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ANNUAL MEETING, MARCH 21st, AT 4 P.M.

March, 1893.

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THE BEAVER (*Castor Canadensis*, Kuhl).

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OTTAWA, CANADA:

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MINERAL WATERS OF CANADA.

(Continued from Page 167.)

This water has been used for many years in connection with baths erected over the well, where, at a depth of 114 feet from the surface, the water was struck. An analysis by Prof. Croft gave about two parts of solid matter in 1,000 of water; these consisted of nearly equal parts of the sulphates of lime and magnesia and traces of chloride of sodium. The water deposits pure yellow pulverulent sulphur around its outlet. (*Vide* report Geol. Surv., 1863-66.)

Manitoulin Islands—In well No. 1, sunk by the Manitoulin Oil Co., at a depth of 192 feet from the surface or 60 feet beneath the summit of the Trenton limestone, an intensely bitter saline water was encountered; the following analysis was made by Dr. T. Sterry Hunt:

Chloride sodium.....	4.800
“ potassium.....	.792
“ calcium.....	12.420
“ magnesium.....	3.650

In 1,000 parts of water..... 21.662

The water was not examined for bromides or iodides which were, according to the analyst, probably present.

Niagara, Lincoln Co.—Full data are not at hand regarding a somewhat well-known gas spring at Niagara, which by reason of the great quantities of inflammable gas given off, is in a constant state of ebullition and is known as the “Burning Spring.” The water rising from rocks of the Medina formation is peculiarly styptic and acid to the taste, and contains a very large proportion of sulphuric acid. The mean of two analyses gave Dr. Sterry Hunt 2.1376 parts of the acid (S O³) to 1,000 parts of water.

Another spring, similar in character to the above, is noted about a mile and a half above Chippewa and near the Niagara river, wherein the water was found to be somewhat stronger in sulphuric acid. This latter water rises from the Onondaga formation.

Otonabee, Peterborough Co.—An examination was made by Mr. G. C. Hoffmann (report Geol. Surv., vol. IV, 1888-89, part R) of water from a boring on the west half of lot 26, concession 4, township of Otonabee, with the following result:

Chloride sodium	3.8403	Alumina .....	.0008
“ potassium .....	.0770	Silica .....	.0153
“ calcium .....	.4088	Organic matter.....	traces
“ magnesium .....	.4797		
Sulphate lime.....	.0019	In 1,000 parts of water	5.0824
Carbonate lime.....	.2536	Specific gravity at 15.5° c.....	1003.91
“ iron.....	.0050		

O₁ the physical character of the sample Mr. Hoffmann writes:—
 “On opening the bottles a slight, but decided, odour of petroleum was noticeable. The water contained a considerable amount of suspended matter. This was filtered off and examined—it consisted of argillaceous matter, very fine sand, partially decomposed fragments of wood, fragments of seed-cases and other vegetable matter, together with some carbonate of lime, small amounts of carbonate of magnesia and iron, and a very small amount of sulphate of lime. The filtered water, when viewed in a column two feet in length, was found to have a faint brownish tinge. Taste, mildly saline. Baryta was not sought for. The presence of iodine and bromine requires confirmation.”

Plantagenet, Prescott Co. (a)—Three springs are known to exist in this township, only two of which are, however, at all well known, viz.: The “Plantagenet” and the “Georgian” springs, and of which the following analyses are available:—

Chloride sodium.....	11.6660	9.4600
“ potassium .....	.1040	.1040
“ calcium .....	.1364	.0443
“ magnesium .....	.2452	.4942
Bromide “ .....	.0080	.0029
Iodide “ .....	.0052	.0017
Sulphate lime.....		.1929
Carbonate lime .....	.0330	.2980
“ magnesia .....	.8904	.3629
“ iron .....	.0096	trace
Alumina	traces	undet
Silica .....	.0700	.0205
In 1,000 parts of water.....	13.1678	10.9814
Specific gravity	1009.39	1008.78

Another spring similar to the “Plantagenet” yielded 10.16 parts of solids in 1000 of water and held a comparatively large amount of strontia and traces of boracic acid.

Port Elgin, Bruce Co.—A partial analysis of a mineral water from a spring at this place was made by Mr. G. C. Hoffmann (report Geol.

Surv., vol. II, 1886, p 12 T), showing the water to contain the following :

Potassa	trace	Ferrous oxide	trace
Soda	fairly large quantity	Sulphuric acid	very large quantity
Lithia	trace	Phosphoric acid	trace
Strontia	small quantity	Silica	"
Lime	very large quantity	Chlorine	very large quantity
Magnesia	large quantity		

The water at 15.5° C. had a specific gravity of 1.0269, and contained 2.925 parts of dissolved saline matter in 1000 of water.

Sandwich, Essex Co.—At this place is located a sulphurous spring, near which was erected an hotel and baths ; owing, however, to the loss of the hotel and bathhouses by fire, the spring has of late years fallen into disrepute. The water is highly sulphurous and flows from an artesian boring made some years ago for oil.

The analysis, according to Prof S. P. Duffield, gave the following result :

Chloride sodium	0.070	Carbonate lime	4.813
“ calcium	0.007	“ magnesia	1.618
“ magnesium	19.220	Silica	0.014
Sulphate lime	15.479		-----
Carbonate soda	6.070	Grains in one pint	47.291
“ potassa	traces		

GASES.

Carbonic acid, cubic inches	1.25
Sulphuretted hydrogen, cubic inches	4.72
Nitrogen, cubic inches	0.09

As may be seen on reference to the above, the waters of this well contain a considerable proportion of chloride of magnesium and sulphuretted hydrogen.

St. Catharines, Lincoln Co. (a)—Some years previous to 1863 an attempt was made to obtain brine, for the manufacture of salt, at St. Catharines. With this object, a well was drilled in the town to a depth of about 500 feet, the drill penetrating the Hudson River shales to a distance of 50 to 60 feet.

A brine of low saturation was obtained but owing to the contained lime and magnesia salts was never used in the making of salt.

This water was analysed by Prof. Croft of Toronto as given below I.

In 1861 a second boring was made by Mr. E. S. Adams resulting in the discovery of a water of similar character. Analysis II.

	I	II
Chloride sodium	29·8034	19·94
“ potassium	3555	undet
“ calcium	14·8544	6·49
“ magnesium	3·3977	1·95
Iodide sodium	·0042	undet
Sulphate lime	2·1923	1·77
In 1,000 parts of water	50·6075	30·15
Specific gravity	1036·0	.....

