CANADA
DEPARTMENT OF MINES
HON. LOUIS CODERRE, MINISTER; R. W. BROCK, DEPUTY MINISTER

MINES BRANCH
EUGENE HAANEL, PH.D., DIRECTOR.

MOOSE MOUNTAIN IRON-BEARING DISTRICT ONT.

By
E. Lindeman

OTTAWA
GOVERNMENT PRINTING BUREAU
1914.

[redacted]

No. 303.

LETTER OF TRANSMITTAL.

Dr. Eugene Haanel,
Director of Mines Branch,
Department of Mines,
Ottawa.

Sir,—I beg to submit, herewith, the following report on the Moose Mountain Iron-bearing District.

I have the honour to be, Sir,

Your obedient servant,

(Signed) **E. Lindeman.**

Ottawa, March 16, 1914.

CONTENTS.

ILLUSTRATIONS.

Drawings.

Maps.

MOOSE MOUNTAIN IRON-BEARING DISTRICT, ONT.

INTRODUCTORY.

The Moose Mountain district, in Hutton township, Ont., has, during the last few years, attracted considerable attention, chiefly on account of its large deposits of low grade magnetite, and, with the purpose of ascertaining the extent and character of these deposits, the writer, in the spring of 1912, was instructed to examine the district, and to make a detailed magnetometric survey of the various ore deposits.

The following report is based on field-work carried out from the end of May to the end of September, 1912. During this time, an area of approximately three square miles was mapped in detail; and the boundaries of eleven ore groups were delimited by means of a magnetometric survey. In this work the writer was ably assisted by Messrs. W. M. Morrison, A. H. A. Robinson, and W. H. Davies.

Eight maps accompany this report; six showing the distribution of the vertical magnetic intensity; while two indicate the geology of the area. The observations of the magnetic intensities were taken with a Thalén Tiberg magnetometer, the distances between points of observation varying from 25 to 100 feet, depending on the local complication of the magnetic field. As the magnetic readings were taken with different instruments, the constants of which varied from 0·9H to 1·2H,[1] it was necessary, in order to plot these readings on the same map, to reduce them to values corresponding to those of an instrument with a constant 1. H. This reduction was made according to the following formula:—

$$\tan. V = k_n \tan. V_n.$$

V = the angle which corresponds to the angle V_n for an instrument with a constant 1·O H.

[1] H = the horizontal component of the earth's magnetic field.

V_n = the angle observed with a magnetometer the constant of which is k_n H.

The reduced values have been used for the construction of the accompanying magnetometric maps, which show the distribution of the vertical intensities. By joining points of equal vertical intensity a system of isodynamic lines has been obtained. These lines have been drawn for values of V=0, 20, 40, 50, and 60, —20, —40, —50 and —60 degrees; and the colours used are blue for north pole attraction, and yellow for south pole attraction. The areas between the bounding curves are indicated by appropriate tints, the values of which are shown in the legend.

An accurately measured base line was laid out along the Canadian Northern Railway track; and a triangulation from this formed the main control for the sheet. Transit and stadia traverses were run between triangulation points, and from marked stations on these traverses the detail was put in entirely by work with plane table and stadia.

To Mr. F. Jordan, superintendent of the Moose Mountain Ltd., and to other officials of that company, the writer desires to express his thanks for the many courtesies extended to himself, and party during the fieldwork.

LOCATION AND GENERAL FEATURES.

The expression "Moose Mountain district" is applied in this report as a term of convenient reference, to designate that particular tract of country immediately surrounding the village of Sellwood in Hutton township. Sellwood lies about 35 miles north of Sudbury, its nearest important centre, and is connected by a short branch line with the Toronto-Port Arthur line of the Canadian Northern railway, at Sellwood Junction. A few miles south of the French River, a six mile spur from the main line of the Canadian Northern has been constructed to Key Inlet on the Georgian Bay, making a rail haul from Sellwood to Key Harbor of about 80 miles.

The area within which iron ore deposits are now known to occur is roughly estimated at about 4 square miles; and extends from lot 6, con. III, in Hutton township, in a north-westerly direction into the adjoining township of Kitchener, a distance of about 4·5 miles.

The general character of the country may be described as a series of more or less parallel and disconnected ridges, with a prevailing northwest and southeast trend; the intervening valleys being usually occupied by swamps or muskegs. The elevation of the district is from 1150 to 1350 feet above sea level.

With the exception of the area in the immediate vicinity of Sellwood, where the forest has been cut down or destroyed by fire, the country is, generally, thickly wooded.

HISTORY.

The existence of iron ore in the township of Hutton has been known for many years. During the gold excitement of the early nineties, prospectors, travelling the west branch of the Vermilion river, portaged across an ore deposit at a point known as the "Iron Dam"; the wearing away of the moss here having exposed the banded iron formation in several places. It was, however, not until 1901 that some prospectors from Sudbury succeeded in interesting Mr. John W. Gates of New York, and associates, in the district, hence, the following year, considerable exploration work was carried on by Professor K. Leith. The first development work was begun in 1906; and during 1907 a small crushing plant was installed at No. 1 deposit. During 1907, and the following year, mining operations were not carried on very intensively, since the railroad was not completed. The first shipment of ore was made in the autumn of 1908; but did not meet with a favorable reception, the purchaser refusing to accept the consignment owing to its low iron content. Not being able to bring the ore up to a merchantable grade by sorting it by hand, the company decided to adopt a magnetic cobbing process, and during the winter and spring of 1909 a small cobbing plant was built. During the following summer nine cargoes of ore were shipped, having an average iron content of about 55·3 per cent. The cobbing plant was, however, not of sufficient capacity and at the end of 1909 a new cobbing plant was introduced, and completed in 1910. The plant was in operation from August, 1910, to May, 1911, when it was closed down, owing to unsatisfactory market conditions, and complaints made by the buyers that the ore contained a too high percentage of fines. It was, therefore, necessary to screen the ore before further shipment could be made. This resulted in a considerable loss of magnetite in the fines. These fines will be utilized in the new Gröndal concentrating and briquetting plant being installed. This new plant has been designed to have a capacity of about 800 tons of crude ore per 24 hours.

The total amount of ore shipped from the mine, up to the end of 1912, is reported by Mr. F. Jordan, superintendent of the Moose Mountain Ltd., to be 153,968 tons.

GEOLOGY.

The iron ore deposits consist chiefly of a fine grained, siliceous magnetite interbanded with silicious material, including chert and phases resembling quartzite. There are, however, one or two deposits part of which do not show this banded structure so conspicuously, and in which the magnetite, instead of being associated with silica, is found in irregular masses associated with hornblende, pyroxene, and epidote.

The ore deposits lie in a series of metamorphic schists of Archæan age: the chief constituents of which are, hornblende, chlorite, feldspar, and quartz. The more basic members of this series are prevailingly dark green in colour, owing to the large amount of hornblende and chlorite present; while others, chiefly made up of feldspar and quartz, are of a lighter colour. The deposits have been upturned, faulted, and folded together with these schists; their general strike and dip being, therefore, conformable to that of the latter, which generally is in a northwesterly direction, with a dip varying from 70 to 85 degrees towards the east. Locally, however, where the folding has been very intense, a marked divergence in strike and dip frequently occurs.

In numerous places, intrusives of massive greenstone are found in the older schists, penetrating them in the most intricate manner, and making it rather difficult at many points to distinguish them from the older series. Some of these greenstones are also found to be intrusive into the iron formation; and where this occurs, a concentration of the magnetite is generally noticeable. In their mineralogical composition the intrusive greenstones range from a grano-diorite to more basic types. In texture they are also subject to wide variation, ranging from coarse to very fine grained, and occasionally exhibiting porphyritic varieties, with phenocrysts of feldspar.

Besides the greenstones there are within the area under consideration large intrusions of granite, the chief mineralogical constituent of which is a red orthoclase; a small amount of quartz and mica are also present. Other intrusions consist of a fine grained dark coloured dolerite or diabase. This is the youngest igneous rock of the district. Its distribution is, however, very limited, it being confined to a few narrow dykes intruding into the older rocks. The diabase is well exposed at No. 5 deposit, where it is seen penetrating the ore body as well as the granite.

CHARACTER OF ORE.

The iron ores of the district may, as already stated, be divided into two types:—

(1) Banded quartziferous magnetite.

(2) Magnetite associated with hornblende, pyroxene, and epidote.

Of these types No. 1 is the most common, while No. 2, as far as present knowledge goes, is confined to one or two comparatively small deposits.

The ore of the first type consists of a fine grained silicious magnetite, minutely interbanded with silicious material, including chert and phases resembling quartzite and greywacke. Owing to their mineralogical composition, the individual bands are of various colours, white, grey, and black; the white bands being made up chiefly of silica, while the darker ones always contain a larger quantity of magnetite—to which they owe their colour. The most intimate relationship exists between the various bands, and gradual gradations from one into the other are very common. The bands are often seen traversed by more or less frequent fractures, generally filled with quartz, but occasionally even with magnetite, indicating a secondary origin of these minerals.

The structure and composition of the banded ore deposits at Moose Mountain suggest a sedimentary origin; and it is considered highly probable that they have been formed along somewhat the same lines as the iron-bearing series of the Lake Superior district, i.e., being deposited as an iron-bearing sediment which was afterwards brought under various conditions of alteration through intrusions of igneous rocks, chiefly greenstones.

In places where small dykes of greenstone intrude into the banded iron formation, a concentration of the magnetite is generally noticeable. But while the iron content is thus increased, the texture and structure generally remain unaltered, and the ore still retains its banded character. There are, however, a few places where the intrusions of greenstone have had a much greater metamorphic effect upon the iron-bearing series, and where a more or less complete recrystallization has taken place, resulting in the development of a coarser grained magnetite, together with amphibole and epidote, i.e., ore of type No. 2.

This alteration is local, however, and in the few deposits where it occurs, banded iron formation is generally also found, either in regular layers, or as fragments cemented together by hornblende, or epidote.

The iron content of the various parts of the banded iron formation varies considerably, from almost nothing up to say 45 per cent; and 30 to 40 per cent may be said to be a fair average in this type of ore. The following analysis, supplied by the Moose Mountain Ltd., represents an average sample taken across No. 2 deposit:

Fe	36·70	per cent.
SiO_2	45·20	" "
MnO	0·04	" "
Al_2O_3	0·25	" "
CaO	1·06	" "
MgO	1·59	" "
S	0·024	" "

The exceedingly fine texture and the intimate association of the magnetite with the silica render it impossible to obtain a marketable product from this type of ore by a simple cobbing process, and it is only by a very fine grinding of the material that a satisfactory separation of the magnetite from the silica can be attained. Tests carried out by the Moose Mountain Ltd., have shown that by crushing the ore to 80 or 100 mesh, and passing it through a Gröndal magnetic separator, a concentrate of the following composition can be attained:—

Fe	65·58
SiO_2	8·69
Al_2O_3	0·20
CaO	0·46
MnO	0·04
MgO	0·41
S	0·029
P	0·019

It is almost unnecessary to add that this fine concentrate requires either nodulizing or briquetting before it can be utilized in the blast furnace for the manufacture of pig iron.

The ore of type No. 2—i.e., magnetite associated with hornblende and epidote—is, as far as present knowledge goes, confined to one or two comparatively small deposits, and locally known as No. 1, and 5. Up to the present time, No. 1 is the only deposit which has been subject to exploitation. In this deposit the magnetite is generally of a coarser grain, and, like the hornblende, and epidote, often shows a more or less pronounced segregation into irregular layers and lenses, with the result that, some parts of the ore body have a very high iron content, while others are chiefly made up of hornblende, or epidote. An imperceptible gradation from high grade ore into hornblende, and epidote, is, however, often seen, and a brecciated structure of the ore is not uncommon, pieces of magnetite being cemented together by epidote, which was evidently the last mineral to be formed.

