REPORT

ON

VERMONT MINES LIMITED

MICKLE & FARR TWPS

ONTARIO

Haileybury, Ontario
28 July 1961

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Consulting Mining Engineer &
Geologist.

SUMMARY AND CONCLUSIONS

1. The property of Vermont Mines Limited is a silver prospect covering a portion of a north-trending sill of Nipissing diabase 5 miles west of Elk Lake, Ontario.

2. Statistical study of cooling joints in the diabase indicates that the sill dips west at 17 degrees.

3. Silver deposits in the area occupy cooling joints in the diabase sill near its upper contact. Ore shoots occur where jointing is most intense; intense jointing occurs in zones traversing the sill.

4. Two distinct zones of jointing have been defined; the degree of jointing approaches that found in the productive mines in Gowganda. A rich showing of native silver occurs at the intersection of one of these zones with a third weaker zone.

5. The two main zones of jointing intersect beneath a small pond near the west and upper contact of the diabase sill.

6. The most intense jointing and the best chance for persistent silver deposition are likely to occur at the intersection of these two zones.

RECOMMENDATIONS

I recommend a programme of 3000 feet of "A" core diamond drilling to probe the ground beneath the pond where the two main zones of jointing intersect.

The estimated cost of this drilling is $10,000.

ADDENDUM

Subsequent to the typing of this report, communications from the mining recorder of the Montreal River Mining Division have granted authority to move claim posts so as to wipe out the unrecorded fraction mentioned herein and shown upon the enclosed map.

Furthermore 2 additional claims have been acquired by Vermont Mines Limited: MR 32213 and 32136, lying in Farr Twp. just west of MR 29932. The Vermont property therefore now consists of 15 claims. Geological mapping was conducted upon the following 13 claims.

MR	20364	29935
	20365	29936
	20911	29937
	20912	32237
	29932	
	29933	28544
	29934	28545

The last 2 claims were mapped but have been dropped by Vermont. Assessment work credits are being sought for the remaining 11 claims.

VERMONT MINES LIMITED

INTRODUCTION

This report is devoted to the geology of a property owned by Vermont Mines Limited. The property is a silver prospect consisting of 14 unpatented mining claims located on the boundary between MICKLE and FARR TWPS., Montreal River Mining District, Ontario. This location is also in the Elk Lake-Gowganda portion of the Temiskaming Silver District. The claims lie 5 miles west of the town of Elk Lake, and can best be reached by a good 4.84 miles bush road leading north from the 5 mile post of the Elk Lake-Gowganda Highway.

The claims are numbered;

MR	20364	29935
	20365	29936
	20911	29937
	20912	31936
	29932	31937
	29933	32237
	29934	(unrecorded fraction)

Geological mapping was conducted on all these claims excepting 31936 and 31937; claims 28544 and 28545 were also mapped but the option by which they were formerly held has been dropped.

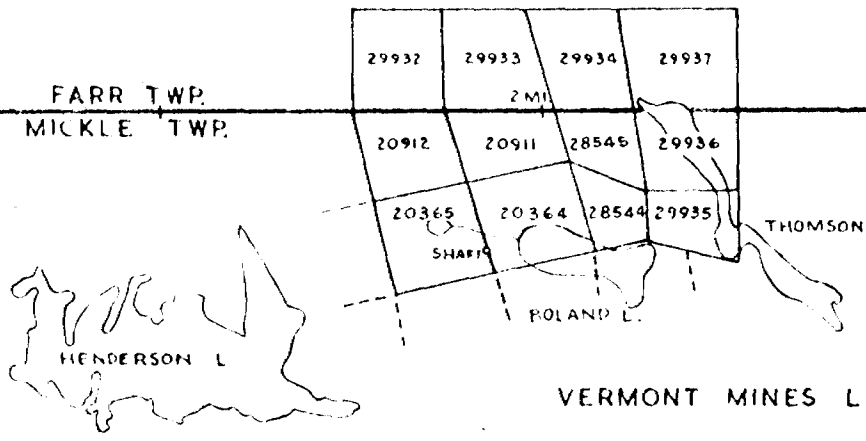
The property enjoys plentiful resources of water and timber suitable for mine use. A comfortable cabin, 6' x 12' is located in the southern portion of the property.

