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DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH
OTTAWA - CANADA

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IRON OXIDES (OCHRE) - 1936.

Production (sales) of iron oxides, crude and calcined, in Canada during 1936 totalled 5,854 short tons valued at $69,630 as compared with 5,516 short tons worth $77,075 in 1935, according to finally revised statistics issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics, Ottawa. Of the 1936 output, 5,458 short tons valued at $65,630 were produced in Quebec and 396 short tons at $4,000 in British Columbia. Production during the first six months of 1937 showed a decided gain over the corresponding period of the preceding year, the output of the material totalling 2,735 short tons valued at $42,580 as against a tonnage of 1,548 worth $21,395 in the first half of 1936.

Oxides or purifying materials consumed in the Canadian Coke and Gas Industry during 1936 were valued at $41,291 while iron oxides, including ochres, siennas and umbers, used in the manufacture of paints and pigments totalled 1,367 short tons valued at $133,669.

Imports into Canada of ochres, ochrey earths, siennas and umbers during 1936 amounted to 1,506 short tons worth $49,750 while exports of mineral pigments, iron oxides, ochres, etc., in the same period, totalled 1,572 short tons valued at $92,011. Of the imports, 917 short tons valued at $28,541 came from the United States, 322 short tons worth $8,399 from France, and 223 short tons at $10,368 from the United Kingdom.

Mineral pigments have been produced in Canada for many years. In 1851 an important deposit of ochre was worked in Quebec at Pointe du Lac, St. Maurice county. These pigments, as produced in Canada in 1886 and classified as iron oxides, amounted to 350 tons valued at $2,350. The annual variation in production has been considerable since that date; the low point for the industry being reached in 1890 when 275 tons were extracted, while the maximum output, 19,128 tons, valued at $157,909, was attained in 1920. The mineral in the crude condition as shipped by Canadian producers is utilized as a purifying agent in the manufacture of heating or illuminating gas, while the calcined or higher grades are consumed in the paint and pigment industries.

A report issued by the Bureau of Mines, Ottawa, contains the following information - "There are numerous occurrences of ochres and iron oxides in Quebec and Ontario, and some of these might be utilized, should the market demand warrant their development.

"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, there are several known deposits of ochre, some of which have commercial possibilities, but owing to their present inaccessibility and also to the limited market they have had little development. In Northern Manitoba, large deposits of ochre have been reported from the vicinity of Grand Rpaids and Cedar Lake. In Saskatchewan there are also several known deposits of ochres and iron oxides that as yet have not been developed commercially."

During 1936 there were six iron oxide properties reported as active in Canada, four in the province of Quebec and two in British Columbia. Capital employed in the industry totalled $167,499, employees numbered 39 and salaries and wages distributed amounted to $30,281. The cost of fuel, purchased electricity and process supplies consumed during the year under review was $11,419 and the net value of sales was computed at $58,211 as compared with a corresponding value of $64,836 in 1935.

Table 1 - PRINCIPAL STATISTICS OF THE NATURAL IRON OXIDES INDUSTRY IN CANADA, 1935 and 1936.

		1935	1936
Number of firms		5	6(x)
Capital employed	$	175,935	167,499
Number of employees - On salaries		2	3
On wages		30	36
Total		32	39
Salaries and wages - Salaries	$	3,472	3,792
Wages	$	23,276	26,489
Total	$	26,748	30,281
Selling value of products (gross)	$	77,075	69,630
Cost of fuel and purchased electricity	$	12,229	10,909
Cost of process supplies	$	10	510
Selling value of products (net)	$	64,836	58,211

(x) Four (4) producing.

Table 2 - WAGE-EARNERS EMPLOYED, BY MONTHS, 1934, 1935 and 1936.

