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REPORT ON
GEOLOGIC AND MAGNETIC SURVEYS
ON THE
SOUTH HANRAHAN LAKE GROUP OF CLAIMS
KENOGAMING TOWNSHIP
SUDBURY MINING DIVISION
PROVINCE OF ONTARIO

by

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Geologic and Topographic Plan Scale 1" = 200'

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GEOLOGICAL REPORT ON THE SOUTH HANRAHAN LAKE
GROUP OF CLAIMS, KENOGAMING TOWNSHIP, SUDBURY
MINING DIVISION, PROVINCE OF ONTARIO

Introduction:

The group comprises thirteen claims - S-101119 to S-101131 inclusive, covering an area at the southern end of Hanrahan Lake and extending in a strip eastward along the Crawford River, which drains from the Lake in an easterly direction. Most of claim S-101119 and part of 101120 are occupied by the waters of the lake or the broader part of the river.

Picket lines have been cut north and south through the area of the claims group, from east - west base lines at 300 foot intervals. They are numbered from 0 to 36W and from 0 to 30E. The maximum north - south extension of the claims group is about 4,300 feet.

The group was mapped on the 13th to the 28th of August, 1957 by two field parties comprising respectively F. M. Vokes and J. Philpotts and M. Ferguson and R. Doig. Subsequently two further days were used by Vokes and Ferguson in detailed prospecting and the clearing up of problems arising during the mapping.

The mapping was carried out on a scale of one inch equals 200 feet using a base constructed from the line outters diagram. All major topographical features were mapped, and the positions of the claim posts inserted.

The area of the claims group was relatively abundant in outcrops, allowing the main geological features to be drawn up. However, several critical areas were deeply covered with overburden and important questions remain unanswered.

Topography and Vegetation:

The claims group area is one of quite varied topography and vegetation. It is bounded, generally speaking, on the north and north-west by the waters of Hanrahan Lake, though part of claim S-101120 does lie west of this lake where it narrows down to form the outlet to the Crawford River.

The river flows generally eastwards from the southern end of the lake, but at about the centre part of the group makes a sharp northerly turn, then swings east and again southeast, including the whole of claim S-101124 within the large bend thus formed. Up to about line 3+00W there is no gradient along the river and very little movement, the river being actually a continuation of the lake. At 3+00W there is an old beaver dam which is responsible for this pounding-back of the lake waters. Downstream from here, to about 11+00E, the very slight flow of the rivers runs in a stream bed of very large boulders, at times being lost to view between them. It is easily fordable at any place along this stretch. East of 11+00E the river becomes deep and sluggish again and wide enough to prevent crossing, except by an old dam at 12+00E and a fallen tree at 23+00E. The river meanders slightly between banks of grassy muskeg and has obviously been graded to base level along this stretch.

The northerly part of the group, in claims S-101119, 121 and 123 is fairly light and dry, standing about 10 or 20 feet above the level of the lake. To the south the land slowly falls away to considerable stretch of spruce-tamarack swamp which occupies most of the ground between the outlet of the river and the big northerly bed. South of this bend, too, the ground is flat and swampy without relief. An exception to this area of swamp is found just west of the northerly arm of the bend in claim S-101122 where there is a roughly oval-shaped area of raised land with rock outcrops rising perhaps 25 feet above the swamp level.

West of the lake, or river entrance, the ground is mainly flat and

covered by cedar and alder swamp, with two somewhat raised, spruce-covered areas along the lake shore. In the extreme southwest of the claim S-101120 here, there is a prominent raised feature which seems to be due to morainic debris. It carries a tangled cover of dead timber and thick secondary underbrush.

In the eastern part of the claim group the low grass-covered swamp along the course of the Crawford River is bounded to both north and south by quite high ground. To the north, along the fringe of claims S-101125 and 101131 there is a steep south-facing escarpment, rising up to 100 feet above the river level, which seems to be composed of, or at least heavily covered with, bouldery moraine. This ground supports a heavy mixed spruce-poplar-birch vegetation, with a thick undergrowth.

South of the river swamps the ground rises sharply at first then more gradually towards the southern borders of the claim group. This area is fairly well exposed and supports a somewhat varying vegetation, with stretches of spruce forest, some cedar swamp and patches of mixed woodland. In the south-centre of this area there are some fine stands of tall white pine westwards in claims S-101127 and 128, the ground is heavily moraine covered and the topography is that of an elevated, irregular plateau with a steep drop on the north to the swamp in the bend of the river.

