

William Logan's 1850 History of the Geological Survey of Canada

Charles H. Smith

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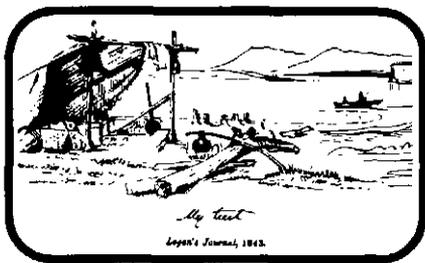
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Article abstract

William Logan wrote the first history of the Geological Survey of (the Province) of Canada in 1850. It was published, anonymously, in a non-geological venue, Scobie's Canadian Almanac for the year 1851. Because of its publication venue, the "history" seems unknown to geological literature. In the history Logan presented a public case for the economic value of geological surveys, to a political, commercial and public audience in Canada, while not appearing to meddle in the political process of the day. Included was a "Catalogue of Economic Minerals of Canada" bearing Logan's name, and which he used to plan the successful Canadian contribution to the 1851 Industry Exhibition, held in London. The history and the Catalogue texts, and their uses, show that Logan was a master in generating public awareness of the benefits of geological surveys in Canada, and of the economic potential of Canada's mineral resources abroad.



William Logan's 1850 History of the Geological Survey of Canada¹

Charles H. Smith
2056 Thistle Crescent
Ottawa, Ontario K1H 5P5

SUMMARY

William Logan wrote the first history of the Geological Survey of (the Province) of Canada in 1850. It was published, anonymously, in a non-geological venue, *Scobie's Canadian Almanac* for the year 1851. Because of its publication venue, the "history" seems unknown to geological literature. In the history Logan presented a public case for the economic value of geological surveys, to a political, commercial and public audience in Canada, while not appearing to meddle in the political process of the day. Included was a "Catalogue of Economic Minerals of Canada" bearing Logan's name, and which he used to plan the successful Canadian contribution to the 1851 Industry Exhibition, held in London. The history and the Catalogue texts, and their uses, show that Logan was a master in generating public awareness of the benefits of geological surveys in Canada, and of the economic potential of Canada's mineral resources abroad.

RÉSUMÉ

C'est William Logan qui, en 1850, a écrit la première histoire des Services géologiques de la (province) du Canada. Il

s'agit d'un texte non signé paru dans une publication non-géologique, l'almanach canadienne Scobie de 1851, et c'est la raison pour laquelle cette « histoire » n'apparaît pas dans la littérature géologique. Dans ce document, Logan faisait valoir l'importance économique des levés géologiques autant devant la classe politique, commerciale que devant la population canadienne en général, tout en paraissant éviter de se mêler de l'actualité politique du jour. Cette « histoire » comprenait un « Catalogue des minéraux économiques du Canada » qui porte son nom, catalogue qu'il a utilisé pour préparer la contribution canadienne à l'exposition qu'a tenue l'industrie houillère à Londres en 1851. Autant cette « histoire » et les textes du catalogue que l'utilisation qu'il en fit montrent que Logan était un maître dans l'art de susciter l'intérêt public sur les retombées bénéfiques de levés géologiques au Canada ainsi que sur le potentiel économique de l'exportation des ressources minérales canadiennes.

INTRODUCTION

It is little known that William Logan wrote the first history of the Geological Survey of Canada in 1850. His account of the origin, progress and results of the geological survey was published, anonymously, in *Scobie's Canadian Almanac and Repository of Useful Knowledge for the year 1851* (Anonymous, 1850). In publishing this account in a non-geological venue, Logan established himself as an early and true practitioner of the art of "public awareness of earth science" in Canada.

Logan's authorship of the anonymous text is confirmed by a draft, unsigned manuscript, in his own handwriting, located in the McGill Archives (M.G. 2046, W.E. Logan Papers). The cover page of this manuscript is titled "History of Geological Survey for Scobie Almanack Toronto August 1850." In those days, Logan wrote all his reports, with duplicate copies, by his own hand, as seen in Figure 1. The McGill University text is nearly complete, but not quite the fi-

nal printed version, as reprinted below from *Scobie's Almanac* for 1851.

Scobie's Almanac (Fig. 2) was published in Toronto annually from 1848 to 1856. Although it has changed ownership and names several times, it is published to this day as the *Canadian Almanac and Directory*. The content of the 84-page issue for 1851 is characterized by numerous tables and listings — astronomical, statistical, governmental, commercial — and advertisements, but little narrative text. The *Almanac* was sold "by storekeepers generally throughout the Province of Canada" and in the northern United States, so it had a wide public audience.

CANADA IN 1850

Scobie's Almanac is full of statistical detail on the governance of the Province of Canada in the 1850s. The province had been formed, in 1840, by the union of Lower and Upper Canada, also called Canada East and Canada West. The Right Honourable James, Earl of Elgin and Kincardine, Governor General of British North America, whose support of the Geological Survey is acknowledged in Logan's account, was also the Governor General of the separate provinces of Nova Scotia, New Brunswick and the "Island of Prince Edward," none of these provinces being part of the "Canada" of 1850. Apart from the powers held by the Governor General and his appointed Executive Council, the business of governing was carried out in the Legislative Assembly of the Province of Canada. It consisted of 81 members, equally elected from Lower and Upper Canada. Logan spent much time developing his contacts among the Members, as they approved the bills establishing and funding the Geological Survey. The Legislative Assembly also published Logan's annual reports.

The Province of Canada, according to *Scobie's Almanac* for 1851, had an area of 349,821 square miles (Logan reports 331,280), which is roughly 10% of the Canada of today. The population

¹ The virtually unknown 1850 *Scobie's Almanac* paper by Logan which forms the main part of this contribution was located recently by C.H. (Charlie) Smith, a long-time Geological Survey of Canada geologist, now retired. Together with Hugh Torrens' account of Logan's geological apprenticeship in Britain 1831-1842 (*Geoscience Canada*, 1999, v. 26, p. 97-110, this issue), we have a complementary pair of contributions that clearly demonstrate firstly how Logan became skilled in geology in Britain, and secondly how well he applied this knowledge in Canada in the 1840s. The *Scobie's Almanac* text, reproduced here thanks to Leslie King so that it closely resembles the original text, shows how capably Logan applied himself to the geology of Canada, almost single-handedly elucidating Canada's unknown geology and economic potential, and building new and long-lasting institutions for the future. As we stand on the brink of the new millennium, it is satisfying to observe how well our journey of geological understanding began with the work of William Logan, and how much has been accomplished by those following his example to the present day. Further information on Sir William Logan, a giant figure in Canadian science, can be obtained at the following website: <http://nrcan.gc.ca/gsc/logan/>. R.W. Macqueen, editor.

of the Province of Canada was 1,582,000, about equally divided between Lower and Upper Canada. Montreal, the largest city, had a population of 57,715, followed by Quebec City with 42,052, and Toronto with 30,775. Travel within Canada depended largely on the waterways.