Months	Number			Months	Number		
	1934	1935	1936		1934	1935	1936
January	12	38	26	July	31	29	51
February	25	21	25	August	34	34	60
March	19	22	25	September	37	42	49
April	15	21	24	October	40	36	44
May	28	28	29	November	29	26	34
June	43	31	38	December	30	28	26

Table 3 - NUMBER OF WAGE-EARNERS IN MONTH OF HIGHEST EMPLOYMENT DURING 1936 - WHOSE REGULAR HOURS PER WEEK WERE -

Hours	Number	Hours	Number
40 or less	10	54	6
41 - 43	1	56 - 59	1
49 - 50	1	60	20
51 - 53	20	Over 60	6

Table 4 - PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF IRON OXIDES, 1935 and 1936.

	1935		1936	
	Quantity	Value	Quantity	Value
	Tons	$	Tons	$
PRODUCTION (SALES) (x) -				
Quebec	5,357	75,388	5,458	65,630
British Columbia	159	1,687	396	4,000
TOTAL	5,516	77,075	5,854	69,630
IMPORTS -				
Ochres, ochrey earths, siennas and umbers	1,555	54,661	1,506	49,750
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.	3,488	623,698	2,999	721,614
EXPORTS -				
Mineral pigments, iron oxides, ochres, etc.	1,925	108,032	1,572	92,011

(x) Includes both crude and refined.

Production of iron oxides in Canada during the first six months of 1937 totalled 2,735 short tons valued at $42,580 compared with 1,548 short tons worth $21,395 during the corresponding period of 1936. Of the output in 1937, 2,155 short tons valued at $36,580 came from the province of Quebec.

Table 5 - PRODUCTION OF IRON OXIDES IN CANADA, 1927 - 1936.

Year	Quantity	Value	Year	Quantity	Value
	Tons	$		Tons	$
1927	6,125	103,536	1932	5,240	46,161
1928	5,414	111,198	1933	4,357	53,450
1929	6,518	115,932	1934	4,959	66,166
1930	6,596	83,873	1935	5,516	77,075
1931	5,520	49,205	1936	5,854	69,630

Table 6 - CONSUMPTION OF IRON OXIDES IN SPECIFIED CANADIAN INDUSTRIES, 1932-1936.

Years	Coke and Gas		Paints, pigments and varnishes		Paints, pigments and varnishes	
	Quantity Tons(a)	Value $	Quantity Tons(b)	Value $	Quantity Tons(c)	Value $
1932	3,736	35,284	701	52,323	512	48,037
1933	2,734	29,076	504	43,826	491	43,671
1934	3,757	47,010	580	53,539	544	53,236
1935	3,701	46,204	990	77,758	564	56,219
1936	(d)	41,291	733	67,850	634	65,819

(a) Oxide or purifying materials.
(b) Iron oxide pigments.
(c) Ochres, siennas and umbers.
(d) Data not available.

PRICES - Canadian - September, 1937 -(x)

Iron Oxides - Red ..... 2 cents to 6½ cents per pound.
Yellow ... 5 cents to 8¾ cents per pound
Brown .... 6¼ cents per pound
Black ..... 7¼ cents per pound
Siennas ..... 5 cents to 7½ cents per pound
Umbers ..... 4¼ cents to 5 cents per pound.

(x) Canadian Chemistry and Metallurgy, Toronto)

PRICES - United States - October, 1937 -

Iron Oxide per pound: standard (No. 1 quality) Spanish red, 3 to 4 cents; domestic earth 2½ to 4½ cents.

Ochre per ton, f.o.b. Georgia mines; $19 in sacks; $22.50 in barrels. Buff clay, 98 per cent through 325 mesh, $19. F.O.B. Virginia, dark yellow, 300 mesh, 60 per cent ferric oxide, in jute bags, $19.50. (x)

(x) Engineering and Mining Journal - Metal and Mineral Markets - New York).

