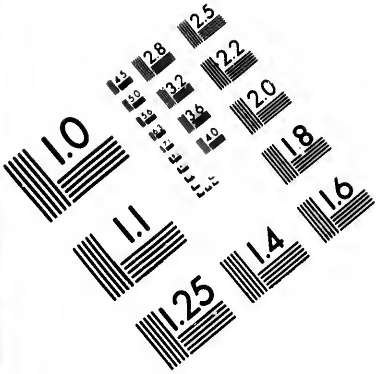
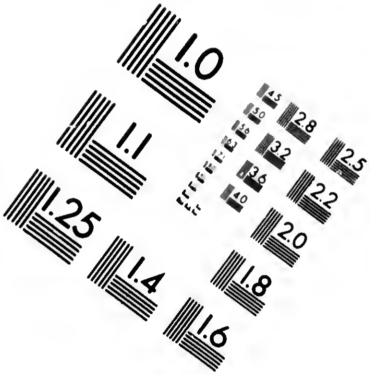
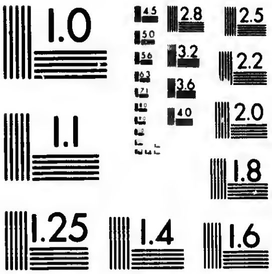
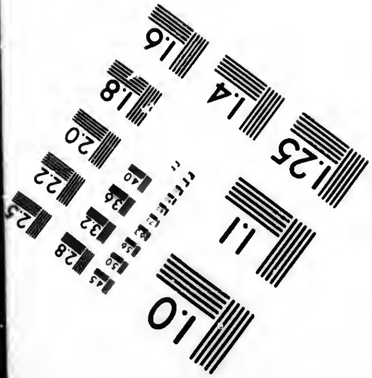
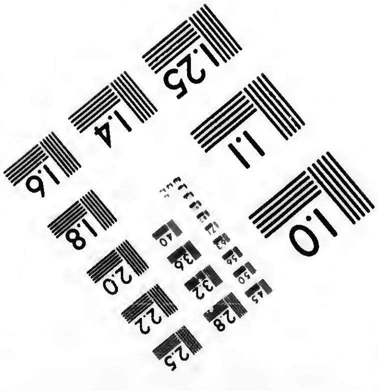




# IMAGE EVALUATION
# TEST TARGET (MT-3)







## Technical Notes / Notes techniques

The Institute has attempted to obtain the best original copy available for filming. Physical features of this copy which may alter any of the images in the reproduction are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Certains défauts susceptibles de nuire à la qualité de la reproduction sont notés ci-dessous.

☐ Coloured covers/ Couvertures de couleur

☐ Coloured maps/ Cartes géographiques en couleur

☐ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées

☑ Tight binding (may cause shadows or distortion along interior margin)/ Reliure serré (peut causer de l'ombre ou de la distortion le long de la marge intérieure)

