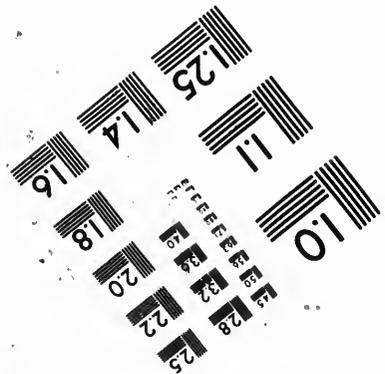
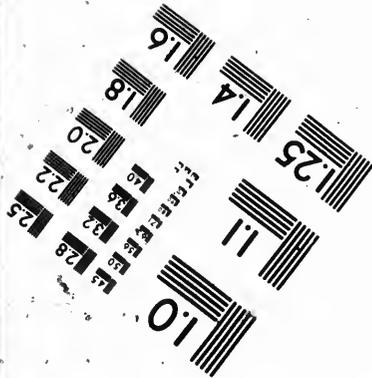
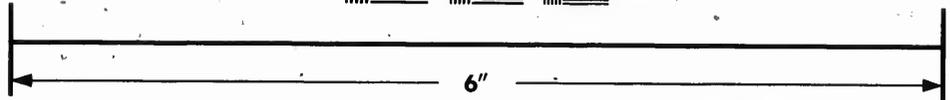
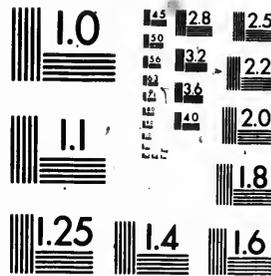


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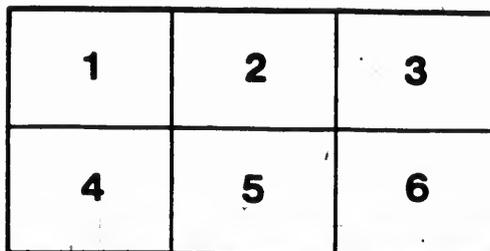
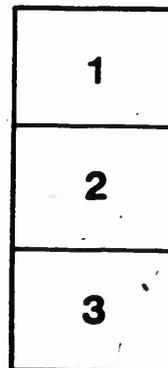
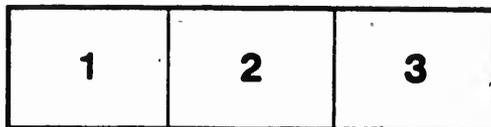
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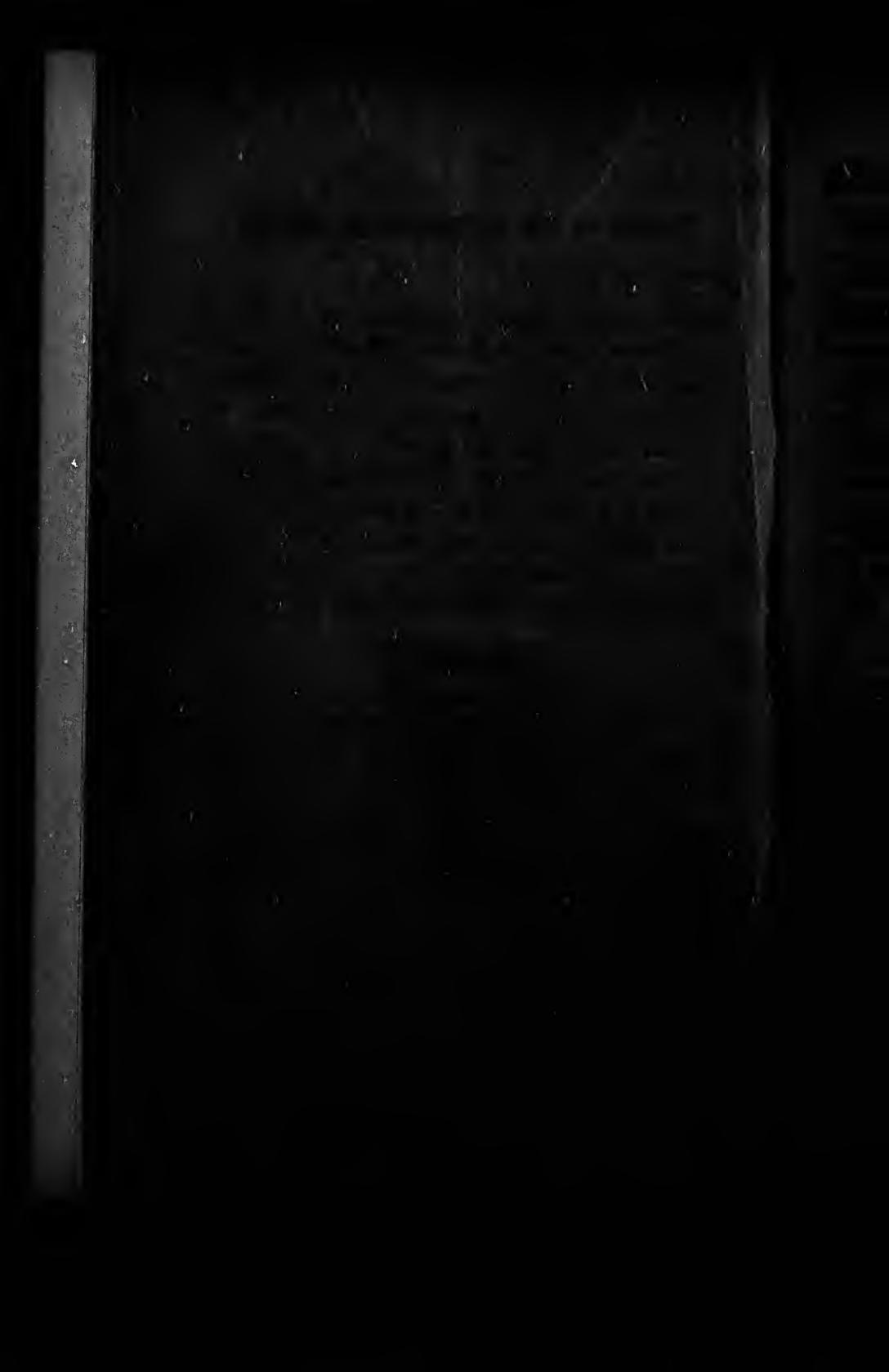
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REPORT OF  
FORREST SHEPHERD, ESQ.,  
ON THE MINERAL LANDS OF THE  
MONTREAL MINING COMPANY  
ON THE  
SHORES OF LAKE SUPERIOR.

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of metals at different points. The stratified rocks, however, soon give place to a scene of violent disturbance and powerful eruptive agency by which numerous dislocations, rents and fissures have been produced and are generally filled with brecciated and sparry matter frequently containing copper ore.

