

**PHILADELPHIA INTERNATIONAL
EXHIBITION, 1876. DESCRIPTIVE
CATALOGUE OF A COLLECTION OF THE
ECONOMIC MINERALS OF CANADA
AND NOTES OF A STRATIGRAPHICAL
COLLECTIONS OF ROCKS**

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Philadelphia International Exhibition, 1876. Descriptive Catalogue of a Collection of the Economic Minerals of Canada and Notes of a Stratigraphical Collections of Rocks by Geological Survey of Canada

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GEOLOGICAL SURVEY OF CANADA

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PHILADELPHIA INTERNATIONAL EXHIBITION,

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DESCRIPTIVE CATALOGUE

OF

THE CANADIAN GEOLOGICAL EXHIBITS,

COMPILED BY

THE GEOLOGICAL CORPS OF CANADA.

THE classification given below is essentially that adopted by Sir W. E. Logan in the catalogue prepared for the London International Exhibition of 1862, although some alterations and additions have been rendered necessary. In some cases, where no more recent information has been obtained, Sir William's descriptions have been repeated here. The names of contributors will be found opposite the localities from which the specimens have been obtained; while the geological formations are in general indicated at the end of the descriptive matter. The arrangement of the specimens under each heading is not geological but geographical, the British Columbia exhibits, when there are any, being given first, then those from the North West Territory and Manitoba, and so on from west to east. The headings under which the various substances are classed are as follows:

- I.—Metals and their Ores.
- II.—Materials used in the production of Heat and Light.
- III.—Minerals applicable to certain Chemical Manufactures, and their Products. (See also under IV.)
- IV.—Mineral Manures. (See also under III.)
- V.—Mineral Pigments and Detergents.
- VI.—Salt, Brines, and Mineral Waters.
- VII.—Materials applicable to Common and Decorative Construction.
- VIII.—Refractory materials, Pottery Clays, and Pottery.
- IX.—Materials for Grinding and Polishing.
- X.—Minerals applicable to the Fine Arts and to Jewelry.
- XI.—Miscellaneous Minerals.

I.

METALS AND THEIR ORES.

IRON.

Native Iron.

1. Madoc, O *Geological Survey.*

a. Native or meteoric iron.

This aerolite was found in 1854, and before cutting weighed 370 pounds. It contains 6.35 per cent. of nickel, and in making a section of it, rounded masses of magnetic sulphide of iron (probably troilite) were observed. When etched with an acid it exhibits beautifully the so-called Widmannstätten figures. Several large masses of meteoric iron have been discovered in the North West Territory, but have not as yet been carefully examined.

Magnetic Iron Ore.

1. Texada Island, B.C. *Geological Survey.*

a. Specimens of magnetic iron ore.

This important deposit occurs in crystalline rocks supposed to be of Carboniferous age. The largest exposure is on the south side of the island, about three miles north-west of Gillies' Bay. Here the ore-bed is seen to be from twenty to twenty-five feet thick, and to rest on grey crystalline limestone, with which, for about two feet down, are interstratified bands of ore, of from half an inch to one inch in thickness. From this point to the north-west, for nearly a mile, the bed is occasionally seen, and at one place there is a continuous exposure about 250 feet long and from one to ten feet thick. To the north-east it is also said to have been traced for more than three miles. As regards mining and shipment the ore is most favourably situated, while in the event of smelting operations being carried on, there is an abundance of wood suitable for making charcoal on the island, and Comox Harbor, from which the coal of the Comox area will be shipped, is less than twenty miles distant.

The ore is of an iron-grey colour, and frequently contains little cavities, which hold red or yellow ochre. Sometimes the cavities are lined with octahedral crystals of magnetite. A partial analysis of a specimen collected by Mr. James Richardson, of the Geological Survey, gave 68.40 per cent. of iron and only .003 per cent. of phosphorus. The deposit is in part owned by Messrs. Nelson & Moody, of Burrard Inlet.—*Carboniferous?*

2. An Island in Queen Charlotte Sound, B. C. *Captain Lewis, Victoria.*

a. Specimen of magnetic iron ore.