The report of the Post Office Department provides an interesting insight into land travel. "Postal services were provided by steamboat, passenger coaches and horseback. On the open roads there are carriages placed, in which travelling can be accomplished with comparative comfort; on others, open waggons; but the experienced and persevering traveller, who does not look for the comforts of the paved city road, in the backwoods settlements, can at all times make sure of passing over, in safety, the beaten track which the post boy travels all the year round." (*Scobie's Almanac*, 1849).

In *Scobie's Almanac* for 1851, Canada's exports in 1850 are reported in terms of the basic industries, "The Mine, The Seas, The Forest, Agriculture", etc., of which the mines accounted for 243 tons of copper ore shipped to Great Britain and 55 tons of copper shipped to the United States. Not having established the presence of commercial coal in Canada, Logan's challenge was to create world awareness of the potential in other mineral resources, as listed in the "Catalogue.. of Minerals..." appended to Logan's Geological Survey of Canada account in *Scobie's Almanac* for 1851.

LOGAN'S 1850 CONTRIBUTION TO SCOBIE'S ALMANAC

An unauthored text in a trade journal is quite unlikely to be quoted or indexed in the geological literature, and this has been the case with Logan's *Scobie's Al-*

manac contribution. Yet its "authentic source," and knowledgeable perspective, make it an important reference for historians of geology and others following in Logan's footsteps. As well as being an interesting early account of the geological activities and accomplishments of Logan and his two colleagues, Alexander Murray and T. Sterry Hunt, the document is another piece of the Logan legacy. Its inaccessibility warrants its reprinting at this time.

That Logan set out to prepare an anonymous text is clear. In his handwritten text he refers to "a modelconstructed by Mr. Logan" and "a catalogue prepared by Mr. Logan". The few changes between the handwritten and printed text also bear mention. The anonymity of the author was reinforced in the printed document by referring, in the opening sentence, to a "brief abstract drawn from the most authentic sources."

Geological Survey

In January 1832 A petition from D. Rae praying for pecuniary assistance in prosecution of a Geological & Statistical Survey of the Province ^{was} ~~presented~~ ^{presented} down by message to the Legislative Assembly, from His Excellency Sir J. Colborne L. Gov^t of Upper Canada. It was read & referred to the Committee of Supply but not considered.

In December 1832 - A petition from the York Literary & Philosophical Society praying that a sum of money might be granted to provide for a course of lectures on Geology, Mineralogy & Natural History of the Province ^{to the} ~~presented~~ ^{presented} Legislative Assembly of Upper Canada. It was read & referred to the Committee of Supply but not considered.

In February 1836 On the motion of Mr. M. Mackenzie seconded by Mr. Parand Mr. J. S. Paulson - Robert Dundas Esq. were named a select Committee to consider & report on a plan for a Geological Survey of the Province. The report was presented, 300 Copies printed & thereupon referred to the Committee of Supply but not considered.

Figure 1 A portion of Logan's August 1850 handwritten manuscript for *Scobie's Almanac*, specifically paragraphs 2-4 from the *Scobie's Almanac* printed document. Original in McGill University Archives (M.G. 2046, W.E. Logan Papers).

Three separate sentences were added to the printed version in *Scobie's Almanac*, not present in the handwritten notes, to praise the roles of Lord Sydenham, Lord Metcalfe, and Lord Elgin, all governors-general supportive of the establishment and continuation of the Survey. In addition, a paragraph was added to the printed version to describe the Survey geological collections, "intended to form the nucleus of a provin-

cial museum."

It seems reasonable to conclude that Logan had several objects in mind in writing this document for *Scobie's Almanac*. First, it provided for a change in audience, style and content from the traditional GSC Reports of Progress, started in 1843 and addressed to the Governor General and Legislative Assembly of the day. These reports were of limited distribution, and could not

have served the purpose of enlightening the general public. Second, although renewed funding for the Survey had recently been obtained, the political climate of the day promoted close expenditure control in government, and the value of geological surveys had to be continually reaffirmed (plus ça change...). Finally, there was a need to make the case for the Survey to a political, commercial, and public audience, while not