This water (I) acquired quite a reputation locally and was partly evaporated and shipped in a concentrated state. Of this concentrated water, the following analysis, made by J. R. Chilton, M.D. 1853, is given in “The mineral springs of the United States and Canada, by Geo. E. Walton, M.D. New York 1874”

Chloride sodium	781·36	Sulphate lime	16·32
“ calcium	2950·40	Carbonate magnesia and lime .	2·08
“ magnesium	1289·76	Silica, alumina, and lithia	2·47
Bromide “	2·01		
Iodide “	2·11	Grains in one pint	5,060·27
Proto-chloride iron	13·76		

“The large amount of proto-chloride of iron was probably formed from the surface of the iron vessel during evaporation.”

“These celebrated waters are the most perfect type of iodo-bromated water known in this country. They very much resemble the celebrated waters of Krueznach, in Prussia, though containing the chloride of sodium, calcium and magnesium in much larger proportions.”

Vide report referred to above.

Silver Islet, Lake Superior.—The following analysis was made by Mr G. C. Hoffmann (report Geological Survey Vol. I, 1885, p. 17 M) of a specimen of water collected at the Silver Islet mine by Capt. Trethewey in 1882.

Chloride sodium	16·8098	Manganese	traces
“ potassium	4582	Cobalt	traces
“ calcium	17·0867	Silica	·0540
“ magnesium	1·2939		
Sulphate lime	·0672	In 1,000 parts of water	36·0634
Carbonate lime	·2936	Specific gravity at 15° C	1028·48

The water was colourless; odourless; taste, strongly saline with slight bitter after taste; reaction, neutral.

Tuscarora, Brant Co. (a)—On the Indian Reserve in this township and about nine miles south of Brantford and three miles south of the Grand River, is located what is known as the “Sour Spring of

Tuscarora." The waters of this spring form several pools of from three to four feet in diameter, where owing to a constant discharge of inflammable gas the water is in a state of agitation. In appearance it is slightly turbid and brownish and has a peculiar styptic, acid and sulphurous taste. Analysis showed the water to contain, in October 1847 :

Sulphate soda.....	0502	Phosphoric acid.....	traces
" potash.....	0608	Hydrated sulphuric acid (So ₃ , Ho)	42895
" lime.....	7752		
" magnesia.....	1539	In 1,000 parts of water.....	61615
" protoxide of iron.....	3638	Specific gravity.....	100558
" alumina.....	4681		

Westmeath, Renfrew Co. (a)—In the Geology of Canada 1863, on page 547, is given the description of two springs in this township as follows:—"On the thirteenth lot of the sixth range of Westmeath is a spring which deposits a considerable amount of calcareous tufa and is known as the Petrifying Spring". The water contains, besides carbonate of lime, small quantities of chlorids, and is feebly sulphurous. On the twenty-third lot of the same range, a copious spring, occurs on Tucker's Creek. It contains a large amount of carbonate of lime, and a little iron; besides which, it holds only traces of sulphates and chlorids."

Whitby, Ontario Co. (a)—A copious spring of saline water is met with at Bowerman's Mills on lot 32, concession 3, township of Whitby where the water rises from rocks of the Trenton series, The following analysis was made of a specimen collected in October 1853:—

Chloride sodium.....	189158	Carbonate lime.....	0411
" potassium.....	traces	" magnesia.....	0227
" calcium.....	175315	" strontia.....	traces
" magnesium.....	95437	" iron.....	traces
Bromide sodium.....	2482		
Iodide.....	0008	In 1,000 parts of water.....	463038

MINERAL WATERS IN QUEBEC.

Ascot, Sherbrooke Co.—The water of a spring near the Belvedere Iron mine and on lot 8, range 9, township of Ascot was examined during 1887 in the laboratory of the Survey (rep. Geol. Surv. Vol. III, 1887-88, p. 22 'T) with the following result:—

Potassa.....	trace	Sulphuric acid.....	large proportion
Soda.....	small proportion	Carbonic acid.....	small proportion
Lime.....	rather large proportion	Silica.....	trace
Magnesia.....	"	Chlorine.....	small proportion
Ferrous oxide.....	trace		
" Total discovered saline matter, dried at 180° c., equalled 00746 parts in 1,000.			

Baie du Febvre, Nicolet Co. (a)—The waters of four springs in the seigniory were examined, though of these the analysis of but one is preserved in its entirety. The analysis given below is that of a water from Courchênes spring about one and a half miles east of St. Antoine church Grand Range, and was collected in September 1852.

Chloride sodium.....	4·8334	Carbonate lime.	·2180
“ potassium.....	·0610	“ magnesia.....	·4263
Bromide sodium.....	undet	Alumina.....	undet
Iodide sodium.....	undet	Silica.....	·2120
Carbonate soda.....	1·5416		
“ baryta.....	trace	In 1,000 parts of water.....	7·2923
“ strontia.....	trace		

The three other springs afforded waters containing solids to the extent of 5·44, 15·94 and 4·96 parts in 1,000 of water. All of these waters probably rise from rocks of the Hudson River formation.

Bay St. Paul, Charlevoix Co. (a)—Several mineral waters are obtained in the neighbourhood of Bay St. Paul of which, however, no detailed analyses are available. A sample from one of these springs contained 20·68 parts of solid matter in 1,000 of water and had a bitter saline taste.

Belzil, Verchères Co. (a)—A mineral water from this seigniory which rises from the Hudson River formation affords the following:—

Chloride sodium.....	5·9662	Carbonate magnesia.....	·4756
“ potassium.....	undet	“ iron.....	traces
Bromide sodium.....	“	Alumina.....	undet
Iodide sodium.....	“	Silica.....	·1140
Carbonate soda.....	·6082		
“ strontia.....	·0250	In 1,000 parts of water.....	7·3330
“ lime.....	·1440		

Berthier, Berthier Co. (a)—About three miles above the church at Berthier and on the Bayonne River is found a copious spring of saline water, of which a specimen collected in July 1853, afforded the following analysis:—

Chloride sodium.....	8·0454	Iodide magnesium.. . . .	traces
“ potassium.....	undet	Carbonate lime.....	·0470
“ calcium.....	·0466	“ magnesia.....	·8354
“ magnesium.....	·0856		
Bromide magnesium.....	undet	In 1,000 parts of water.....	9·0600