Owing to the exceedingly irregular mineralogical composition, it is very difficult to give any figures which may be said to represent the average iron content of this type of ore. Some parts of the ore body average 60 to 65 per cent in iron; while others, often in the immediate vicinity, consist of hornblende, or epidote; and between these two extremes all gradations exist. The following analysis gives the composition of the ore ready for shipment, after it has been crushed down to 1¼ inch, and passed over magnetic cobbers.

Fe	54·35
SiO_2	13·94
Al_2O_3	1·90
MnO	0·06
MgO	3·61
CaO	3·79
S	0·029
P	0·090

DISTRIBUTION OF ORE DEPOSITS.

On the accompanying geological maps, Nos. 205a, and 208c, an attempt has been made to outline the various ore deposits as determined by the magnetometric survey. But, as the greater part of the ore bodies is drift covered, it has been possible, only in a few places, to verify these outlines by actually observed contacts. The outlines are, therefore, as a rule, not well defined.

No. 1 deposit is on lot 9, con. III, and lies on a steep hill about 120 feet above the railway track. So far the principal mining operations have been confined to this deposit. The ore is won by underhand stoping, from an open-cut, with a face from 60 to 70 feet in height, and trammed out to an ore bin, whence it is discharged upon a belt conveyer which delivers it to the cobbing plant. The horizontal area of this deposit is estimated at about 47,000 square feet, most of which has already been opened up. By diamond drilling the ore body has been proved to a depth of 300 feet below its highest outcropping. The ore is chiefly of type No. 2.

No. 2 deposit is exposed in numerous places on the high hill immediately to the west of the village of Sellwood, and extends across the west branch of the Vermilion river. Judging from the magnetometric survey, its total length is about 6,000 feet, with a width ranging from 450 to 150 feet. The total area of this deposit is roughly estimated at 1,286,000 square feet. About 800 feet south of the river, the ore body has been fractured, and folded, resulting in the great dislocation shown on map 205 A. The ore is a low grade silicious magnetite of type No. 1.

No. 3 deposit lies south of the railway track near Sellwood station. It is completely covered by drift, except in one place, where a stripping 150 feet by 75 feet exposes the banded iron formation. Judging from the magnetometric survey the ore body extends in a northwest-southeast direction, and has a length of about 1500 feet.

South of the north end of No. 3 is another deposit which has been exposed by a stripping 75 feet by 25 feet. The ore is a banded, silicious magnetite. In a flat of low ground about 200 feet north of No. 3, the magnetometric survey indicates the presence of another deposit, which is entirely covered by drift. The total area of these three deposits is roughly estimated at 328,000 square feet.

No. 4 deposit lies west of No. 2, and about 400 feet south of the new concentrating plant. It is exposed by a stripping 150 by 90 feet. The ore is of the banded silicious type, but is in places considerably enriched in iron, owing to several intrusions of greenstone—see Fig. 1. The area of this deposit is estimated at 28,000 square feet.

No. 5 deposit lies about 900 feet southwest of No. 1, and is connected with the ore bin of the latter by a tramway, about 1200 feet long. A stripping 300 by 65 feet has exposed part of the ore body, in which numerous intrusions of greenstone and granite can be seen—see Fig. 2. The ore is of similar character to that of No. 1 deposit. The area of the deposit is roughly estimated at 24,000 square feet.

No. 6 deposit is located about 300 feet northwest of No. 5, and, judging from the magnetometric survey, extends in a northwesterly direction for about 700 feet, with a width of 150 feet, in places. The deposit is almost entirely covered by drift, and only one or two small outcrops are visible. Numerous testpits have been sunk on this deposit, by the operating company; but most of these workings were caved in at the time of the writer's visit.

Immediately to the northwest of No. 6, the magnetometric survey indicates the presence of several other deposits, which are, however, entirely covered by drift. The total area of this group of deposits, including No. 6, is roughly estimated at 166,000 square feet.

No. 7 deposit lies in a flat of low ground, about 400 feet north of Sellwood railway station. The ore body is exposed in two places, and its probable area is estimated at 20,000 square feet.

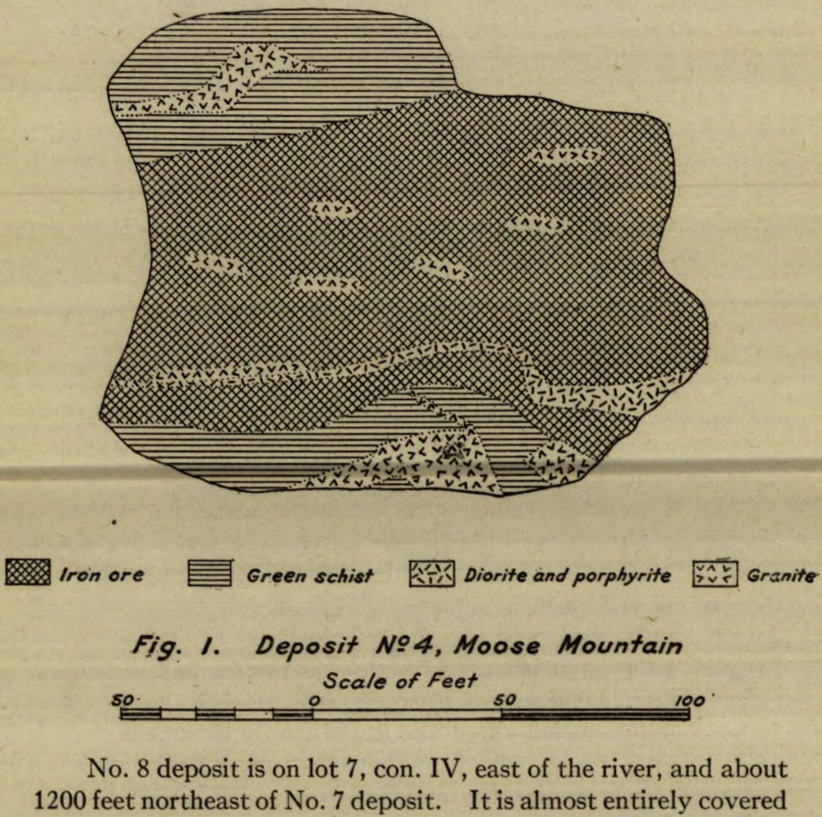
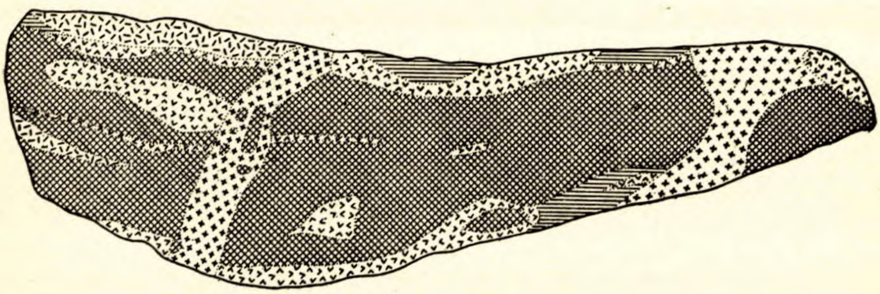


Fig. 1. Deposit No. 4, Moose Mountain

No. 8 deposit is on lot 7, con. IV, east of the river, and about 1200 feet northeast of No. 7 deposit. It is almost entirely covered by drift and only two or three small outcrops of ore can be seen. Judging from the magnetometric survey (see map No. 207), this ore deposit has a length of about 700 feet, with a width ranging from 100 to 175 feet. Its area is estimated at 106,000 square feet.

On lot 6, con. III, about 2500 feet southeast of No. 8 deposit, the magnetometric survey indicated the presence of two other deposits, Nos. 9 and 9 A. A small outcrop of banded, silicious ore can be seen on No. 9 deposit; while No. 9 A lies in a swamp, and is entirely covered by drift. The length of No. 9 deposit is estimated at 750 feet, with a width of about 150 feet. The total area of these two deposits is estimated at 142,000 square feet.

No. 10 deposit is on lot 11, con. IV, about $1\frac{3}{4}$ miles west of the village of Sellwood, and outcrops in several places along the south side of a steep hill. The greater part of the ore body is, however, covered by peat or gravel. Judging from the



Iron ore — Green schist — Diorite and porphyrite — Granite — Diabase

Fig. 2. Deposit No. 5, Moose Mountain

Scale of Feet

50 0 50 100

magnetometric survey (see map 208) the length of the deposits is estimated at 600 feet, with a width ranging from 100 to 115 feet.

Immediately to the east of No. 10 deposit, the magnetometric survey indicates the presence of another deposit, which is, however, entirely covered by drift. The length of this deposit is roughly estimated at 800 feet, with about the same width as that of the former. The total area of the two deposits is roughly estimated at 184,000 square feet. There are also several other deposits, indicated by the survey, on this lot, but their extent is very limited.

A group of deposits, locally known as No. 11, is on lots 11 and 12, con. V, and lot 12, con. VI. Going up the west branch of the Vermilion river the banded iron formation is first met with at a sharp bend of the river on lot 11, con. V, about 2 miles from the village of Sellwood. It outcrops here in several places along the river for a distance of about 1200 feet. Farther up, the banded iron formation does not outcrop along the river, but can be traced by outcrops and magnetic observations, a short distance from the river for an additional distance of about 6000 feet, extending in a northwesterly direction into the adjoining township of Kitchener. The river being, at first, to the west of the iron bearing formation, makes a sharp bend to the east, and crosses the same on lot 12, con. V. Having crossed the formation, it immediately resumes its old course in a northwesterly direction, and from here, on the banded iron formation, is found at a short distance west of the river. The total distance through which the iron-bearing series can be traced by outcrops and magnetic readings is about 7300 feet. It is, however, not continuous for all this distance, since the magnetometric survey indicates several breaks in the formation. The total area of this group of deposits is roughly estimated at 925,000 square feet. The ore is of type No. 1.

MINING OPERATIONS

Mining operations have so far been confined to No. 1 deposit, which consists, chiefly, of ore of type No. 2: that is, of magnetite, associated with hornblende, and epidote. The ore is won by underhand stoping, from an open-cut, with a face of from 60 to 70 feet in height, and trammed out to a large ore bin, discharging on to a belt elevator, which delivers it to the cobbing plant. Here the ore is crushed either in a No. 8 gyratory crusher or in a 24 by 36 inch jaw crusher—the crushers standing side by side. From the crushers the ore is conveyed to a storage bin of 800 tons capacity, whence it is fed to No. 4 gyratory crushers. The product from these crushers passes through a $1\frac{1}{4}$ inch, revolving, perforated screen, the oversize being returned to the crushers; while the undersize is delivered by belt conveyers to the storage bins, whence it is fed to Ball and Norton single drum magnetic separators; the cobbed product being transferred by belt conveyers to the shipping bin, or to the stock pile; while the tailings go to another pile. In order to remove the fines, the ore is now screened before shipment is made.

COMMERCIAL POSSIBILITIES OF THE MOOSE MOUNTAIN DISTRICT

From what has been said in regard to the extent of the various deposits, it is evident that a large quantity of low grade ore is available in this district. The total area of the various deposits is roughly estimated at 3,256,000 square feet; which, assuming that the specific gravity of the ore is 3·8, would correspond to an ore quantity of about 38,665,000 tons per 100 feet of depth of the ore bodies. The actual depth of the various deposits is not known at present, but diamond drilling carried out by the Moose Mountain Ltd. has shown that No. 2 deposit is at least 400 feet deep; while No. 1 deposit has been proved to a depth of 300 feet. Unfortunately, the great bulk of this large tonnage is made up of banded silicious magnetite, of type No. 1, requiring fine crushing and concentration, with subsequent briquetting or nodulizing before it can be made marketable. So far, mining operations have been confined to No. 1 deposit, where the local character of the ore has made it possible to obtain a merchantable product by a simple cobbing process. But, the amount of this type of ore being limited, it is evident that the future of the district as an iron ore producer depends chiefly on the possibility of utilizing the banded silicious magnetite of type No. 1. Being well aware of this fact, the operating company is now erecting a modern Gröndal concentrating and briquetting plant, which, when fully completed, is planned to have a capacity of 800 tons of crude ore per 24 hours. Concentration tests have, as already stated, demonstrated that by grinding the material sufficiently fine, 80 to 100 mesh or finer, an excellent concentrate having the following composition can be obtained: Iron 65·6 per cent, Phosphorus 0·019 per cent, Silica 8·6 per cent, Sulphur 0·029 per cent. It remains to be seen, however, if this concentrating and briquetting process can be economically carried out. The cost of mining the ore will, no doubt, for years to come, be rather low; owing to the fact that a large tonnage can be obtained from No. 2 deposit by simply quarrying the ore in open-cuts at various elevations. Cheap electric power is now available, being obtained from Wahnapitae Power Co., over a transmission line of about 35 miles in length.