From these points the rocks continue to change until they present a stupendous exhibition of metamorphism and mineralization extending over a wide area. Among these rocks may be seen cones of granite, syenite and porphyry, piercing and elevating the micaceous, chloritic and talcose schists and killas; together with green stone basalt, amygdaloid and other varieties of trap, frequently overlying, conglomerate, sand-stones, lime-stones, slates and shales. The granite in some places seems to have effected the same agency as the trap. In other places the trap has a dip and stratification similar to the conglomerate and sand stone beneath it. There are also wrinkles and furrows on the surface of the interstratified amygdaloid, plainly indicating successive overflows of Plutonic matter, yet the whole as before remarked, traversed with dikes and veins almost innumerable. The veins are composed chiefly of calcareous spar, laumonite, fluor spar, amethystine quartz and sulphate of barytes. Their accompanying minerals are usually prehnite, stilbite, datholite, analcime and steatite, which latter frequently occupies the sides of the veins and greatly facilitates excavation especially in the amygdaloid. These veins are often richly loaded with the mundic, gossan, brent and pryant of the Cornish miners, and in their numerous vugs and cavities are found native copper, native silver, the green and blue carbonates of copper, the yellow pyrites, but more abundant than all the horse flesh, and rich grey sulphuret of copper. The above appearances are designed to be more particularly descriptive of the Northern or British side of Lake Superior, which presents far more interesting external indications on the coast, and also far greater facilities for mining than the opposite American shore. On the American or Southern Shore the mineral region is, with few exceptions,

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destitute of harbors, and the shore generally low. While the British side presents upon the coast a highly elevated region with spontaneous drainage so fortunately indented with bays and clustered with islands as to afford the most desirable of harbors and the safest anchorage. As to the age of the rocks nothing is as yet certain. The appearance of fucoids is reported in the lower shales, indistinct sigillaria, &c., in the jaspideous schists of the conglomerate, but not sufficient to identify any particular period. It is presumed, however, that the valuable and persevering researches of W. E. LOGAN, Esquire, Provincial Geologist, will in due time arrange them in their proper order. The amygdules of the trap are made up of agates, cornelians, &c., which often give place to chlorite, steatite, carbonate of lime, quartz and native copper. Numerous geodes of prehnite and laumonite, also contain native copper. Much of the rock is in a state of decomposition, and there is consequently a great inequality of surface. The hills rise from the height of a few yards to that of one thousand feet or more. The rivers from the interior flow in torrents to the lake and thereby afford numerous mill-seats. The soil upon the trap formation is rich and fertile, and sustains a dense growth of spruce, fir, cedar, larch or tamarack, white birch, poplar and pine; sufficient it is believed, for all mining and building purposes.

The foregoing is a brief outline of the general appearance and geological structure of the Mineral region on the northern shore of Lake Superior.

In the course of the season I have selected and located for the Montreal Mining Company, one hundred and eighty square miles in separate tracts, each measuring two miles in breadth by five in depth. I shall now proceed to give a more particular description of each location.

#### 1.—Location of W. B. JARVIS, Esq.

Is situated on the coast between Fort William and Pigeon River. Beginning at a post planted on the shore, said post being the beginning of the western side line of the loca-

tion made by JOHN PRINCE, Esquire, thence westward on the shore, a distance sufficient to give the location an average breadth of two miles; thence northward in a line parallel with the side lines of Prince's location, a distance sufficient to give an average depth of five miles; thence eastward at right angles, a distance sufficient to give the location an average breadth of two miles; thence southward to the place of beginning, including the Victoria Islands southward.

This location exhibits a surprising boldness of outline, both upon the shore and inland. The hills of trap-rock superincumbent on slates rise in abrupt precipices to the height of eight hundred to one thousand feet above the level of the lake, and are succeeded by deep and fertile valleys, which serve as channels for the small streams that furnish water sufficient for the washing of ores, and also be useful in affording a water power except in dry seasons. The whole tract is covered with a dense growth of forest trees, among which are large white pines, valuable for saw-logs. Good crops of grass, wheat, oats, and potatoes may be obtained here by cultivation, and also almost every variety of esculent roots. The wild cluster pea grows spontaneously along the coast, and during the month of August is fully ripe. I have in some instances counted seven pods in one clustre, full and good. The susceptibility of the soil here for agriculture, together with the excellent fisheries on the location, give every reasonable assurance that a large mining population may be cheaply sustained here after the lapse of a few years. An excellent harbour for schooners and larger vessels is found in Prince's Bay, immediately fronting the location.

The rocks, as before remarked, consisting of nearly horizontal slates overlaid by mountains of trap, and not unfrequently pierced with eruptive cones of porphyry and syenite, are intersected by large trap dikes, running as usual parallel to the general course of the shore, or nearly north-east and south-west. Numerous and some

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very large veins of spar are found to traverse the tract at right angles to the trap dikes. The vein-stone is chiefly carbonate of lime, together with fluor spar, and a mixture of quartz and sulphate of barytes. Vitreous, or as it is commonly called, gray sulphuret of copper, and also the yellow sulphuret and green carbonate of copper, have been found in these veins, although as yet no regular systematic exploration has been prosecuted on the premises. As illustrative of the Mineral riches of this region, a rich vein of vitreous gray and variegated copper, accompanied with native silver, has been opened on the adjacent location of Colonel Prince. This vein is about fifteen feet in thickness, has a shaft sunk upon it to the depth of several fathoms, and promises fair to yield an abundant supply of very rich ore. There is good reason to believe, from the geological features of this region, that other veins in the vicinity will prove equally productive.

**2.—Location of JOHN STUART, Esq.**

Beginning on the shore at the mouth of Pigeon River, in or near latitude 48 degrees north, and longitude 89 degrees and 47 minutes west, (per Bayfield) thence easterly by the meanderings of the shore, a distance sufficient to make the location two miles in breadth; thence northerly, parallel to the general course of the Pigeon River, five miles; thence westerly, at right angles to said general course of Pigeon River, two miles more or less to Pigeon River; thence southerly, by the meanderings of the shore, down the stream to the place of beginning.

This Location, like that of Jarvis, occupies high and broken land covered with a thick forest of evergreens, the most valuable of which is the white pine. There is much good soil upon the track notwithstanding the inequality of surface, and the rich Indian gardens at the mouth of the river give convincing proof of its adaptedness to agriculture. The bay and river afford a commodious and safe harbour for vessels large and small, as well as a

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most valuable fishery; and a short distance up the river there is a perpendicular fall of 83 feet, furnishing an extraordinary water power, easily available for all hydraulic purposes. Here, logs and timber may be easily floated down the river to saw-mills; and copper ores from the surrounding country with great economy and facility be freighted to this point to be washed and conditioned for smelting. The rocks of this location are varieties of trap overlying slates, slightly elevated by the intrusion of syenite and porphyry, and traversed by numerous copper bearing veins. A number of these veins may be seen by following up the river two or three miles, and also by crossing the tract in a line eastward from the falls. They contain yellow and gray copper, and in one or two may be found blend or sulphuret of zinc. No systematic exploration has been made on this tract for the proper development of its mineral resources for want of time. Its surface indications however are highly promising.