Access:

The group was surveyed from the campsite on the shore of the lake in the very northwest corner of claim S-101121, to which the party and their supplies were brought by float plane. Access to the group from the camp is readily afforded either by canoe down the Crawford River as far as the west end of base line No. 2 and then east along it, or by a trail east and then southeast from the camp to the southeast corner of claim S-101123 where it hits the river bank and then turns more easterly, following the course of the river at some distance to the north, as far as, and beyond the eastern border of the claims group.

General Geology:

Formations present:

Porphyritic diabase (Matatchewan?)
Feldspar-mica porphyry - sills
Gabbro, fresh and amphibolitized
Hornblende - diorite (amphibolite)
Serpentinite
Hornblende schists (medium to fine grained amphibolites)
and chlorite schists
Banded Iron Formation
Andesite (fresh, practically non-schistose)

Porphyritic diabase: Isolated outcrops of a fresh looking diabase with greenish feldspar phenocrysts have been observed at isolated places in claims S-101125 and 126. They would indicate a dyke having a strike of about N30°W. The main outcrop, near the south bank of the Crawford River at about 14400E, 3400N shows a contact with medium to coarse grained, amphibolitic schists to the east. The contact is distinct, and 'steeped' in parts. In the south of claim S-101126 the diabase appears to be cutting a body of gabbro.

Acid sill rocks: A few small outcrops, mostly in the northern part of the group, show a light coloured fine to medium grained feldspathic rock with micas or hornblendes scattered throughout. These appear to be concordant sills of gabbroic composition and are never more than a few feet wide. They form an unimportant rock type in this group.

Gabbros: - mostly now recrystallized in amphibolite facies - form lenticular bodies in the schists and are especially abundant in the eastern part of the area, south of the Crawford River. There also appears to be a body of a fresher and possibly younger type lying in the northerly belt of schists in the northern half of claim S-101123. The volume of the rocks of this type is small and the lenses do not appear to exceed more than about 50 - 100 feet thick. They probably represent earlier intrusions into the sediments (now schists) before the Regional metamorphism, except perhaps in the case of the one in S-101123.

Hornblende-diorites: occur in much the same manner as the gabbros - in lens-like bodies concordant with the schistosity of the surrounding rocks. The distinction

between diorite and gabbro is not always easy to make. In some cases there seems to be a transition between the two types. The diorites are even less important as a rock type than the gabbros. Since they, also, are now completely amphibolitized, they must be classed as older intrusives - i.e. pre-regional metamorphism.

Serpentinite: This is by far the most abundant rock type of the claims group. Its outcrops are fairly large and numerous both in the northern and the eastern segments of the group, especially in the latter. The geological interpretation map shows that serpentinite most probably underlies almost half the area of the claims group. The rock is almost wholly a coarse grained, granular, grass-green one, very highly serpentinitized, probably originated from an olivine rich peridotite. One or two minor outcrops of a fine grained black serpentinite were seen. In places the rock is considerably altered, the alteration being either a talcose one or a carbonate one. The talcose alteration is especially well seen in an outcrop just south of the river in the northern half of claim S-101126 along the north side of a prominent NW - striking fault zone. At other places east of this fault talcose alteration can be seen in the very good outcrops of the ultrabasic. In this area also, a brown - weathering carbonate occurs in irregular veins and as a general dissemination throughout the serpentinite. The veins of carbonate are especially notable in the large outcrop of serpentinite south of the Crawford River between 21+00E and 24+00E.

The fibre showings in the serpentinite on the claims group are meagre in the extreme. They are confined to two outcrops in the extreme west of the main area of the group, along the eastern edges of claims S-101119 and S-101120. Here the altered ultrabasic carries thread veins and occasional 1/32 inch veins.

Elsewhere, e.g. in the large outcrops on either side of 24+00E, veins of asbestiform microlite and carbonate were seen, but a careful search did not reveal any fibre.

The area of serpentinite in the claims group is so large and so much of it is covered, e.g. by swamp along both banks of the river, that there is plenty of room for fibre to be present. There is always the possibility that the fibre showing just off our eastern claim boundary may extend to the west under the cover of the swamp.

On the geological interpretation map, three main areas of serpentinite have been shown. In the northern part there is a clearly defined E-W belt bounded by schists to the north and covered by swamp on the south. The schists are dipping at angles between 70 to 85° to the north and it seems reasonable that the HW of the serpentinite is conformable with their schistosity, thus being in the form of a large sill. How far south the serpentinite belt extends is not known from the geological observations. The ground magnetic map will be of help in determining its extent.

