet of gas, its present capacity.

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In Saskatchewan, a project to test a gas field in the Dirt Hills district, 50 miles southwest of Regina, was started, with the object in view of obtaining a gas supply for the cities of Regina, Moose Jaw, and Saskatoon. Several small showings of gas were obtained. Other exploratory drilling in Saskatchewan was undertaken at a well west of Maple Creek, and also at a well 9 miles southeast of Hudson Bay Junction. In Manitoba, further drilling for gas was carried on at a well in the Pembina valley, Manitou district. In British Columbia, a well was being drilled near Cloverdale, and in November a small flow of gas was obtained at a depth of 820 feet.

General Situation, Market Conditions, etc.:

The natural gas industry continues to make steady progress, and the year 1933 showed that both natural and manufactured gas are in increasing demand as a fuel, both for domestic and industrial purposes. In southern Ontario, in particular, a wider market was available for natural gas, and the industry in Ontario has become firmly established. Renewal and expansion of pipe lines to meet the increasing demand is noted. In Alberta, the waste gas problem in Turner Valley, which has been a serious one for the Provincial Government during the past several years, appears to be nearing solution. Due to the limited market in Alberta there will continue to be a waste surplus, but the figure of waste gas has been considerably reduced, and towards the end of the year, waste gas, which was not being processed, amounted to approximately 160 MM cubic feet a day, as compared to between 350-400 MM cubic feet which was wasted a few years ago before the Government took up the problem of conservation.

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

"Oil and Gas in Western Canada" (Geological Survey Economic Series No. 5).

"Oil and Gas in Eastern Canada" (Geological Survey Economic Series No. 9).

"Petroleum and Natural Gas Resources of Canada," Vol. I, 'Technology and Exploitation'; Vol. II, 'Occurrence of Petroleum and Natural Gas in Canada' (Mines Branch Report No. 291).

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March 1934 (E.H.W.)

OIL SHALE IN 1933

Production:

There is no present production of oil shale in Canada and there are no imports.

Important Developments and Prospective Producing Localities:

No important changes have taken place during 1933.

The Maritime Eduction Company of Rosedale, New Brunswick, went into bankruptcy during 1930, and title to the plant and mining lease became vested in the National Funding Company, 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, Nova Scotia, after making a few runs, was nearly destroyed by fire in October, 1930. The Canadian Torbanite and By-Products, Ltd., a subsidiary of the Oil and Nitrates, Ltd., built a small experimental plant at McLellan Brook, about 5 miles from New Glasgow, at which some experimental work was conducted during 1929 and 1930, since when the plant has been idle.

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, the more recent of which include the following:

"Report on Oil Shale from Pictou, N. S., and Port Daniel, Bonaventure County, Quebec" (Mines Branch Report No. 725, Investigations of Fuels and Fuel Testing, 1930-31, pp. 136-148).

"A World Survey of Recent Oil Shale Developments (1932)" by A.A. Swinnerton (Mines Branch Memorandum Series No. 53).

"Pritchard Process for the Distillation of Oil Shale" (Mines Branch Report No.689, Investigations of Fuels, 1926, pp. 106-120).

"Canadian Shale Oil and Bitumen from Bituminous Sands as Sources of Gasoline, etc." (Mines Branch Report No. 689, Investigations of Fuels, 1926, pp. 121-132).

"Preliminary Report on the Investigation of Oil Shales," which includes New Brunswick shale (Mines Branch Report No. 590, Investigations of Fuels and Fuel Testing, 1921, pp. 239-252).

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PEAT IN 1933

Production:

1933: 1,131 tons valued at $3,449
1932: 3,248 " " " 7,593

Exports:

Nil.

Imports:

1933: 260 tons valued at $4,700
1932: 302 " " " 5,227

Peat Bogs Worked:

With the exception of some peat dug by hand for local use on bogs about ten miles north of Kemptville in eastern Ontario, no peat fuel production was reported in Canada in 1933.

From time to time plants have been built for the production of machine-made peat fuel from some of the numerous bogs scattered over eastern and central Canada - so far without commercial success. Within recent years attempts of this kind have been made at St. Hyacinthe, Quebec, where in 1932 Hydropeat Company, Ltd., of Montreal, set up a plant for the production of peat fuel and humus by an hydraulic process, from bogs in that vicinity; and at Alfred, Ontario, where a plant which for a number of years previously had been operated in an experimental way by the Dominion Government was closed down in 1929.

Plants for the production of such moss and peat products as litter, insulating material, packing material, etc., have also been set up on some of the bogs. Plants producing material of this kind were reported in operation during 1933: at New Westminster, British Columbia; at Waterville, Quebec (10 miles from Sherbrooke); and at St. Stephen, New Brunswick, this last operating in an experimental way.

Important Developments and Prospective Producing Localities:

There were no developments of importance affecting the peat fuel situation in 1933.

According to press reports, new plants for the production of moss and peat products were started during the year by:

Moss Products, Ltd., at Shelley, Manitoba, and by Alouette Peat Products, Ltd., near Pitt Meadows, British Columbia.

General Situation, Market Conditions, etc.:

All attempts to establish a peat fuel industry in Canada on a large scale so far have been commercial failures. Fuels of somewhat better grade, or which are for other reasons more favourably regarded, are now virtually everywhere available at competitive prices. Plants for the production of moss and of peat products other than fuel, if suitably located with respect to adequate prospective markets, would appear to have better chances of commercial success than peat fuel plants.