Since it will be necessary to mine and crush to a fineness of 80 or 100 mesh, about 2·2 tons of ore in order to obtain one ton of concentrate of 65 per cent iron; and adding to the cost of mining, crushing, and concentration, that of briquetting, which by the Gröndal process is rather high, it is evident that only by the most economical handling of the material, on a large scale, will it be possible, at the present time, to work these low grade ores profitably.

CANADA

DEPARTMENT OF MINES

HON. LOUIS CODERRE, MINISTER; R. W. BROCK, DEPUTY MINISTER;

MINES BRANCH

EUGENE HAANEL, PH.D., DIRECTOR.

REPORTS AND MAPS OF ECONOMIC INTEREST

PUBLISHED BY THE

MINES BRANCH.

REPORTS.

1. Mining Conditions in the Klondike, Yukon. Report on—by Eugene Haanel, Ph.D., 1902.

†2. Great Landslide at Frank, Alta. Report on—by R. G. McConnell, B.A., and R. W. Brock, M.A., 1903.

†3. Investigation of the different electro-thermic processes for the smelting of iron ores, and the making of steel, in operation in Europe. Report of Special Commission—by Eugene Haanel, Ph.D., 1904.

†4. Rapport de la Commission nommée pour étudier les divers procédés électro-thermiques pour la réduction des minerais de fer et la fabrication de l'acier employés en Europe—by Eugene Haanel, Ph.D., (French Edition), 1905.

5. On the location and examination of magnetic ore deposits by magnetometric measurements—by Eugene Haanel, Ph.D., 1904.

†7. Limestones, and the Lime Industry of Manitoba. Preliminary Report on—by J. W. Wells, M.A., 1905.

†8. Clays and Shales of Manitoba: Their Industrial Value. Preliminary Report on—by J. W. Wells, M.A., 1905.

†9. Hydraulic Cements (Raw Materials) in Manitoba: Manufacture and Uses of. Preliminary Report on—by J. W. Wells, M.A., 1905.

†10. Mica: Its Occurrence, Exploitation, and Uses—by Fritz Cirkel, M.E., 1905. (See No. 118.)

†11. Asbestos: Its Occurrence, Exploitation, and Uses—by Fritz Cirkel, M.E., 1905. (See No. 69.)

†12. Zinc Resources of British Columbia and the Conditions affecting their Exploitation. Report of the Commission appointed to investigate—by W. R. Ingalls, M.E., 1905.

†Publications marked thus † are out of print.

†16. *Experiments made at Sault Ste. Marie, under Government auspices, in the smelting of Canadian iron ores by the electro-thermic process. Final Report on—by Eugene Haanel, Ph.D., 1907.

†17. Mines of the Silver-Cobalt Ores of the Cobalt district: Their Present and Prospective Output. Report on—by Eugene Haanel, Ph.D., 1907.

†18. Graphite: Its Properties, Occurrence, Refining, and Uses—by Fritz Cirkel, M.E., 1907.

†19. Peat and Lignite: Their Manufacture and Uses in Europe—by Erik Nystrom, M.E., 1908.

†20. Iron Ore Deposits of Nova Scotia. Report on (Part I)—by J. E. Woodman, D.Sc.

†21. Summary Report of Mines Branch, 1907-8.

22. Iron Ore Deposits of Thunder Bay and Rainy River districts. Report on—by F. Hille, M.E.

†23. Iron Ore Deposits, along the Ottawa (Quebec side) and Gatineau rivers. Report on—by Fritz Cirkel, M.E.

24. General Report on the Mining and Metallurgical Industries of Canada, 1907-8.

25. The Tungsten Ores of Canada. Report on—by T. L. Walker, Ph.D.

26. The Mineral Production of Canada, 1906. Annual Report on—by John McLeish, B.A.

26a. French translation: The Mineral Production of Canada, 1906. Annual Report on—by John McLeish, B.A.

27. The Mineral Production of Canada, 1907. Preliminary Report on—by John McLeish, B.A.

†27a. The Mineral Production of Canada, 1908. Preliminary Report on—by John McLeish, B.A.

†28. Summary Report of Mines Branch, 1908.

†28a. French translation: Summary Report of Mines Branch, 1908.

29. Chrome Iron Ore Deposits of the Eastern Townships. Monograph on—by Fritz Cirkel. (Supplementary Section: Experiments with Chromite at McGill University—by J. B. Porter, E.M., D.Sc.)

---

*A few copies of the Preliminary Report, 1906, are still available.
†Publications marked thus † are out of print.

30. Investigation of the Peat Bogs and Peat Fuel Industry of Canada, 1908. Bulletin No. 1—by Erik Nystrom, M.E. and A. Anrep, Peat Expert.

32. Investigation of Electric Shaft Furnace, Sweden. Report on—by Eugene Haanel, Ph.D.

47. Iron Ore Deposits of Vancouver and Texada islands. Report on—by Einar Lindeman, M.E.

†55. Report on the Bituminous, or Oil-shales of New Brunswick and Nova Scotia; also on the Oil-shale industry of Scotland—by R. W. Ells, LL.D.

58. The Mineral Production of Canada, 1907 and 1908. Annual Report on—by John McLeish, B.A.

NOTE.—*The following parts were separately printed and issued in advance of the Annual Report for 1907-8.*

†31. Production of Cement in Canada, 1908.

42. Production of Iron and Steel in Canada during the Calendar Years 1907 and 1908.

43. Production of Chromite in Canada during the Calendar Years 1907 and 1908.

44. Production of Asbestos in Canada during the Calendar Years 1907 and 1908.

†45. Production of Coal, Coke, and Peat in Canada during the Calendar Years 1907 and 1908.

46. Production of Natural Gas and Petroleum in Canada during the Calendar Years 1907 and 1908.

59. Chemical Analyses of Special Economic Importance made in the Laboratories of the Department of Mines, 1906-7-8. Report on—by F G. Wait, M.A., F.C.S. (With Appendix on the Commercial Methods and Apparatus for the Analysis of Oil-shales—by H. A. Leverin, Ch. E.).

Schedule of Charges for Chemical Analyses and Assays.

†62. Mineral Production of Canada, 1909. Preliminary Report on—by John McLeish, B.A.

63. Summary Report of Mines Branch, 1909.

67. Iron Ore Deposits of the Bristol mine, Pontiac county, Quebec. Bulletin No. 2—by Einar Lindeman, M.E., and Geo. C. Mackenzie, B.Sc.

†Publications marked thus † are out of print.

†68. Recent Advances in the Construction of Electric Furnaces for the Production of Pig Iron, Steel, and Zinc. Bulletin No. 3—by Eugene Haanel, Ph.D.

69. Chrysotile-Asbestos: Its Occurrence, Exploitation, Milling, and Uses. Report on—by Fritz Cirkel, M.E. (Second Edition, enlarged.)

†71. Investigation of the Peat Bogs and Peat Industry of Canada, 1909-10; to which is appended Mr. Alf. Larson's Paper on Dr. M. Ekenberg's Wet-Carbonizing Process; from Teknisk Tidskrift, No. 12, December 26, 1908—translation by Mr. A. v. Anrep, Jr.; also a translation of Lieut. Ekelund's Pamphlet entitled 'A Solution of the Peat Problem,' 1909, describing the Ekelund Process for the Manufacture of Peat Powder by Harold A. Leverin, Ch. E. Bulletin No. 4—by A. v. Anrep (Second Edition, enlarged).

81. French Translation: Chrysotile-Asbestos: Its Occurrence, Exploitation, Milling, and Uses. Report on—by Fritz Cirkel, M.E.

82. Magnetic Concentration Experiments. Bulletin No. 5—by Geo. C. Mackenzie, B.Sc.

83. An investigation of the Coals of Canada with reference to their Economic Qualities: as conducted at McGill University under the authority of the Dominion Government. Report on—by J. B. Porter, E.M., D.Sc., R. J. Durley, Ma.E., and others—

Vol. I—Coal Washing and Coking Tests.

Vol. II—Boiler and Gas Producer Tests.

Vol. III—
Appendix I
Coal Washing Tests and Diagrams.

Vol. IV—
Appendix II
Boiler Tests and Diagrams.

Vol. V—
Appendix III
Producer Tests and Diagrams.

Vol. VI—
Appendix IV
Coking Tests.
Appendix V
Chemical Tests.

†84 Gypsum Deposits of the Maritime Provinces of Canada—including the Magdalen Islands. Report on—by W. F. Jennison, M.E. (See No. 245.)

---

†Publications marked thus † are out of print.

88. The Mineral Production of Canada, 1909. Annual Report on—by John McLeish, B.A.

NOTE.—*The following parts were separately printed and issued in advance of the Annual Report for 1909.*

†79. Production of Iron and Steel in Canada during the Calendar Year 1909.

†80. Production of Coal and Coke in Canada during the Calendar Year 1909.

85. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials during the Calendar Year 1909.

89. Reprint of Presidential address delivered before the American Peat Society at Ottawa, July 25, 1910. By Eugene Haanel, Ph.D.

90. Proceedings of Conference on Explosives.

92. Investigation of the Explosives Industry in the Dominion of Canada, 1910. Report on—by Capt. Arthur Desborough. (Second Edition.)

93. Molybdenum Ores of Canada. Report on—by Professor T. L. Walker, Ph.D.

100. The Building and Ornamental Stones of Canada. Report on—by Professor W. A. Parks, Ph.D.

100a. French translation: The Building and Ornamental Stones of Canada. Report on—by W. A. Parks, Ph.D.

102. Mineral Production of Canada, 1910. Preliminary Report on—by John McLeish, B.A.

†103. Summary Report of Mines Branch, 1910.

104. Catalogue of Publications of Mines Branch, from 1902 to 1911; containing Tables of Contents and list of Maps, etc.

105. Austin Brook Iron-Bearing district, Report on—by E. Lindeman, M.E.

110. Western Portion of Torbrook Iron Ore Deposits, Annapolis county, N.S. Bulletin No. 7—by Howells Fréchette, M.Sc.

111. Diamond Drilling at Point Mamainse, Ont. Bulletin No. 6—by A. C. Lane, Ph.D., with Introductory by A. W. G. Wilson, Ph.D.

118. Mica: Its Occurrence, Exploitation, and Uses. Report on—by Hugh S. de Schmid, M.E.

142. Summary Report of Mines Branch, 1911.

†Publications marked thus † are out of print.

143. The Mineral Production of Canada, 1910. Annual Report on—by John McLeish, B.A.

NOTE.—*The following parts were separately printed and issued in advance of the Annual Report for 1910.*

†114. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada, 1910.

†115. Production of Iron and Steel in Canada during the Calendar Year 1910.

†116. Production of Coal and Coke in Canada during the Calendar Year 1910.

†117. General Summary of the Mineral Production of Canada during the Calendar Year 1910.

145. Magnetic Iron Sands of Natashkwan, Saguenay county, Que. Report on—by Geo. C. Mackenzie, B.Sc.

†150. The Mineral Production of Canada, 1911. Preliminary Report on—by John McLeish, B.A.