☐ Additional comments/ Commentaires supplémentaires

☐ Coloured pages/ Pages de couleur

☐ Coloured plates/ Planches en couleur

☐ Show through/ Transparence

☐ Pages damaged/ Pages endommagées

---

## Bibliographic Notes / Notes bibliographiques

☐ Only edition available/ Seule édition disponible

☐ Bound with other material/ Relié avec d'autres documents

☐ Cover title missing/ Le titre de couverture manque

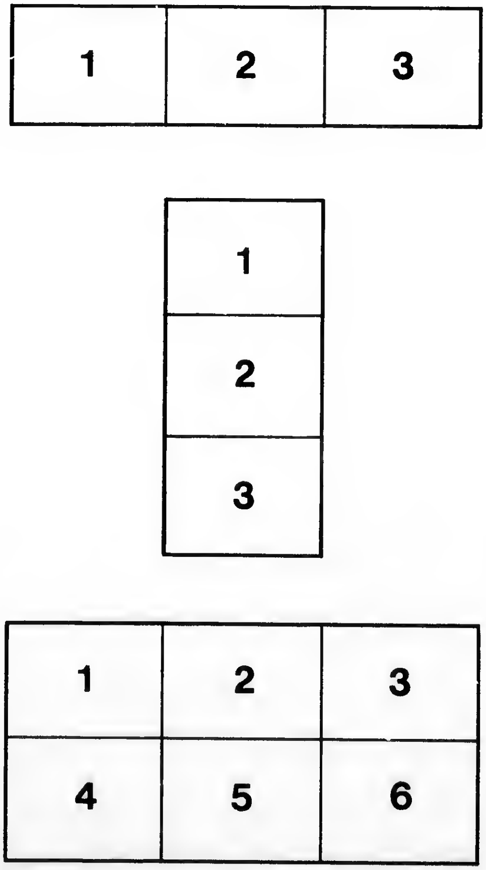
☐ Plates missing/ Des planches manquent

☐ Additional comments/ Commentaires supplémentaires

☐ Pagination incorrect/ Erreurs de pagination

☐ Pages missing/ Des pages manquent

☐ Maps missing/ Des cartes géographiques manquent


1
2
3
1
2
3
1
2
3
4
5
6

TH

Nat

# THE NATIONAL OR GEOLOGICAL

AND

# Natural History Survey Museum.

The

Looke
M
Fi
[I

Rec
the fie
Survey
need o
provin
of wor
their
names
desired
into ee
Wit
Survey
ot my r
to the
The to
tivenes
a natio

I fin
or "N
present
that is
younge
vey in
the exh
I. *P*
provinc

# The National or Geological and Natural History Survey Museum.

## Looked at from a Business Standpoint.—Economic Minerals and Mining as a Part of the Wide Field Covered.

[By a member of the Geological Survey staff.]

*Reprinted from the Canadian Mining Review.*

Recently it has fallen to my lot to glance over the fields of work occupied by the Geological Survey in the past. What led to this was the need of grouping the reports of the Survey by provinces, and the many different branches of work performed by specialists according to their general subject, in connection with the names of the specialists whose work it was desired to trace—felt as a means of inquiring into certain exhibits in the museum.

With the permission of the Director of the Survey, I have here extracted a small portion of my notes, thus incidentally made, appropriate to the field of the CANADIAN MINING REVIEW. The topic is timely on account of its suggestiveness in connection with the general subject of a national museum.

### SCOPE.

I find the contents of the Geological Survey or "National Museum" building in its present state, to be classifiable,—including all that is therein presented by the older to the younger generation,—the reports of the Survey in the book room and library, along with the exhibits in the museum, as follows:—

I. *Physiographic Work*, representing all the provinces; embracing geological and geographical surveys, and field work in various departments more or less special. Reports, specimens, photographs, &c.

II. *Economic Minerals, mining* and mining geology. Analysis of minerals &c.

III. *Biological Work*, embracing—

(*a*) ancient and extinct life as a means of understanding the past and present world and its inhabitants. (palæontology.)

(*b*) natural history, including animated nature as far as interesting or important to mankind.

(c) botany, including forestry, agricultural plants, &c.

(*d*) ethnology, including human inhabitants of the country in the past and present.

IV. *Chartographic* work, embracing everything in all departments capable of being represented in graphic form, such as maps, sections and diagrams.

V. *Exhibits* in all the above mentioned departments; embraced in the museum and library.

### WEALTH ACCUMULATED.

Any one familiar in the slightest degree with the operations of the Geological Survey will recognise at once the wealth of matter that has accumulated in each of these departments.

Omitting the more general and better represented departments (except to remark regarding them that they are all crammed to over-flowing in a building not fire-proof) I will append a brief abstract of Sub-division II, the titles regarding minerals and mining since the Survey was organized. It will illustrate the character of the work done in a department not very extensively represented in the industries of Canada, and serve as an index to that industry in each of the provinces so far as represented in the museum and library.

### THE WEALTH UNDER THE SURFACE.

The economic minerals form the main feature of the first floor of the museum. The arrangement is according to the uses to which they are adapted. A second feature of the same floor is the Scientific Collection of minerals, in which all the minerals represented in the Dominion are arranged according to their chemical ingredients and natural relationship to each other. A third feature of the floor is that of the Metals and their Ores (arranged in the flat glass cases along the centre of the room), and remarkable for its completeness and general excellence. Though forming Class I of the Economic minerals it is on account of its importance placed separately. The subdivisions of the Economic minerals (the balance arranged along the walls on both sides) are :—

1. Metals and their ores.
2. Fossil fuel.
3. Minerals applicable to certain chemical manufactures and their products (see also under 4).
4. Mineral manures (see also under 3).

5. Mineral pigments and detergents.
6. Salt brines and mineral waters.
7. Materials applicable to common and decorative construction.

The only exhibition beside these mentioned on the first floor is that of the rocks. It is arranged in the centre according to formations; consequently is also important to mining. Mr. Broadbent is constantly adding to the attractions of this floor, devoting all his time to it; so that every day visitors will find in one or another of its departments something new.

