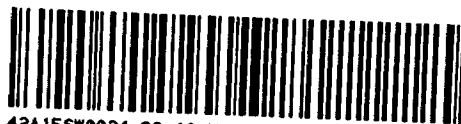


Prof. J. G. G. Ch



Report on the Geological and the Geophysical Research Investigations for Cunigold Mining Syndicate Limited and Mr. H. P. Ayres on the mining properties located in Lots 3, 4, 5, 6, 7 and 8, of Concessions 2 and 3, in the Township of Mann, in the Temiskaming Mining Division of Ontario:-

The Geological Investigation was carried out by Dr. F. G. Smith of the Department of Geological Sciences of the University of Toronto, with the assistance of Mr. George R. Ayres, from June 22nd to July 2nd, 1945 inclusive. See Report and Map herewith.

The Geophysical Research Investigations were carried out under the direction of Professor Laohlan Gilchrist with the assistance of Mr. J. W. Templeton and Mr. Paul Pfalsner, from June 29th to August 18th, 1945, inclusive.

(A) The Geophysical work comprised the following:-

1. A study of the results of the Geological investigations on the property, made by Dr. F. G. Smith, and portrayed on Map "1".

2. A general study of the surface geological conditions, from which was designed a suitable lay-out of an East-West Base Line and of North-South parallel profiles from the Base Line. The maximum separation of the N/S profiles was 400 feet. The profiles extended over the rock outcrops as well as over glacial cover.

The position of the Base Line and of the profiles is placed on the geological map "1".

3. Measurements of the vertical component magnetic intensity due to the underlying structures, were made at suitable points on the North-South profiles to a maximum distance north of the base line of about 3,000 feet, and 2000 feet south of the base line. The maximum separation difference of the points on the profiles, was fifty feet.

4. At places where it was deemed desirable to obtain more detailed information, e.g. on the rock outcrops or in the vicinity of quartz veins, measurements were made on profiles about 1,000 feet in length N-S and separated by about 100 feet east-west, and the separation of the points on the profiles at which measurements were made was much less than fifty feet.

5. The Base Line is a continuous East-West line positioned at about North-South center line of Concession 2. The Western half of this

apparently about fifty feet east of their position relative to the western end of rock outcrop 'A' on the ground surface as noted by the men making magnetic measurements. It is probable that the short profiles near the region of the quartz veins in the valley between rock outcrop 'B' and rock outcrop 'A' were also not quite parallel.

Conclusions based on the results of magnetic measurements are presented having regard for the modifications above. It might be desirable to re-measure and check the distances from the zero point on the base line to the place where the quartz veins are known to exist, and also the distances from the zero point on the base line to the central point of some of the smaller outcrops.

D. Conclusions which appear to be warranted by the magnetic measurements:-

(a) The sharp changes in the magnetic intensities indicated over the outcrops in which highly basic material e.g. basalt, gabbro and iron formations were found, was due in general to the numerous clusters of consequent poles in the materials and the short distances of the magnetic needle of the instrument from these groups of poles. From the graphs of the magnetic intensity on Map '1' it is evident that there is very shallow overburden, (that is - approximately rock outcrops), in the following regions, for the graphs of magnetic intensities obtained in these regions show the same sharp changes as are found in the graphs of intensities obtained on the outcrops.

(1) In the valley between rock outcrop 'B' and rock outcrop 'A',

(2) North and south of the base line in the neighbourhood of point 'O',

(3) Near the easterly portion of the outcrops that occur 500 feet north of the point 'K' on the base line.

(4) 800 feet north of the points 'G', 'H' and 'I' on the base line,

(5) Overburden of perhaps 10 feet in depth, exists over extensive strongly basic rock material, in the region 1,400 feet north of points 'N', 'O', and 'P' on the base line.

(b) Massive deposits of basic rock materials, possibly dykes of basalt or gabbro are indicated under deep overburden in the following regions:

base line is at the southern boundary of the property, whereas on the eastern half the property extends approximately one half mile south of this base line. Profiles in general ran south to north from this base line. However, measurements were also made on profiles from north to south, chiefly in the eastern portion of the property.