151. Investigation of the Peat Bogs and Peat Industry of Canada, 1910-11. Bulletin No. 8—by A. v. Anrep.

154. The Utilization of Peat Fuel for the Production of Power, being a record of experiments conducted at the Fuel Testing Station, Ottawa, 1910-11. Report on—by B. F. Haanel, B.Sc.

155. French translation: The Utilization of Peat Fuel for the Production of Power, being a record of Experiments conducted at the Fuel Testing Station, Ottawa, 1910-11. Report on—by B. F. Haanel, B.Sc.

156. French translation: The Tungsten Ores of Canada. Report on—by T. L. Walker, Ph. D.

167. Pyrites in Canada: Its Occurrence, Exploitation, Dressing, and Uses. Report on—by A. W. G. Wilson, Ph.D.

170. The Nickel Industry: with special reference to the Sudbury region, Ont. Report on—by Professor A. P. Coleman, Ph.D.

184. Magnetite Occurrences along the Central Ontario railway. Report on—by E. Lindeman, M.E.

196. French translation: Investigation of the Peat Bogs and Peat Industry of Canada, 1909-10; to which is appended Mr. Alf. Larson's paper on Dr. Ekenburg's Wet-Carbonizing Process: from Teknisk Tidskrift, No. 12, December 26, 1908—translation by Mr. A. v. Anrep; also

†Publications marked thus † are out of print.

a translation of Lieut. Ekelund's Pamphlet entitled "A Solution of the Peat Problem," 1909, describing the Ekelund Process for the Manufacture of Peat Powder, by Harold A. Leverin, Ch. E. Bulletin No. 4.—by A. v. Anrep. (Second Edition, enlarged.)

197. French translation: Molybdenum Ores of Canada. Report on—by T. L. Walker, Ph.D.

198. French translation: Peat and Lignite: Their Manufacture and Uses in Europe—by Erik Nystrom, M.E., 1908.

201. The Mineral Production of Canada during the Calendar Year 1911. Annual Report on—by John McLeish, B.A.

NOTE.—*The following parts were separately printed and issued in advance of the Annual Report for 1911.*

181. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada during the Calendar Year 1911. Bulletin on—by John McLeish, B.A.

†182. Production of Iron and Steel in Canada during the Calendar Year 1911. Bulletin on—by John McLeish, B.A.

183. General Summary of the Mineral Production in Canada during the Calendar Year 1911. Bulletin on—by John McLeish, B.A.

199. Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and other Metals of Canada, during the Calendar Year 1911. Bulletin on—by C. T. Cartwright, B.Sc.

200. The Production of Coal and Coke in Canada during the Calendar Year 1911. Bulletin on—by John McLeish, B.A.

202. French translation: Graphite: Its Properties, Occurrence, Refining, and Uses—by Fritz Cirkel, M.E., 1907.

216. Mineral Production of Canada, 1912. Preliminary Report on—by John McLeish, B.A.

224. Summary Report of the Mines Branch, 1912.

226. French translation: Chrome Iron Ore Deposits of the Eastern Townships. Monograph on—by Fritz Cirkel, M.E. (Supplementary Section: Experiments with Chromite at McGill University—by J. B. Porter, E.M., D.Sc.)

227. Sections of the Sydney Coal Fields—by J. G. S. Hudson, M.E.

†229. Summary Report of the Petroleum and Natural Gas Resources of Canada, 1912—by F. G. Clapp, A.M. (See No. 224.)

†Publications marked thus † are out of print.

230. Economic Minerals and the Mining Industry of Canada.

231. French translation: Economic Minerals and the Mining Industry of Canada.

233. French translation: Gypsum Deposits of the Maritime Provinces of Canada—including the Magdalen Islands. Report on—by W. F. Jennison, M.E.

259. Preparation of Metallic Cobalt by Reduction of the Oxide. Report on—by H. T. Kalmus, B.Sc., Ph.D.

262. The Mineral Production of Canada during the Calendar Year 1912. Annual Report on—by John McLeish, B.A.

NOTE.—*The following parts were separately printed and issued in advance of the Annual Report for 1912.*

238. General Summary of the Mineral Production of Canada, during the Calendar Year 1912. Bulletin on—by John McLeish, B.A.

247. Production of Iron and Steel in Canada during the Calendar Year 1912. Bulletin on—by John McLeish, B.A.

256. Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and other Metals of Canada, during the Calendar Year 1912—by C. T. Cartwright, B.Sc.

257. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials during the Calendar Year 1912. Report on—by John McLeish, B.A.

258. Production of Coal and Coke in Canada, during the Calendar Year 1912. Bulletin on—by John McLeish, B.A.

283. Mineral Production of Canada, 1913. Preliminary Report on—by John McLeish, B.A.

303. Moose Mountain Iron-bearing District. Report on—by E. Lindeman, M.E.

The Division of Mineral Resources and Statistics has prepared the following lists of mine, smelter, and quarry operators: Metal mines and smelters, Coal mines, Stone quarry operators, Manufacturers of clay products, and Manufacturers of lime; copies of the lists may be obtained on application.

IN THE PRESS.

56. French translation: Bituminous or Oil-shales of New Brunswick and Nova Scotia: also on the Oil-shale Industry of Scotland—by R. W. Ells, LL.D.

---

†Publications marked thus † are out of print.

149. French translation: Magnetic Iron Sands of Natashkwan, Saguenay county, Que. Report on—by Geo. C. Mackenzie, B.Sc.

169. French translation: Pyrites in Canada: Its Occurrence, Exploitation, Dressing, and Uses. Report on—by A. W. G. Wilson, Ph.D.

179. French translation: The Nickel Industry of Canada—by A. P. Coleman, Ph.D.

180. French translation: Investigation of the Peat Bogs, and Peat Industry of Canada, 1910-11. Bulletin No. 8—by A. v. Anrep.

195. French translation: Magnetite Occurrences along the Central Ontario Railway. Report on—by E. Lindeman, M.E.

203. Building Stones of Canada—Vol. II: Building and Ornamental Stones of the Maritime Provinces. Report on—by W. A. Parks, Ph.D.

209. The Copper Smelting Industry of Canada. Report on—by A. W. G. Wilson, Ph.D.

219. French translation: Austin Brook Iron-bearing district—by E. Lindeman, M.E.

222. Lode Mining in Yukon: An Investigation of the Quartz Deposits of the Klondike Division. Report on—by T. A. MacLean, B.Sc.

245. Gypsum in Canada: Its Occurrence, Exploitation, and Technology. Report on—by L. H. Cole, B.Sc.

254. Calabogie Iron-bearing District. Report on—by E. Lindeman, M.E.

263. French translation: Recent advances in the Construction of Electric Furnaces for the Production of Pig Iron, Steel, and Zinc. Bulletin No. 3—by Eugene Haanel, Ph.D.

264. French translation: Mica: Its Occurrence, Exploitation, and Uses. Report on—by Hugh S. de Schmid, M.E.

265. French translation: Annual Mineral Production of Canada, 1911. Report on—by John McLeish, B.A.

266. Investigation of Peat Bogs and Peat Industry of Canada, 1911 and 1912. Bulletin No. 9—by A. v. Anrep.

279. Building and Ornamental Stones of Canada: Vol. III. Report on—by W. A. Parks, Ph.D.

281. Report on Bituminous Sands of Northern Alberta—by S.C. Ells, M.E.

287. French translation: Production of Iron and Steel in Canada during the Calendar Year 1912. Bulletin on—by John McLeish, B.A.

†Publications marked thus † are out of print.

288. French translation: Production of Coal and Coke in Canada, during the Calendar Year 1912. Bulletin on—by John McLeish, B.A.

289. French translation: Production of Cement, Lime, Clay Products, Stone, and Other Structural Materials during the Calendar Year 1912. Bulletin on—by John McLeish, B.A.

290. French translation: Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and other Metals of Canada, during the Calendar Year 1912. Bulletin on—by C. T. Cartwright, B.Sc.

291. Petroleum and Natural Gas Resources of Canada. Report on—by F. G. Clapp, A.M., and others.

299. Peat, Lignite, and Coal: Their Value as fuels for the Production of Gas and Power in the By-product Recovery Producer. Report on—by B. F. Haanel, B.Sc.

305. Report on the Non-metallic Minerals used in the Canadian Manufacturing Industries—by H. Frechette, M.Sc.

308. French translation: An investigation of the Coals of Canada with reference to their Economic Qualities; as conducted at McGill University under the authority of the Dominion Government. Report on by J. B. Porter, E.M., D.Sc., R. J. Durley, Ma. E., and others.

Vol. I.—Coal Washing and Coking Tests.

Vol. II.—Boiler and Gas Producer Tests.

Vol. III.—

Appendix I:

Coal Washing Tests and Diagrams.

Vol. IV.—

Appendix II:

Boiler Tests and Diagrams.

309. Physical Properties of Cobalt, Part II. Report on—by H. T. Kalmus, B.Sc., Ph.D.

314. French translation: Iron Ore Deposits, Bristol Mine, Pontiac Co., Que. Report on—by E. Lindeman, M.E.

MAPS.

†6. Magnetometric Survey, Vertical Intensity: Calabogie mine, Bagot township, Renfrew county, Ontario—by E. Nystrom, 1904. Scale 60 feet = 1 inch. Summary report, 1905. (See Map No. 249.)

†13. Magnetometric Survey of the Belmont Iron mines, Belmont township, Peterborough county, Ontario—by B. F. Haanel, 1905. Scale 60 feet = 1 inch. Summary report, 1905. (See Map No. 186.)

NOTE.—1. Maps marked thus * are to be found only in reports.

2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

†14. Magnetometric Survey of the Wilbur mine, Lavant township, Lanark county, Ontario—by F. F. Haanel, 1905. Scale 60 feet = 1 inch. Summary report, 1905.

†33. Magnetometric Survey, Vertical Intensity: Lot 1, Concession VI, Mayo township, Hastings county, Ontario—by Howells Fréchette, 1909. Scale 60 feet = 1 inch.

†34. Magnetometric Survey, Vertical Intensity: Lots 2 and 3, Concession VI, Mayo township, Hastings county, Ontario—by Howells Fréchette, 1909. Scale 60 feet = 1 inch.

†35. Magnetometric Survey, Vertical Intensity: Lots 10, 11, and 12, Concession IX, and Lots 11 and 12, Concession VIII, Mayo township, Hastings county, Ontario—by Howells Fréchette, 1909. Scale 60 feet = 1 inch.

*36. Survey of Mer Bleu Peat Bog, Gloucester township, Carleton county and Cumberland township, Russell county, Ontario—by Erik Nystrom, and A. v. Anrep. (Accompanying report No. 30)

*37. Survey of Alfred Paet Bog, Alfred and Caledonia townships, Prescott county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 30.)

*38. Survey of Welland Peat Bog, Wainfleet and Humberstone townships, Welland county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 30.)

*39. Survey of Newington Peat Bog, Osnabruck, Roxborough, and Cornwall townships, Stormont county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 30.)

*40. Survey of Perth Peat Bog, Drummond township, Lanark county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 30.)

*41. Survey of Victoria Road Peat Bog, Bexley and Carden townships Victoria county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 47.)

*48. Magnetometric Survey of Iron Crown claim at Klaanch river, Vancouver island, B.C.—by E. Lindeman. Scale 60 feet = 1 inch. (Accompanying report No. 47.)

*49. Magnetometric Survey of Western Steel Iron claim, at Sechart, Vancouver island, B.C.—by E. Lindeman. Scale 60 feet = 1 inch. (Accompanying report No. 47.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

*53. Iron Ore Occurrences, Ottawa and Pontiac counties, Quebec, 1908—by J. White and Fritz Cirkel. (Accompanying report No. 23.)

*54. Iron Ore Occurrences, Argenteuil county, Quebec, 1908—by Fritz Cirkel. (Accompanying report No. 23.) (Out of print.)

†57. The Productive Chrome Iron Ore District of Quebec—by Fritz Cirkel. (Accompanying report No. 29.) (Out of print.)

†60. Magnetometric Survey of the Bristol mine, Pontiac county, Quebec—by E. Lindeman. Scale 200 feet = 1 inch. (Accompanying report No. 67.)