The second largest, and probably the most economically interesting belt of serpentinite, stretches from east to west on both sides of the Crawford River in the eastern part of the claims group. Its southern boundary is well defined, and again appears to be parallel to the foliation of the schistose rocks to the south, which here dips to the north at fairly low angles, especially in the east. This boundary has been displaced several hundred feet by a northwest striking fault zone (see later). The movement along it is dextral, so that the eastern part of the serpentinite belt appears to have been displaced to the south relative to the western part. To the north the serpentinite becomes heavily covered and its extent in that direction is not known. Again the geomagnetic data would be of great help. There is always the possibility of course that this eastern belt is continuous with the northern belt.

In the central part of the claims group, mainly in claim S-101122, there is a smaller area of serpentinite bounded to the east by north-south striking anisitic volcanics. This strike is at right angles to that in the rest of the area and the geological relationships here are somewhat of a puzzle. The serpentines'

Western boundary again appears to be conformable to the westerly-dipping volcanics, maintaining the sill-like pattern. The serp here probably stretches as far west as the entrance of the Crawford River, as evidenced by the outcrop of the same rock near the eastern edge of claim S-101120.

West of the lake and river the "dry" part of claim S-101120 does not show any solid serpentinite outcrops, but there is very heavy blocky serpentinite drift along a northwest-facing feature in the extreme west and southwest of the area. These very large blocks may be locally derived.

Similar heavy serpentinite drift occupies most of the islands in Hanrahan Lake, with the exception of one or two of the more southerly ones. These point to a further belt of serpentinite north of the northerly belt of schists on the claims group area.

Schistose Rocks: Schistose rocks of various types occur in two main belts, one in the north, bordering on the northerly serpentinite belt, and one in the south, to the south of the serpentinite belt there. They comprise chlorite schists, hornblende schists and schistose amphibolites of various grain sizes. It is not possible to be definite about their origins, but the chloritic schists seem to be sedimentary derivatives. This is partly suggested by the presence of sedimentary quartzitic Iron Formation in normal stratigraphic succession with these schists in claim S-101126. Also in the northern schist belt, one or two outcrops show a grey, impure fine grained quartzite interlayered conformably with the chloritic schists. The grade of metamorphism in these schistose rocks is quite low, the mineralogical associations suggesting upper green schist or lower epidote-amphibolite facies.

These rocks did not display any alteration or mineralization of possible ore-geological significance.

Banded Iron Formation: In claim S-101126 there occurs a very minor representative of the regionally-developed Banded Iron Formation. It is exposed over an E-W strike length of about 100 to 200 feet and a band, from 4 to 6 feet true thickness

ing in normal sedimentary succession with the thin-splitting chloritic schists both above and below it. It dips to the north in conformity with the enclosing schists at values of 45 to 60°.

The outcrops show a very thinly bedded white, sandy quartzite inter-layered with fine grained magnetite rich material, the layers being only a fraction of an inch thick. Towards the western part of the outcrop this type seems to grade into a less magnetic black, fine grained, cherty quartzite with concordant layers of apparently syngenetic pyrite.

The Banded Iron Formation is of no possible economic interest in this claims group, but is geologically interesting from a regional point of view, in that it suggests an eastern continuation of the apparent southern limb of Iron Formation found by magnetic and ? geological) observations farther west in the Montgomery Lake group. This indicates a very large regional fold with its northern limb along the Crawford River and Nest-Benbow groups and its closure in the Montgomery Lake group.

The band of Iron Formation in S-101126 is cut off to the east by the fault already mentioned. To the west its strike takes it along under covered ground and it cannot be picked up here. It is so narrow that the possibilities of detecting it by the GM measurements are slight.

Andesites: A large outcrop of apparently fresh andesitic volcanics occurs just to the east of the northerly stretch of the Crawford River in claim S-101122. The rock is generally a fine to medium grained, green, non-schistose rock which shows its original volcanic banding in parts, and parts are highly amygdaloidal. The flows appear to be plunging to the west, i.e. they are not inverted.

A small outcrop of this rock, just west of the river, at about 5400W, 8400S shows a chloritic shear zone striking about northwest, i.e. across the layering. North of this shear zone the rock, while apparently normal on the weathered surface, shows notable rusting along joints and cracks just below this surface. On cracking with the hammer and close inspection it was found that there

is an even albeit very sparse and fine grained dissemination of pyrrhotite and chalcopyrite. These minerals occur also as small spots along asbestiform calcite veins cutting the rock. The sulphide mineralization is very meagre, and it was not considered enough to warrant taking samples for analysis. But its mere presence is quite striking since this is the only place epigenetic sulphides, including copper sulphide, have been seen on the group (see later).

