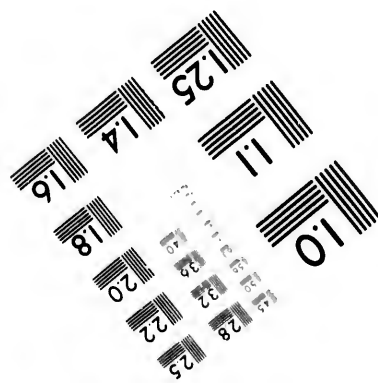
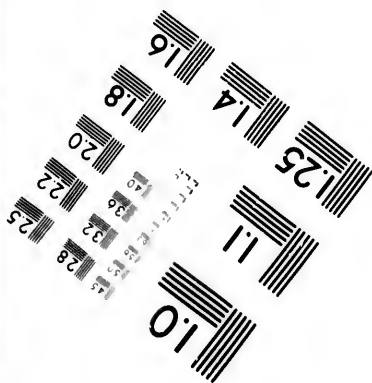
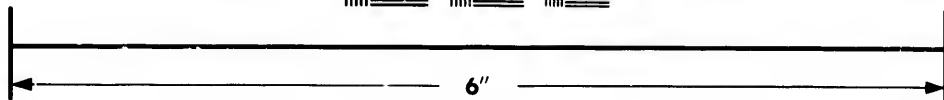
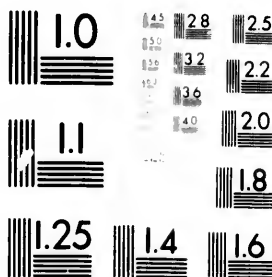


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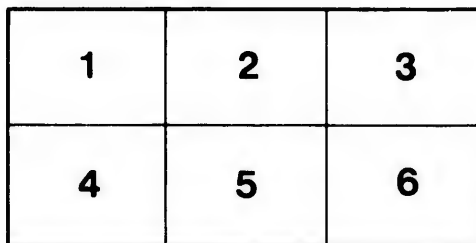
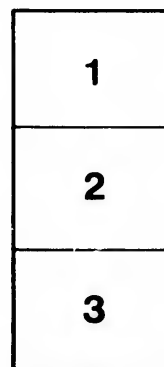
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SKETCH

OF

THE MINERALOGY OF NOVA SCOTIA,

AS ILLUSTRATED BY THE

COLLECTIONS OF MINERALS SENT TO THE PARIS EXHIBITION, 1867;

By PROF. HOW, D. C. L.,
UNIVERSITY OF KING'S COLLEGE, WINDSOR, N. S.

Published by Authority of the Commissioners for Nova Scotia.

HALIFAX:
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1867.

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SKETCH

OF

THE MINERALOGY OF NOVA SCOTIA.

THE collections of minerals made on the present occasion are sufficient evidence that the Mineralogy of Nova Scotia is very interesting, the variety of minerals and of their associations represented being considerable, and the beauty of many of the specimens unquestionable. That it is not only of scientific interest but of economic importance is at once obvious from the representation made of Gold as it occurs at several localities, that of the bulk of metal obtained up to the present time, as shown in a Pyramid of considerable dimensions, viz.: six feet three inches high and one foot and a half square at the base, and that of Coal in several columns, varying from about five feet to over thirty seven feet in height, shewing the actual thickness of some of the seams at present worked. The statistical details respecting these minerals, given, in another part of this *Appendix*, by P. S. Hamilton, Esq., Chief Commissioner of Mines, shew that from Jan. 1st, 1862 to Sept. 30th 1866,

84,706 ounces 14 dwts. 10 grs. of Gold of the value of \$1,632,315.86, have been obtained, while in the year ending Sept., 30th, 1865, there were raised 605,595 tons of round Coal, and 47,259 tons of slack Coal.

The nature of the other mineral resources of the Province, is shewn by the rest of the Collections, to which reference is made in the following brief descriptions of some of the minerals represented, and statements as to their economic value at the present early period of the mining history of Nova Scotia.