*61. Topographical Map of Bristol mine, Pontiac county, Quebec—by E. Lindeman. Scale 200 feet = 1 inch. (Accompanying report No. 67.)

†64. Index Map of Nova Scotia: Gypsum—by W. F. Jennison.

†65. Index Map of New Brunswick: Gypsum—by W. F. Jennison.

†66. Map of Magdalen Islands: Gypsum—by W. F. Jennison.

(Accompanying report No. 84.)

†70. Magnetometric Survey of Northeast Arm Iron Range, Lake Timagami, Nipissing district, Ontario—by E. Lindeman. Scale 200 feet = 1 inch. (Accompanying report No. 63.)

†72. Brunner Peat Bog, Ontario—by A. v. Anrep.

†73. Komoka Peat Bog, Ontario—by A. v. Anrep.

†74. Brockville Peat Bog, Ontario—by A. v. Anrep

†75. Rondeau Peat Bog, Ontario—by A. v. Anrep.

†76. Alfred Peat Bog, Ontario—by A. v. Anrep.

†77. Alfred Peat Bog, Ontario: Main Ditch profile—by A. v. Anrep.

(Out of print.)

†78. Map of Asbestos Region, Province of Quebec, 1910—by Fritz Cirkel. Scale 1 mile = 1 inch. (Accompanying report No. 69.)

†94. Map showing Cobalt, Gowganda, Shiningtree, and Porcupine districts—by L. H. Cole, B.Sc. (Accompanying Summary report, 1910.)

*95. General Map of Canada, showing Coal Fields. (Accompanying report No. 83—by Dr. J. B. Porter.)

*96. General Map of Coal Fields of Nova Scotia and New Brunswick. (Accompanying report No. 83—by Dr. J. B. Porter.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

*97. General Map showing Coal Fields in Alberta, Saskatchewan, and Manitoba. (Accompanying report No. 83—by Dr. J. B. Porter.)

*98. General Map of Coal Fields in British Columbia. (Accompanying report No. 83—by Dr. J. B. Porter.)

*99. General Map of Coal Field in Yukon Territory. (Accompanying report No. 83—by Dr. J. B. Porter.)

†106. Geological Map of Austin Brook Iron Bearing district, Bathurst township, Gloucester county, N.B.—by E. Lindeman. Scale 400 feet =1 inch. (Accompanying report No. 105.)

†107. Magnetometric Survey, Vertical Intensity: Austin Brook Iron Bearing District—by E. Lindeman. Scale 400 feet=1 inch. (Accompanying report No. 105.)

*108. Index Map showing Iron Bearing Area at Austin Brook—by E. Lindeman. (Accompanying report No. 105.)

*112. Sketch plan showing Geology of Point Mamainse, Ont.—by Professor A. C. Lane. Scale, 4,000 feet=1 inch. (Accompanying report No. 111.)

†113. Holland Peat Bog, Ontario—by A. v. Anrep. (Accompanying report No. 151.)

*119-137. Mica: Township maps, Ontario and Quebec—by Hugh S. de Schmid. (Accompanying report No. 118.)

†138. Mica: Showing Location of Principal Mines and Occurrences in the Quebec Mica Area—by Hugh S. de Schmid. Scale 3·95 miles=1 inch. (Accompanying report No. 118.)

†139. Mica: Showing Location of Principal Mines and Occurrences in the Ontario Mica Area—by Hugh S. de Schmid. Scale 3·95 miles= 1 inch. (Accompanying report No. 118.)

†140. Mica: Showing Distribution of the Principal Mica Occurrences in the Dominion of Canada—by Hugh S. de Schmid. Scale 3·95 miles =1 inch. (Accompanying report No. 118.)

†141. Torbrook Iron Bearing District, Annapolis county, N.S.—by Howells Fréchette. Scale 400 feet=1 inch. (Accompanying report No. 110.)

†146. Distribution of Iron Ore Sands of the Iron Ore Deposits on the North Shore of the River and Gulf of St. Lawrence, Canada—by Geo. C. Mackenzie. Scale 100 miles=1 inch. (Accompanying report No. 145.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

†147. Magnetic Iron Sand Deposits in Relation to Natashkwan harbour and Great Natashkwan river, Que. (Index Map)—by Geo. C. Mackenzie Scale 40 chains = 1 inch. (Accompanying report No. 145.)

†148. Natashkwan Magnetic Iron Sand Deposits, Saguenay county, Que.—by Geo. C. Mackenzie. Scale 1,000 feet = 1 inch. (Accompanying report No. 145.)

†152. Map showing the Location of Peat Bogs investigated in Ontario—by A. v. Anrep.

†153. Map showing the Location of Peat Bogs investigated in Manitoba—by A. v. Anrep.

†157. Lac du Bonnet Peat Bog, Manitoba—by A. v. Anrep.

†158. Transmission Peat Bog, Manitoba—by A. v. Anrep.

†159. Corduroy Peat Bog, Manitoba—by A. v. Anrep.

†160. Boggy Creek Peat Bog, Manitoba—by A. v. Anrep.

†161. Rice Lake Peat Bog, Manitoba—by A. v. Anrep.

†162. Mud Lake Peat Bog, Manitoba—by A. v. Anrep.

†163. Litter Peat Bog, Manitoba—by A. v. Anrep.

†164. Julius Peat Litter Bog, Manitoba—by A. v. Anrep.

†165. Fort Francis Peat Bog, Ontario—by A. v. Anrep.

(Accompanying report No. 151)

*166. Magnetometric Map of No. 3 mine, Lot 7, Concessions V and VI, McKim township, Sudbury district, Ont.—by E. Lindeman. (Accompanying Summary report, 1911.)

†168. Map showing Pyrites Mines and Prospects in Eastern Canada, and their relation to the United States Market—by A. W. G. Wilson. Scale 125 miles = 1 inch. (Accompanying report No. 167.)

†171. Geological Map of Sudbury Nickel region, Ont.—by Prof. A. P. Coleman. Scale 1 mile = 1 inch. (Accompanying report No. 170.)

†172. Geological Map of Victoria mine—by Prof. A. P. Coleman.

†173. Geological Map of Crean Hill mine—by Prof. A. P. Coleman.

†174. Geological Map of Creighton mine—by Prof. A. P. Coleman.

(Accompanying report No. 170.)

NOTE.—1. Maps marked thus * are to be found only in reports.

2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

†175. Geological Map showing Contact of Norite and Laurentian in vicinity of Creighton mine—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†176. Geological Map of Copper Cliff offset—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†177. Geological Map of No. 3 mine—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†178. Geological Map showing vicinity of Stobie and No. 3 mines—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†185. Magnetometric Survey, Vertical Intensity: Blairton iron mine, Belmont township, Peterborough county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†185a. Geological Map, Blairton iron mine, Belmont township, Peterborough county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†186. Magnetometric Survey, Belmont iron mine, Belmont township, Peterborough county, Ont.—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†186a. Geological Map, Belmont iron mine, Belmont township, Peterborough county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†187. Magnetometric Survey, Vertical Intensity: St. Charles mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†187a. Geological Map, St. Charles mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†188. Magnetometric Survey, Vertical Intensity: Baker mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†188a. Geological Map, Baker mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†189. Magnetometric Survey, Vertical Intensity: Ridge iron ore deposits, Wollaston township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

†190. Magnetometric Survey, Vertical Intensity: Coehill and Jenkins mines, Wollaston township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†190a. Geological Map, Coehill and Jenkins mines, Wollaston township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†191. Magnetometric Survey, Vertical Intensity: Bessemer iron ore deposits, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†191a. Geological Map Bessemer iron ore deposits, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†192. Magnetometric Survey, Vertical Intensity: Rankin, Childs, and Stevens mines, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†192a. Geological Map, Rankin, Childs, and Stevens mines, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†193. Magnetometric Survey, Vertical Intensity: Kennedy property, Carlow township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†193a. Geological Map, Kennedy property, Carlow township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†194. Magnetometric Survey, Vertical Intensity: Bow Lake iron ore occurrences, Faraday township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†204. Index Map, Magnetite occurrences along the Central Ontario Railway —by E. Lindeman, 1911. (Accompanying report No. 184.)

†205. Magnetometric Map, Moose Mountain iron-bearing district, Sudbury district, Ontario: Deposits Nos. 1, 2, 3, 4, 5, 6, and 7—by E. Lindeman, 1912. (Accompanying report No. 266.)

†205a. Geological Map, Moose Mountain iron-bearing district, Sudbury district, Ontario. Deposits Nos. 1, 2, 3, 4, 5, 6, and 7—by E. Lindeman. (Accompanying report No. 266.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

†206. Magnetometric Survey of Moose Mountain iron-bearing district, Sudbury district, Ontario: Northern part of Deposit No. 2—by E. Lindeman, 1912. Scale, 200 feet = 1 inch. (Accompanying report No. 266.)

†207. Magnetometric Survey of Moose Mountain iron-bearing district, Sudbury district, Ontario: Deposits Nos. 8, 9, and 9A—by E. Lindeman, 1912. Scale 200 feet = 1 inch. (Accompanying report No. 266.)

†208. Magnetometric Survey of Moose Mountain iron-bearing district, Sudbury district, Ontario: Deposit No. 10—by E. Lindeman, 1912. Scale 200 feet = 1 inch. (Accompanying report No. 266.)

†208a. Magnetometric Survey, Moose Mountain iron-bearing district, Sudbury district, Ontario: Eastern portion of Deposit No. 11—by E. Lindeman, 1912. Scale, 200 feet = 1 inch. (Accompanying report No. 266.)

†208b. Magnetometric Survey, Moose Mountain iron-bearing district, Sudbury district, Ontario: Western portion of Deposit No. 11—by E. Lindeman, 1912. Scale, 200 feet = 1 inch. (Accompanying report No. 266.)

†208c. General Geological Map, Moose Mountain iron-bearing district, Sudbury district, Ontario—by E. Lindeman, 1912. Scale, 800 feet = 1 inch. (Accompanying report No. 266.)

†210. Location of Copper Smelters in Canada—by A. W. G. Wilson, Ph.D. Scale, 197·3 miles = 1 inch. (Accompanying report No. 209.)

†215. Province of Alberta: showing properties from which samples of coal were taken for gas producer tests, Fuel Testing Division, Ottawa. (Accompanying Summary Report, 1912).

†220. Mining Districts, Yukon. Scale 35 miles = 1 inch—by T. A. MacLean. (Accompanying report No. 222.)

†221. Dawson Mining District, Yukon. Scale 2 miles = 1 inch—by T. A. MacLean, B.A.Sc. (Accompanying report No. 222.)

*228. Index Map of the Sydney coal fields, Cape Breton, N.S. (Accompanying report No. 227).

†232. Mineral Map of Canada. Scale 100 miles = 1 inch. (Accompanying report No. 230.)

†249. Magnetometric Survey, Caldwell and Campbell mines, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 254.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

†250. Magnetometric Survey, Black Bay or Williams mine, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale, 200 feet =1 inch. (Accompanying report No. 254.)

†251. Magnetometric Survey, Bluff Point iron mine, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale, 200 feet =1 inch. (Accompanying report No. 254.)

†252. Magnetometric Survey, Culhane mine, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale, 200 feet=1 inch. (Accompanying report No. 264.)

†253. Magnetometric Survey, Martel or Wilson iron mine, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale, 200 feet =1 inch. (Accompanying report No. 254.)

†261. Magnetometric Survey, Northeast Arm iron range, Lot 339 E.T.W. Lake Timagami, Nipissing district, Ontario—by E. Nystrom, 1903. Scale, 200 feet=1 inch.

IN THE PRESS.