Structural Geology:

Folds - No large folds have been observed or deduced from the geological rock. The rocks too, are singularly free from minor folds of any type.

The strike of the schistose rocks in the northern and southern belts is fairly constant, within a few degrees of E-W. Dips are almost invariably to the north at varying values from about 40 - 80°.

As a contrast to this E-W strike in the schists, the andesites in S-101126 show a plain N-S strike. This strike is also found in a small outcrop of andesitic volcanics in the western part of claim S-101120, and it could be that this north-south strike is characteristic of the southwest segment of the claims group.

The reason for this completely different strike is not easily deducible from the geological observations. The two strike directions would seem to indicate two different directions of folding, and on a larger scale could be interpreted as being due to two different orogenies within the Precambrian, but here the distances involved are so small that it seems rather ambitious to invoke two ages of folding to explain the two strikes. The question must remain unanswered at the moment.

Lineation The regional lineation appears to plunge fairly constantly between west and northwest at values of between 20 and 40°. Along the southwest side of the fault, in claim S-101126, the shearing and stretching associated with the fault movement has superimposed a new lineation direction on the rocks, one which plunges southeast parallel to the fault. These observations are an added confirmation of the nature of the movement along the fault.

Faulting: The one observed fault on the claims group has already been mentioned sufficiently to make its description here somewhat of a repetition. It is a northwest striking dip-fault with a considerable horizontal dextral movement. The fault has an associated zone of shearing up to 20 feet wide. This can be seen very well along the southwest bank of the Crawford River at about 15400E. Here a body of serpentinite has a wide zone of talcose shearing along its southwest border and the gabbroic and amphibolitic rocks to the southwest of the fault zone are considerably crushed and sheared.

There is no observable mineralization associated with this fault zone.

The AM map of the region suggests an E-W major fault zone cutting through the area almost along the line of base line No. 1. This would conveniently provide a boundary between the northerly belt of serpentinite and the N-S striking andesites and serpentinite in claim S-101126. A study of the GM map might help to confirm or refute the presence of such a fault.

F.M. VOKES *per [signature]*
F. M. Vokes

M.A. FERGUSON *per [signature]*
M. A. Ferguson.

September 1957.

REPORT ON MAGNETOMETER SURVEY ON
THE SOUTH HANRAHAN LAKE GROUP OF
CLAIMS, KENOGAMING TOWNSHIP, SUD/
BURY MINING DIVISION, PROVINCE
OF ONTARIO.

Introduction:

The following report describes the magnetometer survey conducted during the summer of 1957 on the Canadian Johns-Manville claims located in the west-central section of Kenogaming Township, Sudbury Mining Division, Province of Ontario.

These claims were staked by M. Ferguson during the period January 1st to February 2nd, 1957 and were recorded and transferred to Canadian Johns-Manville Company Limited on February 14th of the same year. Tagging of this group was completed during the early part of September by G. Cobby.

Line cutting and chaining was contracted to Jean Alix Company Limited of Val d'Or, Quebec. Picket lines were established at 300 foot intervals with numbered pickets every 100 feet.

The magnetometer survey was carried out by L. Allison, a geophysical operator for Canadian Johns-Manville Company Limited, with the assistance of R. Rintamaki. Readings were observed using a Sharpe's D-I-M type instrument. Stations were spaced at 100 foot intervals.

Supervision and interpretation of this work was the responsibility of the writer, senior geologist with Canadian Johns-Manville Company Limited, Matheson, Ontario.

Property:

Thirteen claims are included in this group and are numbered as follows:

S-101119 to 31 inclusive.

Note that claim S-101119 has been placed on extension as survey work covers only fifty percent of the claim, the remainder being covered by water.

Approximately 520 acres are comprised by the entire group.

Previous Work:

These claims were formerly held by Dunvegan Mines Limited and both magnetic and electromagnetic surveys were conducted over the group in 1955. As the results of these surveys appeared relatively uninteresting the claims were allowed to lapse and were subsequently staked by Canadian Johns-Manville as previously described.

Line Cutting and Chaining:

Four east-west trending base lines were established on the claims group as shown on the accompanying plans. Right-angled offset lines were cut at 300 foot intervals along these base lines and pickets with numbered locations were established at 100 foot intervals along the base and picket lines.

Line cutting and chaining was contracted to Jean Alix Company Ltd. of Val d'Or, Quebec, and work commenced on June 8th, 1957. Five men were employed during the course of this work which was completed on June 21st, 1957.