### PUBLISHED INFORMATION.

It is proper to remark that the library is an important part of the museum, as containing all the published information extant, and the reports of the Geological Survey, describing the contents of the museum. It is open to the public, like the museum itself, and has in attendance a librarian who is always ready to produce any required report. It is only necessary to explain that the years mentioned below are part of the titles of the reports, referring to date of field work, not of publication.[*]

### ECONOMIC MINERALS—NOVA SCOTIA.

Logan & Hartley.—On the Pictou coal field, 1866-69.

---

[*] In the Museum the year and collector's name are often seen on the label. By this arrangement full and complete information may at once be turned to in the Survey Reports. Other numbers on the labels refer to curator's catalogues, and the individual specimen is (at present) only traceable by personal inquiry.

E. Hartley.—On coal and iron ores of Pictou County, 1866-9. Spring Hill coal field 1886-9. Map in Atlas of 1863.

T. S. Hunt.—On the gold region of Nova Scotia. (Separate publication) 1868.

A. R. C. Selwyn.—Observations on gold fields, 1870-1. Acadian vein deposits, Londonderry and Colchester, 1872-3.

Jas. Robb.—On coal mines of eastern or Sydney coal field of Cape Breton, 1872-3.

Scott Barlow.—On Spring Hill coal field, with map, 1873-4. Survey of coal in fields Cumberland County, 1875-6.

W. McOuat.—On coal in Cumberland County. 1873-4.

Maps accompanying reports. Map of Acadain iron mines, 1872-3; index map of Spring Hill coal field, 1873-4; map of Sydney coal field, one inch to one mile, 1873-4; ditto same scale, 1875-6.

### NEW BRUNSWICK.

R. W. Ells.—Borings for coal at Newcastle bridge, 1872-3. Second report on same, 1874-5. Iron ore deposits of Carleton County, with map, 1874-5.

Maps accompanying reports. Map of Grand Lake coal field, with older rocks in Queen's and Sunbury, 1863. Map showing distribution of iron ores in Carleton County, 1874-5.

### QUEBEC.

Sir W, Logan.—On the gold of the Chaudiere region, 1850-51; economic minerals from

Montreal to Cape Tourment, 1852-53; the Ramsay lead mine and Acton copper mine with miscellaneous economic minerals, 1858.

B. J. Harrington.—On minerals of apatite bearing veins in Ottawa County, 1877-78.

A. Michel.—On the gold region of Lower Canada, 1863-66.

T. S. Hunt.—Mineralogy of gold veins, 1863-66; petroleum in Gaspe (separate publication), 1865.

R. Bell.—Map of Gaspe in connection with the above (separate publication), 1865.

A. R. C. Selwyn.—Observations on gold fields, 1870-71.

J. F. Torrance.—On apatite in Ottawa County, 1882-84.

G. Broome.—On phosphate of lime and mica found in North and South Burgess, 1870-71.

H. G. Vennor.—Plan of Dalhousie iron mine, 1872-73; explorations in Frontenac, Leeds and Lanark counties, 1873-74; plumbago and apatite in Templeton, Portland and Ottawa counties, 1873-74; explorations in Renfrew, Pontiac and Ottawa counties, with additional notes on iron, apatite, and plumbago in Ottawa County, 1876-77.

C. W. Willimot.—On mines in Quebec, 1880-82.

Maps, etc., sep. Catalogued.—Localities of copper ores in the Silurian of Lower Canada, 1858; on copper localities, 1863-66; notes on the gold region of Eastern Canada (reprint of various reports from 1843 to 1863—separate publications), 1864; map of North Burgess showing the positions of apatite openings, 1876-77; map showing phosphate of lime in Ottawa County, 1876-77.

## ONTARIO.

Sir W. Logan.—On the geology and economic minerals of Lake Superior, 1846-7; on various economic minerals, and on the Industrial Exhibition of 1851, 1851-2; on the Ramsay lead mine and the Acton copper mine, and miscellaneous economic minerals, 1858.

T. S. Hunt.—On the Goderich salt region, 1866-9; on the gold region of the County of Hastings (jointly with A. Michel—separate publication) 1867; locations of copper ores in the Huronian rocks of Mississagui river, 1858; on the Goderich salt region (reprinted from the Transactions of the Canadian Institute of Mining Engineers, Vol. V) 1876-7.

H. G. Vennor.—On the geology of portions of Hastings, Peterborough and Frontenac counties, Ontario, with geological map, 1866-9. (Vicinity of Belleville).

Marmora gold mines, 1871-2; notes on economic minerals of Ontario, 1874-5.

T. McFarlane.—On the geology and economic minerals of portions of the County of Hastings, 1863-6; Laurentian, Huronian and upper copper bearing works of Lake Superior; with an appendix on the rocks and cuopriferous beds of Portage Lake, Michigan, 1863-6.

