93-A-7

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Eureka Mountain

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Introduction

This property was visited on August 2 by helicopter from Williams Lake, returning the following morning. Eureka Mountain lies between Crooked Lake and McKay River in the upper Horsefly River drainage basin on the east half of Quesnel Lake map sheet (NTS 93A). A road has been constructed to the property leading off the main logging road on Horsefly River. The last few miles of the road to the property are currently closed by a number of deep washouts. Prospector Eric Scholtes of Williams Lake was at the camp on the property when I arrived, having succeeded in getting in the previous day by Honda motorcycle. Scholtes is co-owner of the property with Jim Carson of Williams Lake and an unidentified grubstaker.

The copper showings were discovered about 2 years ago and subsequently optioned to Helicon Explorations, a subsidiary of Chapman, Wood and Griswold Ltd. None of the maps and reports by Chapman et al were available until after visiting the property. Noranda recently examined this data but expressed no further interest.

Eureka Mountain comprises a long, northwest-trending ridge dividing the drainage of McKay River and McKoskey Creek, both tributaries of Horsefly River. The ridge rises above 6500 feet elevation over about 6 miles of its length and culminates in Eureka Peak at 7959 feet. On the northeast side of the ridge are a series of deeply-cut, northerly-trending valleys which terminate upstream in well defined cirques, most of which contain small lakes.

These cirques are subsequently referred to by number with No. 1 being furthest to the southeast. On the northeast side of the mountain the upper slopes are almost precipitous and the rock is largely exposed. In Cirque 2, where most work has been done, the exposure is almost continuous from the summit ridge down to about the 5300 feet level. The inter-cirque ridges are heavily forested and here the exposure is poor to well above 6000 feet elevation.

Geology

The geology is complex and would challenge even the most experienced geologist. As a first approximation the rocks can be divided into 3 northwest trending belts: a basic to ultra-basic intrusive on the northeast; a central mixed zone of rusty-weathering rocks; and on the southwest a large area of grey-weathering augite porphyry.

The intrusive on the northeast is at least 4500 feet wide and possibly several miles long. The southwest contact of this body appears from the air to be somewhat irregular and to coincide roughly with the line of cirque lakes on the northeast side of the mountain. According to Mr. Scholtes argillite outcrops in McKay River valley to the north of the intrusive. Where examined in Cirque 2 this intrusive appears to be a pyroxenite. On one of the available maps the names 'gabbro' and 'bronzitite' are pencilled across this intrusive at other points so probably the rock varies from pyroxene gabbro to pyroxenite. Biotite is present in some specimens. Float of this rock near the southwest contact was

noted to be strongly altered to hydrous minerals, mainly chlorite with some green amphibole and brittle amphibole asbestos. Some float of this rock shows bleaching and alteration to indeterminate white material. Also noted within the altered zones were thick seams of almost pure epidote, apparently developed along faults. Some of this rock is strongly magnetic owing to abundant magnetite.

The augite-porphyry belt southwest of the central zone is a structureless mass of uncertain origin. The writer walked across about ¼ mile of this belt without being able to determine whether it was intrusive or extrusive. A porphyritic texture is characteristic but the size of the black augite phenocrysts varies from one outcrop to another up to a maximum size of about 1 inch. The matrix is generally dark green, fine-grained, and indeterminate. Some shearing is present locally and also small dykes of grey hornblende-porphyry. The rock much resembles some of the Triassic-Jurassic augite-porphyry flows that underly much of the country further to the northwest.

The entire central belt was crossed in Cirque 2. The belt as a whole is characterized by foliated rocks of low metamorphic grade but the degree of schistosity varies irregularly across the belt. Approximately the southern half of the belf is underlain by metavolcanic rocks of intermediate to basic composition. These rocks include breccias and possibly some flows and finer grained clastic rocks. Where not too strongly sheared the volcanic rock and breccia fragments resemble the finer grained portions of the augite porphyry belt to the southwest. The greater part of these rocks are now altered to chlorite schists. Pyrite and sometimes pyrrhotite are locally quite abundant constituents but copper mineralization appears to be practically absent. Only at one point,

in a bleached zone along a small fault, was a trace of chalcopyrite noted in the southern half of the central belt.