Caxton, St. Maurice Co. (a)—A saline spring rising from Cambrosilurian limestones, occurs in the township of Caxton on the banks of the Yamachiche river. The water is accompanied by very considerable quantities of carburetted hydrogen gas and had at the time of the collection of the specimen examined, October 1848, an estimated flow of eight gallons per minute. It afforded the following analysis:—

Chloride sodium.....	11'7750	Carbonate magnesia.....	1'0593
“ potassium.....	'0800	“ iron.....	'0054
“ calcium.....	'0503	Alumina.....	'0050
“ magnesium.....	'3743	Silica.....	'0479
Bromide “.....	'0542		
Iodide “.....	'0039	In 1,000 parts of water.....	13'6513
Carbonate lime.....	'2160	Specific gravity.....	1010'36

Chambly, Chambly Co. (a)—Several springs occur in the immediate neighborhood of Chambly, the waters of which are in all cases feebly saline. One of these, about three miles above the village in the Range des Quarantes, affords a very considerable quantity of saline water, containing 5'74 parts of solid matter in 1,000 of water and abundance of carburetted hydrogen gas. Temperature of water 53° F.

Another spring occurring on the Grand Coteau gave the following analysis of a specimen collected there in October 1852.

Chloride sodium.....	'8387	Carbonate iron.....	'0024
“ potassium.....	'0324	Alumina.....	'0063
Carbonate soda.....	1'0604	Silica.....	'0730
“ strontia.....	'0045		
“ lime.....	'0380	In 1,000 parts of water.....	2'1322
“ magnesia.....	'0765	Temperature of water.....	53° F.

Henryville, Ibroville Co. (a)—A water containing a large amount of carbonate of soda, with chlorides, and a trace of iodides occurs about two miles south of this place. The water at the time of examination, prior to 1863, contained 16 cubic inches of sulphuretted hydrogen in 1,000 cubic inches of water. No analysis is available.

Jacques Cartier River, Portneuf Co. (a)—A water strongly impregnated with sulphuretted hydrogen rises from the Utica formation near Marcotte's Mills on the Jacques Cartier river, near Quebec. The specimen examined was collected in the summer of 1852 and gave:—

Chloride sodium.....	'0347	Carbonate magnesia.....	'0278
“ potassium.....	'0076	Alumina.....	undet
Sulphate potash.....	traces	Silica.....	'0110
Carbonate soda.....	'1952		
“ lime.....	'0710	In 1,000 parts of water.....	'3473

Joly, Lotbinière Co. (a)—A sulphurous water is found in this township on the Magnetat Brook about five miles from Methot's mills. The water is feebly saline and contains a portion of boracic acid, besides sulphuretted hydrogen equal to 75 cubic inches per litre. A specimen collected in July 1853, afforded the following analysis:—

Chloride sodium	·3818	Carbonate magnesia	·0257
Chloride potassium	·0067	Alumina	undet
Sulphate soda	·0215	Silica	·0245
Carbonate soda	·2301		
“ lime	·0620	In 1,000 parts of water	7523

Lanoraie, Berthier Co. (a)—A saline spring occurs at a point about midway between the village of Lanoraie and Industry. The water evolves large quantities of carburetted hydrogen and contains somewhat large proportions of baryta and strontia as shown in the following analysis of a specimen collected in March 1851.

Chloride sodium	11·1400	Carbonate strontia	·0137
“ potassium	·1460	“ lime	·4520
“ barium	·0303	“ magnesia	·4622
“ strontium	·0185	“ iron	traces
“ calcium	·2420	“ Alumina	undet
“ magnesium	·2790	“ Silica	·0552
Bromide	·0283		
Iodide	·0052	In 1,000 parts of water	12·8830
Carbonate baryta	·0106	Specific gravity	1009·42

L'Assomption, L'Assomption Co. (a)—A saline water which some years ago was used quite extensively and was somewhat widely known is found in the range of Point du Jour, near the village of L'Assomption. The spring, known as the “Aurora spring” rises from Cambro silurian rocks and an analysis of its waters showed them to contain 7·36 parts of solid matter in 1,000 of water as well as considerable quantities of carburetted hydrogen.

Longueuil, Soulanges Co.—In the report of the Geological Survey Vol. I. 1885 page 12 M is given the analysis of a water from a spring in this seigniory and which rises from rocks of the Chazy formation. The spring has an estimated flow of about 450 gallons per minute and the water was odourless and practically tasteless. The analysis gave the following result:—

Chloride sodium	'0021	Silica	'0092
Sulphate soda	'0078		
“ potassa	'0028		'1482
“ lime	'0233	Carbonic acid, half combined ..	'0483
Carbonate lime	'0073	“ “ free	'0128
“ magnesia	'0357		
“ iron	traces	In 1,000 parts of water.....	'2093
		Specific gravity at 15° C.....	1.060.16

Maisonneuve, Hochelaga Co. (a)—An examination was made by

Mr. G. C. Hoffmann in the laboratory of the Survey (report Geol. Surv. Vol. IV. 1888-89. part R.) of a water from a deep boring on the property of Messrs Viau et Freres at Maisonneuve, near Montreal. The boring attained a depth of 1,500 feet, in rocks of Cambro-silurian age from which the water emanated. Of the physical features of the specimen, Mr. Hoffmann writes as follows:—

“The sample of water sent for examination had, when received, a faint yet decided odour of sulphuretted hydrogen; it contained but a trifling amount of sediment; colour of the clear water, when viewed in a column two feet in length, light yellow; taste, mildly saline; reaction, faintly alkaline.”

The analysis gave the following result:—

Chloride sodium	4.0358	Silica	'0135
“ potassium	'0391		
Sulphate soda	2.8624		7.3587
“ lime	'0867	Carbonic acid, half combined...	'1658
Carbonate lime	'0855	“ “ free.....	'0503
“ magnesia	'2447		
Alumina	trace	In 1,000 parts of water.....	7.5748
		Specific gravity at 15° C.....	1.066.31

Quarante Arpents, Nicolet Co. (a)—Near the line of St. Gregoire and in the concession of Quarante Arpents occurs an alkaline water, impregnating a small area of marshy ground in which a pit was dug and the specimen, of which the following is an analysis, collected in the Autumn of 1853. The water is yellowish and alkaline in taste, and rises from rocks of the Hudson River formation:—

Chloride sodium	'3290	Carbonate iron	undet
“ potassium	'0318	Alumina	“
Sulphate potash	traces	Silica	“
Carbonate soda	1.1353		
“ lime	undet	In 1,000 parts of water.....	1.5591
“ magnesia	“		

Rawdon, Montcalm Co. (a)—In the “Geology of Canada” 1863, page 541 the following description of two springs in this township is found:—

“Two springs have been examined from the township of Rawdon. One of the third class from the twenty-fifth lot of the third range, is somewhat strongly saline, containing 4.96 parts of solid matter, in 1,000, and yielding the reactions of baryta, boracic acid, bromine and iodine. The other from the twenty-seventh lot of the same range is an abundant spring, of slightly sulphurous water, belonging to the fourth class, which yields only 0.32 parts of solid matter in 1,000 and contains portions of sulphates and borates, with a trace of bromine. These springs apparently rise from the Potsdam formation.”

