

PRINCETON PROJECT

Exploration Report - Period Ending May 31, 1971

The crew, consisting of Scott Boyd, Werner Gruenwald, Ted LaRose and myself, together with Stan Maurer of Sabre Electronics, left Vancouver on May 3, 1971 for Princeton. During the month reconnaissance soil, silt and geological surveys were completed on the Cop claims. A series of soils taken from a talus slope on claims Cop 37 and 38 was followed by a ground magnetometer and soil survey on a grid 400' by 200'. This survey was not complete at the month end and the results of the soils are not yet in.

Approximately 352 square miles were flown with an airborne magnetometer. An altitude of between 200 and 500' was maintained above the ground surface with a few exceptions. Because of the topographic relief there were occasions when the aircraft was possibly 800' above a river valley or 50' above a mountain top. These extreme variations were noted on the tapes.

As a result of the aeromag survey, a group of 80 claims was staked on Frenchy Creek, about 28 miles southwest of Princeton. At the time of staking, snow covered the claims, consequently, nothing is known of the underlying rocks. By month end the area was still snow covered. The group includes mineral claims Toe 1 to 80, inclusive.

On May 22 Scott Boyd, Werner Gruenwald and Ted LaRose returned to Vancouver. On May 27 Bruce McLean and John Carnegie arrived at Princeton to continue the work.

Weather during the period was mixed - high winds, rain, snow flurries, clouds and sun prevailed. The weather hampered the airborne magnetometer survey somewhat.

Discussion on the Aeromagnetic Survey:

At the beginning of the survey a bird recently purchased from the makers of the Elsec Magnetometer was used. The bird, however, appears to have been designed for high speeds and would not fly. It could not fly horizontally because of its design and since it could not fly in this position it had a tendency to 'fish-tail'. In an attempt to rectify this situation the following was tried:

- (a) A cord was tied from the tail to the tow cable to bring the bird horizontal. - this failed to stop the fishtail.
- (b) A funnel-shaped plastic air scoop was tied to the tail of the bird - this failed.
- (c) The tow cable was shortened - slight improvement.
- (d) A 20 pound lead weight was suspended from the tow cable 10' in front of the bird. This stabilized the cable, however, the bird tended to sway as well as fishtail below the weight.

When these attempts failed to make the bird fly, it was abandoned. The helicopter balance was recalculated with the aluminum boom on the pilot's side and extended to a point where the head was 6" to 8" in front of the rotor and the battery moved

back on the tail by about 16". Rebalancing the machine in this manner eliminated the need for the 40 pounds of weight previously used on the tail section of the helicopter. The elimination of the 40 pound weight was one of the reasons for ordering the bird. A second reason for the bird, of course, was to add a margin of safety not available with the boom.

Because of the problems with the bird and some problems with the magnetometer itself, the number of hours to fly the area exceeded the estimate by 5 to 7 hours.

Ted LaRose took over operation of the magnetometer from Stan Maurer on May 15.

Plans for Next Period

1. Complete work on the Cop claims.
2. Examine the north anomaly at the head of Asp Creek.
3. Examine any airborne magnetic anomalies that may occur.
4. Some regional silt sampling.

John C. Lund.

## PRINCETON PROJECT

Exploration Report - Period Ending June 30, 1971

During this period work was concentrated on the Cop claims and on the aeromag anomaly on Whipsaw Creek. Weather was generally cool and cloudy. Rain showers were common and warm sunny days rare.

### Cop Claims:

Soil, magnetometer and geological surveys were completed over Cop claims 37 to 44 and 55 to 62. Traces only of copper were found. These were in a slightly altered volcanic rock associated with disseminated pyrrhotite.

The area is underlain by andesitic and basaltic lavas as well as crystal and lithic tuffs of the Nicola group. These have been intruded by diorite and syenodiorite intrusive masses. All the above rocks are cut by a Cretaceous intrusion which is mainly granodiorite in composition, but may in places be as acid as granite. Dark to medium green feldspar porphyry and light grey finely porphyritic felsite dykes cut Nicola rocks. The felsite dykes have scattered thin laths of hornblende and short, stubby, doubly terminated quartz crystals. A third porphyry, slightly granitic in character, occurs on an east-west creek in the centre of the claim group. This rock is heavily pyritized in part, particularly where the rock is cut by felsite dykes. No copper was seen in the porphyry.

Finely vesicular and amygdaloid tertiary lavas with one small mapped sandstone bed overlie all other rocks.

Results of the geochem survey were not encouraging. Only small, isolated, mainly one sample 'highs', were outlined.