The topography of the area is rugged; the highest elevation probably lies 300 feet above the local lake level. Rock outcrop is plentiful; many outcrops have cliff-like edges rising up to 50 feet above the surrounding overburden. Swampy areas are rare and largely confined to the creek margins.

Vegetation in this region is remarkably uniform; areas of overburden support good growths of poplar, birch, white spruce and a thick undergrowth of alders; outcrop areas are covered by jack-pine. Rock outcrops are partially covered by moss.

The geological outcrop map accompanying this report is of a scale of 1 inch to 200 feet. The field work was conducted by R.A. Poutanen, a graduate of the Lakehead Technical Institute in 1953, under the direction and personal guidance of the writer. Acknowledgement must be paid to A. Byberg of New Liskeard who performed the service of geological assistant.

Survey control for the mapping was provided by a north-striking base line from which cross-lines were turned off at right angles at intervals of 400 feet. Any divergence in these cross lines was assessed by cutting north-south tie lines at



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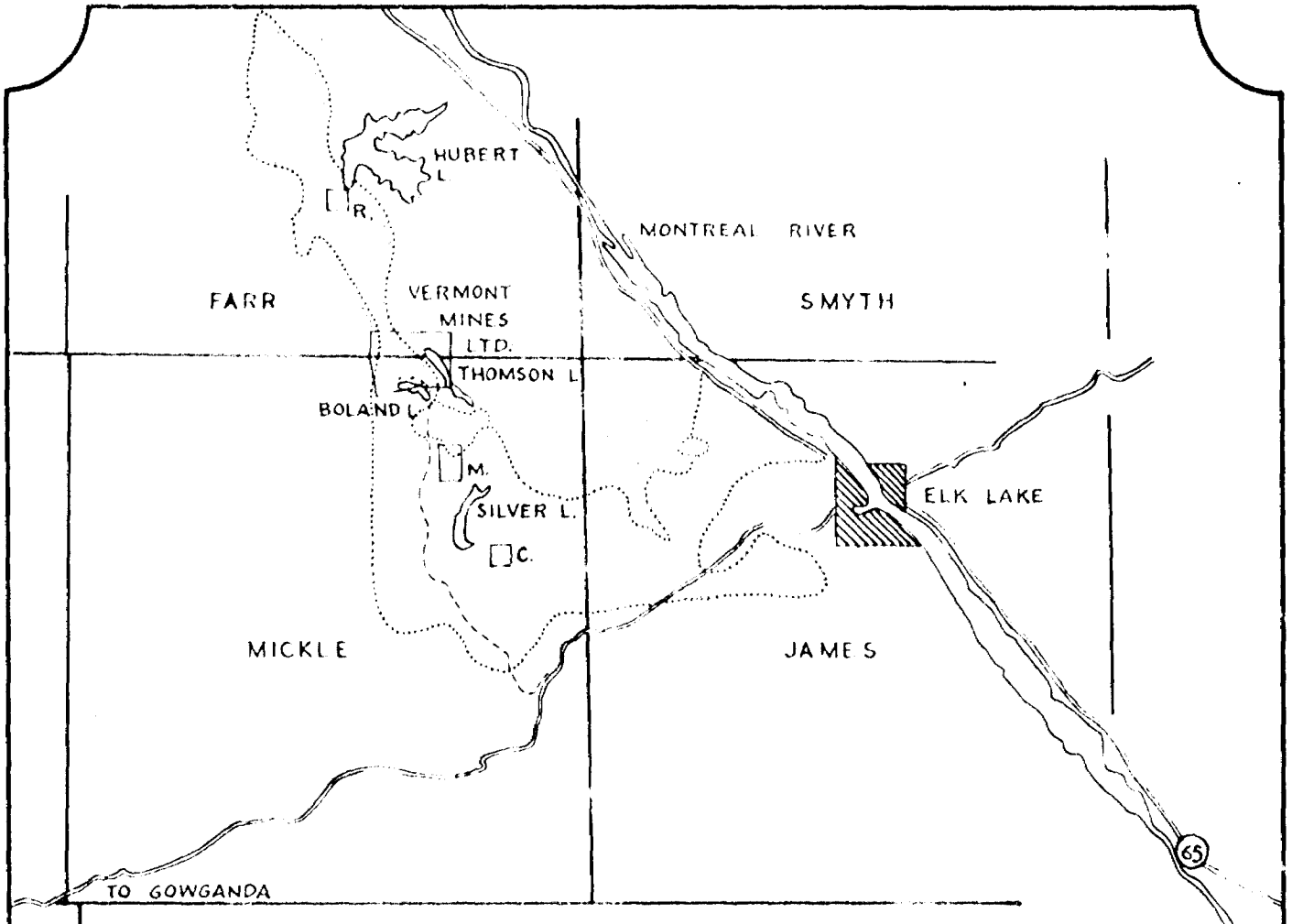
CLAIM SKETCH

SCALE: 1 IN. TO 20 CH.