Rivière Ouelle, Kamouraska Co. (a)—In the third concession of the seigniory of Rivière Ouelle, are several small basins wherein is found a saline water. No analyses are available though a partial examination showed the water to contain 13.36 parts of solid matter made up principally of chlorides of calcium and magnesium and a small proportion of earthy chlorides, in 1,000 parts of water.

St. Anne de la Pocatière, Kamouraska Co. (a)—Several saline springs are known to exist in this seigniory of which however no analyses are available. Two of these, mentioned in the “Geology of Canada, 1863” as occurring in the second concession gave 0.36 and 5.06 parts of solid matter in 1,000 of water, the latter amount (5.06) being contained in a bitter saline water holding besides chlorides an abundance of the sulphates of lime and magnesia. The water affording 0.36 parts is slightly sulphurous and is strongly saline to the taste.

St. Benoit, Two Mountains Co. (a)—“A spring nearly opposite to the old church of St. Benoit, rises through the clays, which here overlie the Potsdam formation. The specific gravity of the water is 1.004.3, and it contains about 6.0 parts of solid matter to 1,000. This water * * * * contains traces of carbonates, and large amounts of calcareous and magnesia salts, both chlorides and sulphates” vide Geology of Canada, 1863.

St. Eustache, Two Mountains Co. (a)—A feebly saline water, yielding 1.88 parts of solid matter to 1,000 of water and rising from rocks of the Trenton formation occurs near the village of St. Eustache in the parish of that name.

St. Geneviève, Batiscan Co. (a)—Several medicinal springs are known to occur in the vicinity of St. Geneviève and near to the Batiscan river. The waters which are strongly saline, flow from rocks of Trenton age, and in the case of that, of which No I is the analysis, give off no inconsiderable quantities of carburetted hydrogen. The analyses refer to I, from a spring about three miles above the church, and II, from a spring at the ferry landing directly opposite the church. The specimens examined were collected in August 1853.

	Trudel's spring I	Ferry spring II
Chloride sodium	17'2671	11'5094
“ potassium	’2409	undet
“ calcium	’6038	’2264
“ magnesium	2'0523	’8942
Bromide magnesia	’0587	’0273
Iodide	’0133	’0183
Carbonate lime	0120	’0180
“ magnesia	’7506	’4464
“ iron	traces	traces
Alumina	undet	undet
Silica	undet	undet
In 1,000 parts of water	20'9987	13'1400

St. Hyacinthe, St. Hyacinthe Co.—A mineral water, which is now finding a ready sale throughout the province of Quebec, is obtained at St. Hyacinthe and sold under the name of “Philudor.” No data are available beyond the following analysis made by Prof. C. P. Choquette, of St. Hyacinthe College :

Chloride sodium	3'6923	Carbonate manganese	’0114
“ potassium	’1230	Sulphur	’0009
“ magnesium	’0415	Alumina	’0041
“ lithium	’0074	Silica	’0246
Sulphate calcium	’0319	Titanic acid	traces
“ barium	’0032	Free carbonic acid	’0461
“ strontium	’0024	Carbonic acid (forming bicarbonates)	’0983
Carbonate sodium	’0422		
“ magnesium	’0648		
“ iron	’0371		
Residue at 180° C in 1,000 parts of water			4'4423

St. Léon, Maskinongé Co.—The best known and most widely used medicinal water found in Canada is undoubtedly that obtained at St. Leon Springs. Large quantities of this water are annually sold in all the important cities and towns of the Dominion and considerable quantities are of course used in the baths etc, at the sanitarium erected

near the spring. The water is strongly saline and slightly chalybeate and at the spring evolves considerable quantities of carburetted hydrogen. The following analysis was made by Dr. T. Sterry Hunt and was confirmed by Prof. O. F. Chandler of Columbia College, New York, and Jno. Baker & Edwards Ph.D. etc.

Chloride sodium	077.4782	Phosphate soda	1690
“ potassium	13.6170	Bi-carbonate lime	29.4405
“ barium . . . . .	.0699	“ magnesium	82.1280
“ strontium . . . . .	.5070	“ iron . . . . .	.6856
“ calcium	3.3338	Alumina . . . . .	.5830
“ magnesium	59.0039	Silica	1.3694
“ lithium	1.0147		
Bromide sodium . . . . .	.8108	Grains in imp. gallon	871.6681
Iodide . . . . .	.2479	Specific gravity	1011.8
Sulphate lime . . . . .	.0094		

Another spring (*a*) in this neighborhood occurring about a mile from the church at St. Leon and in the valley of the Rivière à la Glais, affords a very similar water to the foregoing. The water is saline, has a marked chalybeate taste and contains traces of baryta and lithia, and is accompanied by large quantities of carburetted hydrogen. The analysis of a specimen collected in October 1848 gave the following result :

Chloride sodium	11.4968	Carbonate lime	3493
“ potassium . . . . .	.1832	“ magnesium	9388
“ barium . . . . .	.0019	“ iron . . . . .	.0145
“ strontium . . . . .	.0019	Alumina . . . . .	.0865
“ calcium . . . . .	.0718	Silica . . . . .	.0145
“ magnesium . . . . .	.6036		
Bromide magnesium . . . . .	.0091	In 1,000 parts of water	13.8365
Iodide . . . . .	.0046	Specific gravity	1011.23

Ste. Martine, Beauharnois Co. (a)—“A feebly saline water from the parish of Ste. Martine, in Beauharnois, * * * probably rises from the Calciferous formation. It gives 1.98 parts of solid matter to 1,000 and contains a small portion of sulphates. The spring is said to be sulphurous”—vide Geology of Canada, 1863.