### 3.—Location of JOSEPH WOODS, Esq.

Beginning at a post planted on the shore at the westerly point of a small bay about 9 miles north east from Thunder Cape, Lake Superior, in or near lat. 48 degrees 21 minutes north, and longitude 88 degrees 59 minutes west, (per Bayfield,) thence north-westerly at right angles to the general course of the shore, two miles; thence south-westerly parallel to the said general course of the shore, five miles; thence south-easterly at right angles to the said general course of the shore two miles, to the shore of Lake Superior; thence north-easterly following the meanderings of the coast to the place of beginning, including however the neighbouring islands as represented to the Provincial Geologist by an accompanying map.

By means of the islands along the shore of this location, good harbours and landings are secured. And upon these same islands may be seen large and well defined me-

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tallic veins, highly charged with the mundic and gossan of the cornish miners. Also a very prominent vein containing galena and green carbonate of copper is seen to cross a long narrow island near the main land. (See Map.) This vein as well as others should be traced to the highlands in the back ground of the location, and the great dislocation effected by the junction of the trap and sandstone thoroughly examined, as being the repository of valuable ores. The rocks, on the southern portion of the tract are similar to those last described, on Pigeon River, while on the northern part they are composed of stratified limestone and overlying sandstone.— The limestone is here situated immediately upon deep water, and may be easily quarried and loaded into a boat or vessel for transportation. This valuable quarry was discovered by the vigilant inspection of W. E. LOGAN, Esquire, Provincial Geologist ; and as no limestone is found on the southern shore of the lake, it cannot fail to be of great economical importance in smelting copper, and in the business of mining generally. The sandstone may also be very useful in the construction of furnaces. There are one or two mill-seats of importance on this location, furnished by the small rivers that water the tract, and the supply of wood and timber is abundant. This tract is well worthy of minute and faithful exploration.

#### 4.—Location of S. DERBISHIRE, Esq.

Beginning at the southern extremity of Point Porphyry, at the entrance of Black Bay, Lake Superior, in lat. 48 degrees 20 minutes and 40 seconds north, and longitude 88 degrees 51 minutes and 30 seconds west, (per Bayfield,) thence running northerly along the eastern shore of said point and Edward's Island, five miles more or less, to the northern extremity of the last named island ; thence north-westerly and then southerly to the place of begining so as to include the adjacent neighbouring islands as represented to the Provincial Geologist by an accompanying map.



This Location promises to be a very valuable one, not only for its favorable situation, its excellent harbors and fisheries, but more especially for the number, magnitude and richness of its copper bearing veins, for a more perfect illustration of which, I would refer to the accompanying map or chart. The Islands of this location are collectively known as Point Porphyry, of which the two larger and more southern are the most important. The larger of these two is known as Edward's, or Prince Edward's Island, and the long narrow one, south of it, as Point Porphyry proper. The land on the latter Island rises only to the height of about one hundred feet, while on the former the hills swell into ridges and cliffs of two or three hundred feet in height. The rock of the small Island is a soft and easily decomposed amygdaloid trap, while that of Edward's Island is the same rock superincumbent on sand stone, and has a gentle dip to the south-east. Both Islands are surprisingly traversed with trap dikes, and also brecciated porphyritic dikes, enclosing vein stone such as quartz, carbonate of lime and sulphate of barytes bearing yellow copper pyrites, gray sulphuret, and horse-flesh copper ore. Also a large number of spar veins, varying from a few inches to seven or eight feet in thickness, generally composed of carbonate of lime in the form of rhombic and dog-tooth spar. These veins are almost invariably charged with the mundic of the cornish miners, which commonly leads to the vitreous or gray copper. It is not uncommon to find the copper ore mixed in the cubic crystals of sulphuret of iron. A small quantity of native copper has been found here, but the vitreous or gray ore is more abundant than any other. A series of veins, seven or eight in number, bearing this valuable ore, may be seen at the water's edge on the northern point of the smaller island of the two above described. This excellent ore is not only found here in veins, but also forms amygdules in the adjacent trap rock. Some of the larger veins, varying from one to two feet in thickness, have been opened and traced to some extent inland, whither the copper is found to extend. From the appearance of ore upon the surface, there

is no doubt that a much larger quantity exists below, and that a vigorous system of exploration should forthwith be prosecuted on these islands. Specimens of this ore have been collected and forwarded to the Company, and also furnished to the Provincial Geologist. Specimens from this locality have been forwarded to Professor SILLIMAN for analysis, the result of which may be seen in the Appendix.

Time would fail to describe the number and magnitude of the veins along the western coast of Edward's Island, measuring from five to eight feet in diameter, and the largest of them bearing copper. The islands of this group, further north, are of sand stone, and rise only to a moderate height above the water. As yet they are unexplored, but like all the rest they are covered with a good supply of wood and timber:

One of the finest harbors on the lake is found on this Location, at which a wharf has been built the summer past, so that a steamboat or schooner may come alongside with the greatest facility, and discharge her cargo with ease and expedition. The other improvements are a store house and dwelling house, erected one story and a half high, 25 feet by 15. Also a house for a mining superintendent, a blacksmith's shop, a large baker's oven and powder magazine. Several acres of trees have been felled and burned over to make ready for gardens and meadow in case of need. Much of the soil on these islands will be good for cultivation, and the Location is distinguished for its excellent fisheries.

##### 5.—Location of WILLIAM ELLIOTT, Esq.

Beginning on the southern shore of Michipicoten Island, on the north side of Lake Superior, two miles westerly from the south-west corner of Angus McDonnell's location on the said Michipicoten Island, in or near latitude 47 degrees, 42 minutes north, and longitude 85 degrees, 59 minutes west, (per Bayfield;) thence northerly parallel to the west or end line of the said Angus McDonnell's lo-

cation, to the north shore of said Michipicoten Island, thence westerly along the shore, a distance sufficient to make the location average two miles in breadth; thence southerly, parallel to the above side line, to the south shore of said Island; thence easterly along the shore to the place of beginning. Including the adjacent neighboring islands near the shore.

This location was visited and explored by G. K. SMITH, Esquire, Commissioned Assistant Geologist of the Montreal Mining Company. Mr. Smith here discovered metaliferous veins, collected specimens, and built anew a dilapidated log house near the fishery. From his notes I learn that the rock is amygdaloid trap, alternating with conglomerate towards the northern shore of the Island. The hills rise to the height of several hundred feet, and are thickly wooded with fine maple trees. Much of the soil on the tract will be good for cultivation, and the location embraces the only harbor of importance on this interesting island. Both copper and native silver are known to exist on the island, and will without doubt be found on this location. For further particulars, I would refer to Mr. Smith's Report, which if not already, I trust will soon be submitted to the Company. The fishery on the above location is considered a very important one.

#### 6.—Location of ROBERT STUART WOODS, Esq.

Beginning at a post marked M.M. Co.: and a rock beside it similarly marked; being about two miles south of the largest Island of Mamainse; the said post is situated on a rocky point on the north shore of Lake Superior, about latitude  $47^{\circ} 45'$  north, and longitude  $85^{\circ} 30'$  west, (per Bayfield); thence running north  $80^{\circ}$  degrees east, a distance sufficient to give an average depth of five miles; thence south,  $10^{\circ}$  degrees east two miles; thence south,  $80^{\circ}$  degrees west to the lake shore; thence following the shore northward to the place of beginning.