268. Map of Peat Bogs Investigated in Quebec—by A. v. Anrep, 1912.

269. Large Tea Field Peat Bog, Quebec " "

270. Small Tea Field Peat Bog, Quebec " "

271. Lanoraie Peat Bog, Quebec " "

272. St. Hyacinthe Peat Bog, Quebec " "

273. Rivière du Loup Peat Bog " "

274. Cacouna Peat Bog " "

275. Le Parc Peat Bog, Quebec " "

276. St. Denis Peat Bog, Quebec " "

277. Rivière Ouelle Peat Bog, Quebec " "

278. Moose Mountain Peat Bog, Quebec " "

Address all communications to—

DIRECTOR MINES BRANCH,
DEPARTMENT OF MINES,
SUSSEX STREET, OTTAWA.

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

Canada
DEPARTMENT OF MINES
MINES BRANCH

HON. LOUIS CODERRE, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER
EUGENE HAANEL, PH.D., DIRECTOR
1913

MAGNETOMETRIC MAP

LEGEND

Isodynamic lines of the vertical magnetic intensity

Positive Intensity

Magnetic attraction greater than			60°
between	50°	–	60°
"	40°	–	50°
"	20°	–	40°
"	0°	–	20°

Negative Intensity

between	0°	–	–20°
"	–20°	–	–40°
"	–40°	–	–50°
"	–50°	–	–60°

Constant of Instrument = 1.0 H

Magnetic declination about 6°55′ west

LEGEND

- Road
- Lot line
- Reference posts
- Stream
- Swamps
- Contours, interval 10 feet

Contours showing heights above sea-level based on an elevation supplied by the Moose Mountain Limited.

H. E. Baine, Chief Draughtsman
L. H. S. Pereira, Draughtsman

Nº 208

DEPOSIT Nº 10

MOOSE MOUNTAIN IRON BEARING DISTRICT

HUTTON TOWNSHIP, SUDBURY DISTRICT
ONTARIO

Scale, $\frac{1}{2400}$: 200 Feet to 1 Inch

200 150 100 50 0 200 400 600

Surveyed by
E. LINDEMAN 1912
Assisted by
A. H. A. ROBINSON
W. M. MORRISON
W. H. DAVIES

Canada

DEPARTMENT OF MINES

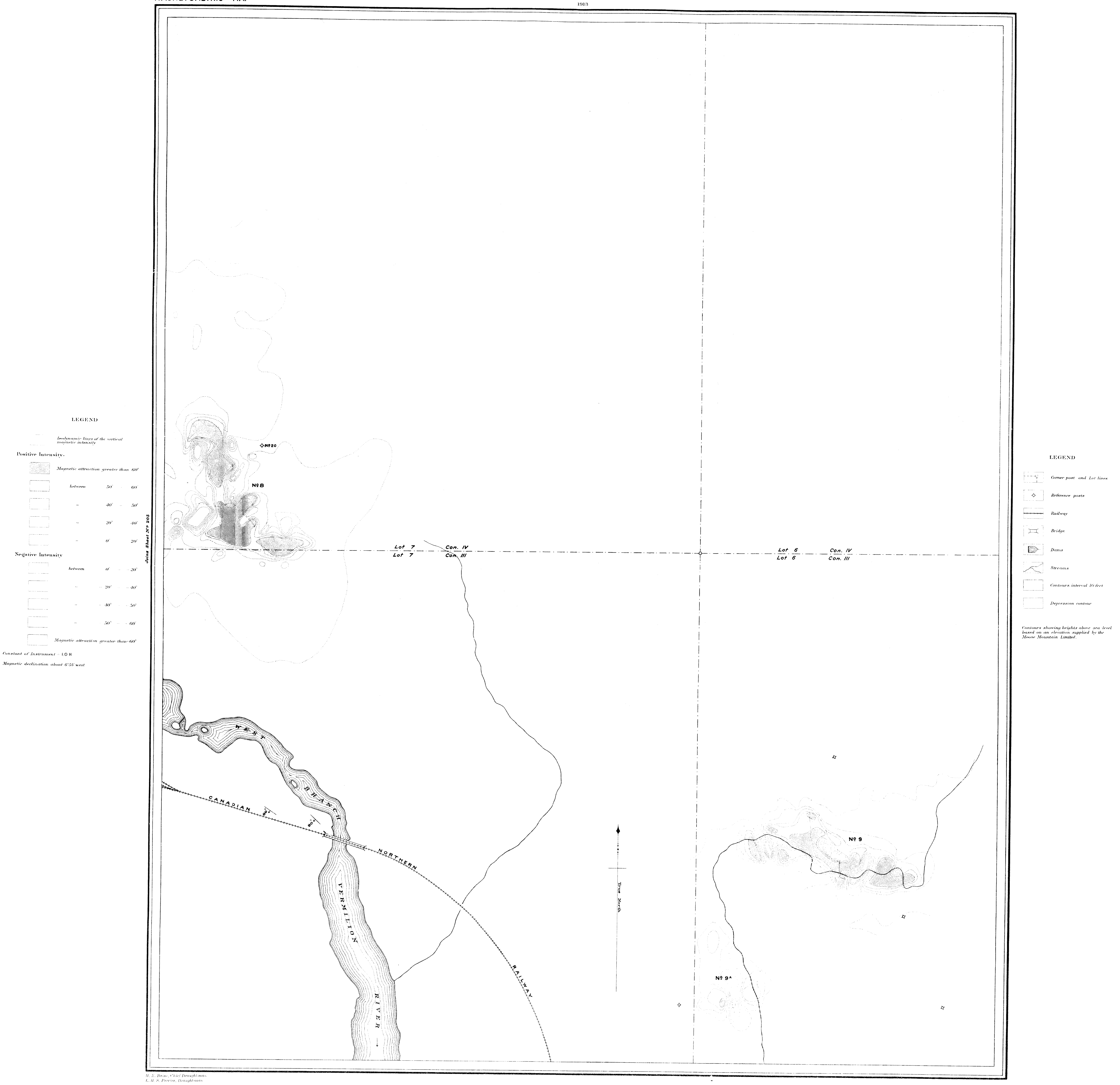
MINES BRANCH

HON. LOUIS CODERRE, MINISTER. A. P. LOW, LL.D., DEPUTY MINISTER

EUGENE HAANEL, PH.D., DIRECTOR

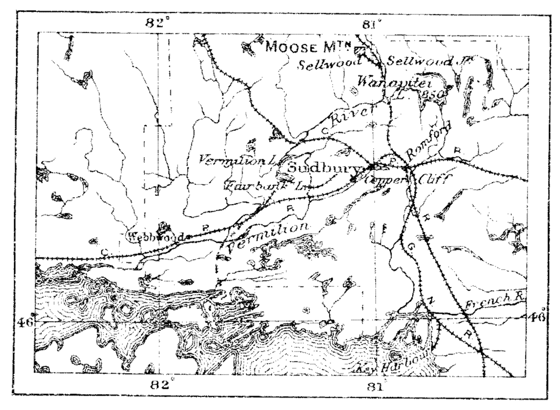
1913

MAGNETOMETRIC MAP



H. E. Baine, Chief Draughtsman
L. H. S. Pereira, Draughtsman

Nº 207



Scale 35 miles to 1 inch

DEPOSITS Nos 8, 9 AND 9A

MOOSE MOUNTAIN IRON BEARING DISTRICT

HUTTON TOWNSHIP, SUDBURY DISTRICT

ONTARIO

Scale, 1/2400 : 200 Feet to 1 Inch

200 150 100 50 0 200 400 600 800

Surveyed by
E. LINDEMAN 1912
Assisted by
A. H. A. ROBINSON
W. M. MORRISON
W. H. DAVIES