St. Ours, Richelieu Co. (a)—Some years prior to 1852, in which year the specimen affording the following analysis was collected, a spring was tapped while constructing a lock on the Richelieu River at St. Ours. As the water could only be obtained by means of a pump it was difficult to state positively as to the purity of the specimen obtained. The analysis illustrates the character of the water afforded :

Chloride sodium	·0207	Carbonate iron	traces
“ potassium	·0496	Alumina	undet
Sulphate potash	·0081	Silica	·0160
Carbonate soda	·1340		
“ lime	·1740	In 1,000 parts of water.....	·5311
“ magnesia	·1287		

St. Sévère, St. Maurice Co.—The water of a spring occurring in this parish has lately been put upon the market under the name of “Mineral water Divira” though with what success, and under what conditions the water occurs, are not known to the writer. The only available analysis is that by Profs. Favard and Pfister of Montreal:

Chloride sodium	551·68	Phosphate soda	·96
“ potassium	38·59	Bi-carbonate lime	8·61
“ lithium	7·29	“ magnesium	119·72
“ barium	trace	“ iron	18·01
“ calcium	1·49	“ manganese	·28
“ magnesia	58·18	Alumina	37·85
Bromide sodium	398·87	Silica	5·46
Iodide	6·42		
Sulphate lime	trace	Grains in imp. gallon	1255·25

Varennes, Verchères Co. (a)—Two springs known locally as the “Saline” and “Gas” springs occur at this place, the waters rising through the clay from rocks near the summit of the Utica or base of the Hudson River formation. In both instances carburetted hydrogen is given off, in the case of the saline spring in but small quantities at infrequent intervals, while from the gas spring sufficient was evolved at one time to warrant its collection and utilization in the lighting of the house that had been erected over it. In November 1847 the temperature of the Saline spring was 47° F. and that of the Gas spring 40° F., the air being 19° F. Again on the 18th of October in the following year the temperature was taken and found to be 47·5° F. in the Saline spring, while the Gas spring was 45·5° F. the atmosphere being 44° F. The following analyses are available:

	Saline Spring	Gas Spring
Chloride sodium	9·4231	8·4286
“ potassium	·1234	·0382
Bromide sodium	·0126	·0046
Iodide	·0054	·0085
Carbonate soda	·1705	·3260
“ baryta	·0226	·0123
“ strontia	·0140	·0096
“ lime	·3540	·3490
“ magnesia	·5433	·3559
“ iron	·0048	traces
Alumina	traces	“
Silica	·0465	·0540
In 1,000 parts of water	10·7202	9·5867
Specific gravity	1008·15	1007·7

MINERAL WATERS IN NEW BRUNSWICK.

Apotaqui, Kings Co.—A mineral water known as “Apotaqui Mineral Water” is obtained from a spring about one mile east of the village of Apotaqui, and has lately been put upon the market with marked success, being used, both medicinally and in the pure state as an emulsifier of the fatty oils for which purpose it is eminently satisfactory, making, especially with cod-liver oil, a perfect and thorough emulsion. It has also been used with beneficial effect in the cure of diabetes and gravel and other bladder affections, as well as derangements of the digestive organs.

An analysis made in 1886, by Mr. W. F. Best of St. John resulted as follows:—

Chloride sodium	7600	Iron	traces
“ potassium	0108	Silica	0090
Phosphate “	0050	Organic matter	traces
Carbonate calcium	0125		
Bi-carbonate sodium	20160	In 1,000 parts of water	28183
Magnesium	traces		

Bennet's Brook, Kings Co.—Near the head waters of Bennet's Brook are several springs, the waters of which might possibly be more correctly classed under the head of brines, though they have acquired a local celebrity on account of their supposed medicinal properties. No examination has been made as to their contents.

Havelock, Kings Co.—The spring known as the “Havelock Mineral Spring” is situated in the village of that name and has a daily flow of about 700 barrels. This water is shipped throughout the lower provinces and it is claimed has a highly curative effect upon skin diseases and affections of the digestive organs.

An analysis made in 1889, by Mr. W. F. Best, of St. John gave the following result:—

Chloride sodium	3513	Bi-carbonate magnesium	8455
Sulphate potassium	827	Iron	trace
“ calcium	146	Iodine	“
Sulphur	09	Silica	“
Bi-Carbonate sodium	1244		
“ calcium	1980	Grains in imp. gallon	16176

Norton Dale, York Co.—In the vicinity of Norton Dale, a settlement on the Nacawicac River, is a spring affording a water which

evolves a sufficient quantity of sulphuretted hydrogen, to give the water a strong sulphurous taste and odour. No examination of the water has been made, though it is said to be used to a considerable extent locally. Many similar springs are known to occur in the vicinity, of none of which, however, is anything definite known.

MINERAL WATERS IN NOVA SCOTIA.

Bras D'Or Lake, Victoria Co.—On the north shore of the Little Narrows, Bras D'Or Lake, and about twelve miles south-west of Baddeck are several brine springs, a specimen of the water of which was examined by Mr. G. C. Hoffmann (report Geol. Surv. 1873-4, p. 181). Although more correctly a brine, it has been thought advisable to note its occurrence here, the following analysis is by Mr. Hoffmann :

Chloride sodium	50·6881	Alumina	traces
“ potassium	·1942	Silica	“
“ magnesium	·1593		
Sulphate calcium	5·6810	In 1,000 parts of water	56·7226

Unsuccessful efforts were made to utilize this brine in the manufacture of salt ; works etc. having been erected and abandoned many years prior to 1873. Mr. Chas. Robb, who collected the specimen examined, states that in the neighborhood of the springs, of which there are several, there is a noticeable odour of sulphuretted hydrogen.

East Bay, Cape Breton Co.—At the junction of the Ben Eoin and Gaspereaux River roads, and about four miles from the shores of East Bay, is a spring which at one time had a comparatively wide reputation and was resorted to by many in search of relief from rheumatic troubles. The spring rises from syenitic rocks and the water has an unpleasant brackish and astringent taste. An analysis afforded Prof. Hy. How, Kings College, Windsor, the following result:

Chloride sodium	343·11	Phosphoric acid	traces
“ potassium	4·55	Carbonate lime	} ·60
“ calcium	308·90	“ magnesium	
“ magnesium	4·47		
Sulphate lime	·94	Grains in imp. gallon	662·57
Iron	traces	Specific gravity at 54° F	1007·397

Grande Anse, Richmond Co.—In the “ Mineralogy of Nova Scotia 1868,” page 194, Prof. Henry How, writes thus of a water found at this place:—“ At Grande Anse, at the mouth of the McKenzie River, two springs issue from the metamorphic Lower Carboniferous rocks

of aerated table waters and ginger ale. Several analyses are available, all of which have been made by Prof. Hy. How of Windsor. Of these the following is typical and is thought sufficient :

Chloride potassium	1'60	Carbonate iron	14
Sulphate soda	8'35	Phosphoric acid	traces
" lime	121'98	Silica	55
" magnesia	5'35	Organic matter	traces
Carbonate lime	2'70		
" magnesia	37	Grains in imp. gallons	141 04

Windsor, Hants Co.—The following analysis was made by Prof. Hy. How, (Minerology of Nova Scotia, 1868, page 195) of a water from a spring which rises from Lower Carboniferous rocks near Windsor. The water was collected in 1858 and was found to be perfectly colorless and to have but little taste; its temperature was 49° F., that of the air being 31° F., and the specific gravity at 49° F. 1.001858.