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This location is made on the presumption, that alledged prior claims embracing the entire coast may not be granted by the Government. The ground defined by the boundary is choice mineral land with trap rock for a base similar to the Point Keeweenon on the American shore.

7.—Location of W. C. MEREDITH, Esq.

Beginning at a post planted on the northern shore of Lake Superior about 4 chains southward of the south end of the largest island at Point Mamainse, said island measuring 18 chains in length and its average breadth about four chains and situated in latitude 47 degrees, and two minutes and 40 seconds north, and longitude 85 degrees, and six seconds west (per Bayfield,) magnetic variation 3 degrees and 10 minutes east; thence from said post running on a magnetic course north, 80 degrees east five miles; thence on a magnetic course north about 37 degrees, and 30 minutes east corresponding with the general course of the shore, a distance sufficient to make a rectangular breadth of two miles; thence on a westerly course parallel to the first named side line, five miles to the shore of Lake Superior; thence southerly by the meanderings of the coast to the place of beginning. Including however the adjacent small islands.

This location has unfortunately been in collision with other claims, and it is to be hoped that an early and amicable adjustment will be made to the satisfaction of all concerned. The geological character of the rocks is so remarkably uniform for several miles in extent, that there is no particular choice of locality, except a preference be given to the more elevated hills of trap in the back ground. Both native copper and the yellow and grey sulphurets of copper are found on this, and adjacent grounds in well formed veins. The coast is destitute of good harbors except one for small sloops. For further particulars of this section, I would refer to the report of T. R. DUTTON,

Esquire, Assistant Geologist of the Montreal Mining Company, who has given more particular attention to the survey of Mamainse.

### S.—Location of THOMAS RYAN, Esq.

Beginning at a point about two-and-a-half miles south from the southerly point of Cape Gargantua, on the north shore of Lake Superior, in or near latitude 47 degrees 34 minutes north and longitude 85 degrees 12 minutes west (per Bayfield), thence north-easterly at right angles to the general course of the shore, a distance sufficient to make the location an average breadth of two miles; thence north-westerly parallel to the said general course of the shore, five miles; thence southwesterly at right angles to said general course of the shore, two miles more or less to the shore of the lake; thence south-easterly along the shore to the beginning, including the adjacent neighboring islands near the shore.

This location very fortunately secures the most safe and commodious harbours, in conjunction with good mineral land. Native copper was discovered in veins in different places on the tract by Capt. B. A. STANNARD in his explorations in behalf of the Montreal Mining Company. Mr. A. P. EDWARDS and also Mr. RICHARD OATEY, likewise discovered native copper here, both afloat and in veins. Mr. G. K. SMITH also collected some interesting specimens of native copper and yellow sulphuret from this location. Native silver is also reported, and I think from the character of the rocks, there is good reason to expect its occurrence. It is to be regretted that the lateness of the season prevented further exploration. The rock on the shore is trap abounding with agates and cornelians, which is succeeded by granite in the interior; the surface is exceedingly uneven, so that there is little or no ground fit for tillage. The growth of wood is small, but sufficient for ordinary consumption. Two or three small streams water the location, and will afford useful water powers.

The fisheries of this location will not perhaps be excelled by any on the lake.

#### 9.—Location of JAMES WILSON, Esq.

This location embraces a number of the Battle Islands of Battle Group, as represented to the Provincial Geologist by a map descriptive of the same. Its geological position is favorable for copper and silver, the former of which was discovered in veins by Mr. WHITING in his explorations under the license of Mr. WILSON, previous to its union with the Montreal Mining Company. The location is very easy of access, is furnished with good harbors, and in my opinion promises well to become a valuable one to the Company; (See map.)

#### 10.—Location of JAMES HOPKIRK, Esq.

Beginning at the southern extremity of Fluor Island, near the southern part of Neepigon Straits, on the north shore of Lake Superior, in or near latitude 48 degrees 38 minutes north, and longitude 88 degrees 21 minutes west (per Bayfield), thence northerly along the eastern shore and to the northerly point of said Fluor Island; thence southerly along the westerly shore of said island to the place of beginning, including the adjacent neighboring islands, as represented to the Provincial Geologist in an accompanying map.

This location may be considered as an island of trap mountains, thinly wooded on their summits, which rise to the height of nearly one thousand feet, and are cut into deep gorges by gigantic dikes and elvans, accompanied with large spar veins. Fluete of lime is an important constituent of this spar, and hence the name of the island.

Green carbonate and also the vitreous sulphuret or grey copper have been found in veins on this location. It is believed further judicious exploration will be rewarded with further and more valuable discoveries. In reference

to such explorations, a good store-house for provisions and a good sized cabin have been built on the premises at the extremity of an excellent harbor, which constitutes a valuable fishery. Very fine blue clay is found in abundance in and around the shores of the above mentioned harbor. A miner's cabin is also built on the north part of the island.

### 11.—Location of S. J. LYMAN, Esq.

Beginning on the western shore of the island of St. Ignace, Lake Superior, at a post easterly from and nearly opposite Pointe à la Gourganne, in latitude 48 degrees 46 minutes 30 seconds north, and longitude 88 degrees 18 minutes west (per Bayfield), said post being the south-west corner of the location selected for W. H. MERRITT, Esquire, thence north 55 degrees east, five miles; thence south 35 degrees east, two miles; thence south 55 degrees west, five miles more or less, to the shore of the Neepigon Strait; thence northerly by the meanderings of the coast, to the place of beginning.

The land on this location rises gradually from the water for two or three miles, where it attains the height of several hundred feet. The surface is covered with a handsome growth of forest trees, and is susceptible of cultivation.

The rock formation is amygdaloid trap apparently stratified and dipping gently to the south. Beautiful veins of calcareous spar and also veins of laumonite traverse the location in a direction from the shore inland north 55° east. For a more perfect illustration of the veins on this and neighbouring locations, I would refer to the accompanying map. One of the many interesting veins upon this location, although it made but little show externally upon the shore, has been opened by Mr. OATEY, by way of experiment. The vein is about eighteen inches in diameter, with well defined walls and mostly filled with rose colored calcareous spar and lanmonite; having however its numerous cavities filled with a soft unctuous ferruginous clay, very

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similar to that of the rich lead veins of Galena. In the centre of the spar is a narrow vein of vitreous sulphuret or grey copper ore. This vein has every indication of being a rich and profitable vein if judiciously worked. Some specimens from this vein vanned by Mr. OATEY, have been delivered to Professor B. SILLIMAN, Junior, for analysis, the result of which may be seen in the Appendix. Other and much larger veins are found to yield the same ore as above; and also a vein of white calcareous spar of about the same magnitude near the miners' cabin on this location is found to contain native copper. A beautiful mill stream waters this tract, affording not only repeated water powers, but also the best facilities for washing ores. A bed of very fine clay is situated at the mouth and extends some distance along the banks of the above stream. The only improvement on this location is the log-house or miners' cabin above named. The straits afford a safe harbor in storms.