6. The results of the measurement of the vertical component magnetic intensities are presented on graphs placed on geological map '1'. In order to avoid confusion, the scale used is much smaller than is justified by the accuracy of the results of measurement. Profile distances - 200 feet to 1 inch. Magnetic scale 1000 gammas to the inch. The results of measurement are also placed on a second geological map '2' on a scale for Gammas, six times that used on geological map '1'. They are also presented on the larger scale on separate sheets of section paper. On map '2' and on these separate sheets the delineation of the differences of magnetic intensity is much more pronounced. The use of this larger scale is justified by the accuracy of the measurements.

(B) The information from the magnetic intensity measurements was desired for the following purposes:-

(a) To correlate the results of measurements obtained on rock outcrops with the results obtained over covered regions and thus to locate places where only shallow overburden exists, and therefore where sub surface conditions may be readily examined, after stripping the cover.

(b) To locate under the cover of deep overburden the position of other massive basic materials, e.g. basalt or gabbro and their contacts with granitic bodies.

(c) To correlate the results of measurement of the magnetic intensity due to rock materials associated with quartz veins, with the results obtained in adjacent territory and thus give guidance in the location of the extension of the veins under the overburden.

(C) There was some uncertainty in the correlation of the position of zero point and the base line used in the magnetic measurements with the position of geological features as presented on Map '1'.

The position of profiles W4 and W5 at the western end of rock outcrop 'A' on which magnetic measurements were made as shown on Map '1' are

1. 2,500 feet north of the zero point on the base line,
2. Part of the body indicated in the region 1,400 feet north of the point 'K', 'Q' and 'P' on the base line,
3. 800 feet north of the point 'K' on the base line,
4. 800 feet north of point 'P' on the base line,
5. 800 feet north of the section B/C on the base line.

(c) Quartz veins were found in the region about 1,200 feet north of the base line on profile WB. In the region south east of this, apparently shallow sediments overlie basic rock materials - probably basalt in contact with massive grano-diorite. From the graphs of magnetic intensity in this region and in the adjacent territory, it is probable that the contact of the basic materials and the grano-diorite extends to the south under the sediments.

**E. Recommendations for further geophysical explorations:**

1. The grano-diorite in the region 1,200 feet north on profile WB, where the quartz veins are in place, apparently extends to the south under the overburden. It is desirable to have more detailed magnetic intensity measurements made in this region in order to locate the contact of the basic rock materials with the grano-diorite.

2. More detailed magnetic investigations are desirable in all regions where massive bodies of basic rock materials are indicated under the overburden. It is almost certain that the contact with adjacent grano-diorite bodies could be indicated approximately.

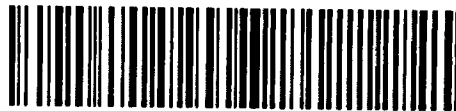
3. Wherever the contact between basic rock materials and the grano-diorite is indicated as having only shallow cover, e.g. 1,000 feet north of point 'G' on the base line, the overburden should be stripped in a search for more quartz veins. In some places shallow drill holes might be necessary to find this contact.

4. The possibility of the existence of intrusions of base metal sulphides, might justify an electrical geophysical investigation in the form of a "self potential survey", and an "applied potential survey" in order to determine resistivities.

September 15<sup>th</sup> 1945

Lachlan Gulchrist

GEOLOGICAL REPORT



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THE CUNIGOLD MINING CLAIMS  
TOWNSHIP, TEMISKAMING MINING DIVISION, ONTARIO

F. Gordon Smith, Ph. D.

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The principal rock outcrops on the property were examined during the summer of 1945 while prospecting and a geophysical survey were also being carried on. This report covers the geology exposed on the surface, the geology inferred from the results of the geophysical survey, and the economic possibilities of the group of claims.

The position of the Cunigold area is shown on Map A. It is within the largest region of non-granitic Precambrian rocks on the Canadian Shield, which embraces the Porcupine, Kirkland Lake and Western Quebec mining camps. Any area within the region can be expected to contain gold ore deposits in favorable structures. The amount of over-burden, however, restricting rock exposures to a few percent of the total area has made the discovery of new camps within the region a very slow process. The principal expansion method has been in proceed from known geological structures along the strike. The chances of mineable ore being found exposed on rock outcrops in a new area are small. Cunigold has been fortunate in finding gold-bearing veins on rock outcrop on their property, and these should be explored energetically.

The Cunigold mining claims are situated in Mann Township, as shown on Map B. The number of claims total thirty six, of which fifteen are now ready for Patent to Title. The workings may be reached by a dirt-surfaced concession road for  $8\frac{1}{2}$  miles from the Ferguson Highway to the eastern boundary of Mann Township, then by a winter road three miles along the centre line of Concession 2 to the camp, and then by foot path another  $\frac{1}{2}$  mile.