Canada

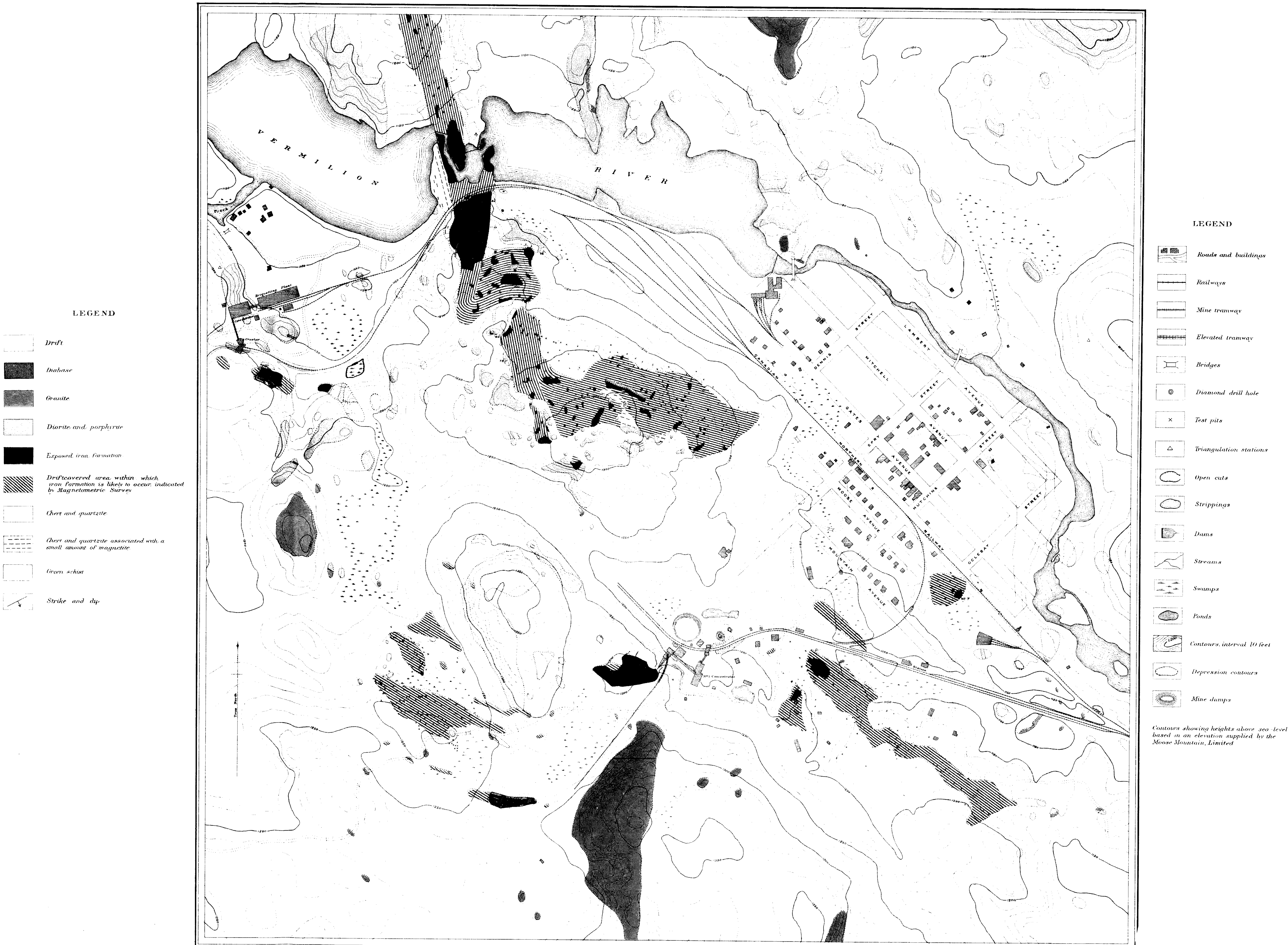
DEPARTMENT OF MINES

MINES BRANCH

HON. LOUIS CODERRE, MINISTER A. P. LOW, LL.D., DEPUTY MINISTER
EUGENE HAANEL, PH.D., DIRECTOR

GEOLOGICAL MAP

1913



H. E. Baine, Chief Draughtsman
L. H. S. Pereira, Draughtsman

No 205A

MOOSE MOUNTAIN IRON BEARING DISTRICT

HUTTON TOWNSHIP, SUDBURY DISTRICT

ONTARIO

E. Lindeman 1912

Scale, $\frac{1}{4800}$: 400 Feet to 1 Inch

400 300 200 100 0 400 800 1200

Canada

DEPARTMENT OF MINES

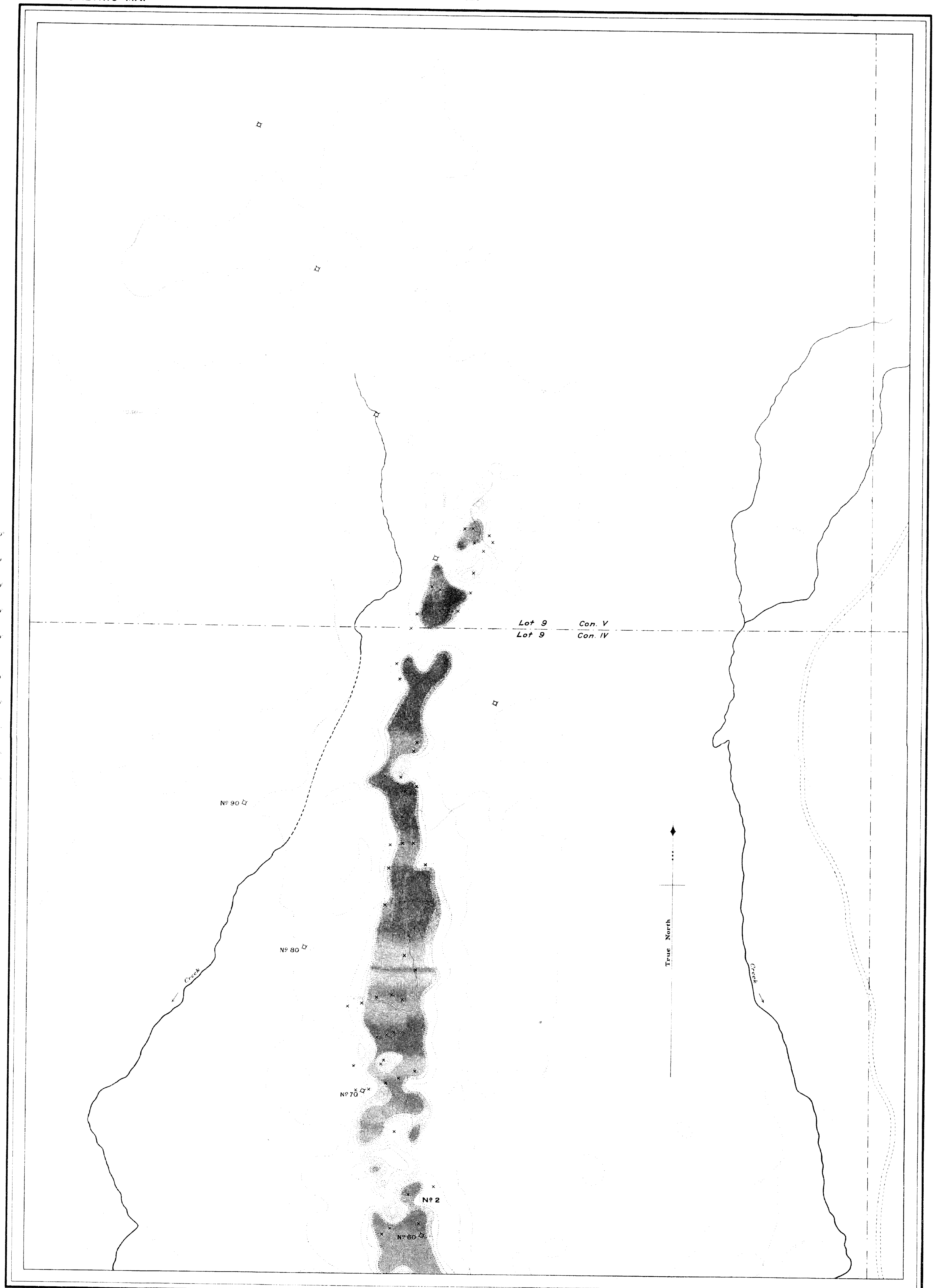
MINES BRANCH

HON. LOUIS CODERRE, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER

EUGENE HAANEL, PH.D., DIRECTOR

1913

MAGNETOMETRIC MAP



LEGEND

Isodynamic lines of the vertical magnetic intensity

Positive Intensity

Magnetic attraction greater than 60°			
between	50°		60°
"	40°	–	50°
"	20°		40°
"	0°		20°

Negative Intensity

between	0		20°
"	20°	–	40°
"	40°	–	50°
"	50°	–	60°
Magnetic attraction greater than 60°			

Constant of Instrument – 1.0 H

Magnetic declination about 6°55' west

LEGEND

- Road
- Lot lines
- Reference posts
- Test pits
- Streams
- Contours, interval 10 feet

Contours showing heights above sea level based on an elevation supplied by the Moose Mountain Limited.

H. E. Baine, Chief Draughtsman
L. H. S. Pereira, Draughtsman

Joins Sheet 205

Nº 206

NORTHERN PORTION OF DEPOSIT Nº 2

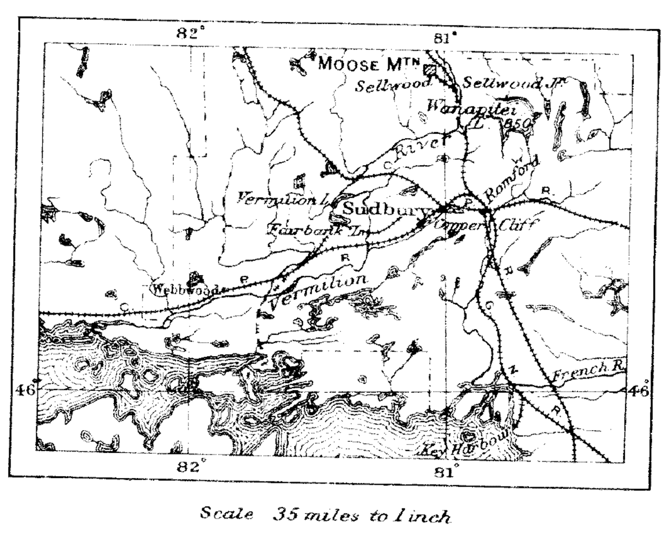
MOOSE MOUNTAIN IRON BEARING DISTRICT

HUTTON TOWNSHIP, SUDBURY DISTRICT

ONTARIO

Scale, $\frac{1}{2400}$ = 200 Feet to 1 Inch

200 150 100 50 0 200 400 600 800



Scale 35 miles to 1 inch

Surveyed by
E. LINDEMAN 1912
Assisted by
A. H. A. ROBINSON
W. M. MORRISON
W. H. DAVIES

Canada

DEPARTMENT OF MINES

HON. LOUIS CODERRE, MINISTER. R.W. BROCK, DEPUTY MINISTER

MINES BRANCH

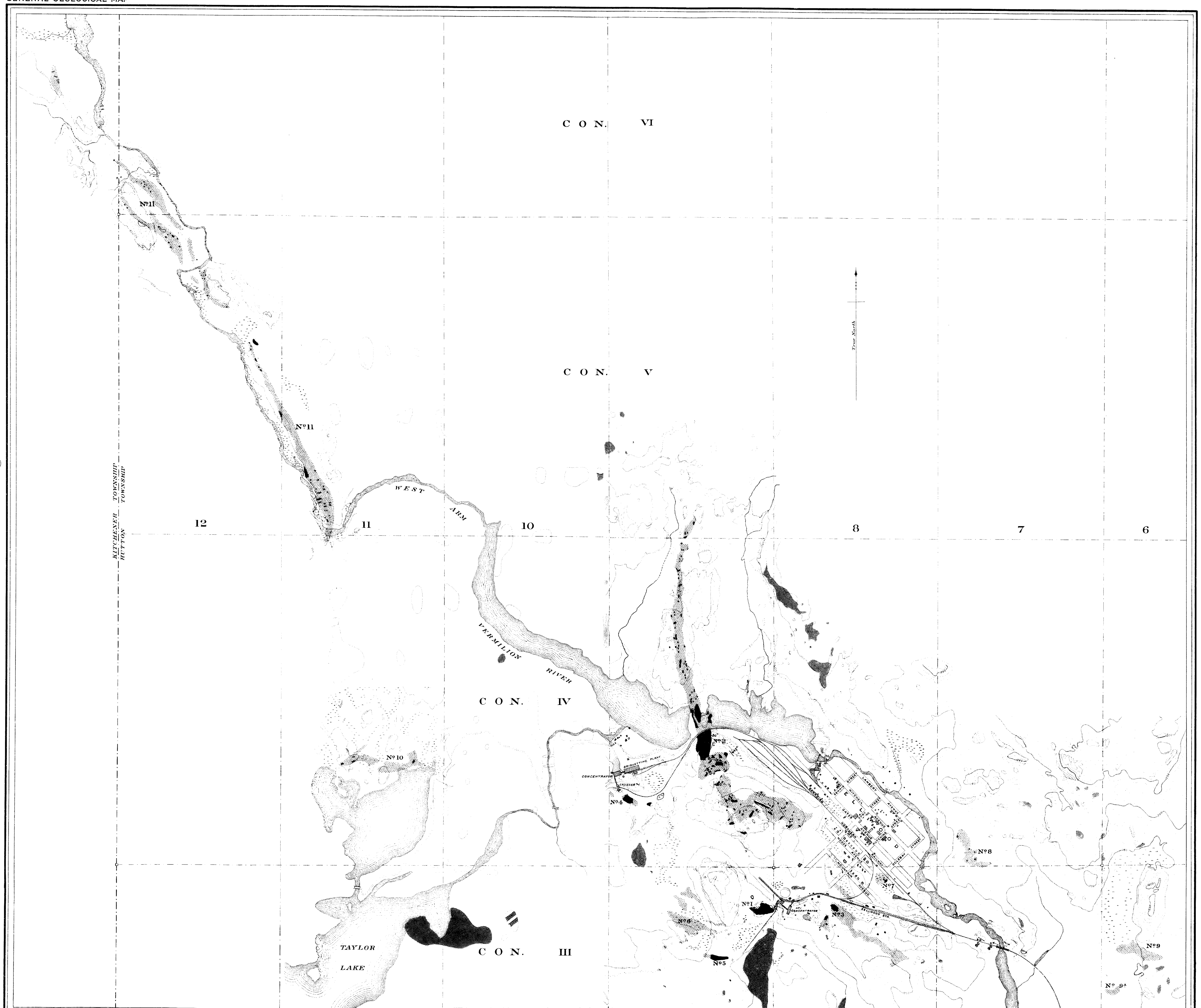
EUGENE HAANEL, PH.D., DIRECTOR

1914

GENERAL GEOLOGICAL MAP

LEGEND

- *Drift*
- *Granite* (*Laurentian*)
- *Diorite and porphyrite* ”
- *Exposed iron formation*
- *Driftcovered area within which iron formation is likely to occur, indicated by Magnetometric Survey*
- *Green schist* (*Keewatin*)
- *Strike and dip*



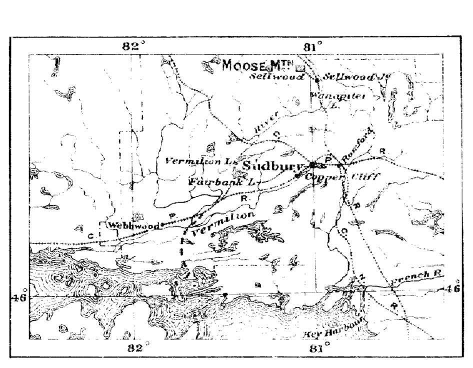
LEGEND

- *Roads and buildings*
- *Railways and tramways*
- *Bridges*
- *Open cuts*
- *Strippings*
- *Dams*
- *Streams*
- *Swamps*
- *Ponds*
- *Contours, interval 10 feet Elevation above sea level*
- *Mine dumps*

Contours showing heights above sea level based on an elevation supplied by the Moose Mountain Limited.