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LOCATION & GENERAL GEOLOGY

SCALE: 1 IN. TO 2 MI.

- NIPISSING DIABASE
- COBALT SERIES
- GRANITE

R ROY SILVER
M MAPES JOHNSTON
C COTLEY

E.E.C.

their extremities and measuring their terminal intervals. The tie lines in the western extremity of the mapped area were cut and measured but are not shown on the map. Chainage pickets, in addition to pointed pickets for line, were erected at 100 ft. intervals along all lines.

Claim posts, roads, creeks, and topographic features are plotted on the map to provide monuments for the relocation of any desired geological feature. Claim boundaries shown on the map are imaginary lines jointing observed claim corners; claim lines as observed on the ground are not shown.

For the field location of any mapped feature, an appropriate and known point on a picket line was chosen and a true north or south line was run by compass and paced to a position exactly east or west of the feature, which was finally located by a short east or west line. These traverses were plotted upon transparent sheets stapled to heavy squared cardboard. From such firmly established points the geologist used compass and pacing to sketch the detail of the feature being mapped. All picket lines were run, and both the geologist and assistant quartered from one side to the other in search of outcrop. The absence of leaves from the vegetation during the time of the mapping contributed to the ease of finding outcrop.

Much of the outcrop on the property is covered by moss which obscures most of the detailed structure which was sought. The geologist and his assistant exerted considerable effort in removing this cover, and a small work force was engaged to expose and clean out many of the old rock trenches with which the property abounds.

Channel and grab samples were taken from the most promising of the observed showings; their results are shown on the geological map.

REFERENCES

Much of the general data drawn upon for this report derives from the writer's general experience in the Cobalt-ElkLake-Gowganda area from 1949 until the present day. In the course of this experience he has examined and studied several properties in Mickle and Farr Twps., and has made an exhaustive study of diabase structures in the Miller Lake basin of Gowganda. Specific outside references used for this report are:

O.D.M. Annual Report, part II, 1907, pp 126-127
" " " , part I, 1909, pp 125-127
" " " , part I, 1915, pp 126-127
" " " , part I, 1919, pp 150-152
" " " , part II, 1947, p 106

Unpublished notes, S.E. Wolfe, Resident Geologist, O.D.M. Swastika, 1946.

Unpublished notes, R. Thomson, Resident Geologist, O.D.M. Cobalt, 1954.

HISTORY OF WORK

The diabase body on which the Vermont claims are located underlies what is known locally as the Silver Lake area. Many small exposures of rich silver have been discovered in the area; three have approached productive stature.

Roy Silver Mines (now Tiara) operated a property on the south shore of Hubert Lake in Farr Twp. in 1953-54. A small concentrator was built and some cobalt-copper concentrates were produced. The writer examined the property and its underground workings in 1953. The operations were not profitable. Some pockets of high grade silver were alleged by the management to have been found in a small shaft south of the main workings. No evidence of them could be seen in the dump.

The Mapes-Johnston claim is located southeast of the Vermont property. The writer has seen an old working composite map containing a notation that high grade silver was found at surface near the shaft. ODM 1915 (op. cit.) refers to the likelihood of a shipment to be made in that year.

The Cotley (formerly the Shane Darragh) was operated by Siscoe Metals in 1954. It is located just east of the south end of Silver Lake. Of the main vein, C.W. Knight (ODM pt. II, 1907) states: "This was the most promising vein seen by the writer in the Montreal River area." The ore shoot in this vein produced approximately 35,000 ozs of silver during Siscoe's operation.