## 12. Location of ABNER & STANLEY BAGG, Esqs.

Beginning at the Cedar Post at the south-east corner of John Ewart's location on Pointe à la Gourganne, in lat. 48 degrees 46 minutes 30 seconds north, and longitude 88 degrees 19 minutes 30 seconds west (per Bayfield,) thence south 55 degrees west, a distance sufficient to make the location average five miles in length; thence south 35 degrees east two miles; thence north 55 degrees east to the shore of Neepigon Strait; thence northward by the meanderings of the coast to Pointe à la Gourganne, the place of beginning.

This location is immediately opposite the one last described, having the same veins and exhibiting the same general features. It is most favorably situated on the western side of the Neepigon Channel and consequently secured against the perils and dangers of the Lake. A small river waters this tract having a fall of about fifty feet shortly before it unites with waters of the Neepigon Strait. There is an excellent site for a saw mill, to which logs may be

floated from the surrounding country with comparative ease and safety. Only one small cabin has been erected on this location, and as yet no veins have been opened upon it. It should therefore invite early attention another season.

### 13.—Location of JOHN EWART, Esq.

Beginning at a white cedar post seven inches in diameter, planted on the shore at Pointe à la Gourganne, Neepigon Straits, in lat 48 degrees 46 minutes 30 seconds north, and longitude 88 degrees 19 minutes 30 seconds west (per Bayfield,) thence running south 55 degrees west five miles; thence north 35 degrees west two miles; thence north 55 degrees east five miles, more or less, to Neepigon Bay; thence by the meanderings of the shore southward to the place of beginning.

This location is like the one preceding, is situated on the main land, and bounded on the east by Neepigon straits along the shore where the channel opens into Neepigon Bay. The land for this country is densely wooded with large trees of arbor vitæ or white cedar, spruce, larch, poplar and white birch; and rises constantly from the front to the rear of the location where it attains the apparent height of five or six hundred feet. The soil on the whole tract will either serve for tillage or afford rich pasture. On Pointe Gourganne is a high bank of rich clay the base of which has been excavated and levelled, so that it is now in readiness for making bricks. On the north side of the Point is a safe harbour for boats and barges, and a wharf for larger vessels may be easily extended to deep water. There, at the landing, three large dwellings have been built, each a story and a half high, with divisions in the centre, and apartments for lodging over head. Besides these there is a store house of smaller dimensions on the shore. The larger houses are I think twenty-five feet by fifteen. Further northward on the shore are also two other log-houses and a blacksmith's shop, garden, &c. Potatoes, barley, beans, peas, &c. were planted here about the

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The rock formation of this Location is amygdaloid trap overlying the conglomerate and sand stone, which crop out at the waters edge on Neepigon Bay. The superincumbent trap has a stratification and dip corresponding to that of the sand stone beneath it, and is very similar to the amygdaloid of Eagle River on the southern shore of Lake Superior, having amygdules of native copper distributed through the rock for one or two miles along the shore. This native copper is found to contain a portion of silver, and numerous specimens of it have been forwarded to the Company, and some also put into the hands of Professor SILLIMAN for analysis, the result of which may be seen in the appendix.

Specimens of native silver and also native copper were found loose upon the shore, attached however to veinstone such as it was found to exist in place on both sides of the channel. Along the shore at different distances on the Location, veins varying from one to two feet and upwards in thickness made their appearance. Several of these veins were cut into, and were found to contain more or less of native copper, and the finest specimens of transparent Iceland spar, exhibiting surface appearances quite equal if not superior to many of the veins which have become so celebrated on the southern shore of the Lake.

Around the landing at Point Gourganne, the trees have been felled and mostly burned off over a space of several acres, so that the area may be profitably occupied as a planting ground if needed next year. Several small rivulets water this Location sufficient for the working of ores if not for creating water powers.

14--Location of W. H. MERRITT, Esq.

Beginning at a cedar post planted on the north-west point of the Island St. Ignace, Lake Superior in lat. 48

deg. 48m. north, and long. 88 deg. 19m. 20 sec. west, (per Bayfield,) thence southward by the meanderings of the shore a distance sufficient to make two miles in width; thence north 55 deg. east, five miles; thence north 35 deg. west, two miles more or less to Neepigon Bay; thence westerly along the meanderings of the shore to the place of beginning.

This Location possesses such similar geological features, that it may be considered nearly a "fac simile" of the one last described; being separated from it only by the Neepigon Channel, about one mile in breadth. It occupies the north-western part of the great Island St. Ignace, which so far as surface indications may enable one to judge, bids fair to yield a handsome amount of copper and silver. Two or three veins on this Location near the north-western part of the tract, from one to four feet in thickness, enter boldly into the bluff as may be seen by the accompanying map, and are found to contain both native copper and native silver at the water's edge. The native copper was found standing on edge in a vertical position, precisely as the great masses are now found standing in the veins on the southern or American shore: namely, the mass of fourteen tons and upwards at the Copper Falls Location, and the mass of twenty-two tons and upwards at the Cliff or Pittsburg Mine on the west branch of Eagle River. I would here remark, that a little more than one year since, the surface indications on these veins, which now exhibit such astonishing and unparalleled masses of native copper, were no more promising than those on the Location I am now describing. An opinion prevails to some extent, that wherever native copper occurs, the supply is always limited; but the history of recent and extensive mining goes far to contradict this. In Japan, where copper is every man's wealth, native copper is, we are told, the principal product. In the Island of Cuba, the mines of San Fernando yield large masses of native copper near the surface, which are succeeded by the oxides and sulphurets at a greater depth. As indicative of this, I would mention that one of the veins on the Location under con-

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sideration, was opened only to the depth of a few feet, and there yielded rich grey sulphuret, while native copper and native silver existed in the same vein on the surface. The veins here are nearly vertical, and at the depth of one hundred feet or more will enter the conglomerate, at which depth, it is presumed, that the veins will enlarge and yield a produce of sulphurets instead of native copper. In all cases where I have traced veins, in the superincumbent trap, down into the underlying sand stone, I have found their size to widen more than double in the latter; and in no instance have I been able to discover native copper in the veins which penetrate the stratified sand stone.

The silver in the above described veins is mechanically attached to the native copper; but in other places it is found mixed with grey or vitreous sulphuret of copper. At the Eagle River mine, on the American shore, some months past, a solid mass of native silver was discovered, weighing seven pounds. This was found, I am informed, at some depth in a vein in connexion with native copper, when upon the surface more points of silver made their appearance. It is to be hoped that these veins will receive early and judicious attention in the explorations of another season. As this locality and Point Gourganne was the scene of the active and valuable labours of Mr. G. K. SMITH, I would with pleasure refer to his report for many particulars which I have not time to enumerate. A small cabin has been erected on this location near the veins above described. For the analysis of specimens, see Appendix.