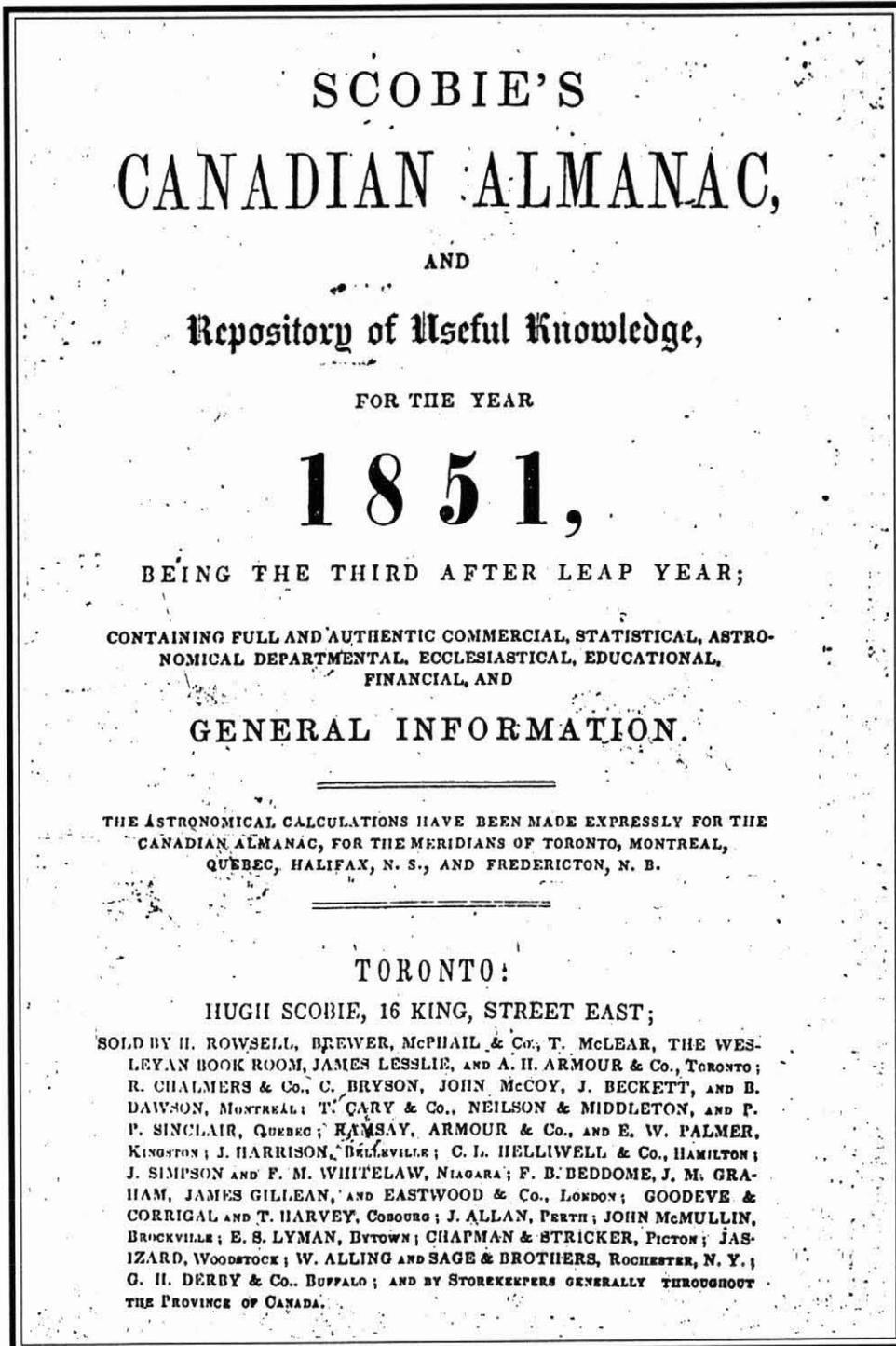


Figure 2 Title page of *Scobie's Almanac for 1851* (from the National Library of Canada, Ottawa).

appearing to be meddling in the political process.

True to Logan's reputation in dealing with public opinion, he prepared a straightforward, but masterful document. It begins as a "history" and concludes with a strong endorsement of the value of geological surveys. Along the way, he reminds readers that the area of Canada, given as 331,280 square miles, was too large for only three persons, Logan, Murray and Hunt, to examine in the lapsed time since the work started (a plea for more staff?). Logan lists the districts in Canada that he has examined to date. There is no reference to his historic work (1843) on the Joggins, Nova Scotia section, as this was not part of Canada at the time. This had not prevented Logan from including the Joggins section in a GSC Report of Progress published in 1845, however. He had written De la Beche "I mean to get the document published somehow or other ...I am aware they [Geological Society of London] will not publish it. There is not poetry enough in it for their pages ...If I was in Britain and had more leisure, I think I could make geological capital of this section." (Logan to De la Beche, 20 April, 1844, McGill University Archives M.G. 2046, W.E. Logan Papers; also GSC Report of Progress for 1843, Appendix).

The great value of topographical surveys including those by Logan and Murray is described, as well as the "great multitude of useful metallic ores and other minerals" analysed by T. Sterry Hunt. Only passing reference is made to the geological structure and the "great coal fields spread out in the middle and western states" of the United States. Instead, attention is drawn to the "Catalogue of... Economic Minerals and Deposits of Canada... prepared by Mr. Logan" for the 1851 Industrial Exhibition in London, and appended to the *Scobie's Almanac* publication. The Catalogue had been previously transmitted to the Government (Report of Progress, 1849-1850).

Finally, and most importantly for public consumption, extensive space is given to describing the larger scale of activity of geological surveys in the United States, especially the New York State survey, and the economic benefits. The rationale for using information on American State surveys was explained by Logan in correspondence with New York State Geologist James

Hall as follows (see Logan to Hall, April 1844, New York State Archives, Albany, J. Hall papers): "I wish to have it in my power to quote your outlay with accuracy to the Canadians by way of encouragement should they hesitate at any time in regard to funds." The punch line in Logan's *Scobie's Almanac* text is a quote that "the eminent geologist Sir R.J. Murchison, computes that the money expended in England alone, before geology was understood, in searching for coal where it would now be considered madness to expect it, would be sufficient to effect a correct general geological examination of the whole crust of the globe."

LONDON EXHIBITION, 1851

During the period in which Logan was writing the *Scobie's Almanac* article, he was invited to prepare the Canadian mineral contribution to the Exhibition of the Industry of all Nations, held in the Crystal Palace in Hyde Park, London, May-October 1851. Logan used the Catalogue, as printed in *Scobie's Almanac* for 1851, as the basis for "diffusing a knowledge of the mineral resources of the country" to an international audience. He later reported the successful results in considerable detail to the Governor General and the Legislative Assembly (GSC Report of Progress for the year 1851-1852, p. 37-56). Only the minerals capable of industrial applications were sent, and they were assembled from the contributions of 29 exhibitors, and the three officers of the Geological Survey. Logan reported the opinion of the jury of the class "comprehending mineral products" as follows:

Of all the British Colonies, Canada is that whose exhibition is the most interesting and the most complete, and one may even say that it is superior, so far as the mineral kingdom is concerned, to all countries that have forwarded their products to the Exhibition. (GSC Report of Progress, 1851-52, p. 43).

Logan's report to the Legislative Assembly (Report of Progress for the Year 1851-1852) provided a detailed assessment of the economic significance of each class of Canadian mineral displayed, based on the responses of foreign delegates to the Exhibition: information of value in planning future economic development. Logan also used the Report of Progress to inform the Governor General and legislators of the importance of a provincial Museum of Economic Geology, as provided for in

the Act of 1845, modelled after the Museum of Practical Geology, attached to the Geological Survey of the United Kingdom. In Logan's words:

In a new country, just beginning to ascertain its possession of useful minerals, one of the most difficult things possible is to introduce the skill required to make them available. Descriptions of them, and their applications, may be printed and published, but it is not easy to get the descriptions read; indeed a vast number of those whose labor might be available to turn the materials into profit, can read with difficulty or not at all; but it requires little tuition to comprehend the objects of industrial art when addressed by the eye, and imitative skill is more excited by the sight of such objects, than by the written descriptions even when understood. In a collection of them, many persons, to whom the knowledge would in no otherwise come (sic), may recognize substances which they have in abundance at their own doors, but of which they know not the use. The examples which show their uses....would be a means of exciting native industry. (GSC Report of Progress for 1851-1852, p. 56).

CONCLUSIONS

Truly, as the record for 1850-1851 shows, Logan was a master in generating public awareness of the economic value of geological surveys, of museums, and of the mineral resources of Canada. William Logan is a giant figure in Canadian geology and the Canadian nation, an individual whose geological contributions and philosophy provide an outstanding example to those who follow in his footsteps today.