The Vermont property was known originally as the Boland-Thomson. Its history can be sketched in the Resident Geologist's notes (op. cit.) and in ODM pt. II, 1947 p. 106. The original operators sank the shaft and conducted most of the surface work. The underground workings were dewatered and sampled in 1946 under the direction of Ray Binch. The shaft was found to be 70 feet deep, and some lateral work had been done at the bottom of it. F. Quesnel and P. Desormeaux optioned the claims to W.S. Kennedy in 1954; it seems probable that the diamond drilling in the vicinity of the shaft was conducted during the same year under the direction of W.J. Hosking.

GENERAL GEOLOGY

The consolidated rocks underlying the property are pre-Cambrian in age. They are divided into four distinct groups, from oldest to youngest.

Algoman granite
Matachewan diabase
Huronian sediments
Nipissing diabase

Algoman granite constitutes a basement for the immediate area, and outcrops sparsely in the eastern portions of the property. It is undoubtedly a portion of the Round Lake batholith which, with continuity interrupted by later Huronian sediments and Nipissing diabase, extends from just north of Gowganda to just south of Kirkland Lake. Throughout the whole of the batholith, and indeed from outcrop to outcrop within the property, the batholith exhibits a wide variation in mineral composition. On the Vermont property its consists of quartz and buff to rose coloured feldspar which is probably largely sodic plagioclase. The mafic constituent is amphibole, chlorite pseudomorphic after an amphibole, and in some specimens a trace of biotite. A complete absence of crystal outline supports an assumption that the mafic constituent minerals are all secondary. A faint gneissosity is apparent in some specimens, but since no continuity of gneissosity could be discerned, it has not been recorded upon the map. Weathered granite outcrops are buff-coloured; a pick scratched across such a surface produces a characteristic gritty feeling and leaves a white mark.

A dyke of Matachewan diabase with a probable width of 100 feet cuts the Algoman granite in a north-striking direction; the contacts are chilled and are vertical or steeply dipping to the west. Matachewan diabase is almost indistinguishable from Nipissing diabase unless they can be seen in contact with one another. Generally speaking Matachewan diabase is darker and denser, but many variations of both types appear identical. Both weather to a rough brown-coloured surface which is only mildly gritty. Matachewan diabase can be distinguished from all other types in this locality by its invariable habit of occurrence in steeply dipping dykes which in this region strike north, and, quite diagnostically, by distinct clusters of pale green plagioclase from 1/4 inch to 2 inches in diameter ("saussurite"). Fresh specimens are typically dark; they contain augite and plagioclase in a fresh ophitic texture. Quartz is not uncommon. The outcrops of Matachewan stand higher than the surrounding granite attesting to the greater resistance of the diabase to erosion.

Huronian sediments outcrop sparsely in the western part of the property; one cluster of outcrops was found lying on granite in the eastern part of the property. Locally the facies of the Huronian are restricted to coarse arkose and fine con-

glomerate between which no clearcut disconformity exists. Distinction between the two has been made only by an arbitrary assessment of grain size, wherein a specimen containing grains larger than 1/10 inch is classified as conglomerate. Both rocks have obviously been derived from the products of erosion acting upon the earlier Algoman granite. The rocks are buff-coloured and are composed of sub-rounded grains of quartz and feldspar. A very few wisps of unidentifiable mafic mineral can be seen in places. The attitude of the rocks is reflected by that of bands of varying grain size. Weathered surfaces are indistinguishable from those of granite. In general, like the granite, erosion has worn down areas containing Huronian sediments to a degree greater than that in adjacent areas underlain by diabase.

Nipissing diabase is exposed in plentiful high outcrop throughout the central part of the property. The rock seems to be identical to occurrences elsewhere in the Temiskaming district. It is coarse grained, dark green, relatively fresh, and is composed of augite, plagioclase, minor amounts of quartz and, throughout its central portions, dark brown irregular grains of hypersthene. Its ophitic texture is distinguishable, but is never too clear. In some places the diabase is extremely coarse grained and contains long (1/4 inch to 1 inch) blades of amphibole as its principle mafic constituent. Near its contacts it is finer grained and somewhat darker, and within 6 inches of its contacts it is chilled, black, dense, and glassy. Diabase outcrops are a characteristic brown colour, quite rough, and produce both a gritty and greasy feeling under the point of a pick. In its fine grained portions near its contacts exposures of the rock feel extremely greasy.