The magnetometer survey outlined a distinct N60°E lineament that is also marked by topography and the soil survey. This lineament likely represents a prominent fault. Values of 11,500 gammas or less occur mainly over the Cretaceous granodiorite. The diorite or syenodiorite is distinctly more magnetic giving values of 12,500 to 13,500 gammas. The survey suggests that the diorite-syenodiorite rocks continue beneath the Tertiary cover.

The rocks are, with the exception of epidote and chlorite, essentially unaltered and generally massive with no outward signs of copper mineralization. The exception is a small area that has traces of chalcopyrite associated with disseminated pyrrhotite. To date nothing has been done on the north Cop group other than five reconnaissance lines of soil samples none of which were anomalous. As a consequence, no further work has been done on this group and none is planned.

Before a final recommendation is made regarding further work, the data will be re-examined for evaluation.

Toe Claims:

Nothing has been done on the Toe claims because of the presence of snow. It is expected that conditions will permit work to begin about mid-July.

Other work:

Three aeromagnetic anomalies were examined. Two were magnetic lows caused by Tertiary lavas, the third, a "thumb print" magnetic high which appears to be caused by a basic intrusion.

The magnetic high lies south of Whipsaw Creek between the main easterly flowing and a northeast flowing tributary of Whipsaw Creek. The "eye" of the anomaly occurs on claims held by Whipsaw Mines. A group of 16 claims were staked to cover the eastern part of the anomaly. A map is enclosed showing the position of our claims called the Dale Group with respect to the Whipsaw Mines property.

During staking we found a small copper occurrence that does not appear to have had any previous work done. It consists of chalcopryrite in a quartz-rich rock that appears to be a lense of highly altered granitic rock wedged between or near the contact between a quartz-sericite schist and a coarse-grained pyroxene porphyry. The lense is about 1' X 2' as exposed, however, with some excavation it may extend further. Very little chalcopryrite extends beyond the lense. Present plans for the Dale property are to complete a ground magnetometer and soil survey over the Dale #7,8,9, 10, 11 and 12 claims. If anything of interest were to develop from this small showing and the present surveys, it would be essential to have control of the Whipsaw Mines Pat #5 to #21 mineral claims and the Cass #5 to #16 claims held by J.E. Smith of Box 639, Merritt, B.C. Soils from lines over the showing will be sent on Sunday's bus to Vangeochem for assay. Results should be back by Friday, July 9. A decision regarding adjacent ground could be made at that time unless you feel that recipients of the GeoEx survey might develop an interest in the ground.

Plans for Next Period:

1. Complete the ground mag and soil survey on the Dale claims.
2. Check conditions on the Toe claims.

John C. Lund

Received July 5, 1971.

COPY

G.M. Hogg

W.M. Sirola

Princeton Project Exploration Reports for Periods  
Ending May 31 and June 30, 1971.

July 13, 1971.

Enclosed are the above reports together with copies of geochemical results and sketches of the newly acquired Dale claims on a tributary of Whipsaw Creek.

The purpose in sending you this information is to provide you with the actual details of what John has been doing. We regret that the June report is not yet typed since we just got it a few days ago, but we will send along the typed copy within the next few days.

Our policy in evaluating the claim blocks has been to do geological and geochemical evaluations in the areas of immediate interest, such as the contact between the pyroxenite and the Nicola rocks on the Dale group. The pyroxenite shows up as a strong aeromagnetic anomaly centered just west of the east boundary of the Whipsaw Mines Pat claims, which in turn border on our Dale claims (see sketch).

There are sporadic copper highs on both the Cop and Dale claims, but I have not as yet had an opportunity to put these on a map, so for the moment you will have to be content with the assay sheets.

WMS/jm  
Encls.

W.M. Sirola.

## PRINCETON PROJECT

### Exploration Report - Period Ending July 15, 1971

Work was mainly confined to the Dale claim group on Whipsaw Creek during this period. Weather was unsettled and cool - on July 6 there was snow on the Dale property.

#### Dale Claims:

A geological, geochemical and magcrometer survey was completed on the ten most westerly claims. Results from the soil survey have not all come in yet, however, there is an interesting anomaly shaping up on L16E between 22 and 28 north. Whether or not it will be important will depend on results from adjacent lines to the east. The magcrometer appears to roughly outline a magnetic high which would correspond to the aeromag anomaly. The ground mag, however, seems to pick out small pyroxinite bodies intruding the schists locally. These small pyroxinites are likely apophysis off a larger unexposed mass.

Geologically, the region has been regionally metamorphosed. The grade of metamorphism increases from a green schist facies near Whipsaw Creek (main branch) to a relatively high grade sericite schist on the south boundary of the property. Within the chlorite-sericite schists, phenocrysts of pyroxene are commonly present. With increased metamorphism these crystals are broken down and "squeezed" into "micro-cigar" shapes. This variation in metamorphic grade is more apparent on the eastern part of the property.