#### 15.—Location of Hon. S. B. HARRISON,

Beginning at a cedar post planted near the mouth of a small stream flowing into the northern extremity of the large bay on the south-eastern part of the Island of St. Ignace, Lake Superior, in or near latitude 48 degrees 47 minutes 40 seconds north, and longitude 88 degrees 2 minutes west; thence north three miles, more or less, to Neepigon Bay; thence easterly by the meanderings of the coast to the north-eastern point of the Island; thence

southerly, westerly and northerly by the meanderings of the coast to the place of beginning, including, however, the whole of Bead's Island, situated immediately south of the above tract.

This location occupies all the eastern and north-eastern part of the Island of St. Ignace. In the central and also on the northern part of the tract, the land rises to the height of several hundred feet. It is well wooded and sustains generally a good soil; has several small streams upon it sufficient for working ores, and perhaps for propelling machinery, and what is equally important, enjoys the great advantage of excellent harbours. The geological structure of this section of the Island is similar to that of the western part of Point Gourganne on the main land, that is, amygdaloid trap overlying conglomerate red sand-stone, then a softer white and friable sand-stone, and lastly calcareous and aluminous slates and shales. The location, as may be seen by inspecting the map, is literally filled with veins and dikes. The size of the veins is various; from a few inches to four or five feet—their direction nearly east and west; the vein-stone generally, calcareous spar, drusy quartz, and laumonite. The opportunity for observing these veins is very favourable on account of the middle Neepigon channel, by which they are washed with such distinctness as to leave no doubt that they extend on to the adjacent locations. And as the character and position of the rocks are there the same, the description of this location may be considered as generally applicable to the three remaining adjacent locations belonging to the Montreal Mining Company.

The chief interest in these veins is, however, to know that they are metalliferous. Three of them have been found to contain native silver, and a large number of them grey sulphuret of copper; one or two native copper and one variegated copper and yellow sulphuret of copper. Specimens from several of these veins have been forwarded to Montreal, and also delivered to Professor SILLIMAN for analysis. (See appendix.)

In the midst of such a display of veins and metalliferous appearances, it was judged expedient to make all diligent preparations for the future economical exploration and mining of this tract, inasmuch as it is a very convenient and central radiating point for the neighbouring locations. Accordingly a wharf was built at Harrison's Landing, (see the accompanying sketch of this place drawn by Captain Stannard) put into a sufficient depth of water for schooners and steamboats to come alongside with freedom and safety. Two dwelling houses, a store-house, blacksmith's shop, and large bakers' oven were substantially built, in order to afford necessary facilities for future operations. In one of the houses is a cellar excavated and walled up, capable of holding at least one or two hundred bushels of vegetables secure from frost. Also on Bead's Island, near at hand, is a good sized dwelling house, suitable for a family or superintendent.

The harbour at Harrison's Landing is one of the best upon Lake Superior, with good depth of water, good anchorage, perfectly safe, and always accessible except when obstructed by ice. This place also affords one of the most valuable fisheries on the whole coast; an important consideration in the current expenses of mining. These preparations have been made at Harrison's Landing not only on account of its favorable position, occupying the southern point of the location, but because there are three veins at least averaging about two feet in thickness yielding grey copper, in one of which native silver was first noticed by Mr. Whiting, and hence it is called Whiting's vein. All these veins may be easily found by following the coast westward and northward from the landing. A shaft has been sunk on Whiting's vein to the depth of seven or eight feet, when the water from the lake prevented further excavation. Specimens from this vein are now in the hands of Professor SILLIMAN, for the result of which see Appendix.

For the convenience of the northern part of this location, a dwelling house with a good stone chimney has been



erected at Moffatt's Harbour, (see view of the place by Captain B. A. Stannard,) sufficient for the accommodation of ten or twelve miners; also an Agent's house or office, and a good blacksmiths' shop and coal-house. A supply of one or two hundred bushels of charcoal has been burned for early operations if needed the ensuing spring; and here, as at the other important depôts, the trees have been cut and burned from around the house, in order to prevent destruction by fire hereafter and to prepare the ground for planting. The veins on the eastern shore of the location, intermediate between Harrison's Landing and Moffatt's Harbour, are altogether too numerous to describe particularly. It is believed that many of them will yield grey copper, for it is seen on the surface in some of them. At King's Point is a vein accompanied by trap dike, in which I found both native copper and native silver. Two excellent Cornish miners who formerly worked in the Herland mines, Cornwall, at the business of excavating silver ore, declared to me that they have never in any other place seen so close a resemblance to the Herland mines as here. I have procured specimens from this vein for analysis, in the hope that they may contain sulphuret of silver. Those familiar with the annals of mining will recollect that the silver raised at the Herland mine has sometimes amounted to eight thousand pounds sterling in a year. At Wheal Brother's native silver and also the ruby and grey silver amounted to three thousand pounds for the year 1812.—(Carne Trans. Geol. Soc. Cornwall, pp. 122 123). A short distance northward from Moffatt's Harbour are several veins nearly parallel, and are thus represented on the accompanying map. One contains variegated or horse-flesh copper ore, another native copper, and another vitreous grey copper and native silver. This latter and more important one is nearly vertical, and varies in thickness from eight or ten to eighteen inches, enlarging as it descends. The appearance of this vein at first was to show only a little vitreous copper in calcareous spar on the water's edge; the first blast, however, threw out native silver, and then it was found, by tracing the vein inland, that na

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tive silver existed along on the surface in dendretic branches and filamentary wires loosely adhering to the mossy and crumbling vein-stone. On washing the earth along the vein it was found to contain grains of pure silver, but blackened and tarnished on the surface. There is reason to believe that many valuable specimens of tender decaying native silver were either overlooked or ground to powder before this discovery was made. As soon as practicable some of the richest surface specimens of the vein were collected and forwarded to Montreal. From the decayed and rusty appearance of these specimens, it is not surprising, but yet to be regretted, that they are not now to be found. Sufficient specimens however remain to show the character of this decayed or decomposing native silver, a portion of which has been examined by Professor SILLIMAN, and found to be perfectly pure silver. A shaft was commenced upon this vein and carried to the depth of six or seven feet below water level, and about fifteen feet below the top of the bank on the shore. In the course of this excavation numerous specimens of beautifully crystallized calcareous spar with drusy quartz were taken out, with pure native silver attached; also specimens of vitreous grey copper, with numerous grains of pure silver distributed throughout; also in the cavities of the vein filled with a soft lithomargic substance, known to miners under the name of "pryan," were to be seen innumerable minute particles of native silver, which would invariably fall out on becoming dry or from suffering the least violence. The Provincial Geologist was supplied with good representative specimens from this excavation, and others have been forwarded to Professor SILLIMAN for analysis. In one of the cavities above mentioned, in the process of sinking on this vein, a specimen of pure silver was found imbedded in the soft pryan; this specimen has been taken to Professor SILLIMAN and found to weigh one ounce and a half,—it is herewith presented to the Company. When the work ceased in the excavation, the copper and silver were left occupying the vein in the bottom of the shaft. A vein of this description would certainly be looked upon with peculiar interest, even

in Mexico or Peru. The character of the rocks is here so uniform, that there can be scarcely a doubt that this vein extends through the Island from east to west, and also into the adjacent locations; if so it is secured to the Company for nineteen miles in extent. For the analysis of specimens from this vein, see Appendix.