IRON ORES.—Of these there are shewn Titaniferous Iron Sand from several localities, Magnetic Iron which is believed to exist in considerable quantity, Specular Iron found in several places in unknown amount, and Brown Hematite which is known to exist in at least five large deposits. One of these, that situated at Londonderry, Colchester County, has been worked for several years, and both mining and smelting operations are carried on to a considerable extent. Fine specimens of the ores found here are shewn in the cabinets and among the large masses. The Company not only illustrate the quality of their ore, but also of the iron and steel produced at their works at Londonderry, and of the cutlery made from it in England. The chemical composition of the iron has been given by Dr. Percy, as follows:—

	Pig Iron	No. 1.	No. 2.
Carbon	3.50	3.27
Silica	0.84	0.67
Sulphur	0.02	0.01
Phosphorus.....	0.19	0.28
Manganese	0.44	0.57
Iron	94.83	95.70
		<hr/>	<hr/>
		99.84	100.30
		<hr/>	<hr/>

This analysis accounts for the fact that the bar iron ranks with the best qualities of the Swedish metal for making steel. The quantity of iron made at these works since their commencement in 1850, is probably about 12,000 tons; it has been rapidly increasing of late years, during which the larger proportion of metal made has been bar iron, worth about £16 sterling per ton.

The Iron ore from Springville, East River of Picton, also illustrated by a fine set of specimens, occurs in large quantities; from an analysis I made in connection with the Provincial Geological Survey, it contains

Peroxide of Iron, with traces of Phosphoric Acid,	84.54
Alumina and Phosphoric Acid..	0.19
Sesquioxide of Manganese	0.76
Magnesia	0.43
Water	11.41
Siliceous Gangue	2.22
Carbonic Acid and loss.....	0.45
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	100.00
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The Iron Ore from Brookfield, Colchester Co., of which various specimens are shewn, is found in large quantities of boulders, some of which are of huge dimensions, believed to indicate great deposits. One specimen, examined for the owners, I found to contain:—

Peroxide of Iron, with a very little Alumina...	87.10
Magnesia	trace
Phosphoric Acid	trace
Silica and Gangue.....	1.54
Water	11.36
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	100.00
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These last two ores are evidently very good indeed, and will doubtless be found to give iron and steel of such quality as to maintain the high reputation of the Province in this respect.

ORES OF MANGANESE.—Of these are shewn specimens of Wad, Manganiite, and Pyrolusite, all of which are found in large quantities. Of Wad, shipments to the extent of some hundreds of tons were made during the past year to the United States, where a use has also been found for Manganiite. The Pyrolusite is exhibited in a variety of forms. I have found the quality of this ore from different localities very good indeed, from 85 to 97 per cent of peroxide of manganese, with a very

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small amount of iron having been obtained on analysis. A cargo of about 8 tons from Teny Cape, examined in England gave an average of 91.5 per cent peroxide of manganese, and less than one per cent of iron. A second cargo of one hundred and twenty tons gave in England 89 per cent peroxide of manganese. The quantity of ore raised at Teny Cape up to the present time is estimated at about 1000 tons, of an average value of from £8 to £9 sterling per ton. A few tons have been raised at other localities, among which Onslow has furnished a portion of excellent quality.

MINERAL PAINTS.—Very extensive deposits of hydrated oxide of iron often mixed with hydrated oxide of manganese, are found in different localities. Some of these have been rather extensively employed as mineral paints and found to answer admirably both for buildings and vessels. Several colours and qualities are shewn, and very instructive sets of specimens from Onslow and Chester, illustrate the production of these substances from rocks containing carbonates of lime and protoxide of iron and manganese, and occasionally pyrites: by the weathering of these rocks, very fine numbers of various colours are found to result.

NATIVE COPPER.—This is represented by specimens from three localities on the Bay of Fundy, where it occurs in trap rock, sometimes in a zeolitic matrix, in masses which are occasionally of several pounds weight; it is reported that at one place it occurs in a thick bed with ore of copper. Systematic operations carried on for a short time at one place produced about three hundred weight of the metal, and what is considered to be the same deposit is being worked at about a mile inland from the original scene of operations on the shore of the Bay of Fundy. I have found a small amount of silver in some of the copper from this region.

ORES OF COPPER.—Of these a variety is exhibited, ^{some} of them being very rich. The ore from Tatamagouche, which is rich vitreous ore in sandstone has paid expenses on small operations. The ore from Five Islands is cupriferous oxide of iron, samples of which I have found to yield about six per cent of copper; the deposit is thought to be considerable. The ore from Lochaber is copper pyrites, mixed with iron pyrites, containing in some samples nine per cent of copper, in picked samples considerably more; it has hitherto been found in boulders but lately it has been reported as discovered in a vein. The ore at Cheticamp, Cape Breton, is Chrysocola, which is found in a vein about 5 inches in thickness: operations have been carried on to some extent, but are, I believe suspended. On the whole little encouragement has so far been found in copper mining, for although very rich ores exist, some of which are in very curious association with "lignite," (in a sample of one of these I found 40 per cent of copper,) no large quantity of them has yet been met with: indications, however, are considered promising in several localities.