Chloride sodium	0'90	Silica	0'60
Sulphate soda	0'68	Phosphoric acid and organic matter	trace
" potassa	0'38		
" lime	106'21	Grains in imp. gall	138'00
" magnesia	11'02	Free carbonic acid (1.35 cubic ft. at 33° F.)	0'04
Carbonate lime	17'50		
" magnesia	0'31		
" iron	0'40		

Miscellaneous localities—Throughout the reports of the Geological Survey, in How's Minerology of Nova Scotia 1868, and many other publications, may be found mention of many springs, specific information regarding which is not given. Among these may be mentioned the so-called Thermal Spring of Chester, Lunenburg Co., which is said to afford a slightly better water, probably alkaline in character. At Cheticamp, Inverness Co., a water is found which is said to have medicinal properties as is also the case at Gairloch, Pictou Co., and Earltown, Hants Co. Another spring, mentioned by Mr. Hugh Fletcher, (report Geol. Survey. 1876-78, page 456) as occurring near Deadman's Point, Washaback, Pictou Co., affords a brine smelling strongly of sulphuretted hydrogen. In Pictou Co., near the mouth of Sutherland's River, a brine used locally for medicinal purposes issues into the bed of the river, and at St. Andrews in the same county is located the so-called "Rotten Spring," the waters of which have acquired a local reputation as a cure for rheumatic and other diseases. Other localities mentioned by Mr. Fletcher (report Geol. Surv. 1879-80, page 133 F)

are: Rabbit Isd, Landrie Lake and River Tillard, the water from the two latter places being chalybeate in character, while that from Rabbit Island is highly charged with sulphur, which is deposited in the pond into which it flows.

MINERAL WATERS IN MANITOBA AND THE NORTH WEST TERRITORIES.

Banff, Alberta.—The waters of the Thermal springs at this place have of late years commanded considerable attention, though more particularly since the inauguration of the Banff National Park and the erection by the Canadian Pacific Ry., of their large sanitarium. The curative properties of the waters are too well known to require further mention here.

In the Geol. Surv. Rep. III, part II, 1887-88, p. 21 T, is an analysis of a specimen collected by Mr. R. G. McConnell:

Chloride sodium	'0110	Silica	'0398
Sulphate soda	'0089	Organic matter.....	trace
“ potassa	'0096		
“ magnesia	'2070		'9551
“ lime	'5627	Carbonic acid, half combined...	'0510
Carbonate lime.....	'1148	“ free	'0434
“ iron	'0013		
Alumina	undet	In 1,000 parts of water.....	1'0495

“The water was examined for lithia, iodine, and bromine, but no other constituents. Distinct evidence was obtained of the presence of lithia; iodine and bromine were not detected; this does not necessarily imply that they were not present in the water, in as much as the amount of water operated on was far less than would be required for the detection of traces, or even very small quantities of these substances. Geol. Surv. Rep. Vol III., 1887-88, part II, p. 22 T.

The physical features most apparent were: colourless; devoid of any marked taste; odourless; reaction faintly alkaline; specific gravity of filtered water, at 15.5° C. = 1000.99. Mr. McConnell in referring to this spring says:—“The water has a temperature of 111° F. in summer, but it is said to rise to 119° F. in winter. The lower temperature in summer may be caused by the water being affected to some extent by the surface drainage, which is more active at that season. It has a large flow, and is forced up in large quantities through an aperture several inches in diameter” * * Ibid, page 21 T.

Brandon, Manitoba.—A partial analysis was made in the laboratory of the Survey—Geol. Surv. Rep. 1882-84, p. 18 MM.—of a water from a shallow well north of Brandon :

Potassa and soda.....	a large quantity ; soda predominating
Lime.....	“
Magnesia	“
Sulphuric acid.....	a very large quantity
Carbonic acid.....	a rather large quantity
Chlorine.....	a “ small “
Sulphuretted hydrogen	

After being filtered it was found to have a content of solids—dried at 100° C = equivalent to 268.9 grains to the imp. gall. The water at the time of the examination smelt strongly of sulphuretted hydrogen and had a most offensive odour.

Clearwater River, N. W. T.—In the same volume an analysis is given of a specimen collected by Dr. Robert Bell and labelled as follows :—“ Salt resulting from the evaporation of about five and a half quarts of water of a spring situated on the north bank of the Clearwater River, about four miles below the Cascade Rapid, N. W. T. From $\frac{1}{3}$ to $\frac{1}{4}$ more adhered to the kettle and was lost.” The residue handed in for examination weighed 595 grains.

Potassa.....	very small quantity	Ferric oxide.....	very small quantity
Soda.....	“ large “	Sulphuric acid.....	“ large “
Lime.....	“ “	Chlorine.....	“ “
Magnesia.....	“ “	Carbonic acid.....	“ “
Alumina.....	“ small “	Insoluble residue	“ “

Rosenfeld Station, Manitoba.—The water was obtained from an artesian boring made at Rosenfeld Station, C. P. R., at a depth of 235 feet, from which depth and lower points the water rises and flows in considerable quantities, Mr. G. C. Hoffmann, Geol. Surv. Rep. I, 1885, p. 13M—says :—The filtered water was perfectly colorless ; taste, strongly saline with a very slight bitter after taste ; it did not affect the color of turmeric paper, but exhibited a slightly alkaline reaction with reddened litmus paper. The reaction for boric acid, although faint, was quite distinct. Bromine and iodine are both present—the amount of the former exceeding, apparently, that of the latter,—but owing to a total insufficiency of material, the determination of the respective amounts of these constituents, could not be carried out. The specific gravity of the water, at 15.5° C., was found to be 1032.86.”