The Department of Mines, Ottawa, has published numerous reports on Peat, among which are the following:

"Facts about Peat" (Mines Branch Report No. 614).
"Peat, Its Manufacture and Uses" (Mines Branch Report No. 641).

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PETROLEUM IN 1933

Production:

1933; 1,148,916 bbls. valued at $3,083,995
1932: 1,044,412 " " " 3,022,592

Exports:

	Quantity		Value
Petroleum (crude)	10,658,848	gal.	$394,727
Coal oil	996,468	"	179,986
Gasoline	4,042,959	"	627,851
Mineral oil	12,938,982	"	537,776
Mineral wax	2,498	cwt.	6,955
		Total	1,747,295

Imports:

Petroleum	1,023,456,354	gal.	$22,819,739
Kerosene, fuel & illuminating oils	28,534,664	"	848,985
Lubricating oils	9,868,734	"	2,624,334
Gasoline & other oils	57,116,622	"	4,082,836
Asphaltum & other petroleum products			670,443
		Total	$31,046,337

Producing Localities:

The province of Alberta is the leading producing area in Canada. The chief product is naphtha which is derived from the wet gas of the Turner Valley field. Light crude oil also is obtained from Turner Valley and Red Coulee fields, while heavy crude is produced in the Wainwright field. Other oil fields in Alberta which have produced crude oil in commercial quantities are the Ribstone and Skiff fields.

Ontario's chief oil field is the Petrolia-Oil Springs area, which has been in production since 1861. The Bothwell, Moza, and Dawn township 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 New Brunswick production is relatively small, compared to the Alberta and Ontario figures, but remains fairly constant from year to year.

The two wells in the Fort Norman field, Northwest Territories, which had been re-opened in 1932, to supply fuel oil and gasoline for mining operations in the Great Bear Lake field, were again operated together with the small topping plant, during the summer season.

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

Important Developments and Prospective Producing Localities:

New regulations in Alberta governing the output of wells in Turner Valley were put into effect in April 1933 by the Alberta Government. These regulations limited the output of wells to 40 per cent of their open flow, but allowed drilling to limestone formation. Former regulations allowed drilling only to the upper oil formations. The Department of Lands and Mines of Alberta which has taken over control of conservation from the Turner Valley Gas Conservation Board has adopted a modified scheme of conservation which has increased the maximum permitted flow of the entire field to about 240,000,000 cubic feet per day. During the year there were approximately 15 wells drilling in Turner Valley and of those practically half were started during the year. Several wells in the south end of the field reached production during the year. In May 1933, a new absorption plant in Turner Valley was put into operation by the leading producer, designed to recover all the naphtha in the gas from the wells of the company itself, also those of companies subsidiary to or associated with the company. Due to a drop in pressure in the majority of

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the wells in the older parts of the field, which led to a loss of efficiency at the separators, it was apparent that gases leaving the separators were carrying an appreciable percentage of naphtha. Now, after passing through the new absorption plant, an appreciable amount of naphtha is being recovered which was formerly lost.

Outside Turner Valley, wells were being drilled in several fields, from Athabaska Landing in the north to Coutts and Waterton Lake fields in the south. At Athabaska Landing, oil and gas was struck in fair volume, but drilling was later suspended. Showings of oil and gas were encountered in some of the other wells drilled but no commercial supply was obtained.

Drilling was also done at several locations in Saskatchewan; and in British Columbia, a new well in the Sage Creek district, Flathead Valley, was drilled to about 1300 feet, with several showings of oil and gas around 1100 feet being obtained.

Refineries were constructed during the year at Edmonton, Moose Jaw, Rosetown, and Swift Current, and the first unit of the large refinery under construction at North Burnaby, Vancouver, was completed early in the year. The same interests who are erecting this latter refinery, also commenced operations at a large new refinery in Montreal East, Quebec. Other points in Eastern Canada at which small refineries were being erected were Port Credit and East Hamilton, Ontario.

General Situation, Market Conditions, etc.:

The new oil regulations in Alberta, governing natural gas and naphtha production in Turner Valley, which were put into effect during the year, together with a slackening of conservation requirements in increasing total output of the field to approximately 240 MM cubic feet per day, it is hoped, will establish better conditions in Alberta's oil industry, and will help to bring the serious problem of conservation nearer to a solution. Better prices for naphtha were obtained during 1933 in Alberta, and Turner Valley companies have been increasing their output, due to these various favourable factors. The consumption of gasoline in Canada for 1933 shows a slight decline, due possibly in part to the decline in tourist traffic for the year. The construction of new refineries would indicate that an increasing demand for gasoline and petroleum products is expected. Indications at the close of 1933 point to a greater stability of the world's petroleum industry in 1934. Over production of petroleum, which has been indulged in by the world's largest producers in recent years, has been greatly checked and the large stocks on hand are being rapidly reduced to a point where production and consumption may be more nearly equal.

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

"Oil and Gas in Western Canada"(Geological Survey Ecomomic Series No.5).
"Oil and Gas in Eastern Canada"(Geological Survey Economic Series No.9).
"Petroleum and Natural Gas resources of Canada," Vol I - 'Technology and Exploitation'; Vol. II - 'Occurrence of Petroleum and Natural Gas in Canada' (Mines Branch Report No. 291).

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