ACKNOWLEDGMENTS

I wish to thank Roger Macqueen for his interest and thoughtful contributions to improving the quality of the text and illustrations presented in this paper. Glen Edwards of GSC Calgary prepared the two figures using computer scanning techniques.

REFERENCES

- Anonymous, 1850, Geological Survey of Canada: *Scobie's Canadian Almanac and Repository of Useful Knowledge for the Year 1851*, published at Toronto, p. 67-70.
- Geological Survey of Canada Reports of Progress, 1843, 1849-50 and 1851-52.

The text of Logan's 1850 *Scobie's Canadian Almanac* account of the Geological Survey of Canada follows, set so that it resembles the original text.

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GEOLOGICAL SURVEY OF CANADA

The origin, progress and results, up to the present time, of this interesting work is given in the following brief abstract drawn from the most authentic sources:—

In January, 1832, a petition from Dr. Rae, praying for pecuniary assistance in prosecution of a geological and statistical survey of the Province was sent down by message to the Legislative Assembly, with a favourable recommendation from his Excellency Sir John Colborne, Lt. Gov. of Upper Canada. It was read and referred to the Committee of Supply, but not considered.

In December, 1832, a petition from the York Literary and Philosophical Society, praying that a sum of money might be granted to provide for an investigation of the Geology, Mineralogy, and Natural History of the Province, was presented to the Legislative Assembly of Upper Canada.

It was read and referred to the Committee of Supply, but was not considered.

In February, 1836, on the motion of Mr. W.L. Mackenzie, seconded by Mr. Durand, Messrs. R.G. Dunlop, Gibson and C. Duncombe were named a select committee to consider and report on a plan for a Geological Survey of the Province. Three hundred copies of this report were ordered to be printed, and it was referred to the Committee of Supply, but it was not considered.

In November, 1836, Mr. R.G. Dunlop gave notice of a motion for leave to bring in a Bill for the purpose of instituting a geological examination of the Province, but the bill was not proceeded with.

In November, 1836, on the motion of Mr. R.G. Dunlop, seconded by Col. Prince, the House went into a committee of the whole to consider the expediency of a geological survey, and, on their report being received, it was resolved that an address should be presented to His Excellency the Lt. Governor, (Sir F.B. Head), to ascertain whether there were any means at his disposal to effect a geological survey of the Province. The address was ordered to be drafted, but was not reported.

In December, 1836, Mr. R.G. Dunlop gave notice that he would move an address to His Majesty for a grant of wild lands to defray the expense of a geological survey of the Province, but no address was presented.

To Lord Sydenham, who well appreciated the importance of an examination into the mineral resources of Canada, the country is indebted for the commencement of the geological survey which has been instituted.

In July, 1841, in the first united parliament, a petition from the Natural History Society of Montreal, praying for aid to carry out a systematic geological survey of the Province, was presented by Mr. B. Holmes. It was referred to a select committee consisting of Messrs. Holmes, Neilson, Quesnel, Merritt, and the Hon. Mr. Killaly, but it was not reported on. A similar petition was presented by Mr. Black, from the Literary and Historical Society of Quebec, which was read. The Government took up the matter, and on the motion of the Hon. S.B. Harrison the sum of £1500 for the purposes of a survey was introduced into the estimates.

In 1842, Sir Charles Bagot appointed two geologists, Mr. W.E. Logan, F.G.S., principal, and Mr. A. Murray, assistant, to carry the survey into operation, and the investigation was commenced 1st May, 1843.

To Lord Metcalfe is due the credit of a more systematic continuance of the survey.

In March, 1845, under the administration of the Hon. Mr. Draper, Mr. Attorney General Smith brought before parliament a bill, which was supported by all parties and passed into an act without a dissentient voice, (8 Vic. cap. 16.) making a provision of £2000 per annum for 5 years, for a complete examination of the rocks, soils, and minerals of the Province. For the purpose of analyzing minerals, ores, mineral waters, and soils, a chemist was attached to the survey.

The area of Canada, according to Bouchette, is 331,280 square miles. It was not to be expected that 3 persons could examine the whole of this in the time which elapsed from the commencement of the survey to the expiration of the 8 Vic. cap. 16, (March, 1850,) and Lord Elgin, who, from the circumstance of his own family estates being so extensively enriched with mineral deposits, must be well acquainted with the importance of geological investigations, was no doubt favorable to a continuation of the Canadian examination, and therefore well pleased that the present administration should renew the act, which they did (again without a dissentient voice being raised in the Legislature,) during the last session of parliament, for 5 years more.

The districts examined, according to the reports of progress that have been published, are as follows:—

The Canadian coast and islands of Lake Superior and two rivers on the north shore for distances of 40 and 60 miles up.

The Canadian coast and islands on Lake Huron with distances of 20 to 70 miles up 4 principal tributary rivers on the north shore.

The coast of the lower part of Lake Erie and the upper part of Lake Ontario, as well as the country back from Toronto to the exit of Lake Simcoe and Matchedash Bay.

The Ottawa from its mouth near Montreal to the head of Lake Temiscamang, a distance of 400 miles, with many

of its tributaries on the right bank for distances of 20 to 40 miles up.

The Eastern Townships from the Richelieu to the Chaudiere River.

The country between the Chaudiere River and the Temiscouata Portage road.

The coast of the Gaspé Peninsula from the Metis road round by Cape Gaspé and Isle Perce to the mouth of the Matapedia River a distance of about 800 miles, with several sections across the peninsula from the St. Lawrence to the Bay Chaleur.

From this it would appear that there still remain to be examined the following districts:—

The region on the south side of the St. Lawrence between the Temiscouata and Metis roads. The whole of the north shore of the St. Lawrence, including the Island of Anticosti, from Labrador to Quebec, with the exception of Murray Bay and Bay St. Paul.

The north shore of the St. Lawrence from Quebec to Montreal.

The same from the Cascades to Kingston, including various parts of the interior between the St. Lawrence and the Ottawa.

The country between Kingston and Lake Simcoe, extending back to the Mattawa.

The interior of the peninsula between Lakes Huron and Erie.

The whole of the region extending along the height of land separating Canada from the Hudson Bay Territory in the entire length of the Province.

A large and valuable collection of specimens has been made to illustrate the minerals, rocks and fossils of the districts examined, which is preserved at the office of the survey, for the present at No. 10, Little St. James street, Montreal; a full suit of these specimens is intended to form the nucleus of a provincial museum, and the duplicates, after they have served the purposes of the survey, are to be distributed among such educational establishments of both sections of the Province as the Government may determine.