The northern half of the central belt was examined in Cirque 2 and Cirque 7. In Cirque 7 this section is obviously of sedimentary origin though intruded by very numerous sills and dykes. The sediments noted were mainly light colored quartzitic (?) siltstones with some dark argillite metamorphosed to about phyllite grade. In Cirque 2 a greater variety of rocks are present and more intense alteration renders their primary origin obscure. The section on Cirque 2 undoubtedly contains some volcanic (?) breccia, possibly some altered sediments, and a great profusion of dykes and irregular small intrusive bodies. Some chlorite schists are present but for the most part the rocks present a less basic aspect than in the southern part of the central belt. The most common rock type is a hornblende porphyry which in some outcrops looks like a volcanic or dyke rock and in others gives the impression of being a contact metamorphic granulite. A number of serpentinized basic dykes were noted, now altered to schist, and containing traces of copper mineralization. Also noted were very pale green schistose rocks of indeterminate origin but occurring in well defined layers trending about N60E and dipping steeply north. These schists, which are quite limey and much resemble fine-grained diopsidic marbles, invariably carry disseminated pyrite and chalcopyrite mineralization. The chalcopyrite is in lenticular aggregates, flattened in the plane of foliation, and the amount varies up to an estimated maximum of 0.3% copper.

Acid rocks are absent or scarce on the eastern side of Cirque 2. On the west side of Cirque 2 the lowermost outcrops expose irregular zones of medium-grained feldspathic rock which may have been intrusive but could not be differentiated with certainty from altered volcanic rocks or sediments. Possibly this rock is a phase of a small 'diorite to quartz-diorite' body mapped by 'Chapman" geologists at higher elevations on this same slope.

Structure

An episode of penetrative deformation, apparently confined to the central belt, has produced a foliation in the original section and in many of the intrusive bodies. Possibly some of the younger more acid intrusions post-date this deformation but further observations are necessary to establish this point. The foliation, so far as known, has a fairly regular attitude striking about N70^{o}W and dipping steeply north. Near the middle of the central belt, vertical and even steep southerly dips were noted but these variations were limited in extent. This foliation is perhaps impressed on previously folded rocks though the difficulty of recognizing bedding in these altered and sheared rocks precluded reliable observations. In Cirque 7 what appeared to be bedding with a southerly dip was visible from the air but no determinations could be made at the points examined on the ground. Here the mineralized shear zones show the same attitude as the foliation in Cirque 2. The metamorphic foliation impressed on these rocks is possibly the result of stresses induced near a major fault.

Economic Geology

Evidence of hydrothermal alteration is widespread, particularly in the northern part of the central zone. Argillic alteration is present along faults and epidotization and chloritization is very common, especially in the breccias. It appears that some at least of the alteration post-dates the development of foliation. Small quartz veins are fairly abundant and usually contain one or more uncommon silicate minerals tentatively identified as clinozoisite (?) prehnite (?) adularia (?) and fibrous amphibole. Pyrite and chalcopyrite are scarce in quartz veins.

Iron sulfide mineralization is present throughout the central belt and becomes increasingly abundant towards the gabbro contact. The iron mineralization may be either pyrite or pyrrhotite or both and occurs as both disseminations and fracture fillings. In places the iron sulfide content may be as high as 20% but usually it is much less though always conspicuous. Copper mineralization is present almost entirely as chalcopyrite. Malachite is rare. Except for one minor occurrence in the southern half of the central belt copper mineralization seems to be restricted to within about ¼ mile of the gabbro contact and to occur with increasing frequency towards the gabbro and towards lower elevations. Apart from the basic dykes and the pale green diopsidic (?) rocks noted above which carry disseminated chalcopyrite, all the copper mineralization seen occurred along fractures. Copper occurrences are numerous but widely scattered. In some cases as at Cirque 7, the mineralization is along faults and here ore grade material can be seen. Some of these zones in Cirques 1 and 7, have been drilled by x-ray drill and thicknesses of several feet of ore grade are reported by the owners. In other cases sparse chalcopyrite mineralization occurs in systems of small tight fractures