Under this contract a total of 10.64 miles of lines was out and chained on the claims group.

Magnetometer Survey:

A magnetometer survey was conducted over the South Hanrahan Lake Group of claims by L. Allison with the assistance of R. Rintanaki. This survey was carried out during the period August 13th to 28th, 1957. Magnetic readings were recorded using a Sharpe's D-I-M type instrument. This magnetometer had been calibrated in such a manner that readings approximate those obtained when using a Watts Type Vertical Variometer. This instrument was previously checked on the Government Magnetic Base Station at Matheson and a gamma value of 1220 corresponds to an absolute value of 57,599⁴15 gammas. Readings were observed at 100 foot intervals along the offset picket lines over the greater part of the map-area, however, readings were observed at 25 foot intervals where abrupt changes in the magnetic intensity were recorded.

A base control station was established at the north end of line 12+00 West, adjacent to the main campsite and has a fixed value of 2500 gammas. Three temporary control stations are located as follows:-

T. C. S. #1 - on base line #1 at 9+00 West - value - 1629 gammas

T. C. S. #2 - on base line #2 at 12+00 East - value 1885 gammas

T. C. S. #3 - on base line #4 at 30+00 West - value - 3104 gammas

Readings were observed on these stations at least four times per day as a check on the working condition of the instrument and the daily diurnal variation.

The results of the magnetometer survey are depicted on the accompanying plan on a scale of 1 inch equals 200 feet. Contour lines of equal magnetic intensity have been drawn at 500 gamma intervals from 1500 to 5000 gammas. A 1000 gamma interval was used for readings exceeding 5000 gammas. Interpretation has been based on the results of the magnetometer survey, Vokes' detailed geological plan, regional data and aerial photographs.

Magnetic results over the map area indicate the occurrence of an intensely faulted sill-like intrusion of ultrabasic rocks (serpentinized peridotite, as shown by geological mapping). The ultrabasic has an east-west strike and varies radically in width in the various fault blocks. Widths range from 150 feet to over 2,000 feet. The magnetic intensity over the ultrabasic ranges from 2,500 to 9,000 gammas with a large area of extreme 'highs' occurring over the fault block in the east-central portion of the claims group, straddling the Crawford River.

As shown on the accompanying plan, narrow zones of talc-carbonate alteration occur along the north and south contacts of the ultrabasics. This alteration, is substantiated by the geological mapping and has been observed in other intrusives in this region. The magnetic intensity over the talc carbonate ranges from 1500 to 2500 gammas.

The remainder of the map area is underlain by rocks of volcanic and sedimentary origin intruded by narrow sill-like bodies of gabbro. Magnetic readings over these formations range in value from 2500 to 4500 gammas.