It being impossible to understand the true bearing and relation of geological facts as parts of a whole unless their geographical position is accurately ascertained, and so large a portion of Canada being still unsurveyed topographically, it has been necessary for the geologists to measure extensive lines of exploration, and the maps resulting from these topographical measurements have proved of great value to the Crown Land Department. To this collateral work on the geological survey we are indebted for the chief part of what we know of the interior of the peninsula of Gaspé, where six rivers have been measured, — the Matanne, the Chat, the St. Ann, the St. John, the Bonaventure, and the Great Caspédia. From it also we have the course of the Kamanistiquia and the Michipicoten rivers on Lake Superior; the Thessalon, the Mississague, the Spanish and the French rivers on Lake Huron; in addition to 150 miles of the Ottawa, and 40 miles (the whole of its length) of the Mattawa. These measurements are effected by Rochon's micrometer, an instrument by which much time is saved; and, as showing how far it may be depended on, it may be mentioned that the Mattawa having been re-surveyed by Mr. Sinclair, a Provincial Surveyor, by the chain, by order of the late Commissioner of Crown Lands, Mr. D.B. Papineau, the map resulting from the re-survey is almost a complete counterpart of the other. The map of the Ottawa is used in the Crown Land Office for the distribution of timber limits, for that part of the river represented by it.

Mr. Hunt, the chemist attached to the survey, was appointed three years since, and as the results of his labours, in addition to the analyses of a great multitude of useful metallic ores and other minerals, we have those of thirty valuable mineral springs, and, by the last report of progress, it will be perceived that a commencement has been made upon the soils of the country: with great diligence 18 soils were completed last winter.

It would extend our notice of the geological survey to too great length for the limits of this publication, were we to attempt a description of the geographical distribution of the formations of the Province as far as ascertained, and show how these formations present concentric zones, encircling the great coal fields spread out in the middle and western states on the one hand, and our sister provinces on the other, with a wider and a wider sweep in their range as they descend in the order in which they are placed upon one another, the whole being arranged after the manner of a nest of weights or of irregularly rimmed but close fitting dishes one within another, the edges of which constitute the geographic surface; the edges of the lower dishes only strike through Canada and thus leave it without coal. To make this perfectly intelligible would require such a model of the forms as has been constructed by Mr. Logan, and was exhibited here to the members of the Legislature during the last session. In preference we give below, as containing much information in a small space, a catalogue of some of the minerals and deposits of the Province, capable of useful application, prepared by Mr. Logan, for the purpose of promoting a collection of native specimens to be sent to the grand Industrial Exhibition in London, in May, 1851, and appended to the last report of progress, that for 1849-50.

We would first, however, wish to show the importance attached to geological examinations by giving a few facts connected with that of the State of New York. The area of New York is 46,200 square miles, and on the geological

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survey there instituted, 4 principal geologists, and 4 assistants, were employed, besides a chemist and a palaeontologist, to examine and describe fossil organic remains. The examination of the geographic distribution of the rocks required five years. The act establishing the geological survey, comprehended also a general examination of the natural history of the State, including a description of its quadrupeds, birds, fishes, shells, insects and plants, and naturalists were appointed for all the separate branches. The works resulting from all these investigations, of which a copy in 15 volumes was presented by the State to the library of the Provincial Legislature, and unfortunately burned in Montreal, are too well known to require mention. Though the examination of the geographical distribution of the rocks was so far complete in 5 years as to permit the publication of a geological map of the State, the fossils belonging to them (which are of great importance as affording brands or marks by means of which to follow out the formations, and therefore the useful materials associated with them) required farther investigation, and 5 years more have been bestowed on them and on the examination and analyses of soils. The works connected with these branches are beginning to appear; one volume on each branch has been published, and several more are to follow. Up to the termination of the year 1849, the sum which had been expended by the State on these investigations exceeded \$300,000, and it was stated to be the intention of the Government to propose a further outlay of \$125,000, the only debate being whether \$100,000 should be voted at once, and \$25,000 more when that should be exhausted, or an annual sum of \$25,000 for 5 successive years.

In the United States the geology of about 500,000 square miles of territory has been placed before the world by the investigations of about 70 geologists in a period of 20 years; and the exact knowledge of the mineral resources of the States which these investigations, and the publications connected with them, have produced in foreign countries, has been instrumental in introducing a great amount of capital to make them available. The investigations have been of vast importance, not only in showing where useful materials do exist, but also in marking where they do not: pointing out where capital may be profitably employed in the one case, and saved in the other by preventing useless search. The negative results are of value chiefly in regard to coal; upwards of half a million dollars were expended in the State of New York, a large part in the valley of the Mohawk, in researches for coal in black bituminous shales, which, shortly after the geological survey commenced, were shown to run a long way below it; and the eminent geologist Sir R.J. Murchison, computes that the money expended in England alone, before geology was understood, in searching for coal where it would now be considered madness to expect it, would be sufficient to effect a correct general geological examination of the whole of the crust of the globe.

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**C A T A L O G U E**

*Of some of the Economic Minerals and Deposits of Canada, with their localities,*

By W. E. Logan, Esq., Provincial Geologist.

**METALS AND THEIR ORES.**

**IRON** — *Magnetic*. — Marmora, range 1, lot 7 (a 100 feet bed,) range 2, lot 13; range 9, lot 9; range 9, lot 6. Madoc, range 4, lot 2 (a 25 feet bed;) range 5, lot 11; range 6, lot 10; range 7, lot 9. South Sherbrooke, C.W., Meyers' Lake, range 3, lots 17, 18, 19, ( a 60 feet bed.) Bedford, range —, lot —. Hull, range 7, lot 11; (a 40 feet bed); range 5, lot 11; range 6, lots 12 and 13 Litchfield, Portage du Fort, a small vein. — *Specular*. — Lake. Huron, Wallace Mine location, near White-fish River, (a 15 feet vein.) McNab, ranges C and D, lot 6, Dochart River, (a 12 feet vein.) — *Bog*. — Middleton; Charlotteville; Walsingham. W. Gwillimsbury, mouth of the Holland River. Fitzroy, Chats; Eardley, range 8, lot 20; March, Constance Lake; Hull, range 7, lot 14. Templeton, McArthur's mill; Vaudreuil Seignory, Cote St. Charles and Sac au Sable. St. Maurice Forges. Stanbridge, range —, lot —; Simpson, range 12, lot 8; Ireland, range 4, lot 12; Lauzon Seignory, St. Lambert;

Valiere Seignory, junction of Riviere du Sud and Bras. — *Titaniferous*. — St. Armand East, lot 45, (a 5 feet bed.) Sutton, (in beds of 2 to 8 feet) range 9, lots 4, 5, 6, 7, 9; range 10, lots 7, 8; range 11, lots 7, 9. Brome, (in beds of 2 to 15 feet) range 3, lots 1, 2; range 1, lots 5, 6; range 5, lots 4, 5. Bolton, range 14, lot 2. Vaudreuil Beauce Seignory, north corner (a 45 feet bed). Bay St. Paul, St. Urbain, (a 90 feet bed;) St. Lazare (a still larger mass.)

