860691

QUESNEL PROJECT

The reconnaissance geochemical program of 1966 covered most of the band of Mesozoic rocks between Quesnel (to the north) and Canim Lake (to the southeast). Although the work was largely restricted to the Mesozoic rocks, it did in places lap over onto the adjacent strata. In the follow-up work of 1967, the better anomalies in areas free of mineral claims were examined. In order to determine the amount of additional exploration needed in this region it is necessary to review the known mineralization in relationship to the geology.

GENERAL GEOLOGY

In the northern half of the surveyed area, the Mesozoic volcanic and sedimentary strata occur in a northeasterly-striking band about twenty miles wide. The Pinchi Fault separates this Mesozoic band from the Palaeozoic strata to the northeast and the ancient positive block of Cache Creek rocks bound it on the southwest. Within the Mesozoic band, volcanic rocks are dominant in the western part, whereas sedimentary rocks predominate along the eastern side. At Quesnel the volcanic band appears to pinch out; and to the north of Quesnel the Mesozoic strata are mainly sedimentary rocks (argillites and slates).

In the southern half of the geochemically surveyed area, a batholith with diameter of thirty miles forms the main geologic feature. The Mesozoic strata bulge eastward around this batholithic body and also westward around it. The intrusive body has previously been referred to as Takomkame Batholith.

Another important geological unit is the Cuisson Batholith which occurs within the Cache Creek block. Large exposures of this batholith occur in the vicinity of Cuisson Lake east of the Fraser River. Additional exposures of intrusive rock, which are probably part of the same batholith, occur along Narcosli Creek west of the Fraser River. The two areas of exposures of the batholith are separated by about ten miles of plateau basalts.

At the south end of the surveyed area and extending southward for another forty miles Eocene volcanic rocks are in fault contact with the Mesozoic rock units.

Plateau basalts lap onto all of the prior rock units and bound the surveyed area on the south and on the west.

Numerous occurrences and deposits of copper occur in the Mesozoic

rocks of the region. Near Quesnel there is disseminated chalcopyrite in the andesites of Mouse Mountain; in the vicinity of Hen-Ingram Lake, chalcopyrite and pyrrhotite appear to be associated with gabbroic dykes; along the north shore of Quesnel Lake a similar occurrence of minor chalcopyrite occurs in volcanic rocks in the vicinity of gabbroic intrusives; the Bootjack Lake deposit of Cariboo-Bell occurs within the Mesozoic volcanic rocks and is geologically very similar to the copper occurrences at Peach Lake. Probably the largest concentrations of copper occur near Cuisson Lake where several companies have been drilling them for several years. These deposits occur within the Cuisson Batholith and also at the contact of the Cuisson Batholith and the Cache Creek rocks.

The Bootjack Lake deposit (Cariboo-Bell Copper Mines Ltd.), the Peach Lake showings (Coranex Limited), and probably the Horsefly showings (Magnum Consolidated Mines Co. Ltd.) are geologically very similar and a review of some of the unusual features of the volcanic rocks and the mineralization might shed some light on their genesis:

1. Flows of pyroxene basalt are a common volcanic type in the southern part of the area. In places the pyroxene phenocrysts become so abundant that the rock is actually a pyroxenite. At the contact of the Takomkame Batholith, near Canim Lake, these pyroxene basalts are metamorphosed to hornblendite with local bodies of diorite. No copper sulphides have been noted in any of the basalts or in the hornblendite. However a small copper occurrence was found in one of the diorite bodies. Even in the area to the north and south of Spout Lake where alteration and copper mineralization can readily be found within the pyroclastic rocks, the adjacent pyroxene basalts are barren.

2. At Peach Lake and at Bootjack Lake, pyroclastic rocks of an intermediate composition are predominant. Some of the volcanic units in the vicinity of Bootjack Lake contain abundant zeolites both as phenocrysts and as vesicle fillings. In both areas epidote is common throughout the rock and also in concentrations; in places small pods of epidote and garnet occur.