TABLE OF FORMATIONS

RECENT AND PLEISTOCENE

Sand, boulders, residual soil and muskeg

GREAT UNCONFORMITY

PRE-CAMBRIAN

Keweenawan: Nipissing diabase

(Intrusive contact)

Huronian: Arkose and conglomerate

UNCONFORMITY

Matachewan: Diabase dykes

(Intrusive contact)

Algoman: Granite, granite gneiss

STRUCTURAL GEOLOGY

The Algoman granite occuring in the east part of the property is the oldest rock exposed in the immediate area; it constitutes a basement. Exposed contacts of Matachewan diabase with the granite show that the diabase is chilled against the granite and intrusive into it.

No contact could be seen between the Algoman granite and Huronian sediments, but the constitution of those sediments, made up of what appear to be the eroded products of granite, and more definite evidence of the age relations between these two rocks observed elsewhere, make it certain that the sediments are younger than the granite. Strike and dip determinations observed on bands of varying grain size in the sediments can be accepted as reflecting the attitude of the sediments as a whole; they indicate that the sediments dip and thicken to the west.

The structural attitude of the Nipissing diabase is a matter of profound economic importance and much effort was made to determine it with precision. The only observed contact of the diabase occurs in the southwest part of the mapped area; at this point the contact is irregular, causing an embayment into the intruded sediments against which the diabase is plainly chilled. The exposure is, however, on a smooth glaciated low outcrop, and the contact appears to be vertical.

Determination of the attitude of the body of diabase as a whole may be made by a detailed analysis of the joints which are found within it. From 1949 until 1952 the writer conducted a prolonged study of the structures found within the diabase sill in the Miller Lake basin. In addition to the economic aspects of these structures, it was found that the steeply dipping joints, which have unique characteristics, are statistically normal to the plane of the nearest contact. It follows, therefore, that the intersections of various joint sets are straight lines which are the poles of the plane of the contact.

The attitudes of the joints observed on the property are portrayed by symbol on the map accompanying this report. An attempt has been made to also indicate the severity of jointing; joint symbols without qualification represent mild and incidental jointing; symbols described as "2" represent more severe jointing where joints of one set occur 1-3 feet apart; the figure "1" signifies first degree jointing in which the joint planes have great continuity and individual members of each set are spaced less than 1 foot apart.

An important characteristic of this jointing is that members of different sets commonly do not intersect, but join one another on an arc of a circle, or more properly, along the surface of a segment of a cylinder. These cylindrical joints are multiple and constitute co-axial cylindrical surfaces. Cylindrical jointing is remarkably intense in the Miller Lake basin at

Gowganda, is more poorly developed around Elk Lake, and is faint but still discernible at Cobalt. Plane joint sets are tangential to the cylindrical joints; since the joint sets are normal to the diabase contact, and since an intersection of joint sets represents the pole of that contact, it follows that the axes of the joint cylinders are also poles of the contact.

Since the jointing is structurally so intimately related to the attitude of the diabase sill, and since no application of stresses other than contraction could produce the joint pattern, it is safe to accept these structures as the product of cooling and consequent contraction of the diabase sill.

Planar joints on the Vermont property can be classified in three main sets, from strongest to weakest:

North set: N 5° E, dip 74° E
Southwest set: S 43° W, dip 80° E
East set: S 84° E, dip 85° N.

Within the limits of attitude determination, these sets intersect in a common straight line (the pole of the plane of the diabase sill) striking 75° E and inclined to the east at an angle of 73°. The diabase sill therefore has a computed average strike of N 15° W and a dip of 17° to the west. It is interesting to point out that if these three sets be projected on to the plane of the contact itself, they almost achieve a 120° or hexagonal pattern. It is also pointed out that cylindrical jointing seriously interferes with this analysis; within the confines of a small outcrop, or in that small portion from which the moss has been scraped away, it is impossible to differentiate between a plane joint and a segment of a cylindrical joint of large radius. The exact computation of the attitude of the sill is not as important as the "sense" of the attitude; the analysis leaves no room to doubt that the sill dips westerly at a gentle angle. In mapping these joints in the field one quickly becomes aware of this "sense". Elsewhere violation of this "sense" has led to recognition of post-Nipissing diabase dykes cutting the Nipissing sill. No such violation occurred within the Nipissing diabase on the Vermont property.