**ZINC** — *Sulphuret*. — Lake Superior, Prince's location; Mamainse.

**LEAD**. — *Sulphuret*. — Fitzroy, range 8, lot 12; Bedford, range —, lot —. Bastard, range —lot. — Petite Nation Seignory? Gaspé, Little Gaspé Cove, and Indian Cove.

**COPPER** — *Sulphurets, &c.* — Lake Superior — Spar Island, Prince's location, a 4 feet vein, (*vitreous sulphuret*, with *silver*.) St. Ignace Island, Harrison's, Ferrier's and Merritt's locations; (*native copper*, with *silver*.) Michipi-

**NOTE.**— The quantities in the localities indicated are not in every case of a sufficient amount to be profitably available, but they are always of sufficient importance to draw attention to the localities, as a possible guide to the discovery of others in the vicinity, where quantities may be greater.

coten Island, (*native copper*, with *silver*.) Mica Bay, Mamainse, (*yellow, variegated*, and *vitreous sulphurets*.) Lake Huron — Root River, a 3 feet vein, (*yellow sulphuret*.) Echo Lake, (*yellow sulphuret*.) Bruce Mines, a 4 feet vein, (*yellow, variegated*, and *vitreous sulphurets*.) Wallace Mine, Whitefish River, (*yellow sulphuret*.) Eastern Townships — Upton, range 21, lot 51, (*argentiferous yellow sulphuret*.) a 1 foot vein. Ascot, range 7, lot 17, (*argenti-auriferous yellow sulphuret*.) a 2 feet vein. Inverness, range 2, lot 4, (*variegated sulphuret*.) a 2 feet vein.

NICKEL.— *Sulphuret, &c.* — Lake Huron, Wallace Mine. Augmentation to La Noraye and Dautraye Seigniory, (with *iron pyrites*.) traces. Brompton, range 11, lot 19, (*nickel ochre*.) traces.

SILVER. — *Native, &c.* — Lake Superior — Prince's location, a bunch of 4 cwt. of 3 1/2 per cent. met with, equal to 72 lbs. of silver per ton of rock. St. Ignace Island, Harrison's. Ferriers's, and Merritt's locations. Michipicoten Island, north side.

GOLD — *Native in Gravel* — Vaudreuil Beauce Seignory, Rivière Guillaume; Rivière Bras; Ruisseau Lesard; Rivière Toutte des Pins for 3 miles up; Ruisseau du Lac. Aubert de L'Isle Seignory, Rivière Famine. Aubert Gallion Seignory, Ruisseau —, Pozer's River for three miles up. Rivière Metgermet opposite Jersey.

GOLD — *Native, in Vein* — Lake Superior, Prince's location, (traces.) Ascot, range 7, lot 16, (with *copper* and *silver*, value of Gold \$1 per ton of rock.)

#### CHEMICAL MATERIALS, BEING SUCH AS REQUIRE PECULIAR CHEMICAL TREATMENT TO FIT THEM FOR USE.

URANIUM — (*For glass staining, and porcelain painting, &c.*) — Madoc, range 4, lot 12, traces in the iron ore bed, in the form of *uran ochre*.

CHROMIUM — (*For glass staining, porcelain and oil painting, &c.*) — Bolton, range 7, lot 26, a 12 inch bed of chromic iron. Augmentation of Ham, range 2, lot 21, a 14 inch bed of *chromic iron*.

COBALT — (*For glass staining, and porcelain painting, &c.*) — Lake Superior, Prince's location, (traces); Lake Huron, Wallace Mines, (traces.) Augmentation to La Noraye and Dautraye Seigniory with *nickel*, (traces.)

MANGANESE, BOG — (*For bleaching and decolorizing agents*) — Bolton, range 12, lot 22; Stanstead, range 4, lot 24; range 10, lot 9; Tring, near eastern boundary on road from Lambton to St. Francois Beauce; Aubert Gallion Seigniory, near Pozer's River; St. Mary's Seigniory, 3d range, Frampton road; St. Anne Seignory.

IRON PYRITES — (*For manufacture of Copperas and Sulphur*) — Clarendon, range 2, lot 7; Terrebonne Seigniory, a 4 feet vein; Augmentation to La Noraye and Dautraye Seigniory, a 10 feet vein; Garthby, range —, lot —.

DOLOMITE, with 45 per cent of CARBONATE OF MAGNESIA — (*For manufacture of Epsom Salts and the Magnesia of Commerce*) — Exit of Lake Mazinaw; N. Sherbrooke, C.W.; Drummond; St. Armand; Dunham; Sutton;

Brome; Ely; Durham; Melbourne; Kingsey; Shipton; Chester; Halifax; Inverness; Leeds; St. Giles Seigniory; St. Mary's Seigniory; St. Joseph Seigniory.

MAGNESITE, with 83 per cent of CARBONATE OF MAGNESIA — (*For the same purpose*) — Sutton, range 7, lot 12; Bolton, range 9, lot 17.

#### STONE PAINTS.

BARYTES — *Permanent White* — Lake Superior, in a multitude of veins on the north shore from Pigeon River to Thunder Cape; Bathurst, range 6, lot 4; McNab, mouth of Dochart.

IRON OCHRE — *Yellow Ochre, Spanish Brown* — Waltham. Paint Lake or Pond, near Harwood Pierce's Clearing, Black River; Mansfield, Grand Marais; opposite the most northern point of Calumet Island; Durham, range 4, lot 4.

TALCOSE SLATE — *Ochre Yellow* — Stanstead, range 9, lot 13. *French White* — Stanstead, range 9, lot 13; Leeds, range 13, lot 17.

SOAPSTONE — *White* — Sutton, range 7, lot 12; Potton, range 5, lot 20, very pure; Bolton, range 1, lot 17; range 2, lot 6; range 4, lot 4; range 11, lot 1; Melbourne, range 2, lot 19; Ireland, range 3, lot 10; Vaudreuil Beauce Seigniory, range 3 on the Bras, pure; Broughton, range 4, lot 12; Elzevir, range 1, lot 27; range 2, lot 13, pure.

SERPENTINE — *Greenish White* — Eastern Townships, in places too numerous to be particularized. (For the range see Marble)

FERRUGINOUS CLAY — *Light Red* — Naseagaweya, McKann's Mill; Nottawasaga, Mad River.