### HUDSON BAY AND LABRADOR.

R. Bell, Professor Dittmar.—Analysis of waters from Hayes and Nelson rivers, 1878-79.

### MANITOBA.

B. J. Harrington.—Brick clay from Fort Garry, 1872-73.

G. C. Hoffman.—On lignites, 1873-74.

### NORTH-WEST TERRITORY.

R. W. Ells.—Borings for coal, 1875-76.

A. R. C. Selwyn.—Borings for coal on Souris R, 1879-80.

G. M. Dawson.—On coal seams of Bow and Belly river district, 1880-82; general remarks on coals and lignites, 1880-82; geology of Bow and Belly rivers with special reference to coal (separate publication), 1882; map of coals and lignites Bow and Belly river, 1880-82.

G. C. Hoffman.—Analysis of coals and lignites, 1882-84.

### BRITISH COLUMBIA.

J. Richardson.—On the coal fields of the east coast of Vancouver Island with map, 1871-72; the same including Queen Charlotte Islands with map, 1872-73; report on the coal fields of Nanaimo, Comox, Covrtchin, Burrard Inlet, and Lovke with general map, 1876-77.

T. S. Hunt.—Analysis of Richardson's coals from Vancouver Island, 1871-72.

B. J. Harrington.—On (Richardson's) coals from the west coast, 1872-73; gold, silver, &c., 1874-75 and 1876-77.

G. M. Dawson.—General notes on mines and minerals of economic value in British Columbia, 1876-77; same with additions (separate report), 1883.

C. G. Hoffman.—Gold and silver assays, 1875 to 1885.

A. Bowman.—On Cariboo gold region, with general map; also sundry districts with detail maps (in hand).

### MINERALS GENERALLY RELATING TO ALL THE PROVINCES.

Sir Wm. Logan was a practical mining engineer by education and experience. He never made any geological report without doing full justice to the economic minerals of the country examined. Some of his work was catalogued anonymously.

T. S. Hunt.—Mr. Hunt's catalogued reports began with that on mineral springs, ores, &c., 1845-46 and 1848-49, and embraced Ontario and Quebec minerals promiscuously down to 1869. He reported on various minerals and mineral waters, 1847-48; on mineral springs, ores, &c., 1848-49; on soils, peat, asphaltum, mineral springs, &c., 1849-50; on various mineral waters, 1850-51; minerals, soils, mineral waters, &c., 1851-52 and 1852-53; sundry analyses, manufacture of salts from sea water, metallurgy of iron, 1853-56; on dolomites, limestones, fish manures, &c., 1856-57; on intrusive rocks, minerals from silurian rocks and on the history of magnesia limestones,

1858; on petroleum and salt, 1863-66; on peat and its applications, 1863-66; on mineralogy of gold veins and method of gold working, 1863-66; notes on iron ore, 1866-69; petroleum (separate report) in Gaspé, 1865; Canada: a geographical, agricultural and mineralogical sketch (separate report), 1865. In 1867 (separate report) he published a sketch of the Geology of Canada for the Paris exhibition of that year.

Anonymously catalogued.—As appendices and otherwise, including maps accompanying the reports elsewhere mentioned, some titles occur in the "List of Publications" not connected with any authors names:

Statistics of copper mining and copper smelting in Great Britain, 1846-47; catalogues of some of the economic minerals and deposits of Canada, 1849-50; descriptive catalogue of a collection of economic minerals of Canada and of its crystalline rocks (sent to London exhibition for 1862–separate report), 1862; ditto, including stratigraphic collection sent to Philadelphia, 1876; ditto Paris, 1878; on the Goderich salt region (reprinted from the transactions of American Institute of Mining Engineers vol. V), 1876-77.

J. Robb.—Mining and mineral statistics, 1871-72.

B. J. Harrington.—Notes on samples of brick clay from Fort Garry, analysis of serpentine, &c., 1872-73; on the iron ores of Canada and there development, 1873-74; notes on a few Canadian minerals and rocks, 1874-75; notes on miscellaneous rocks and minerals, 1876-77.

G. C. Hoffman.—Chemical contributions to the Geology of Canada, 1874-75, 1875-76, 1876-77, 1877-78, 1878-79, 1879-80, 1880-82, 1882-84 and 1885; on Canadian graphite, 1876-77.

L. Smith.—Observations on the history and statistics of trade and manufacture of Canadian salt, 1874-75.

Prof. Dittmar.—Analysis of the waters of Hayes and Nelson rivers, 1879-80.

E. Coste.—Mining laws and mining policy, 1885; in hand (assisted by Mr. Brummel) statistical report of mining operations in all the provinces.