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The following information is taken from a paper submitted to the Canadian Institute of Mining and Metallurgy by Mr. Joseph Bradley of the Sherwin-Williams Company, Red Mill, Quebec -

"CLASSIFICATION OF IRON OXIDE COLOURS: Some of these iron-oxide minerals are used in the raw (uncalcined) state, in which case all that is required to prepare them for the paint industry is washing, drying, and grinding. Others, especially the hydroxides, are calcined (or "burnt") in order to destroy any associated organic matter and at the same time to drive off a portion or the whole of the water they contain. As they become dehydrated, the colour of the material changes and the process is regulated to give a product of the tint required. Artificially prepared hydroxides are treated in the same manner. Following is a classification of the more important iron-oxide colours:

Un-calcined Group:
Raw ochre (yellow)
Raw sienna (dull yellow)
Raw umber (greenish-brown)
Persian Gulf red
Spanish red

Calcined Group:
Red ochre
Burnt sienna (reddish-brown)
Burnt umber (dark brown)
Metallic brown
Canadian red oxide

"Raw Ochre, Yellow Ochre.- The French yellow ochre, which has world-wide use, is rated the best in this class and has been adopted as the standard of comparison for ochres from other sources. Yellow ochres average about 20 per cent ferric oxide, the balance being combined water, with also silica and alumina.

"Raw Sienna.- This takes its name from the province of Sienna, Italy, the original source of pigments of this type. Deposits of similar nature are found on the isle of Sardinia. The material from both these localities is all exported from the port of Leghorn. There is some production of sienna from deposits in Virginia, but the Italian sienna is still considered to be the standard of quality. Raw sienna usually contains a higher percentage of ferric oxide than the yellow ochres, ranging as high as 75 per cent Fe_2O_3.

"Raw Umber or Raw Turkey Umber.- This is a product from the isle of Cyprus, but was exported through the port of Constantinople, in Turkey, and received its name thereby. The Cyprus umber is of a warm violet-brown hue. Its composition varies somewhat, but averages ferric oxide 36 per cent, silica 29 per cent, manganese dioxide 12 per cent, with small amounts of calcium carbonate, alumina, and combined water. England, the United States, and France have umber deposits, but not equal to the Cyprus umber in quality.

"Persian Gulf Red.- A hematite ore, red with a crimson shade, found on Ormuz island, in the Persian gulf. It is exported in the crude state in bulk to many countries, where it is milled to a fine paint pigment and used extensively by paint manufacturers. It contains 75 per cent ferric oxide, with about 20 per cent silica.

"Spanish Red.- A soft red hematite ore from the province of Andalusia, Spain, exported through the port of Malaga. It is not quite so bright in shade as the Persian red. It is shipped in large quantities to many countries, both in the crude and in the milled state. Grinding mills for preparing the finished colour are located near Malaga. Analysis of the average material gives 85 per cent ferric oxide with 10 per cent silica.

"Red Ochres.- These are prepared by calcining raw yellow ochre in a hearth or rotary furnace so that some of the combined water is driven off and the characteristic red shades of hematite are developed. The shade of the finished product will depend on the raw ochre used and on the method of calcining.

"Burnt Sienna.- Raw sienna calcined at a moderate heat in a hearth furnace yields a product having a dull red shade, which is known as burnt sienna. Considerable skill is required in the calcining process to obtain the rich transparent undertones desirable in this pigment.

"Metallic Brown.- Produced by calcination of iron carbonate and limonite ores.

"Red Oxides.- These are made by calcining the better grades of limonite ore. Depending on the ore and the conditions of calcination, products of various shades, from a light red to purple, may be made. Some of these carry up to 96 per cent ferric oxide.

"Burnt Umber.- Raw umber is calcined at a comparatively low heat, with proper furnace control, to obtain the characteristic rich brown shades of burnt umber so highly prized by colour men."

LIST OF FIRMS IN THE CANADIAN IRON OXIDES MINING INDUSTRY, 1956.

Name of Firm	Head Office Address	Location of Plant
QUEBEC -		
Argall, Thos. H.	639 St.Angel St., Three Rivers	Pointe du Lac
Girardin, Chas. D.	Yamachiche	Almaville
McNicoll, Eugene (x)	354 St. Catherine St.E., Montreal	Labelle Co.
Sherwin-Williams Co. of Canada, Ltd.	2875 Centre St., Montreal	Red Mill
BRITISH COLUMBIA -		
Davidson, J.G., and Thompson, J.H.	3498 Marine Drive, Vancouver	Mons
McDonald, R. W.	128 Grizzly St., Banff, Alberta	Windermere Dist.

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(x) Active, but no production.