ECONOMIC GEOLOGY

Mineralization on the Vermont property conforms with the general pattern elsewhere in the Temiskaming district. Calcite veins are fairly prevalent; rarely they are observed to contain arsenides of cobalt and possibly of nickel which on surface exposures are revealed by cobalt or nickel bloom, minor pyrite, chalcopyrite, galena, and native silver. The veins occupy cooling joints and are from 1/8 to 8 inches in width. Ore shoots in the district are erratically distributed in individual veins and silver within an ore shoot is erratically distributed.

Siscoe Metals of Ontario and Castle-Trethewey at Gowganda have proved to be the only consistent producers of the immediate area. Ore shoots there are almost wholly in diabase and are concentrated within 300 feet of the upper contact. At these mines some of the veins within a vague zone make all the ore; this zone plunges to depth with the overlying diabase contact. The direction of the plunge of this zone is a matter of economic importance; it is not normal to the strike of the diabase contact. This zone, and all ore shoots within it, coincide with a zone of most intense jointing which on surface can be traced into the barren central portion of the Sill. The zone of most intense jointing contains several sets of joints, and the attitude of the zone coincides with the direction of one of these sets, which is not necessarily the strongest or the most productive. Ore shoots within the zone coincide with jointing of maximum intensity.

With this meagre background of structural knowledge, which seems to be all that is available, the severity of jointing on the Vermont property has been assessed; two fairly distinct zones of intense jointing can be perceived; the best coincides with the East set of jointing; the second coincides with the Southwest set; they intersect beneath the small pond just west of Boland Lake. These two zones contain most of the calcite and cobalt showings of the property.

The East-West zone shares many of the characteristics of the Siscoe-Castle zone. The Southwest zone is strong but seems to be made up predominantly of the joint set with the same strike. A third possible zone, of poor definition, strikes about N 15° W. The best showing of silver on the property occurs where this last zone intersects the East-West zone.

In general the degree of jointing rarely attains the intensity of that on the Siscoe and Castle properties, but near the axes of the 2 strongest zones the Vermont jointing is comparable. In contrast, the jointing in the large area between the East-West zone and the Southwest zone north of Boland Lake is anomalously mild. In it no strong joints at all were observed.

A showing of rich silver occurs just west of Boland Lake.

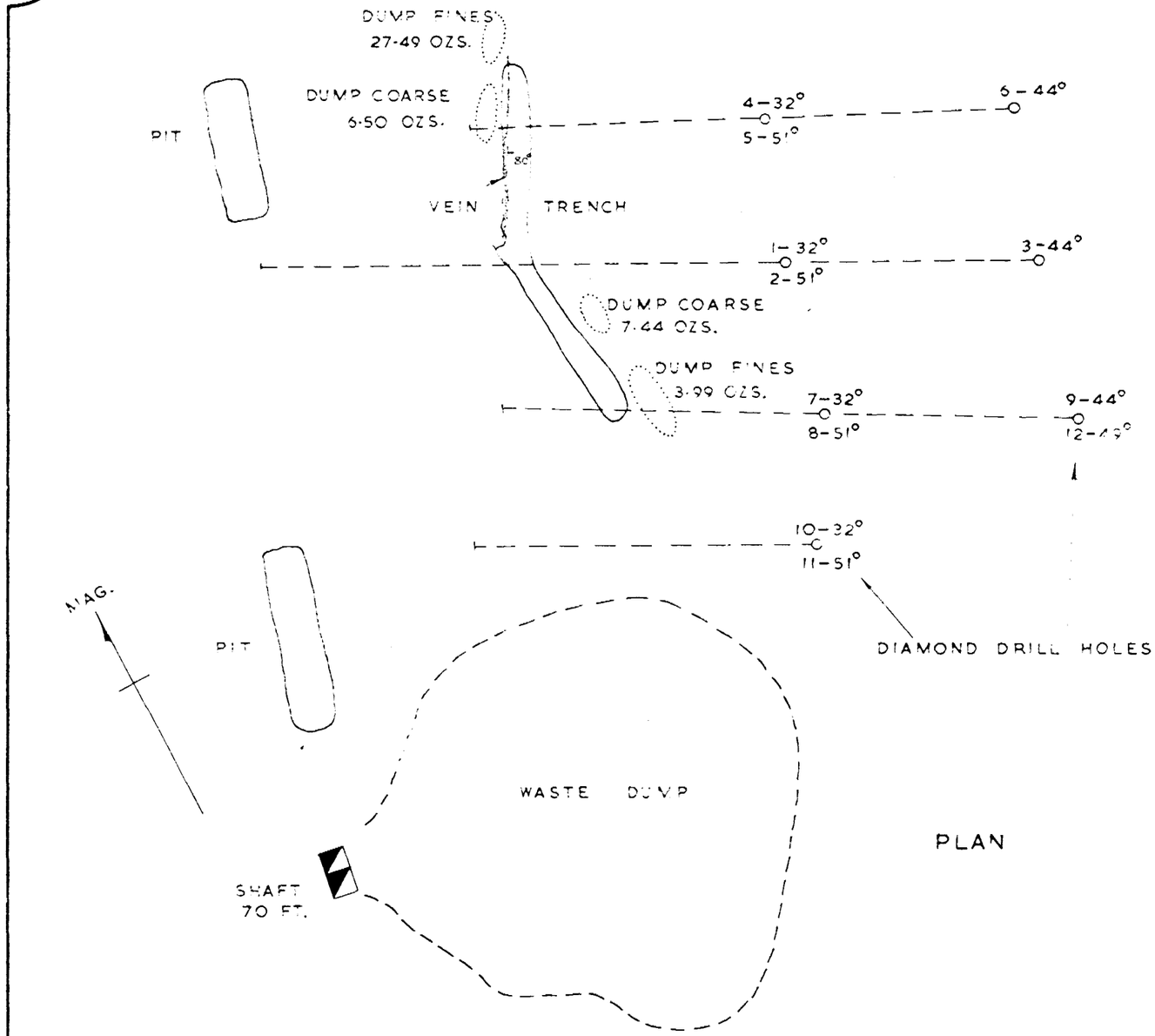
The enclosed 20 scale sketch of it is a compilation of the original drilling plan, R. Thomson's sketch and notes, and the writer's observations. The drill core and dump sampling are attested to by W.J. Hoskins; the surface vein sampling was done by R. Thomson. Copies of the drill logs are in R. Thomson's files.