ORES OF SILVER AND LEAD.—Galena is represented from several localities, in some of them it is not believed to be in quantity. At Gay's River, however, in Colchester County, where it is disseminated in limestone, an engineer has reported his belief in the existence of an immense deposit, which could be easily washed from its matrix so as to yield a high percentage of lead containing sometimes as much as 11.5 oz. of Silver to the ton of Lead. At Baddeck, in Cape Breton, galena occurs

in quartz, and, as I have found, is sometimes associated with rich Silver ore. Assays made in Boston gave very considerable returns both of Silver and Gold.

MISPICKEL.—This is exhibited from three or four localities where it is sometimes found in very large amount, and often associated with and containing Gold, and occasionally Cobalt.

NICKEL AND COBALT—These metals I have found in two minerals which are exhibited, viz. Pickeringite and Pyrrhotine; and in another; but only in very small amount.

BARTES.—This mineral is represented from a good many localities in different parts of the Province, in some of which it occurs of sufficient purity and in such quantity as to render it a profitable article of exportation. In two or three places it has been worked to some extent. The very fine mass from Five Islands, weighing some two or three hundred pounds, is from a mine which was in active operation last summer. Thirty tons had been taken out in three weeks before my visit, and in all, with the result of operations in former years, 500 tons had been quarried and exported.

Gypsum—This mineral exists in inexhaustible profusion; and in many parts of the Province, it is very favourably situated for quarrying and shipping. The various qualities are as well represented. It is used locally in making plaster for walls and ceilings, and is largely exported to the United States, where it is employed as a manure. The Selenite which is abundant in some quarries is valued for making the finest white cornices, and for stuffing fire-proof safes. The compact varieties, forming Alabaster, are suitable for interior carved decorations, as illustrated by a small carving. The quantity of Gypsum exported, having been depressed by the American war, is now again becoming large. In 1860 the quantity quarried was 126,700 tons, of the value of \$85,196.

BORATES IN THE GYPSUM.—A few years ago a most interesting discovery was made in the Gypsum of Windsor of a mineral which I proved to be Natroborocalcite, containing, along with soda and lime, 44 per cent. of boracic acid. A second mineral was afterwards found containing, according to my analysis, 59 per cent. of boracic acid, this I called Cryptomorphite. The former was found embedded in the Gypsum, the latter in crystals of Glauber-salt. Neither was found in large quantity. Both are exhibited.

ANHYDRITE.—Along with Gypsum large beds of Anhydrite are often found. This is used as a building stone under the name of hard plaster. When polished it affords an excellent and much admired substitute for marble, for interior decorations; it has never been as yet long exposed under these circumstances, but the pedestal, table top, and partially polished blocks, all I believe made from what may be called weathered specimens, shew that as regards present appearance the material is admirable.

MARBLES.—These are known to exist in large deposits in various parts of the Province; only surface specimens, however, have as yet been obtained, so that the value of the material cannot be decided upon. Very handsome varieties are exhibited, one of which, of concretionary structure and singular beauty, is sure to be much admired; it would make excellent in-laid work.

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LIMESTONES.—Inexhaustible in amount the Limestones present great variety of structure and quality. Some are exhibited which furnish most excellent lime for building purposes; others, being somewhat phosphatic, afford good manure-lime; others are reported to be hydraulic; while some certainly make good cements. In a country abounding in freestone and granite little use has been made of limestone as a building stone, but there are beds of rock suitable for this purpose of which use is made in railway constructions.

MOULDING SANDS.—Specimens of these are shown illustrating the nature of deposits from which material has been employed in the Province and in the United States, chiefly in brass-casting. One of these sands was exported last year to the latter country to the extent of 250 tons to be used in moulding brass tubes. Another of these sands has been employed in the manufacture of scouring-bricks.

CLAYS.—Immense deposits of very fine qualities of Clays are found, a few specimens only are shewn. These Clays are largely employed in making pottery, firebricks, and both common and pressed bricks, which latter have been highly esteemed abroad.

OVEN STONE.—Dressed specimens show the nature of a sandstone, existing in vast quantity, which is applied after simple hewing with an axe, in the construction of ovens which are found to withstand the action of fire for many years.