without apparent relationship to faults. Pyrite or pyrrhotite accompany the chalcopyrite though the latter appears to be more common near the gabbro contact. The best fracture mineralization seen is around the portal of the adit in Cirque 2 at the lower limit of outcrop. Here the mineralization shows evidence of developing into massive sulfide ore by replacement outwards from fractures. This mineralization is mainly pyrrhotite in amounts up to about 20% and some of this material was estimated to carry more than 1% copper. There appeared to be no regularity to this mineralization around the portal nor any relationship to faults though a few small tight faults are present, one of which appeared to offset the ore towards the valley. The adit is collared at the upper limit of talus and it appears that the adit ran out of this type of mineralization within a few feet. The adit was driven to provide a safe drillsite to test the downward extension of a small 'diorite to quartz diorite' body at surface on which assays of 0.1 to 0.5% copper had been obtained.

Previous Work

Chapman, Wood & Griswold Ltd. through their subsidiary Helicon Exploration, are reliably reported to have spent $155,000.00 on this 172 claim property. Work done includes construction of a road; aerial photography; compilation of a topographic map of the area with 100 feet contour interval; an aeromagnetic survey; ground E.M. and I.P. surveys in Cirque 2, reconnaissance silt (and soil?) sampling of the general area; and some slightly more detailed soil sampling in Cirque 2. A geological map of the area was compiled

on a scale of 1000 feet to 1 inch. In addition some x-ray drilling was done on small copper showings in Cirques 1 and 7; two short trenches were dug in Cirque 2; and a 72 foot adit was driven to provide a safe drillsite for a 630 foot hole drilled southwesterly at $+4^{o}$ from Cirque 2. A campsite was bulldozed in Cirque 2 and two plywood cabins and three floored and sided tent frames erected: the tent frames have been damaged by snow and porcupines but the two cabins are intact.

The results of previous work are available as geological; aeromagnetic; topographic; and geochemical maps. The core from the 630 foot hole is stored at Mr. Scholtes home in Williams Lake. A graphical summary of the 630 foot core assays shows low grade mineralization throughout (.05 - .15% Cu), but none of the better grade ore encountered in driving the adit. This hole was abandoned short of the desired objective. A number of aeromagnetic anomalies occur within the gabbro and at the gabbro contacts, which may be due to magnetite though pyrrhotite in this area is also strongly magnetic. One of the maps notes a pyrrhotite rich zone within the gabbro. E.M. and I.P. anomalies were discovered in Cirque 2 but apparently not tested. The geochemical work revealed high copper values throughout the rusty belt with exceptional concentrations in some sample sites, particularly in Cirque 2. No information is available as to the method of sampling. In general it can be assumed that ground geochemical and geophysical work was conducted over overburden as most outcrop areas are accessible only along the talus margin. Talus accumulation is slow so most talus slopes are thickly vegetated.

Conclusions and Recommendations

The Eureka Mountain area comprises a geological environment favourable to the occurrence of copper mineralization of the Anyox and Granduc type. The area should not be written off without further prospecting which should be done very carefully. The presence of copper in float and outcrop is not indicated by malachite staining and ore grade material looks no different on the weathered surface from rock containing only iron sulfides. (Apparently the copper mineralization at the adit portal was discovered by the miners and was not previously known although right at the surface.) In my opinion the gabbro contact zone represents the most likely place to look for economic mineralization, which if present should be in the form of massive or near massive sulfide ore containing pyrrhotite and chalcopyrite. The presence of E.M. conductive zones along the gabbro contact is most interesting and according to available data the Chapman interests did not test the conductive zone in Cirque 2. Confirmation and testing of at least one E.M. conductor is warranted.

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