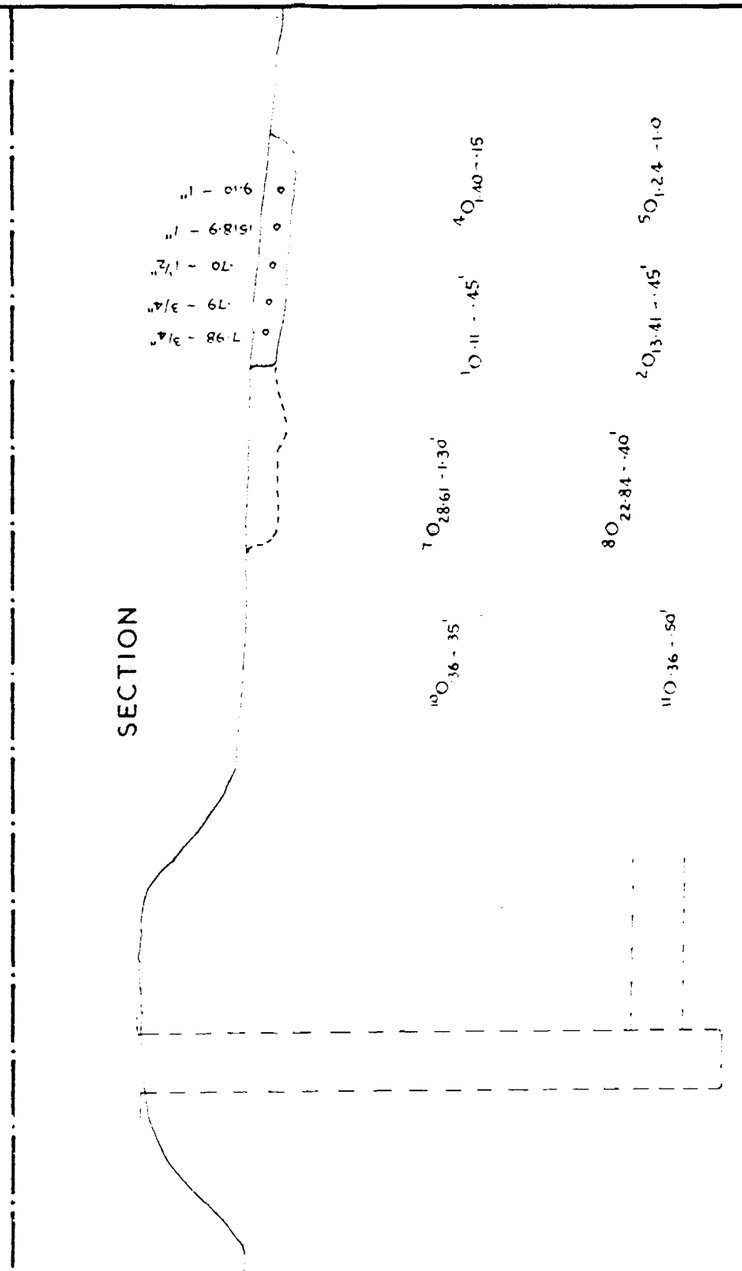
The sketch shows a 1/2-2 inch vein striking north and dipping steeply east. A trench has been blasted 3-4 feet deep along the vein for 60 feet. In the northern portion of the trench a rich pocket of silver is exposed, but the silver and calcite in which it occurs are most erratic. Although the silver lies mainly in the calcite, some rich specimens can be obtained with rich silver and argentite impregnating diabase. Chalcopyrite, galena, cobalt arsenides and pyrite were also observed in the exposure, but none of these minerals is present in economic amounts. Black chloritic alteration was observed for about 2 inches on both sides of the vein, beyond which the diabase is bleached for about 3 inches.