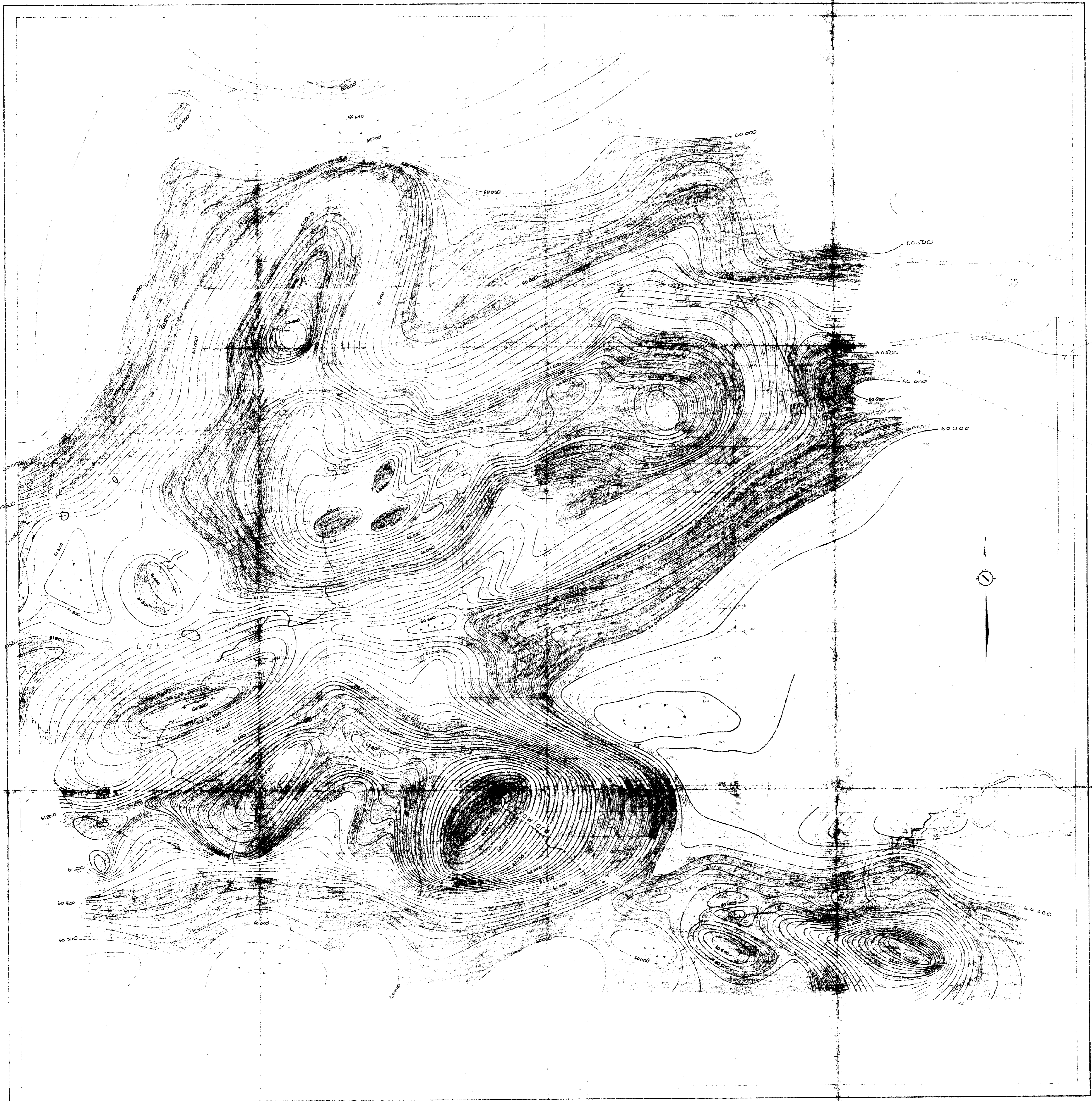
On claim S-101126 an east-west trending band of iron formation was mapped during the course of the geological survey. This iron formation is extremely weak magnetically and was not indicated by the magnetometer survey. A narrow diabase dike striking in a north-south direction was also mapped on this claim.

A band of fresh-looking andesitic volcanics having a width of 200 feet and striking in a north to northwesterly direction is shown on the accompanying plans. These volcanics are strongly indicated magnetically and on the basis of the available information have been interpreted as occurring in a narrow fault block which extends 1800 feet north into the ultrabasics.

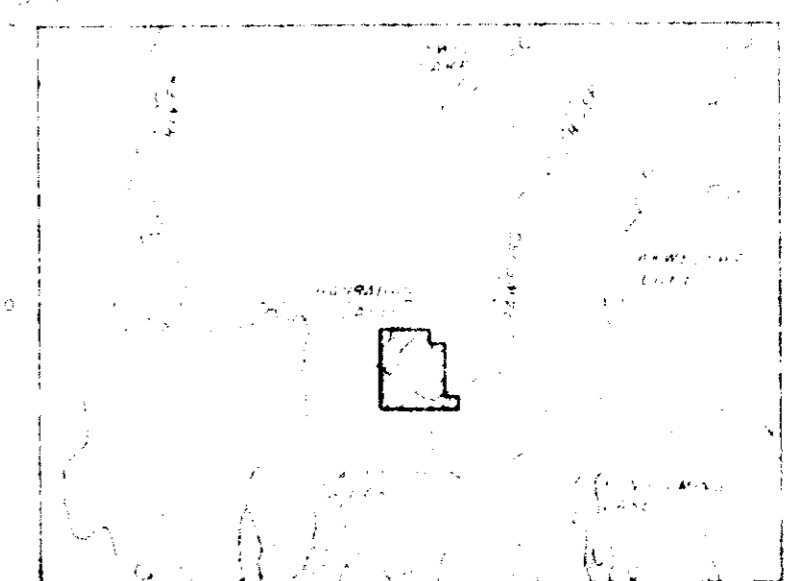
Several cross structures offset the ultrabasic intrusive and are sharply defined magnetically. The strongest of these occurs in the eastern section of the claims group and strikes in a northwesterly direction across the map area. This fault is substantiated by both the geologic and magnetic programs. On the west side of the fault zone the ultrabasic extends across a width of 2000 feet while on the east side the width does not exceed 150 feet. Strike faulting no doubt occurs along the contacts of the ultrabasic but no structures have been shown on the accompanying plan due to a lack of definite information.