The analysis gave the following result :—

Chloride sodium	36.4971	Sulphate lime	4.1511
“ potassium . . . . .	.4179	Carbonate lime . . . . .	.0777
“ calcium . . . . .	.3982	“ iron	traces
“ magnesium	1.7225	Silica . . . . .	.0126
Bromide magnesium	undet		—
Iodide magnesium	undet	Total dissolved solid matter by	
Borate soda	undet	direct experiment dried at 180° C.	43.4280

“The proportion of magnesium assumed to be present as bromide and iodide, amounts to 0.0596”

Sulphur Coulee, Manitoba.—Water which rises from Cretaceous shales, was obtained by Dr. G. M. Dawson from the so-called Sulphur Spring, in Sulphur Coulee, near its junction with the Pembina River, and submitted for examination to Mr. G. C. Hoffmann, who reports as follows:—Geol. Surv. Rep. II, 1886, p. 13 I:—“The filtered water had a specific gravity at 15.5° C., of 1000.42 and contained 0.862 parts dissolved saline matter, dried at 180° C., in 1000 parts, by weight, of the water.” A qualitative analysis gave the following result :—

Potassa	small quantity	Sulphuric acid	large quantities
Soda	rather large quantity	Carbonic acid	“
Lithia	very small quantity	Chlorine	“
Lime	large quantity	Organic matter	small “
Magnesia	“		

Western Butte, Sweet Grass Hills, Alberta.—In the same volume Mr. Hoffmann gives the following result of the examination of a specimen collected by Dr. G. M. Dawson from a spring at foot hills of Western Butte, Sweet Grass Hills, where the water rises from dark Cretaceous shales. “The water, which as it issues from the spring, is charged with sulphuretted hydrogen, still contained a large quantity of that gas. It contained some suspended and sedimentary matter, consisting of carbonate of lime, a little iron, and separated sulphur, together with argillaceous and organic matter, and some sand. The filtered water had a specific gravity, at 15.5° C., of 1001.36. Total dissolved saline matter, dried at 180° C., equalled 0.857 parts in 1000”

A qualitative analysis gave the following result :—

Potassa	trace	Ferrous oxide	trace
Soda	small quantity	Sulphuric acid	small quantity
Lithia	very distinct quantity	Carbonic acid	very large quantity
Lime	fairly large quantity	Chlorine	small quantity
Magnesia	very “	Hydrosulphuric acid	large “
Alumina	“ small “	Organic matter	small “

MINERAL WATERS IN BRITISH COLUMBIA.

Dougherty's Spring, Maiden Creek.—This spring known also as the "Carbonic Acid Spring" on account of the great quantities of that gas evolved, is on Maiden Creek, south of Clinton, and between that place and Cargerville.

Water, collected by Mr. A. Bowman, was examined by Mr. G. C. Hoffmann, (Geol. Surv. Rep. II, 1886, p. 13 T :)—

Potassa.....	trace	Sulphuric acid.....	fairly large quantity
Soda.....	small quantity	Carbonic acid.....	large quantity
Lime.....	large "	Silica.....	small "
Strontia.....	trace	Chlorine.....	" "
Magnesia.....	large quantity	Organic matter....	" "
Alumina.....	very small quantity		

The water when filtered was found to have a specific gravity, at 15.5° C., of 1000.90 and contained in 1000 parts of water 1.442 parts of dissolved solid matter, dried at 180° C.

Harrison Hot Springs.—At the southern end of Harrison Lake two springs have been noted viz:—The Potash Spring and The Sulphur Spring, both of which are thermal. Samples of the water were examined. (Geol. Surv. Rep. IV, 1888-89, part R.)

Potash Spring.—Temperature of water at spring 120° F. The filtered water was perfectly colourless, inodorous and had a slightly saline taste; it showed alkaline reaction with reddened litmus paper but did not affect turmeric paper

Chloride sodium.....	.4059	Carbonate iron, very small amount	undet
" potassium.....	.0202	Alumina.....	undet
" lithium.....	undet	Silica.....	.0586
Sulphate soda.....	.4107	Organic matter.....	trace
" lime.....	.2256		
" magnesia.....	.0024	In 1,000 parts of water.....	1.1600
" strontia.....	undet	Specific gravity at 15.5° C.....	1001.00
Carbonate lime.....	.0366		

Sulphur Spring.—Temperature of water at spring, 150° F. Physical features similar to last with the exception of the specific gravity, which was at 15.5° C., 1001.13.

Chloride sodium.....	.4471	Sulphate strontia.....	undet
" potassium.....	.0246	Bi-carbonate lime.....	.0621
" lithium.....	undet	Alumina.....	trace
Sulphate soda.....	.4723	Silica.....	.0662
" lime.....	.2120		
" magnesia.....	.0021	In 1000 parts of water.....	1.2864

Hot Spring Island, Queen Charlotte Islands.—No analysis of the thermal waters from the spring on this island is available, the only information at hand is that found in the report on the Queen Charlotte Islands, by Dr. G. M. Dawson, (Geol. Survey Rep., 1878-9, p. 22 B). “On the south side of Hot Spring Island is the spring from which it has been so named. Its situation is easily recognized by a patch of green, mossy sward, which can be seen from a considerable distance. Steam also generally hovers over it. The actual source of the water is not seen, but is probably not far from the inner edge of the mossy patch. * * I had no thermometer reading sufficiently high to take the temperature of the warmest streams, in which the hand could scarcely be held with comfort. * * The water has a slight smell of sulphuretted hydrogen, and a barely perceptible saline taste. The stones over which it flows, in some places show traces of a whitish deposit, and the streams and pools are choked with a slimy confervoid growth.”

Nanaimo, Vancouver Island.—In Geol. Surv. Rep., 1872-73, p. 52, is an analysis of a saline water, from the so-called “Salt Spring at Nanaimo.” The water, according to Mr. Jas. Richardson, who collected the specimen, issues from the coal-bearing strata near the Douglas seam, and had, in 1872, an estimated flow of about 3,500 gallons per diem. The Hudson Bay Co., prior to that date, had erected a building near the spring with the intention of manufacturing salt from the water, but the enterprise was abandoned, probably on account of the impurities the product would contain.