#### MATERIALS APPLICABLE TO THE ARTS.

LITHOGRAPHIC STONE. — Marmora, range 4, lot 8; Rama, on St. John's Lake, south of the Junction, and on Lake Couchiching; there are probably many exposures between Rama and Marmora, the distance being 70 miles.

#### MATERIAL APPLICABLE TO JEWELLRY AND ORNAMENTAL PURPOSES.

AGATES. — Lake Superior — St. Ignace and neighbouring islands; Michipicoten Island.

JASPER. — Ascot, near Sherbrooke, in a bed; Gaspé, in pebbles.

LABRADORITE. — Drummond, range 3, lot 1; Bathurst, range 9, lot 19.

SUNSTONE. — Bathurst, range 6, lot 3.

HYACINTHS. — Grenville, range 5, lot 10.

AMETHYSTS. — Lake Superior, Spar Island, and sundry places along the neighbouring coast.

RIBBONED CHERT (*For Cameos*) — Lake Superior — Thunder Bay.

JET. — Montreal

RUBY, SAPPHIRE. — Burgess, range 9, lot 2 (in minute grains.)

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## SCOBIE'S CANADIAN ALMANAC.

## MATERIALS FOR GLASS MAKING.

WHITE QUARTZ SANDSTONE. — Lake Huron — on the north shore, and the Islands near, in great abundance. Cayuga, lots 45 and 46, Town line, north of Talbot road; Dunn; Vaudreuil Seigniory. Isle Perrot Seigniory; Beauharnois Seigniory.

PITCHSTONE, BASALT AND ALLIED ROCKS — (*For Black Glass.*) — Lake Superior — North shore and Islands; Michipicoten Island, and East coast. Lake Huron — in the trap dykes of the North shore; Montreal mountain; Montarville mountain.

## REFRACTORY MATERIALS.

SOAPSTONE — Elzevir — range 1, lot 27; range 2, lot 13; Potton, range 5, lot 20; Vaudreuil, Beauce Seigniory, range 3 on the Bras; Broughton, range 4, lot 12.

ASBESTOS — Potton, range 5, lot 20.

SANDSTONE — Lake Huron, Island of Campment d'Ours, west side; St Maurice Forges.

PLUMBAGO — Grenville, range 5, lot 10, 2 veins.

## MANURES.

PHOSPHATE OF LIME — Ottawa, near the division line between Westmeath and Ross, above the head of Moore's Slide; Calumet Slide; Burgess, range 8, lot 4; Hull, range —, lot —, near Blasdell's mill; Bay St. Paul; Murray Bay.

GYPSUM — Dumfries, range 1, lot 27; Village plot of Paris; Brantford, range 1, lot 15; range 2, lot 16; range 3, lot 17; Oneida, lot 57, and the block next below on the Grand River; Seneca, lots 17 and 18, on the Grand River, and the Town plot of Indiana; Cayuga, range 3, lots 19, 20, 21, 22, 23.

SHELL MARL — North Gwillimsbury, east point of Cook's Bay; Calumet Island, in a small lake 2 miles south-east from Campment des Plaines; Calumet Island, 1 mile north-west of Desjardin's clearing, opposite Moore's slide, and in several small lakes lower down the island; Clarendon, range 1, lot 23; Mink Lake, west of Bromley; McNab, White Lake; Nepean, on Spark's land, near Bytown; Gloucester, Hon. Mr. McKay's land, near Bytown; Argenteuil, range 1, lot 3; East Hawkesbury, range 7, lot 11; Vaudreuil Seigniory, rear of Cavagnol Point; St. Benoit, Grand Brulé, on Chenier's farm; Grande Cote, between St. Thérèse Ferry and St. Eustache, on McAllister's farm; opposite St. Rose, on the road to St. Thérèse, on Henrich's farm; St. Armand West, lots 156 and 157; Stanstead, range 11, lots 5 or 6; St. Hyacinthe Seignory, junction of Granby and St. Pie roads; Montreal, St. Joseph; New Carlisle, in 4 or 5 small lakes, 1 or 2 miles from the village.

## GRINDING AND POLISHING MATERIALS.

MILL STONES — The localities of granitic and syenitic boulders strewn about the country, and used for mill stones, are too numerous and too accidental to be stated; these boulders are derived chiefly from the granitic or

gneissoid rocks, which range on the north side of the Ottawa and St. Lawrence, from Lake Superior to Labrador. Independent of them various rocks in situ are and may be used for the purpose, such as — *Silicious Conglomerate* — Vaudreuil Seigniory, Cascades and Pointe du Grand Detroit; Ham, range 11, lot 10; Port Daniel, at L'Ance à la Veille. *Granular and Corneous Quartz Rock* — This rock accompanies the serpentine of the Eastern Townships, (for the range of which see Marble.) and occurs in too many places to be enumerated; a good sample has been obtained by the Hon. Mr. Knowlton from Bolton, range 6. *Granite* — Stanstead; Barnston; Barford; Hereford; Ditton; Marston; Strafford; Weedon; Vaudreuil Beauce Seigniory, near the band of serpentine. (The Vaudreuil Beauce stone is highly esteemed.) *Pseudo-Granite (without Quartz grains)* — St. Thérèse, Beloeil, Rougemont, Yamaska, Shefford, and Brome Mountains.

GRINDSTONES — A sandstone designated as the grey band which lies at the summit of the red strata of the Medina sandstones, and which reaches from Queenston by St. Catherines, and round the extremity of Lake Ontario by Hamilton, to Esquesing, and thence to Nottawasaga, has been used in some of the northern townships for grindstones. Some parts of the Potsdam sandstone have been used for the purpose, as in Allumettes, at the Allumettes Falls; and in Fitzroy, at Shirreff's mills. Some parts of the Gaspé sandstone, in Gaspé Bay, would yield grindstones, but though these might prove the best of the Canadian stones, none of them would equal those of New Brunswick and Nova Scotia, or those of Newcastle, in England.

WHETSTONES AND HONES — Madoc, range 5, lot 4; Marmora, range 6, lot 22; Lake Mazinaw, rear of Palmerton; Fitzroy, Whetstone Point, Lake Chaudière; Potton, range 11, on Magog Lake; Stanstead, from Whetstone Island, in Magog Lake, by range 5, lots 19 and 20, and range 7, lot 26, to range 9, lot 28; thence through Hatley, to range 9, lot 3, on Massawippi Lake; Stanstead, range 9, lot 4; Bolton, range 14, lot 5; Shipton, range 14, lot 19, and range 5, lot 16; Marston, on Megantic Lake.

CANADIAN TRIPOLI, *a silicious infusorial deposit* — Augmentation to La Noraye and Dautraye Seigniory.