The nearest town is Devonshire, on the Ferguson Highway and on the Temiskaming and Northern Ontario Railway, but supplies are more readily obtainable from Porquis Junction, on the same railway line, six miles south of Devonshire.

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At the time of visiting the property, the winter road was too wet to allow a truck to go all the way to the camp, a horse and sled being used for part of the way. Improvement of at least part of the road would be required if the property is to be actively exploited. First class freight rates from Toronto to Porquis Junction are \$1.15 per 100 lbs. and the cost to take supplies from Porquis Junction to the property has been approximately another dollar per hundred lbs. Labor is available locally among the farmer settlers at \$100.00 to \$150.00 per month plus board and lodging. Electrical power is available eight miles north of the workings.

The Cunigold holdings are underlain by sparsely forested rock exposures, thickly forested glacial debris, principally sorted clay and sand, and newly forested brule. The three largest rock exposures, labelled outcrops A, B and C, on Map "C", furnished most of the data, and the smaller outcrops helped in drawing in the inferred geological contacts. The positional control for this work was a set of vertical aerial photographs which were enlarged and used as base maps, together with unenlarged photos which were examined in stereoscopic pairs.

The observed geology is shown on Map C, together with the inferred contacts shown as broken lines. The rock types mapped were:

- |    |              |      |                            |
|----|--------------|------|----------------------------|
| 1. | sediments    | ---- | colored yellow on the map; |
| 2. | lavas        | ---- | colored green on the map;  |
| 3. | gabbro       | ---- | colored purple on the map; |
| 4. | granodiorite | ---- | colored orange on the map; |

The sediments, presumed to be the oldest rock type according to the structural arrangement, but not definitely determined as older than the lavas, include quartzite, argillite, iron formation, tuff and conglomerate.

The iron formation is found in the succession near the contact of the sediments and the lavas. It is a persistent member and although thin (1 to 10 feet thick) it is in most places highly magnetic and thus forms a good marker horizon for the sediment-lava contact. The lavas are principally basalt though there is some andesite present. It is very much altered, though not with the development of schistosity. Alteration to serpentine, magnetite and carbonate is common. Original structures are not evident. The gabbro, which is seen cutting across the "A" outcrop, is younger than the sediments and the lavas, but is cut by and is thus older than the granodiorite. The granodiorite is a dark colored plutonic, much darker and heavier than the usual granodiorite intrusives. Dikes derived from the granodiorite are porphyritic and cut all the other rock types. The sediments and lavas occur folded into a tight syncline striking about E--W and plunging to the E. The nose of the syncline, shown by the sediment-lava contact, is at the W end of outcrop "A". This syncline is bordered by granodiorite on the north and a smaller body of granodiorite has invaded the south limb of the fold (outcrop "C"). Dikes derived from the southern sides of the granodiorite bodies cut the sediments in a SW--NE direction. A pronounced jointing in the same direction occurs in the granodiorite, and on outcrop "B" some of these contain quartz veins. Veins similar to those on outcrop "B" occur on the NE side of outcrop "A", and there they dip 75° NW, the striae plunge 8° SW in the plane of the vein, and the SE side moved NE relative to the NW side, though the amount of displacement is small (4 to 20 feet).

The metalliferous occurrences are of four types: 1) disseminated sulfides near feldspar porphyry dikes; 2) irregular sulfide replacement bodies in the iron formation or at the sediment-lava contact; 3) carbonate-quartz replacement veins and irregular bodies in the lavas on outcrop "C"; 4) quartz veins in small shears on outcrop "B" and at the NW end of outcrop "A".

The workings on the property at the time of Canigold acquisition were pits sunk on sulfide bodies of types 1) and 2) above. The largest pit is the one shown on outcrop "A" on the contact of the feldspar porphyry dike and the greenstone. It is approximately 17 feet by 12 feet by 10 feet deep. The sulfides are principally pyrrhotite, with some pyrite and chalcopyrite, disseminated to various degrees in the greenstone. No large bodies of massive sulfides were seen. Other sulfide disseminations occur in many places on the property, being most common near the sediment-lava contact, especially in the lean iron formation member. None of the exposed sulfide bodies appear to be of mineable tenor or size, but the possibility of larger and richer bodies under the overburden were not excluded by the geological and geophysical data. Four diamond drill holes were put down in the fall of 1944 on the recommendation of E. K. Fockler to test the horizontal extent of the sulfide zone in which the main pit is located, in a NE direction. Small disseminated sulfide bodies were encountered, as reported by the above engineer, the highest assay of copper being three per cent along with 0.14% nickel and traces of gold. The largest section with appreciable copper was 28½ feet, averaging 6.76% copper and 0.08% nickel. Quartz veins were not encountered in the drilling.