FIRESTONE.—A specimen dressed to shape, exhibits the appearance of a coarse grained rock employed in building fireplaces which are found to be very durable.

GRANITES.—Of these, a small number are shewn dressed in various ways on different sides to exhibit their fitness for particular styles of work. The quantity of these rocks is inexhaustible and large use is made of them in building houses, wharves, and fortifications.

FREESTONES.—Various qualities of these are exhibited. Some are very superior and suited for the finest kinds of work. These stones are very much used in the Province, and have been largely exported to the United States.

GRINDSTONES.—Sandstones particularly adapted for the making of Grindstones, are very abundant in some districts which have become famous for this manufacture. The number of Grindstones made in the Province in 1860 was 46,496.

PENCIL STONE.—A specimen of ~~compact pyrophyllite~~ is exhibited which is found in a bed extending through a considerable tract of country; most excellent Pencils for writing on slates are made from this material which I found, on analysis made in connection with the Provincial Geological Survey, to contain:—

	Silica..... <i>retaining... a little...</i>	Alumina.....	60.53
	Alumina.....		23.01
tot	Peroxide of Iron.....		5.80 30
	Potash, and traces of Soda.....		3.80 4.39
	Magnesia.....		1.42
	Water.....		5.35
			<hr/> 100.00 <hr/>

1841, 1842 COALS.—These are, as before mentioned, treated in another part of this paper, but, in addition to the large masses, some small specimens of various kinds shewn in the cabinet, are well worth the attention of mineralogists; of these are semi-bitumenous Coal in remarkable association with a sort of ankerite, and lignite with copper and lead ores. Oil shales and oil coals are exhibited, and the oil produced from one of these is also shewn in the crude and refined state. One of the oil-coals shewn, yielded from picked samples, in Boston, 199 gallons of oil to the ton.

BITUMEN.—A very interesting specimen shews Bitumen not only disseminated in limestone, but occurring in perfectly globular masses in crystals of calcite. This was discovered by G. W. Barnes, Esq.

QUARTZ AND ALLIED MINERALS.—Many beautiful varieties of these minerals are shewn. Amethysts, Smoky Quartz, Jasper, Agate, Chalcedony are met with in considerable quantities, chiefly in the Trap of the Bay of Fundy; the moss agates in the Webster collection are fair representatives of such as are quite abundant in certain localities. Carnelian is shewn in its red form. Immense quantities of Jasper are said to exist in some places. Wood opal is not uncommon, and Siliceous Sinter of which fine specimens are shewn, is very abundant in the locality from which these were taken. The Amethysts are not of large size, nor are they deep in color. Smoky Quartz is found in very large transparent crystals: one specimen is shewn curiously corroded as it were by Chlorite.

ZEOLITES AND ALLIED MINERALS.—The trap region of the Bay of Fundy and Basin of Mines furnishes a most abundant supply of these minerals which are well represented. The attention of mineralogists may be drawn to the fine specimens shewn by Mrs. Webster, which include all the best known species, of which may be especially noted fine series of specimens shewing varieties of Stilbite, of Apophyllite, and of Heulandite. In the general cabinet are, among others, most beautiful groups of Analcime and Natrolite, Chabazite in fine crystals and interesting associations, and in its Nova Scotian variety of deep red crystals called Acadiolite, of which a remarkably fine specimen is shewn. Here also are some species of rare occurrence, as Faröelite and Gyrolite, and some not as yet certainly found out of this region, as Centrallsite and its associates, also Mordenite, and Wichtyne, a mineral hitherto found only in Finland, all of which I have made known within a few years as occurring in this Province.

OTHER MINERALS.—Among these may be mentioned very fine crystals of Barytes by the side of its matrix, curious forms of Calcite, for example, the nail-head crystals heaped upon Pyrolusite, and Pickeringite or Magnesia-Alum in which, as before said, are small quantities of Nickel and Cobalt, which metals I found constantly present; the mineral occurs in a slate rock 60 feet thick. There are also Glauber Salt in crystals containing, in one specimen, a perfect crystal of Selenite, in another, the borate Cryptomorphite before described as occurring in Gypsum, Ankerite which is in part the vein stone of the Londonderry Iron Ore, and a beautiful variety of soft slate, showing various concentrically arranged bands of different colors, which is easily fashioned with a knife, and is said to exist in abundance: and several other specimens, named in the Catalogue, which will be found interesting on examination, and instructive as to the Mineralogy of Nova Scotia.