### MATTER IN GEOLOGICAL REPORTS.

Not catalogued as individual reports but occupying a portion of almost every geological report issued by the survey since its organization, is the consideration of all economic minerals encountered in the area examined. An index to those would be furnished by a similar classification of the physiographical material in subdivision 1; though it is not difficult to check off any desired portion o. locality from the general list of publications of the Survey, if one had time to read over the 300 to 400 titles.

### POPULAR AND PRACTICAL.

The museum has a wonderful faculty of drawing visitors. Mr. Burke, the doorkeeper, who

keeps a visitors record, informs me that the yearly average is not less than 14,000; monthly, 1,000; and daily in fair weather not less than 40.

They seem to find something that interests them. What is it? The museum is not so attractive in some respects as are the magnificent Agassiz and Redpath museums. When one knows how imperfectly the majority comprehend what the Geological Survey Museum really is, or grasp the idea of how it may be utilized in a practical way for useful or busines purposes, the curious fact would seem to require explanation.

It is observed that the objects on exhibition are all native, and that the animal, vegetable, and mineral worlds in their several departments are all represented. An inkling at once asserts itself that here is accumulated a wonderful store of facts lying at the foundation of every industry in our land. No one man's travels could have won them. No single fortune could have done it, for the Geological Survey has cost, in the 25 years preceding confederation, $375,000, and in the 20 years since confederation, $1,000,000. Has it not been a good investment? What has been the "idea" of so large an investment? For no one calls it an extravagance.

### CONCEPTION OF THE MUSEUM.

An intelligent handling of ones resources is undoubtedly the first consideration in every business.

The Government performs many functions which it is created or called on to perform. It leaves all others to be taken hold of by individuals. It gives attention by preference to those things which enable the people to help themselves. Foremost among these is education —placing in reach of every one the necessary information to handle his resources and powers effectively.

The National Museum is *all the provinces in miniature.* Its object is to place the necessary knowledge and facts regarding the Dominion and its resources, with their surrounding and controlling natural conditions, conveniently within the reach of matured men, and legislators whoare commissioned to attend to their interests. Without such knowledge collected and presented conveniently to their hand, they would be compelled to skirmish individually and unaided in search thereof, just as the child would have to do without the advantages of an education.

### ITS GROWTH AND "MANIFEST DESTINY."

Here is an institution occupying a three story stone block at Ottawa (for many years forming a department under the direction of the Minister of Interior) which has had a continuous active existence since A.D. 1843. Is it possible that what I have written in regard to it, and the matter it covers, should be read in these columns by many intelligent people not strangers to the museum with something like the freshness of news? The publications here referred to in the briefest manner possible, are more fully described in the price list of publications of the Geological Survey (to be had gratis on application), and are sold approximately at cost, a nominal figure when the publication is separate. This is now the case with all reports and maps issued, though they are annually bound together into volumes, for libraries and reference.

Has not the generation of Wm. E. Logan, of John A. McDonald and of J. W. Dawson, whose energies have been those of the Dominion in its youth, done well in presenting this foundation to the active men who are to pilot the destinies of the Dominion henceforward?

The mining exhibit only faintly indicates the far greater wealth of the museum in physiographic and biological material tributary to agriculture, and sundry arts and industries too numerous to mention. Now as it is the business of every one to look out for himself, and presumably of the statesman also, in his public not less than in his individual capacity, is it worth his while, on behalf of his constituents, to consider for a moment any thought which, (looking forward to the proper destinies of the Canada of the next generation), can build up within our means the noble conception of a national museum?

One of the functions that has been acceptably performed by the Geological Survey for years has been the supplying and aiding in building up of local and provincial museums. Subterranean regions in charge of Mr. Willimot, devoted to this requirement, are seldom seen or heard of by the visitor. Several of the provinces, having special local interests, have inaugurated provincial geological surveys, supplementary to those of the Dominion, and commenced local museums of their own; the good policy of which is apparent.

Canada has its *central* mineral belt, the copper, silver, gold and iron belts of the Lake Superior region extending northward, and Drs. Selwyn and Bell think repeating itself along the coast of Hudson's Bay. It has the *cordilleran* belt with all the mineral wealth that term implies in North and South America. It has also its *appalachian* gold belt, which is interesting on account of the reported richness of some of its ledges; and *sundry coal and iron regions*, which justify us in saying her capabilities of sustaining even large populations in unthought of "deserts," may be far better than we have imagined. If so her rigorous climate, during a portion of the year, may turn out to be an advantage rather than a drawback; and the aspect of probable future national developments is materially improved.

**A. B.**