3. "Meta-diorites" or "pseudo-diorites" which are commonly found within the areas of pyroclastics are probably volcanic rock of intermediate composition with relatively coarse-grained plagioclase and biotite and also some large late poikilitic crystals of K-felspar. The so-called "syenite" at Cariboo-Bell and the previously called "meta-syenite" at Peach Lake are actually the "pseudo-diorite" stained by red alteration.

4. The red alteration is actually a reddish orange dusting within the crystals of plagioclase and K-felspar. This reddish alteration in felspars has been mistaken by many geologists for orthoclase; when occurring along a fracture the phenomenon has been mislabelled K-felspar flooding or alteration, and when occurring as a pervasive colouring within the rock, the rock has been misidentified as "syenite".

5. Tourmaline occurs within the pyroclastics at Peach Lake. It occurs along fractures spacially associated with the copper mineral-

ization and also as scattered rosettes within the rock in barren areas and in areas of copper mineralization.

6. At Peach Lake chalcopyrite and minor bornite occur in a disseminated form or within fractures, both in the pyroclastics and in the coarse-grained hornblende syenite to the north. The mineralization is generally associated with red alteration, especially where it occurs along fractures. However it can also occur along fractures where there is no red alteration and it can also occur as disseminated specks within scattered tourmaline rosettes or within epidote pockets away from the copper showings. In addition to the sulphide copper, native copper has been noted in the "pseudo-syenite".

7. A puzzling feature of the pyroclastics is the occurrence of round well-defined boulders of "pseudo-syenite" occurring within the lavas, both in areas where there has been some red alteration and in areas where there is no red alteration. Thus there is a suggestion of two periods of this red alteration. However another explanation is that the boulders themselves were susceptible to formation of this red alteration whereas the surrounding lava was not.

The above data indicates that the pyroclastics were laid down in a marine environment and incorporated within the pyroclastics were the lime constituents which subsequently formed the epidote and garnet and probably also the boron and sodium constituents which subsequently formed the tourmaline and the zeolites. The widespread copper which formed the chalcopyrite may have also originated in this manner. Subsequent metamorphism, possibly related to the intrusion of the granodiorite batholith, reconstituted the rock, forming sericite and epidote. One wonders whether it could also have mobilized some of the copper into fractures.

CONCLUSIONS AND RECOMMENDATIONS

The Cuisson Lake copper deposits occur in a granodiorite batholith that itself occurs within the Cache Creek block. They occur in the vicinity of a granite intrusion and they are accompanied by sericite alteration.

The Peach Lake and probably the other "red alteration" copper prospects of the district are not "porphyry coppers" as they are not related to specific distinct stocks and they do not have typical porphyry copper alteration. Possibly they were formed by reconstitution and the mobilizing force was the adjacent or underlying batholith.

The results of the investigations on three areas (Peach Lake, Horsefly* and Cariboo-Bell) of this unusual copper mineralization have been disappointing. However one must note that the district contains abundant copper and that not all the copper deposits are of the "red alteration" type. Therefore it would be advisable to complete the fol-

*The Horsefly prospect was not examined by Coranex geologists but the information they have indicates that it is probably similar to the Peach Lake mineralization.

123°
122°30'
122°
121°30'
121°
53°
52°30'
52°
WELLS
QUESNEL
Quesnel River
Pinchi Fault
McLeod Fault
Beaver Lake
Lanez Lake
Quesnel Lake
Hen Ingram Lake
Horsefly Lake
CARIBOO BELL
Beaver Lake
GIBRALTER MINES
Cranson Lake
Fraser River
WILLIAMS LAKE
Williams L.
Mahood Lake
Spout Lake
CORANEX
Lac La Hache
LAC LA HACHE
Canim Lake
100-MILE HOUSE

LEGEND

TERTIARY:

- Miocene plateau basalts
- Miocene sediments
- Eocene volcanics

MESOZOIC:

- Batholithic rocks
- Volcanics & sediments

PALAEOZOIC

- Sediments & volcanics

- Contact of Cache Creek block
- Boundary of Coranex geochemical survey

CORANEX LIMITED

QUESNEL PROJECT

REGIONAL GEOLOGY

SCALE 1:500,000

J.R. Woodcock Dec. 1967

Figure 2