H.E. Baine, *Chief Draughtsman.*
L.H.S. Pereira, *Draughtsman.*

No. 208c



Scale 35 miles to 1 inch

MOOSE MOUNTAIN IRON BEARING DISTRICT

HUTTON TOWNSHIP, SUDBURY DISTRICT

ONTARIO

Scale, $\frac{1}{9600}$: 800 Feet to 1 Inch

800 400 0 800 1600 2400 3200

Geology by E. Lindeman 1912

Canada

DEPARTMENT OF MINES

MINES BRANCH

HON. LOUIS CODERRE, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER
EUGENE HAANEL, PH.D., DIRECTOR

1913

MAGNETOMETRIC MAP

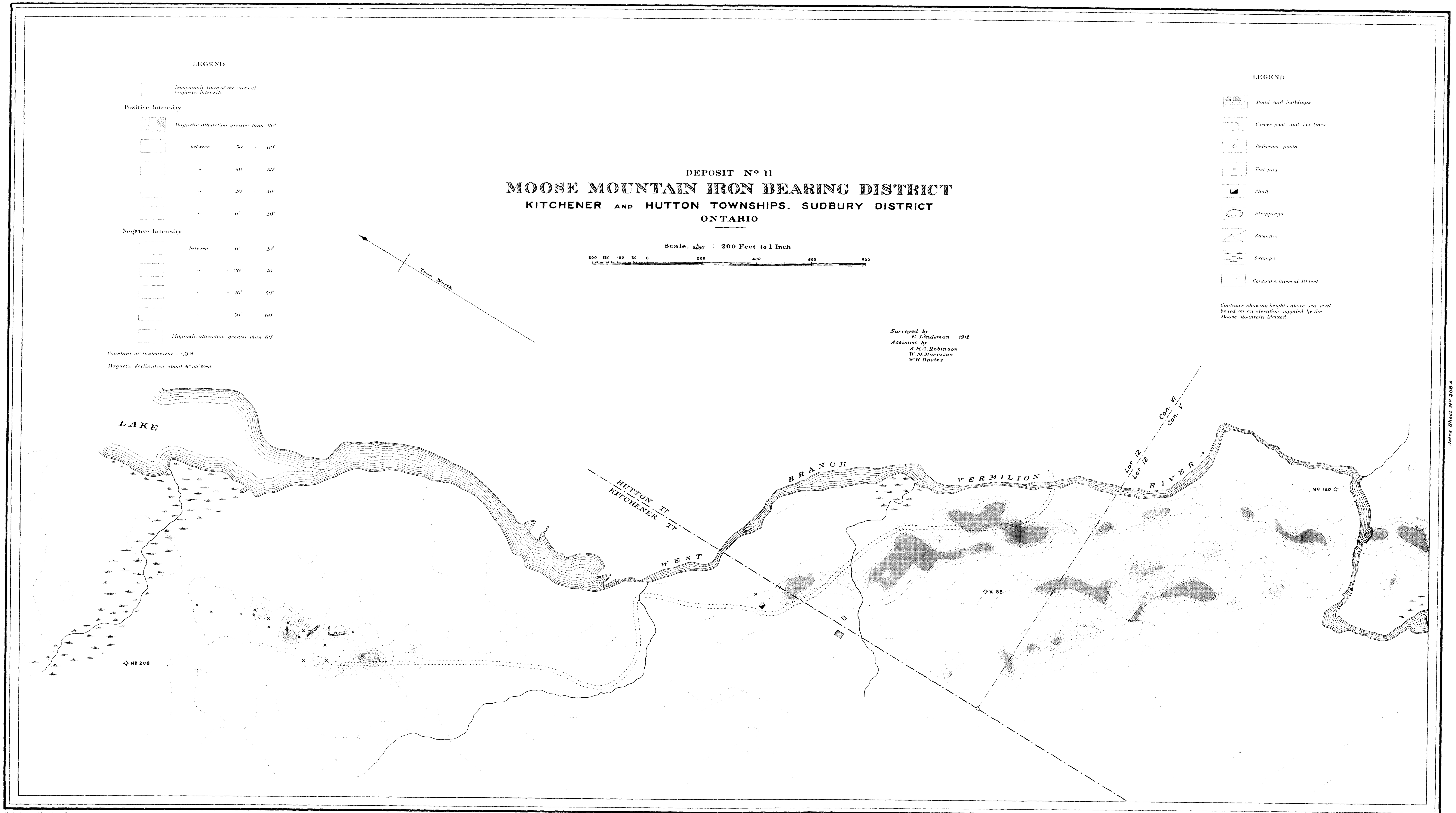
No 208A

Canada
DEPARTMENT OF MINES
MINES BRANCH

HON. LOUIS CODERRE, MINISTER; A.P. LOW, LL.D., DEPUTY MINISTER
EUGENE HAANEL, PH.D., DIRECTOR

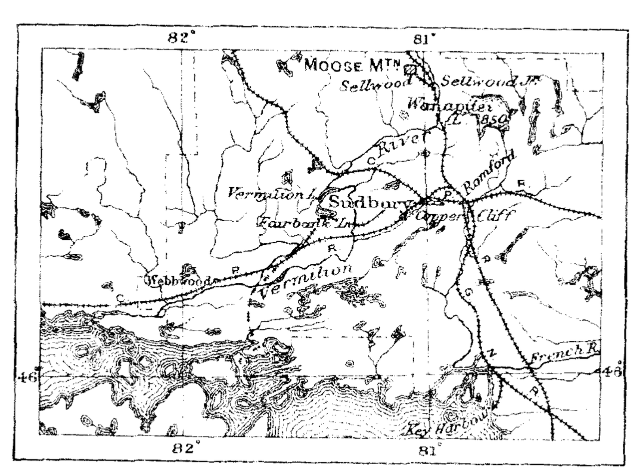
1913

MAGNETOMETRIC MAP



H. E. Baine, Chief Draughtsman
L. H. S. Pereira, Draughtsman

Nº 208 B



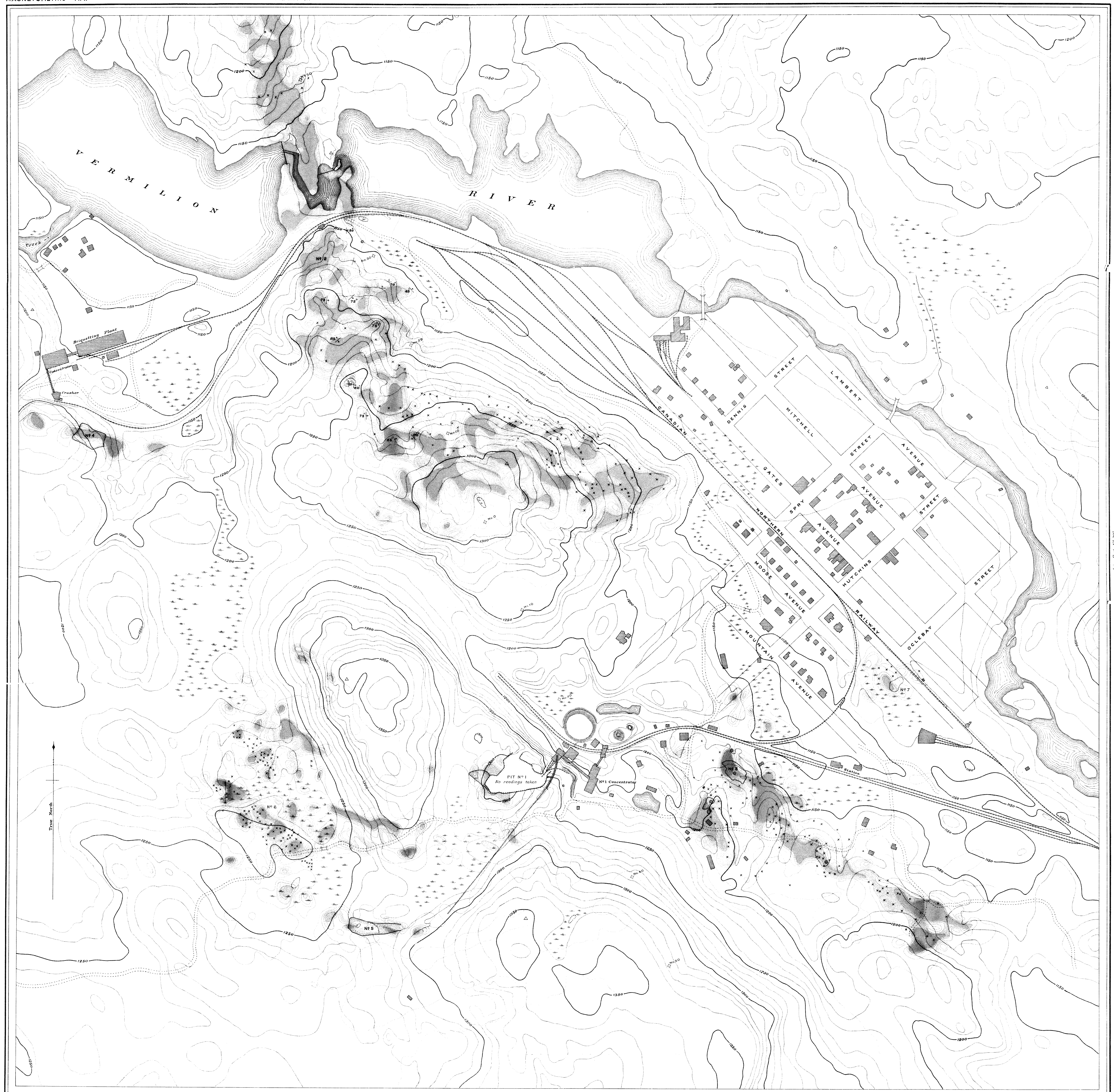
Scale 35 miles to 1 inch

CANADA
DEPARTMENT OF MINES
MINES BRANCH

Hon. Louis Coderre, Minister; A. P. Low, LL.D., Deputy Minister;
Eugene Haanel, Ph.D., Director.
1913

MAGNETOMETRIC MAP

Joins Sheet Nº 206



LEGEND

Isodynamic lines of the vertical magnetic intensity

Positive Intensity

Magnetic attraction greater than 60°
between 50° – 60°
" 40° – 50°
" 20° – 40°
" 0° – 20°

Negative Intensity

between 0° – −20°
" −20° – −40°
" −40° – −50°
" −50° – −60°
Magnetic attraction greater than 60°

Constant of Instrument = 1.0 H

Magnetic declination about 6° 55′ West

LEGEND

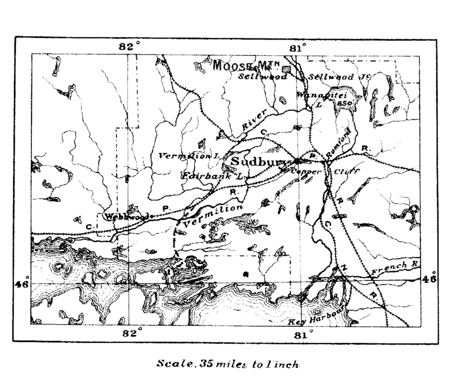
Roads and buildings
Reference posts
Railways
Mine tramway
Elevated tramway
Bridges
Diamond drill-hole
Test pits
Triangulation stations
Open cuts
Strippings
Dams
Streams
Swamps
Ponds
Contours, interval 10 feet
Depression contours
Mine dumps

Contours showing heights above sea-level based on an elevation supplied by the Moose Mountain, Limited.

Joins Sheet Nº 207

H. E. Baine, *Chief Draughtsman.*
L. H. S. Pereira, *Draughtsman.*

Nº 205



Scale, 35 miles to 1 inch

MOOSE MOUNTAIN IRON BEARING DISTRICT

HUTTON TOWNSHIP, SUDBURY DISTRICT

ONTARIO

Scale, $\frac{1}{2400}$ 200 Feet to 1 Inch

200 150 100 50 0 200 400 600 800

Surveyed by
E. LINDEMAN, 1912
Assisted by
A. H. A. ROBINSON
W. M. MORRISON
W. H. DAVIES