The sampling and drilling results show that silver is present in significant amounts, but they do not indicate ore. Their significance lies in possibility that they may represent the roots of an ore shoot which is part of the East zone of jointing. Repetitions might occur at structurally higher horizons within the diabase further west.

Diamond drill hole No. 1 intersected near its end a second vein, consisting of calcite stringers containing some galena. A sample from this point assayed 2.115 ozs Ag over 0.15 feet. This is probably the vein upon which the nearby shaft was sunk.

The nature of other showings on the property can be discerned from the symbols and comments on the accompanying map. The most impressive of these are those occurring just south of the creek joining Boland Lake and the pond to the west.





SCALE: 1 IN. TO 20 FT.

VERMONT MINES LIMITED

SKETCH OF MAIN SHOWING

25 FEB 1960 E.E. CAMPBELL P.ENG.

T.N.

MOSES LAKE

THREE CORAL BLOOM CALCITE SHOWINGS IN THIS AREA

GRANITE PYRAMID

TALUS

CLIFF

BOULDER RIDGES

THOMSON LAKE

FARR TWP.

APPROXIMATE BOUNDRY

MICKLE TWP.

CLIFF 300' ABOVE THOMSON LAKE

BASELINE

BUSH ROAD

CANOE ROAD

POND

SAND PLAIN

SAMPLE 0·46 OZS

SAMPLE 8·74 OZS.

SAMPLE 1·38 OZS

SAMPLE 0·10 OZS

SAMPLE 0·18 OZS

SAMPLES 1257·9 OZS 1136·4 OZS

BOLAND LAKE

STAKED MAY 25 1961

32136 NOT RECORDED

32237 NOT RECORDED

32N L8E
28N L7E
24N L6E
20N L5E
16N L4E
12N L3E
8N L2E
4N L1W
L2W L3W L4W L5W L6W

LEGEND

- N_{DB} [N DB] NIPISSING DIABASE
- H_{CGL} [H CGL] HURONIAN CONGLOMERATE
- H_{ARK} [H ARK] HURONIAN ARKOSE
- M [M] MATACHEWAN DIABASE
- A [A] ALGOMAN GRANITE

- STRIKE, DIP, AND VERTICAL DIP IN THIRD DEGREE JOINTING
- [2] SECOND DEGREE JOINTING
- [1] FIRST DEGREE JOINTING
- [CO] COBALT BLOOM
- [CA] CALCITE VEIN

- GEOLOGICAL CONTACT
- AXIS OF ZONE OF JOINTING

- AREA OF ROCK OUTCROP
- CUT AND CHAINED PICKET LINE
- RISE IN ELEVATION
- SWAMP

VERMONT MINES LIMITED

MICKLE AND FARR TOWNSHIPS
ONTARIO

SILVER PROPERTY

SCALE: 1 INCH = 200 FEET JUNE 4/61

DRAWN BY: R. POUTANEN
CHECKED BY: E.E. CAMPBELL E E Campbell

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