The island is not named on any of the charts, but it occurs near the Walker group, in Schooner Passage. The ore is a finely-granular magnetite, exceptionally rich in iron, the specimens examined yielding as high as 71.57 per cent.

3. Mining lot 10 Z., Township of McGregor, Thunder Bay, Lake Superior..... } T. D. Ledyard, Toronto.

a. Specimen of magnetic iron ore.

The ore is a rich fine-grained magnetite, occurring as an irregular deposit among the slates of the Nipigon or Copper-bearing series at the above locality.—*Nipigon Series*.

4. Mining location Y xii., near Killarney, Lake Huron..... } J. A. Lindsay, Toronto.

a. Three specimens of magnetic iron ore.

This locality is near the west line of the township of Rutherford, and about three miles north-west of the village of Killarney. The main vein is reported to be about twenty feet in thickness, of solid ore, and is situated conveniently for shipping on the west side of a bay of Lake Huron. It runs N.W. and S.E., and is flanked by greenstone or diorite on the N.E. and quartzite on S.W. side. Professor Chapman has made a complete analysis of this ore, and finds it to contain 60.85 per cent. of iron, no titanium, and only traces of sulphur and phosphorus. Two other veins, each about four feet wide, occur on the property, which belongs to the Algoma Iron Mining Co. of Toronto.—*Huronian*.

NOTE.—In the Lakes Superior and Huron region magnetic iron ores occur in quantities which may be of economic value in the following localities: to the south of Nequaquon and Gun-flint Lakes (massive crystalline ore); in the N. W. corner of the township of Neebing, interstratified with sandstone (contains 37.73 per cent. of iron); one to two miles west of the mouth of Little Pic River (deposit 90 feet thick—the iron is chiefly a silicate—metallic iron from 38 to 46 per cent, according to Hayes, Hunt and Girdwood); Portage at the west end of Little Long Lake, near Long Lake House (ore siliceous and slaty); Gros Cap, mouth of Michipicoten River (a good quality of ore); Mammoth and Vulcan Iron Mountains, about eight miles north of Batchawana Bay (large quantities of fine-grained magnetite, averaging about 50 per cent. of iron); Agawa River (a large deposit of ore said to have been recently discovered a few miles from Lake Superior.)

5. Township of Galway, O..... T. D. Ledyard, Toronto.

a. Specimens of magnetic iron ore.

From a series of outcrops on lots twenty-seven in the thirteenth and fourteenth ranges, lot twenty-three in the fourteenth, and twenty-two and twenty-four in the twelfth. There has been no regular mining on any of these lots, but Mr. Ledyard states that small excavations have been made, and that there is reason to believe that the deposits will prove to be of importance. Some of the ores have been examined by Professor Chapman and found to be rich in iron and free from titanium.—*Laurentian*.

6. Snowdon Iron Location, Peterborough, O..... Ontario Advisory Board.

a. Specimens of magnetic iron ore.

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This location comprises lot twenty, range one, of the township of Snowdon, county of Peterborough, and is situated fifteen miles N. E. of Cobcoonk, the present terminus of the Toronto and Nipissing Railway. The ore has a somewhat granular structure, and according to Professor Chapman of Toronto occurs in beds which have a possible aggregate thickness of fifty or sixty feet. Trial pits sunk on one bed showed a thickness of six or seven feet at least. The following is an analysis of an average sample of the ore by Professor Chapman :

Sesquioxide of iron.....	58.35	} Metallic iron 60.18
Protoxide of iron.....	24.87	
Alumina.....	0.42	
Titanic acid.....	0.73	
Oxide of manganese.....	0.13	
Magnesia.....	2.56	} Rock-matter..... 15.16
Lime.....	1.43	
Silica.....	11.17	
Phosphoric acid.....	0.17	
Sulphur.....	0.04	
	<hr/>	
	99.87	

A few tons of the ore have been mined and sent to the United States during the past winter, but as yet the property has not been regularly worked. Messrs. Shortiss, Savigny and Major, of Toronto, are the owners.—*Laurentian*.