Chloride sodium . . . . .	.39117	Carbonate iron	traces
“ potassium . . . . .	.627	Alumina . . . . .	.038
“ calcium	10.049	Silica . . . . .	.038
“ magnesium . . . . .	.135		
Sulphate lime	1.803	In 1000 parts of water	52.154
Carbonate lime . . . . .	.347	Specific gravity	1.03900

Shuswap Lake.—In Geol. Surv. Rep., 1877-78, p. 25 B, Dr. G. M. Dawson describes a spring on the Spallumsheen Arm, Shuswap Lake. The spring is known to the Indians as “Pil-pil-poopil,” and flows into a shallow bay. No data regarding the character of the water are available, beyond the fact that it has a faint, ferruginous taste, and traces of sulphuretted hydrogen. The temperature of the water as it comes to the surface of the bay was, in August, 1877, 70° F.

Upper Columbia Lake, North End.—About seven and a half miles north of the north end of Upper Columbia Lake is located a thermal spring, the water of which afforded (Geol. Surv. Rep. II, 1886, p. 15 T) the following result :

Potassium.....	trace	Sulphuric Acid	very large quantity
Soda.....	rather small quantity	Carbonic acid.....	“ “
Lithia.....	trace	Silica	trace
Baryta.....	“	Chlorine.....	fairly large quantity
Strontia	very small quantity	Organic matter	small quantity
Lime	“ large “	In 1000 parts of water, dried	
Magnesium	large quantity	at 180 °C.....	2.177
Ferrous oxide	trace	Specific gravity at 15.5° C	1001.48

Dr. G. M. Dawson, who collected the specimen, states that the discharge is not less than 20 gallons per minute, and that the temperature at the hottest point was 112°F.

Vermillion Pass.—Dr. G. M. Dawson reports several chalybeate springs which flow out through the gravel on the river flats about 6 miles west of the summit and near the place alluded to in his report as “the bend.” He states that the springs are copious and of such a character as to suggest their use medicinally.—*Vide* Geol. Surv. Rep. I, 1885, p. 120 B.

Many thermal and other springs are, of course, known locally in British Columbia, but no data are available. Of some, however, although no analyses are at hand, the following notes by Dr. G. M. Dawson in his “Report on the Mineral Wealth of British Columbia Geol. Surv. Rep. III, 1887-88, 162 R. may not prove uninteresting.

“*Admiralty Island.*—Salt spring. According to analysis quoted by Pemberton in the place above cited (Nanaimo). The spring contains 65 parts of saline matter to 1,000, but with more impurities than the last (Nanaimo).”

“*Near Lilloet River.*—about five miles from head of Harrison Lake. Hot springs known as St. Agnes’s Well; no particulars.”

“*Sinclair Pass*—Rocky Mountains, Hot Springs, on south side of Berland’s Brook, near the point at which it issues from the mountains into the Upper Columbia valley. Three springs reported, and said to be copious. Mr. John McKay, who discovered these springs, states the temperature of one as 118° F.”

“*Elk River Valley.*—Rocky Mountains, about lat. 50°7; warm sulphur spring reported on east side of river, by Mr. H. M. Hatfield.”

“*Kootanie Lake*—Hot springs, giving its name to the “Hot Springs Mining Camp.” Situated on west side of lake, directly opposite the “Blue Bell Claim.” Several springs occur near the edge of the lake and some below the water level, temperature estimated at about 100° F.”

“*Upper Arrow Lake*.—Hot springs. On the east side of the lake, twelve miles from its head, and one hundred and fifty yards from the lake. Said to be about as hot as can comfortably be borne in bathing.”

“*Albert Canyon Station. C. P. Ry.*—Hot spring. About a mile to the north of the station. Temperature about the same as the last.

“*Near Upper Arrow Lake*.—Hot spring reported by Indians at some distance back from the lake, 3 or 4 miles from its southern end.”

“*Near Albert Canyon Station*.—“Soda spring.” One mile and a half west of the station on south side of the track. This and the following springs are known as “soda springs” in consequence of the presence of large quantities of carbonic acid gas.”

“*Near Carne's Creek*.—On west side of Columbia River and opposite the mouth of Carne's Creek. Groups of springs with copious escape of carbonic acid gas.”

“*Near Downie Creek*.—“Soda spring.” Is situated about three fourths of a mile north-west of the trail from Downie to Gold creek and about four miles from the latter.”

“*Four miles above Smith's Creek*.—West side of Columbia River. Springs with considerable escape of carbonic acid gas, and deposition of iron-oxide, reported.”

“*Skeena River*.—Left bank about fourteen miles above “Inverness Cannery.” Hot spring, no particulars.”

“*Stikine River*.—Hot spring. Situated a short distance above Buck's Bar and directly opposite the Great Glacier. No particulars.”

“*Kennicot Lake*.—At head of south branch of Taku River. Hot spring. Said to feed the lake. (Alaska and its Resources. Dall, p. 628)”

“*McDonald's Oil Spring*.—Head waters of Omineca River, lat. 56° This spring is marked as above on Trutch's map of British Columbia. It is not, however, an oil spring, but is described as a small mound in the centre of which a hollow exists charged with carbonic acid to such an extent as to prove fatal to birds and small animals.”

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SUMMARY

— OF —

Canadian Mining Regulations.

NOTICE.

THE following is a summary of the Regulations with respect to the manner of recording claims for *Mineral Lands*, other than Coal Lands, and the conditions governing the purchase of the same.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein, either by surface or subterranean prospecting, for mineral deposits, with a view to obtaining a mining location for the same, but no mining location shall be granted until actual discovery has been made of the vein, lode or deposit of mineral or metal within the limits of the location of claim.

A location for mining, except for *Iron*, shall not be more than 1500 feet in length, nor more than 600 feet in breadth. A location for mining *Iron*, shall not exceed 160 acres in area.

On discovering a mineral deposit any person may obtain a mining location, upon marking out his location on the ground, in accordance with the regulations in that behalf, and filing with the Agent of Dominion Lands for the district, within sixty days from discovery, an affidavit in form prescribed by Mining Regulations, and paying at the same time an office fee of five dollars, which will entitle the person so recording his claim to enter into possession of the location applied for.

At any time before the expiration of five years from the date of recording his claim, the claimant may, upon filing proof with the Local Agent that he has expended \$500.00 in actual mining operations on the claim, by paying to the Local Agent therefor \$5 per acre cash and a further sum of \$50 to cover the cost of survey, obtain a patent for said claim as provided in the said Mining Regulations.

Copies of the Regulations may be obtained upon application to the Department of the Interior.

A. M. BURGESS,

Deputy of the Minister of the Interior

DEPARTMENT OF THE INTERIOR,)
Ottawa, Canada, December 1892)

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