Quartz carbonate veins and irregular replacement bodies occur in several places on outcrop "C" in the greenstone area north of the granodiorite. They are sparsely mineralized with pyrite.

Grab samples taken by officers of the Syndicate consistently were assayed at about 0.01 ounces of gold per ton.

The quartz veins mapped on outcrop "B" strike N 45° E and dip steeply to the NW. They pinch, swell and branch across the outcrop, but are persistent veins in strike slip faults. The average width of the B-1 vein across the outcrop is about 12 inches, but it appears to widen as it approaches the valley between outcrops "A" and "B". At its SW limit it is 24 inches wide.



The Cunigold property is in my estimation a reasonably good risk for future capital expenditures. I believe the chances of proving enough gold or copper ore to operate a mill are about 60% favorable, with an expenditure of One Hundred Thousand Dollars.

The recommended program of future work includes the following:

Phase 1.

|   |                    |
|---|--------------------|
| 1. Repairs to the road  | \$ 1,000.00        |
| 2. X-Ray diamond drilling on SW continuation of B-1 vein-----                             | 1,500.00           |
| 3. Diamond drilling along SE and NW extensions of the valley between outcrops "A" and "B" | 10,000.00          |
| 4. Exploratory drilling around nose of fold, NW end of outcrop "A" -----                  | 10,000.00          |
| 5. Closely spaced magnetometer survey of claims T23512, T23513 and T25809 -----           | 1,000.00           |
| 6. Exploratory drilling of magnetic anomalies--   | 5,000.00           |
| 7. Management and professional services -----   | <u>6,500.00</u>    |
| Cost -  | <u>\$55,000.00</u> |

Phase 1. should occupy about 18 months, and its successful completion would be followed immediately by Phase 2.

Phase 2.

|  |                    |
|--|--------------------|
| 1. Hard surface gravelling of road,  | \$ 5,000.00        |
| 2. Erection of buildings, opening of subsidiary roads etc.,  | 10,000.00          |
| 3. Diamond drilling to outline and sample ore,   | 40,000.00          |
| 4. Reserve for management and for miscellaneous items such as fees for consulting engineers, geologists, etc., | <u>10,000.00</u>   |
| Cost -   | <u>\$65,000.00</u> |

Phase 2. should occupy an additional 18 months. Total elapsed time 3 years -  
Total cost \$100,000.00.

This vein contains quartz of several generations, much granulated and well mineralized with pyrite, fine grained galena and some sphalerite. Channel samples across the B-1 vein gave the following values:-

|                                     |     |               |
|-------------------------------------|-----|---------------|
| NE end of B-1 vein, NW segment, 15" | --- | trace gold    |
| NE end of B-1 vein, SE segment, 14" | --- | 0.02 oz. gold |
| SW end of B-1 vein, SE segment, 29" | --- | 0.04 oz. gold |