#### 16.—Location of JAMES FERRIER, Esq.

This location was withdrawn with the permission of the Provincial Geologist from Pointe aux Mines, which was in dispute, in order to secure an extension of the above silver vein, and is bounded as follows: Beginning at a post planted on the shore of Neepigon Bay, said post being the north-west corner of the location made for the Hon. S. B. Harrison; thence westward along the shore of said Bay, five miles; thence south two miles or a distance sufficient to give the location a breadth of two miles upon an average, thence east parallel to the general course of the shore of Neepigon Bay, five miles to the west line of S. B. Harrison's location; thence northward following said line to the place of beginning.

This location occupies much higher ground, but is in other respects very much like the one last described.

#### 17.—Location of ROBERT J. TURNER, Esq.

Beginning at a post planted on the north-west point of Simpson's Island in or near latitude 48 degrees 50 minutes 30 seconds north, and longitude 87 degrees 58 minutes west; thence easterly by the meandering of the coast, a distance sufficient to give the location an average breadth of two miles; thence south five miles more or less to the northern line of the location selected for the Hon. Peter McGill and others; thence westward following said line to the western shore of Simpson's Island; thence northerly along the coasts to the place of beginning.

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This location is separated from the Harrison Location only by a narrow channel, and is situated immediately eastward of the Island of St. Ignace. Its rocks and veins therefore may be considered one and the same. Native copper has been found in one of the veins opposite Moffatt's Harbour, and external indications are very favorable for its becoming a valuable mineral tract. As yet it has not been explored, and the only improvement upon it is a miner's cabin.

#### 18.—Location of Hon. PETER MCGILL & Others.

This location is adjacent to the one last mentioned, and occupies the whole southern coast of Simpson's Island\* for ten miles or more. It is beautifully diversified with mountains and valleys, lakes and woods. On the western part of the location, the coast is studded with basaltic columns and nothing can exceed the picturesque scenery around Wood Robin Harbor, when during the Summer months, it seems as if all nature were listening to the sweet songs of birds. On the eastern part of the location, the mariner and voyageur will find a safe retreat in Morin's Harbor, sheltered as it is in a wonderful manner from the ocean waves that beat so near it. A little river flowing from a peaceful inland lake, exhibits a lively rapid as it falls into this harbour, and may be usefully employed in turning a mill. By reference to the map it will be seen that this location is traversed with a great number of metallic veins, yielding native and grey copper. Native copper has been found here in three different veins, and also, in almost innumerable places in geodes of Prehnite and Laumonite. Grey copper is also found in a very large vein about half a mile eastward of Morin's Harbor. Instead of Basalt, the rock is here amygdaloid trap imposed upon, and frequently alternating with conglomerate. Much of this amygdaloid is filled with beautiful agates, and botryoidal prehnite containing native copper. It is believed that when this location shall have been fully explored, that it will not suffer in

\* Named after Sir George Simpson.

comparison with the best upon the lake. There are three small cabins built upon it in different places, besides a store house at Morin's Harbor, where also is a clearing of one or two acres for a garden, &c. It now remains to give the boundaries of this interesting location, which are as follows.

Beginning at a cedar post 7 inches in diameter planted on the shore at the south-east extremity of Simpson's Island, Lake Superior, near latitude  $48^{\circ} 44' 40''$  north, and longitude  $87^{\circ} 49'$  west, thence north-westerly following the meanderings of the coast, a distance sufficient to make two miles in width; thence south  $82$  degrees west, five miles more or less to the western shore of said Island; thence south-westerly and then easterly by the meanderings of the coast to the place of the beginning, including the smaller islands.

I have now given the boundary lines and a brief sketch of the eighteen locations made for the Montreal Mining Company, and it will be seen that they are so selected, that they embrace at least one hundred miles of the lake shore or coast, thereby rendering the copper veins readily accessible in a most extraordinary manner. At the same time a very large number of safe, commodious and readily accessible harbours are secured. These harbours are as important on Lake Superior in copper mining as they would be on the Atlantic coast. And their value may be the better appreciated by enquiring what would such harbours be worth on the exposed coast of Cornwall? It will be seen also that rivers and mill streams fall into many of these harbours, whose water powers will be of singular utility in crushing and preparing the ore for smelting or transportation.

For the growth of timber suitable for securing the levels or adits in mining, at least one hundred and twenty years are required. An adequate supply therefore of timber and fuel is a very important consideration. In this respect it is certain that the Company have secured as good as there is, and sufficient for all their wants. The winters are be-

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Heved to be more mild on Lake Superior than at Quebec and Montreal. In the winter of 1844 and 5 the thermometer fell there only twice below Zero, and once only two degrees below.\* The ground where it is covered with snow seldom freezes in winter. The snow generally falls in November, and continues till April. The summer is of a very pleasant temperature, and no climate on earth can excel it in healthiness or purity of water and atmosphere. Strawberries, gooseberries, cranberries of the mountain and meadow, (two species,) raspberries, whortleberries and wild cherries are both spontaneous and abundant. Few countries if any will surpass it in the luxuriance of its grasses. I planted potatoes in June and had a good return of new ones in August. I am confident also from other experiments that beans, peas, wheat, rye, oats, barley and all important esulent vegetables may be grown here with ease and certainty. Cattle and sheep thrive admirably at Fort William and it is probable that there is no climate north of the equator better fitted for the Alpacca sheep already introduced by Governor Paine into the State of Vermont.

With such a climate, and the fertile soil accompanying the trap rock on your locations, who shall say that the expense of mining may not be materially diminished after the preparation of a few years? The fisheries embraced by the locations are esteemed well worthy the attention of the Company, leaving mineral wealth entirely out of the question; because, if improved, they will yield a constant annual income without any important expense or outlay.

The above enumerated advantages certainly have great weight in the scale of judicious and economical mining. Important however as they are, in making the locations they were only considered as incidental. The great and primary object was to secure those places where eruptive agency had been most active, where numerous brecciated channels, running like elvan courses, were charged with copper ore, where the veins were filled with mundic and gossan, where the bedded trap was found abut against the

\* Taken from the register kept at Grand Island, and Fort Wilkins, Lake Superior.

strata of limestone and sandstone, thereby effecting important changes and extraordinary dislocations. With this prime object in view the locations were made. No one can be absolutely certain as to the result. The business of mining, like that of commerce, is based on probability. A merchant perhaps hazarding his all sends his ship to sea and makes a successful voyage. His neighbor under like circumstances expects to do the same, and will generally accomplish it. So in mining. Under similar circumstances we may reasonably expect to accomplish what others have done before us. On the eastern flank of the Urals at Nijny Tagilsk, where the trap meets the adjacent stratified rock, a thin seam of green copper, occurring only at intervals, was followed down to the depth of 280 feet, where there lay upwards of half a million pounds of Malachite or green carbonate of copper in one solid mass, yielding more than half its weight in pure copper. It may however be said that this is an extraordinary occurrence. But it is no more extraordinary than that two masses of native copper on the southern shore of Lake Superior should be discovered the present year standing erect in the veins, the one weighing upwards of 14 tons, and the other upwards of 22 tons, a thing unparalleled in the annals of mining. There are chances for such occurrences within the limits of your locations, the character and relations of the rocks being similar to those of the ural chain; and there is strong probability that such discoveries will hereafter be made by the judicious prosecution of mining. But beyond the confines of probability you may fall back on facts. It is certain that there exists a large number of copper bearing veins on your locations, showing copper on the surface. It is certain that these veins have in many places been excavated to the depth of some feet, and that the ore is found to continue and increase. It is certain that the grey or vitreous copper, together with the horse-flesh and yellow sulphuret will be the prevailing ores. It is certain that these are among the most desirable and valuable of all copper ores. It is certain that there is a large amount of native copper distributed through the surface