7. Blairton, Belmont, O. { *The Cobourg, Peterborough, and Marmora Railway and Mining Company.*

a. Two large masses of magnetic iron ore, from a depth of 150 feet.

The *Blairton ore bed* or *Big ore bed*, as it was formerly called, is one of the most important deposits of magnetite in Canada, and has been extensively worked for many years. The ore is finely granular and often contains a considerable admixture of hematite. It occurs in a series of beds interstratified with crystalline limestone, talcose slate, serpentine and other metamorphic rocks, the whole highly inclined. Some of the beds are very pure, but others contain a good deal of rock matter and iron pyrites. An analysis of a specimen from what is known as the "sand-pit bed" gave Dr Hunt as follows :

Magnetic oxide of iron.....	72.80	= Metallic iron 52.72
Magnesia.....	6.46	
Lime.....	0.35	
Carbonate of lime.....	2.40	
Carbonate of magnesia.....	0.84	
Phosphorus.....	0.035	
Sulphur.....	0.027	
Water.....	3.50	
Insoluble.....	14.75	
	<hr/>	
	101.142	

Ore is now being raised from a depth of about 160 feet, the mining and loading

on the cars which take it to Rice Lake costing about \$1.25. The annual production from 1869 to 1875, inclusive, was approximately as follows:

1869.....	20,000 tons
1870.....	10,000 "
1871.....	20,000 "
1872.....	20,000 "
1873.....	27,000 "
1874.....	25,000 "
1875.....	20,000 "
	142,000

The largest part of this has been shipped to the United States. Many years ago a blast furnace was erected in the adjoining township of Marmora, to smelt the ore with charcoal, but the attempts which were made were not attended with profit, owing, probably, to distance from a port of shipment, and inattention to the proper sorting of the ore and the nature of the required flux. The number of men employed in connection with the mines is generally about 150.—*Laurentian*.

8. Madoc, O., lot 11, range 5 *Geological Survey*.

a. Specimen of magnetic iron ore.

A bed from twenty-five to thirty feet thick, known as the "Seymour Ore Bed." The ore is finely granular, unusually free from pyrites, and one of the finest in the country. It is underlain by a thin band of soft black mica-schist, and overlaid by reddish-grey highly feldspathic rocks, which are porphyritic in places and graduate into syenite or syenitic gneiss, with epidote. On the run of the bed to the eastward, dark grey hornblende rocks occupy the surface in places, as well as the feldspathic rocks just alluded to. Actinolite forms the chief associate of the magnetic, occurring in scattered radiating bunches, and also uniformly disseminated through the ore. In 1837 a furnace was erected in Madoc village for smelting this ore, but was in blast only a short time when it was abandoned, one of the proprietors having been killed in the mine and the other not having sufficient means to carry on the operations. The iron produced is said to have been of very superior quality. For a short time wood was employed as fuel. The distance of the deposit from railroad or navigable waters has until recently been the great obstacle to its further development, but the Grand Junction Railroad now passes a few miles to the south of it, and it is said that a branch will soon be built to the adjoining ore deposits in Madoc. The following is an analysis by Dr. T. Sterry Hunt:

Peroxide of iron }	89.220	} Metallic iron 64.61
Protoxide of iron }		
Phosphorus.....	0.012	
Sulphur.....	0.073	
Insoluble matter.....	10.420	
	99.725	

Exploratory work carried on during 1875 is said to indicate that the bed is thicker than heretofore supposed.—*Laurentian*.

9. Madoc, O., west half of lot 19, range 2 *Geological Survey*.

a. Specimen of magnetic iron ore.