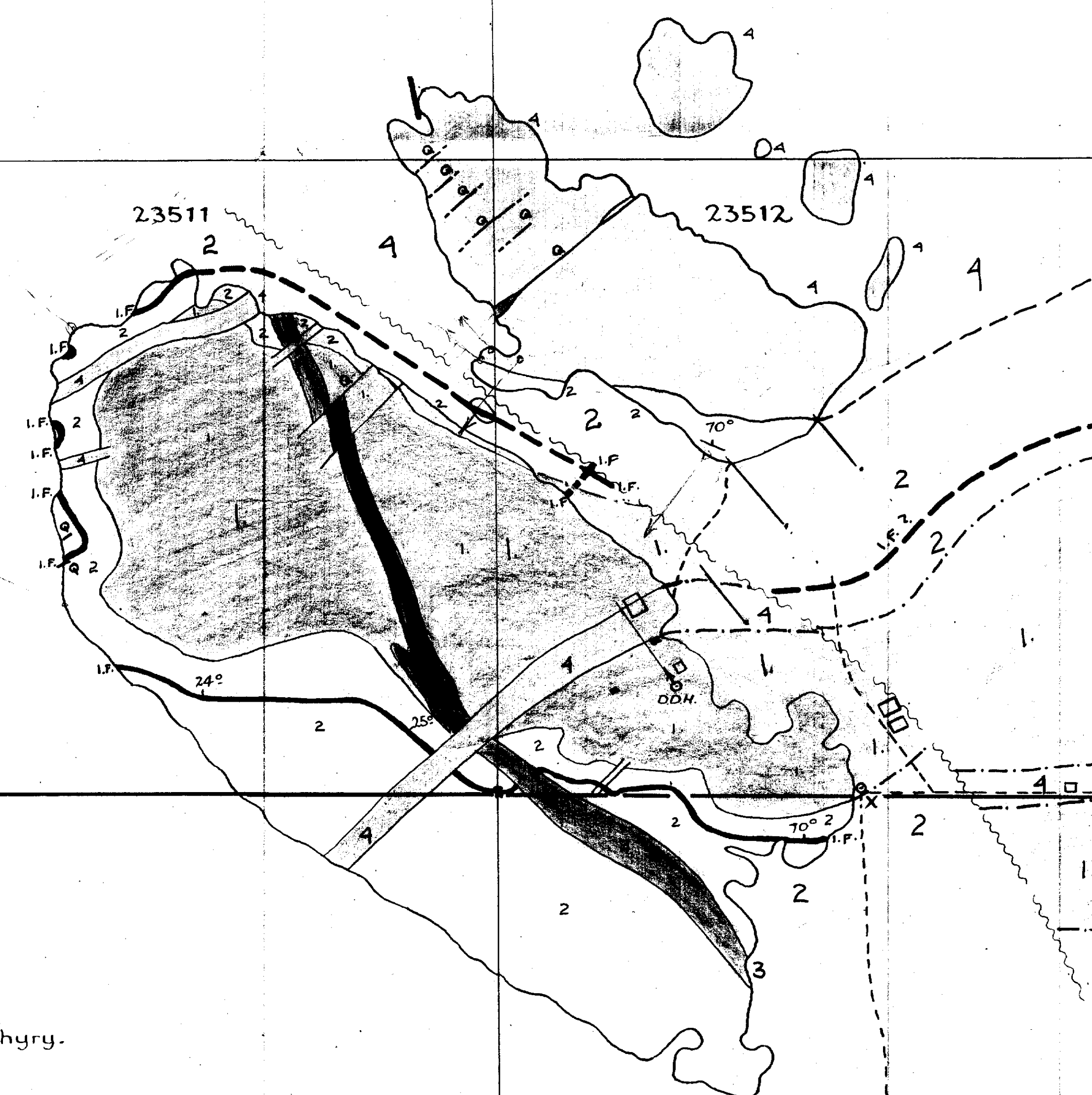
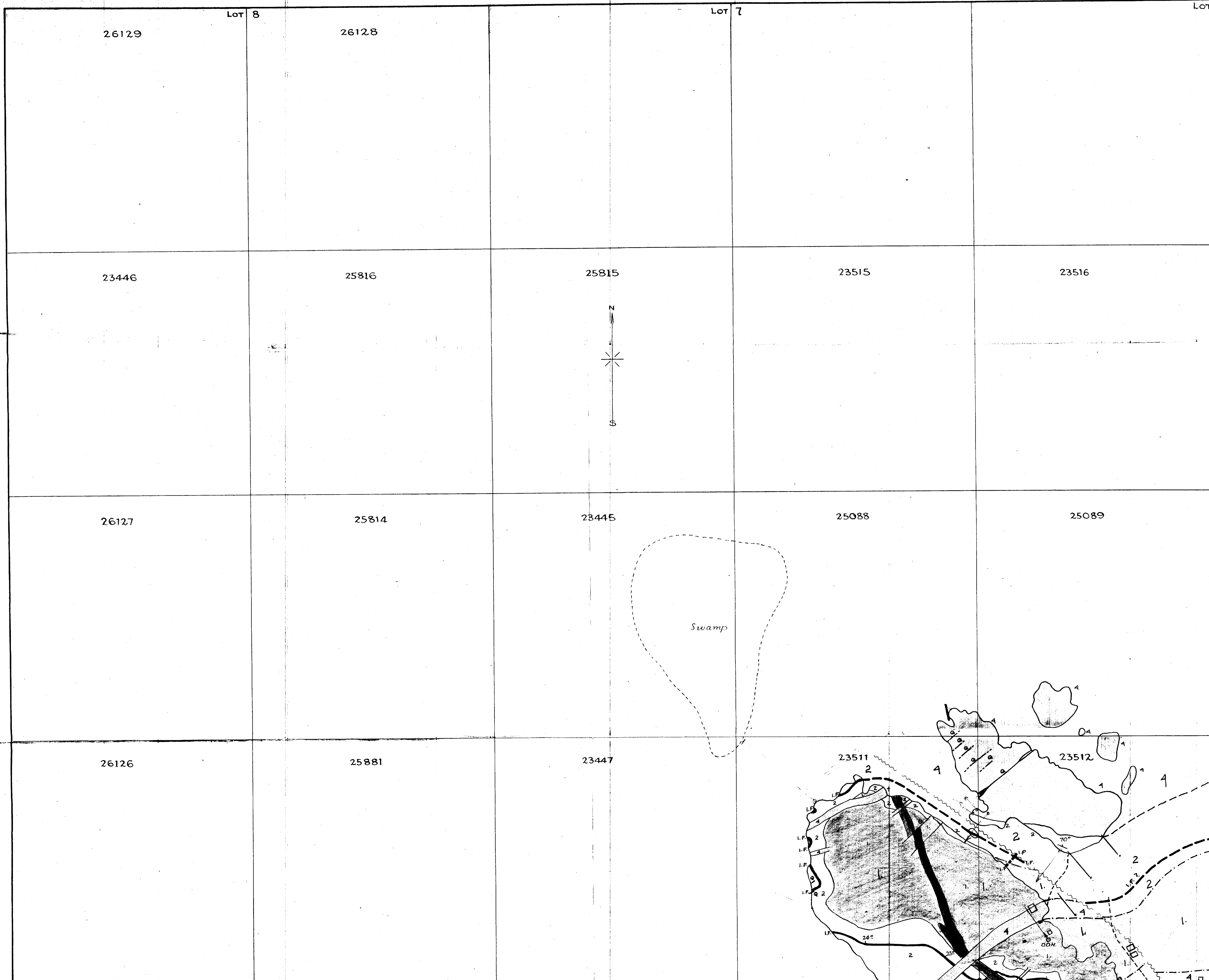
Quartz veins have been located by officers of the Synicate as shown at the west end of the "A" outcrop, and gold has been reported in grab samples.