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rocks on some of your tracts; and it is presumed that as in the mines of San Fernando in Cuba, it will give place to the rich sulphurets at a lower depth. It is certain that the extraordinary developments on the American shore the present season, are sufficient to establish its character as a rich copper region. And it is also certain that during the two first years of exploration there, appearances were by no means so favorable as those exhibited on the British side after the examination of only a few months. It is certain that the surface specimens of native silver on one of your locations at least are as yet altogether unrivalled.

In the midst of such facts, for the feasible working of these locations, it would seem most natural that you should set off at least a portion of your property against the capital of some enterprising and experienced adventurers, and invite hither the active industry of Cornish Tributemen to reap for themselves and children a rich harvest, as well as secure a fair return to the worthy pioneers and proprietors of the soil. Should this be the case, it is not extravagant or unreasonable to suppose that these same locations, so early and so fortunately secured in conjunction with such rare facilities, will become the centre of active mining operations and be to Canada what Cornwall is to England a source of inexhaustible mineral wealth.

Nothing will prevent the free passage of a steamboat from Quebec and Montreal entirely to your locations on Lake Superior, except the completion of a canal half a mile in length at the Sault Ste. Marie. Until that is finished, it is believed that a propeller will be more economical and effectual in meeting the wants of the Company on the Lake, than a vessel of any other description.

A survey has been made for the above canal. The distance is half a mile and the fall 18 feet. The excavation mostly in sand stone. There is scarce a doubt that this important work will be speedily executed, for it completes the chain of ship-canals through British America from tide water into the waters of Lake Superior, (which may be regarded as an inland ocean), and at the same time creates

a water power little inferior to Niagara. A canal on the American side, would occupy about double the distance, and would be entirely superseded by the construction of this, which would inevitably command the increasing business of this great inland sea. The adjacent grounds are admirably fitted for the site of a large town, to which excellent coal may be freighted at the low rate of five (5s.) shillings currency per ton. The material is already on the spot for the erection of furnaces, and what then I ask is there to prevent this place from becoming the Swansea of North America, with available and perpetual water power, equaling if need be one half the steam engines of Great Britain?

For information as to late improvements in smelting the ores of copper successfully in small furnaces, I would respectfully refer the Company to Colonel C. H. GRATIOT, well known on Lake Superior.

Great Britain has hitherto monopolized the copper trade of the world; but unless energetic means are employed for the development of copper in the Canadas, we venture to predict that she will not long enjoy this monopoly. For the United States are already making rapid strides towards a division of this important branch of commerce. Factories, foundries and furnaces are springing up along the seaboard to meet the increasing demand for this important metal. In the small State of Massachusetts two millions and five hundred thousand pounds are annually manufactured; and as an illustration of the consumption of copper in the still smaller State of Connecticut, one house alone in a small village, manufactures four hundred and sixty-nine thousand five hundred pounds annually into brass wire principally for pins. There are four or five other factories briskly manufacturing copper in the same village. The wire being made is wound on large reels and one end of it given to the pin machine which of *itself* finishes about ninety pins in a minute all but the tinning. When this is performed, they are set in papers by another machine, with which one woman performs the labor of three hundred men. The machines in use are not allowed to work more than two or three days in a week, otherwise the world

would be flooded, and pins become a drug. The copper for the above manufacture cost one hundred pounds currency per ton.

Many tons of copper from Lake Superior have already been smelted at Boston or vicinity, and wrought in various ways. It is found to be of excellent quality. Not long since a distinguished merchant and ship owner applied personally to the writer to know if a supply of this copper could be furnished for the sheating of vessels in the above city.

The question will no doubt be asked, why do not the copper ores of the American Mines on Lake Superior come into market? This question will not be asked, when it is understood that the *title* to all the land embracing the American Copper Mines on Lake Superior is *unsettled*, remaining yet to be adjudicated by the United States Congress.

Should any persons feel a disappointment because a considerable amount of ore was not excavated during the past season for the Montreal Mining Company, I would respectfully say to them, that it was impossible to get out ore to any extent without hazarding the loss of the locations by means of rival parties. It was therefore deemed the more prudent course to secure the locations as far as possible, and also to make permanent improvements for mining to better advantage hereafter.

#### VALUE OF LOCATIONS.

With regard to the particular value of the respective locations it is deemed premature to give an opinion, inasmuch as they are all as yet imperfectly explored. A course of early economical exploration is recommended for Maimaise, Gargantua, Michipicoten Island, and also the Wilson Jarvis and Stuart locations; all of which have received less attention the past season than the remaining locations. Many of the veins on Point Parphyry, St. Ignace and Gourganne have been carefully surveyed out with the Solar Compass, and have open trails cut upon their courses so that there can be no difficulty in finding them.

Should Professor **SCHOENBEINS**, gun-cotton prove a good substitute for powder in blasting, these locations may be explored at comparative small expense, and a new era will commence in the history of mining.

In conclusion I should do injustice to my feelings not to acknowledge the kindness and courtesy of Sir **GEORGE SIMPSON** who introduced me into this field of labor, and also the ready attentions of all the Agents of the Honorable Hudson's Bay Company who left nothing undone within their power calculated to give facility and complete success to the expedition.

It is with grateful pleasure also that I would mention my many obligations to **WILLIAM E. LOGAN**, Esquire, Provincial Geologist, who afforded every proper facility for securing the grounds selected. His incessant and arduous labors in his immense field for investigation, will not only greatly enhance the value of the public domain but secure for him in the scientific world a well earned reputation as enduring as the rocks and waters. Nor would I forget the cheerful and friendly aid of **T. R. DUTTON**, Esquire, **G. K. SMITH**, Esquire, and Captain **B. A. STANNARD**, Assistant Geologists. Also of **HIRAM PIERCE**, Esq. **A. P. EDWARDS**, Esquire, **Mr. RICHARD OATEY**, and others, who exerted themselves with energy to carry forward the objects of the expedition.

Finally, it gives me the utmost satisfaction to record the general good feeling which prevails among the voyageurs, miners, and workmen connected with the business of the Company, in so much that they not only are anxious to engage in the service of the Company another season, but that through their influence one hundred others have already applied for permission to enter the same interesting field of labour.

All which is respectfully submitted by,

Gentlemen,

Your faithful and obedient Servant,

**FORREST SHEPHERD.**

Montreal, November 27th, 1846.

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