Small pyroxinite and pyroxine porphyry rocks intrude the schists. Where this occurs the metamorphic grades are not easily recognized. Near the contact of a small pyroxine porphyry mass is a small occurrence of chalcopyrite. It occurs in quartz and quartz-feldspar gneiss and is about 3' long 8" to 1' thick and dips at 24° into the hill. It appears to be a very local concentration of copper.

A feldspathic rock that outcrops near the creek (southwest branch of Whipsaw) resembles in some ways an intrusive rock. It is slightly foliated but has not been subjected to the same metamorphic forces as the volcanic rocks (now schists).

One small diorite outcrop occurs at about L16E & 28N. It is bounded on two sides by outcrops of schists and is likely a dyke.

No major faults were recognized and evidence of hydrothermal alteration not observed.

A map of the geology and mag survey accompanies this report.

Princeton Project - Exploration Report - July 15, 1971.  
PAGE TWO

On July 14 John Carnegie and Richard Sirola were put onto the Toe claims to silt the streams draining the claim area. The property is well endowed with small creeks, hence, silting should give some indication of the presence of copper, if any.

Plans for Next Period:

1. Complete silting and map geology of the Toe claims.
2. Examine R.B. Stokes' properties on Summers Creek and Allison Lake.
3. If possible, examine Shaist Mines property on Whipsaw.
4. Continue regional study based on aeromag data in conjunction with geology.

John C. Lund, P. Eng.

July 18, 1971.

*copies to:  
J. Lund ✓  
E. M. Hagg - August 2/71 ✓*

## PRINCETON PROJECT

### Exploration Report - Period Ending July 31, 1971

Continued work on the Toe Claims as well as examination of aeromagnetic features considered anomalous. Two properties were examined, the Skaist Mines prospect and the Whipsaw Mines Ltd. property. The latter has been described in a separate report.

Weather continues to be hot and dry. Although the forest hazard is high, it has not prevented us from working. When thunderclouds are around, as a safety precaution, we keep near roads or make traverses where swamps or meadows are near in case of fire. The forest is very dry and it would take very little to start a fire.

On July 17th I visited the Amax Summers Creek property. Mineralization there is associated with small masses of diorite and microdiorite where these have intruded Nicola volcanic rocks. The area is complexly faulted and intense shattering of the host rocks is evident. Summers Creek is mapped as a prominent or major north-south break, with mineralization associated with subsidiary faults and shatter zones on both sides of the fault.

The Amax deposit consists of three separate mineralized zones consisting mainly of pyrite, chalcopyrite and malachite on fracture surfaces in Nicola rocks. Alteration is most noticeable in oxidation of pyrite. Epidote and chlorite are present but not useful as a guide. In some specimens examined there were a few salmon coloured feldspar crystals that could be albite, similar to that found at Copper Mountain.

The most outstanding features about this deposit are the intense fracturing, presence of up to 5% pyrite, limonite formed by oxidation of pyrite and the malachite stain.

This is an old showing on which a short adit had been driven several years ago.

#### Property Examinations:

##### Skaist Mines Ltd.

On Saturday, July 24th, I examined the Skaist Mines property near the head of Whipsaw Creek. Phil Anderson of Stokes Engineering acted as guide.

Rocks underlying the Skaist property are mainly gneissic diorite and paragneisses of the Eagle Granodiorite granitoid mass. They have a northwesterly strike and moderate southwesterly dip. These apparently grade easterly in decreasing metamorphic grades to meta-volcanics and sediments of the Nicola Group. Intruding the gneissic rocks are sills of quartz-felspar porphyry.



Mineralization consists mainly of pyrite with sparse chalcopyrite and molybdenite on fracture surfaces in both the unaltered Eagle gneissic quartz-diorite and porphyry sills. There does appear to be an increase in pyrite in the porphyry. Some fractures are quartz filled but in general they are dry.

Alteration is not extensive. There is one zone of argillic alteration accompanied by deep weathering and depletion of mafic minerals. This is a white quartzofeldspathic rock cut by fine quartz veins. Although no noticeable chalcopyrite or  $\text{MoS}_2$  is present, it does appear to be one of the better target areas. The zone is about 2,000' long as exposed by trenching, with an unknown width. Because of the low pyrite content, an I.P. survey would likely be the best for exploring this zone.

$\text{MoS}_2$  bearing float has been found north of the present workings near Hudson Bay Meadows. This area is unexplored. It is an area of many meadows and swamps with little outcrop. A soil survey combined with I.P. and follow-up bulldozer trenching to expose bedrock would be the best way to evaluate this area.