The geology of the Cunigold property is favorable to the occurrence of gold ore deposits, and is also favorable for the occurrence of massive and disseminated copper ore deposits. The positional arrangements of the intrusive granodiorite and the intruded sediments and lavas are ideal for ore deposits, provided structural controls such as faults were also present and were opened at the time of generation of the ore forming solutions.

The structural geology appears to be favorable. The quartz veins on outcrop "B" occupy the position of strike slip shears associated with the N--S horizontal compression due to the intrusion of the granodiorite. Another set of strike slip shears is to be expected nearly at right angles to the above set, and the valley between outcrops "A" and "B" possibly contains such a shear.

The SW side of outcrop "A" is possibly bounded by another shear of the same set. The presence of the granulated quartz and galena and sphalerite in the veins on outcrop "B" indicates that late reopening of the veins has taken place. The gold in the B-1 veins indicates that gold bearing solutions have entered the veins during the later movement. This means that other gold veins can be expected in this area with about 80% certainty.

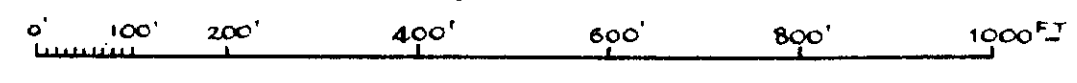




Legend

- 4 Granodiorite, Diorite, Granite, Felspar Porphyry.
- 3 Gabbro.
- 1 Basalt, Serpentine, Andesite
- 2 Quartzite, Conglomerate, Argillite, Iron Formation, (Black)

Scale



Drawn from Plan by *J.H. Smith*  
 by *F.P. Lloyd* Toronto, Ont. 1945

*Curigold Mining Syndicate  
 Mann Twp*

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