F. J. Eveleigh.

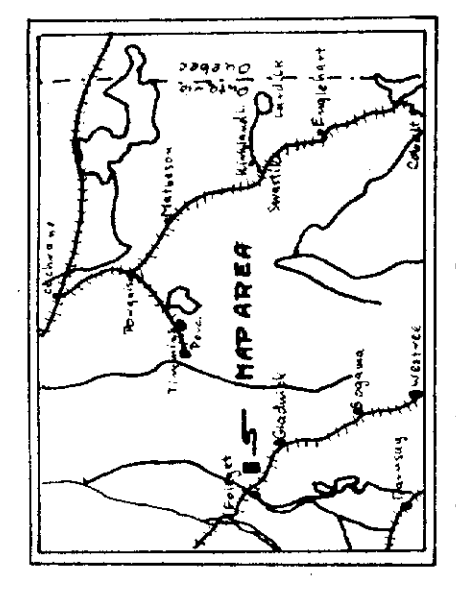
CANADIAN JOHNS-MANVILLE COMPANY LIMITED
ASBESTOS FIBRE DIVISION



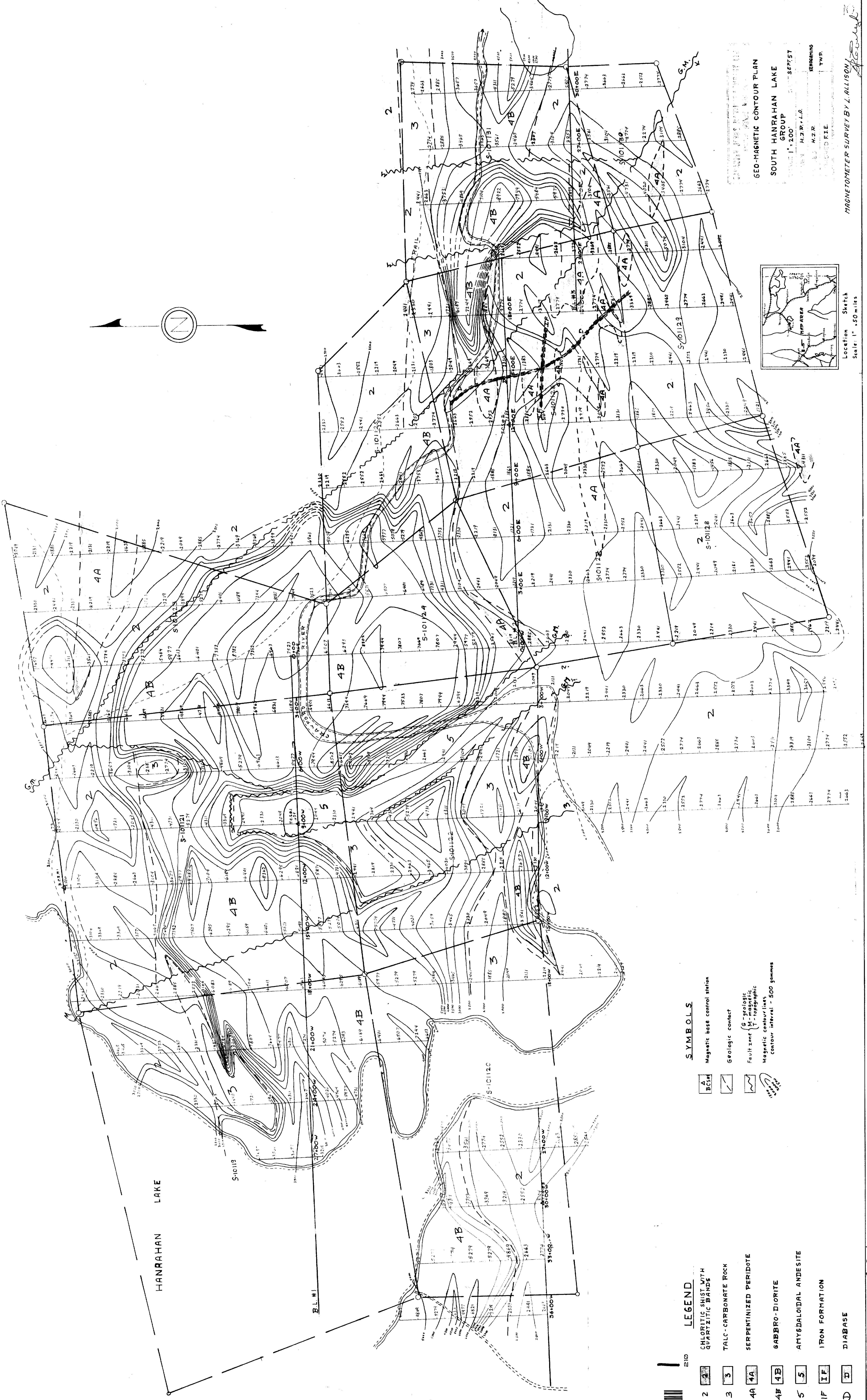
AIRBORNE MAGNETOMETER SURVEY
KENOGAMING TOWNSHIP, ONTARIO



GEO-MAGNETIC CONTOUR PLAN
SOUTH HANRAHAN LAKE
GROUP
 1" = 200'
 H.J.P. & L.A.
 H.Z.R.
 KENNING
 TWP.



Location Sketch
 Scale: 1" = 50 miles

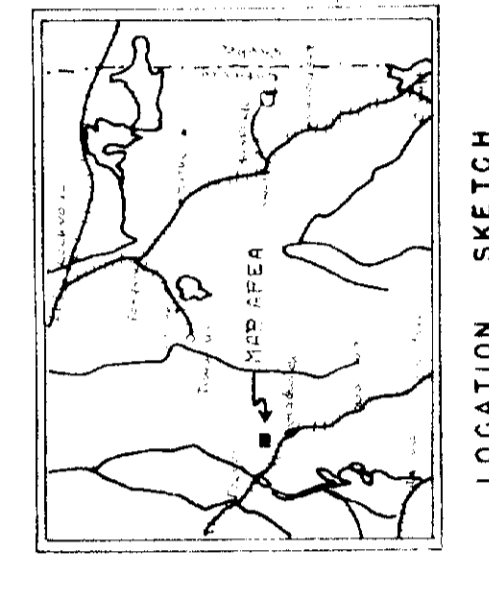
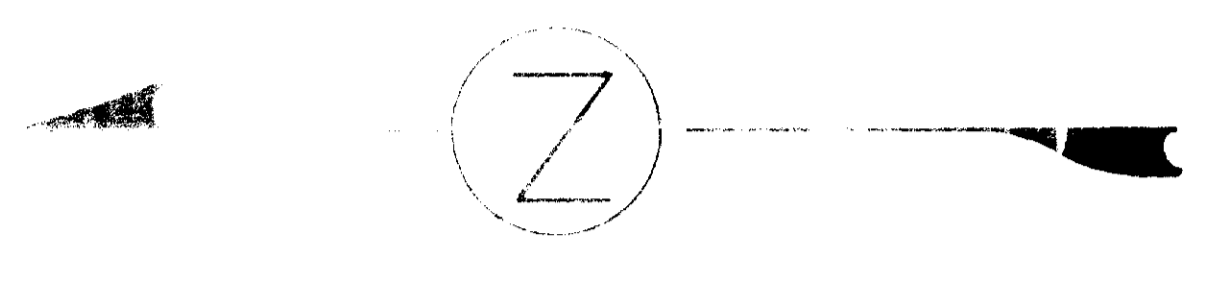


SYMBOLS

- Magnetic base control station
- Geologic contact
- Fault zone (G - geologic, M - magnetic, T - topographic)
- Magnetic contour lines
- Contour interval - 500 gammas

LEGEND

- 2** CHLORITIC SHIST WITH QUARTZITIC BANDS
- 3** TALC-CARBONATE ROCK
- 4A** SERPENTINIZED PERIDOTE
- 4B** GABBRO-DIORITE
- 5** AMYGDALOIDAL ANDESITE
- IF** IRON FORMATION
- D** DIABASE



LOCATION SKETCH
 Scale: 1" = 50 miles

LEGEND

- 1 [Symbol] QUARTZITE, IMPURE
- 2 [Symbol] Banded iron formation
- 3 [Symbol] Hornblende diorite
- 4 [Symbol] Serpentine
- 5 [Symbol] Gtz.-felspar-mica dike rock
- 6 [Symbol] Gabbro, incl. possible dike diabase (Matachewan)
- 7 [Symbol] Loose blocks and boulders

SYMBOLS

- 1 [Symbol] Dip and strike of inclined schistosity
- 2 [Symbol] Direction and value of plunge of lineation
- 3 [Symbol] Geological contacts - inferred