This property still has some potential as a prospect and warrants further work. If an amenable arrangement can be made with Skaist Mines, I recommend the following work:

1. Cut a grid from limits of the present work to the North extent of the property. Initially the lines could be at 800 foot spacing with soil samples taken at 400 foot intervals on the lines.
2. Complete an I.P. survey over the altered zone.
3. Where the soil survey dictates, complete an I.P. survey over copper anomalous areas.
4. Bulldoze trench I.P. anomalies to expose bedrocks. Alternatively, diamond drilling could be done to test coincident I.P. and soil anomalies.

#### Toe Claims

Silting has been completed on the Toe Claims. Results show a slightly higher background area covering possibly six claims on the southeast corner of the claim group. Four lines of soils are being taken to further evaluate this area. The ground covered by the Toe Claims is relatively flat with many swamps, small seepages and few outcrops. There are areas where boulders are not present or at least exposed, consequently geology is sketchy.

Dale Claims

No further work here until geochemical results are in.

Plans for Next Period:

1. Continue evaluation of Toe Claims.
2. Dig test pits on Dale Claims for soil profiles.
3. Dig test pit on Toe Claims for soil profile.
4. Continue regional evaluation of area.
5. Continue to study and examine aeromagnetic features considered anomalous.

John C. Lund.

Received August 16, 1971.

## PRINCETON PROJECT

### Exploration Report - Period Ending August 15, 1971

Work this period was confined mainly to the Toe Claims and the Dale Claims. Weather during this period was hot and dry.

#### Toe Claims:

Geology was mapped and some soils taken on claim lines. Results of the sampling were not encouraging.

Outcrop is scarce on the Toe Claims, probably less than 5%. Consequently, mapping was based on boulder mapping and aeromagnetics. Outcrops of pyroxinite occur within the magnetic high. It is a coarse-grained to fine-grained pyroxinite with disseminated grains of magnetite. Where the rock is coarse-grained there has been alteration to chlorite and/or amph.

Intruded rock, based mainly on boulder mapping, is a sequence of schists ranging from foliated volcanic rock to high grade sericite schists. Some quartz veining is apparently present by a number of barren white quartz boulders in Frenchie Creek. All quartz found was massive and barren.

Nowhere did we find any sulphide mineralization. Lack of response from the soil and silt samples taken is not encouraging.

#### Dale Claims:

Some additional soils were taken on the Dale Claims as a follow-up procedure to expand on small copper anomalous areas. Two test pits were dug to sample different horizons. One pit was dug in an anomalous area, one in a background area. Soil horizons are reasonably well developed.

#### Aeromagnetic Anomalies:

An aeromagnetic anomaly occurring as a circular feature of intermediate intensity southeast of the Toe Claims near the head of the east branch of 47 Mile Creek was checked out. Two silt samples below the anomaly gave values of 193 ppm Cu and 203 ppm Cu. A line of soil samples taken east-west across the anomaly on 1,000 foot intervals has given one sample with 248 ppm Cu. Additional soils have been taken to further evaluate this anomaly. If a picture develops that justifies staking, the Toe Claim block will be extended to cover this area. There are virtually no outcrops in this area.

#### Outside Properties:

The Breccia zone on Texas Gulf's claims next to Whipsaw Mines' property was sampled to determine what values might be expected from any extension of the zone vertically or horizontally. Average copper values across the 50 foot Breccia zone is 0.159%. There is no reason to believe this figure could be increased to an economic grade. Based on the distribution of outcrops, I could estimate that

the zone would not exceed 200 feet in width at any point. Consequently, a grade in excess of 0.7% would likely be required to make the zone economically interesting.

Work Planned for Next Period:

1. Check geological and aeromagnetic target on Darcy Mountain, southeast of Princeton.
2. Sample east side of the two aeromagnetic anomalies southeast of Copper Mountain.
3. Run about 4.5 miles of S.P. lines on the Dale claims.
4. Stake area southeast of Toe Claims to include the coincident copper and aeromagnetic anomaly. These will be staked as an extension to the Toe group.

Comments:

Unless a favourable geochem picture develops on the 47 Mile Creek, east branch, anomaly or encouraging results are obtained from the S.P. work on the Dale Claims, all targets will be checked out within seven days. Additional regional examination and familiarization with the broad geological picture can be done. However, at present I have no specific targets on which to work.

John Carnegie would like to work until mid-September. If there is work for him elsewhere, either in the Yukon or with Fred, we should consider transferring him as soon as we see what develops here.

John C. Lund

Received August 20, 1971.