## MATERIAL FOR PAVING, TILING, &amp;c.

ROOFING SLATES — Kingsey, range 1, lot 4; Halifax, range 1, lot 14; Frampton, on the land of Mr. Quigley.

FLAGG STONES — Toronto, Rivers Credit, Little Mimico, and Etobicoke; Etobicoke, River Humber; York, East Branch of River Don; Lake Temiscaming, 7 miles below Galere; Bagot, at Calaboga rapids; Horton and Clarendon, at the Chenaux; Sutton range, 2 lot 19; Potton, range 10, lot 2, at Potton Ferry;

Stanstead, east side of Memphramagog Lake, for some miles above the Outlet; Inverness, range 2, lot 5; Port Daniel, L'Ance à la Vielle.

#### BUILDING MATERIALS.

**GRANITE** of superior quality, white, and cleavable. — Stanstead, ranges 4, 5, 6, 7, lots 1, 2, 3, 4, 5, 6; range 9, lot 4, to range 14, lot 11; Barnston, range 9, lot 1; ranges 10 and 11, lots 7 to 15; Barford, ranges 1 and 2, lots 5 to 9; Hereford, ranges 4 and 5, lots 19 and 20; Marston,  $1\frac{1}{2}$  miles from upper end of Megantic Lake; Great Megantic Mountain, occupying an area of 12 square miles, about the united corners of Marsden, Hampden, and Ditton; Little Megantic Mountain, 6 square miles in Winslow, about  $1\frac{1}{2}$  miles south-west from line between Aylmer and Gayhurst; Weedon, 1 mile south-east of Lake Louisa; Winslow, 3 miles long, about 5 miles south-east of Lake Aylmer; Strafford, 1 mile, and 3 miles up Felton River; also 6 miles from foot of Lake St. Francis; Lambton, 6 miles from foot of Lake St. Francis.

**PSEUDO-GRANITE**, without quartz grains, white, cleavable — St. Thérèse, Beloeil, Rougemont, Yamaska, Shefford, and Brome Mountains.

**SANDSTONE**, yellowish white — Niagara, at Queenston; Barton, at Hamilton; Flamborough West; Nelson; Nassagaweya; Esquesing, range 5, lot 17; range 6, lot —; Mono; Nottawasaga; Cayuga, range —, lots 45 and 46; Rigaud Seigniory, Rivière à la Graise; Vaudreuil Seigniory, Pointe Cavagnol; Isle Perrot; St. Eustache; Terrebonne Seigniory; Beauharnois Seigniory; St. Maurice Forges; Allumettes; Fitzroy.

**CALCAREOUS SANDSTONE** — Rideau Canal; Bytown — various parts of Ottawa, north side from Bytown, to Papineau Island; various places from Grenville to Fort Fortune; Brockville; Murray Bay, at Les Ecorchats, and White Cape, and the lots of J.B. du Berger and T. Chapreton; Lauzon Seigniory, at St. Nicholas; Cap Rouge, near Quebec.

**LIMSTONES** — Malden, Manitoulin Islands, along the south side; St. Joseph Island; Coast of Lake Huron, from Cape Hurd to Rivière au Sable (north); various parts from Cabot's Head to Sydenham, in Owen Sound; and from Sydenham, by Euphrasia to Nottawasaga; thence by Mono to Esquesing, and by Nelson to Ancaster; Thorold; Matchedash Bay; Orillia; Rama; Mara and various parts to Marmora; Madoc; Belleville; Kingston; McNab; Bytown; and various parts to Plantagenet and Hawkesbury; Cornwall; Isle Bizard; Beauharnois Island, Caughnawaga; Montreal; Isle Jesus; Terrebonne; Phillipsburgh; St. Dominique; Grondines; Deschambault; Beauport; Bay St. Paul; and Murray Bay; Upton; Acton; Wickham; Stanstead; Hatley; Dudswell; Temiscouata Lake; Gaspé; Port Daniel;

Richmond; Anticosti Island.

**LIME** — *Common* — In the various localities above enumerated for limestone Magnesian — In the localities indicated for dolomite. Hydraulic — Point Douglas, Lake Huron; Cayuga, half a mile and  $3\frac{1}{2}$  miles below the Village, and the Grand River; Thorold; Kingston; Nepean, near Bytown; Argenteuil?

#### MATERIALS FOR BRICKS, TILES, AND POTTERY.

**CLAY** — *For Red Bricks* — This is so widely spread in the valleys of the St. Lawrence, Ottawa, Richelieu, &c. that the localities are too numerous to be mentioned. *For White Bricks* — York, range 2 from the Bay, lots 19 and 20; Peterborough. *For Tiles and common Pottery* — All the same localities.

#### MATERIALS FOR ORNAMENTAL ARCHITECTURE.

**MARBLE** — *White* — Dudswell; exit of Lake Mazinaw, rear of Palmerston (a dolomite.) *Black* - Cornwall; Phillipsburgh. *Brown* — Pakenham, at Dickson's mill *Grey and Mottled* — McNab; Phillipsburgh; St. Dominique; Montreal. *Variogated, white and green* — Grenville. *Verde Antique* — Stukely. *Serpentine* — In many parts suitable for ornamental purposes, in a range of 135 miles, running through Potton, Bolton, Stukely, Orford, Brompton, Melbourne, Shipton, Tingwick, Wotton, Ham and its Augmentation, Wolfestown, Garthby, Ireland, Coleraine, Adstoch, Tring, Vaudreuil Beauce to Cranbourne; and in another range of 10 miles, running through Leeds.

#### COMBUSTIBLE MATERIALS.

**PEAT** — Wainfleet; Humberstone; Westmeath; Beckwith; Goulburn; Nepean; Nepean; Gloucester; Cumberland; Clarence; Plantagenet; Alfred; Caledonia; L'Orignal; Osnabruck; Finch; Winchester; Roxburgh; Longueil Seigniory; St. Hyacinthe Seigniory, at St. Dominique; St. Marie de Monnoir Seigniory; Rivière du Loup Seigniory; Rivière Ouelle Seigniory; Matan and McNider, between Rivière Branche and Rivière Matan.

**PETROLEUM, NAPHTHA, &c.** — Mosa, range 1, lot 29, and several spots farther down on the River Thames; River St. John, Gaspé, at the mouth, and 6 miles up on Silver Brook.

**ASPHALT** — Enniskillen, range 6 or 7, lot 9.

#### SUNDRY OTHER MATERIALS.

**MOULDING SAND** — Augusta, 3 miles above Prescott; Montreal; L'Acadie; Stanstead.

**FULLER'S EARTH** — Nassagaweya, at McKann's mill, Sixteen-mile Creek.