

CHRISTMAS CREEK AREA

by J. F. Ariz

GENERAL INFORMATION

The area is located in the NW extremity of the Atsutla Range, approximately 40 miles due S from Mile 752 of the Alaska Highway. It is roughly bounded by $59^{\circ}17.5'N$ to $59^{\circ}22'N$, and $131^{\circ}38'W$ to $131^{\circ}44'W$. The central part of the area lies in the upper Christmas Creek basin which is a broad U-shaped, largely drift-covered valley flanked by steep-walled cirques to the south and east and a continuous moderately steep slope to the west. The south- and south-westerly-facing slopes beyond the ridges from the creek, and along the south-western margin of the Christmas Creek Batholith, are generally moderately sloping, smooth and strewn with talus and scree. The area is largely well-above timberline (4800') and presently only accessible by helicopter. Prospecting work was accomplished from five fly camps which are indicated in Figure 1 accompanying this report,

Soon after the discovery of several copper showings a total of 72 mineral claims were staked by our staff and prospectors. Our field crews were then pulled out and moved to other prospecting localities within our project area. Although spot examinations were made by our Staff on some of the showings, a higher-level follow-up survey has not been conducted.

This report combines preliminary information derived from our prospecting and spot surveys, and also office studies made on photogeology and structure of the area. The information was plotted on a photo-overlay map (Fig.1) from the 1-inch to $\frac{1}{2}$ -mile government air photographs.

GENERAL GEOLOGY & STRUCTURE

The prospected area is in general underlain by granitic rocks of the Christmas Creek batholith, and partly to the south by quartzite and limestone beds presumably belonging to the Kedahda Formation which is Carboniferous (?) and Permian in age. Except near Christmas Creek and a few other places, the granite contact is largely covered by talus and scree along the smooth and moderately sloping margins of the batholith. The contact approximately outlined in the map was traced by the use of distinctive SE-trending bedding joints of the stratified rocks seen in the photographs.

The granitic rocks of the Christmas Creek batholith apparently consists largely of an older phase hornblende diorite and granodiorite, (Unit 3), and a younger phase quartz monzonite (Unit 4). Unit 3 is a grey, medium-to fine-grained rock composed mainly of small laths of epidotized plagioclase, quartz, stubby prisms of hornblende, and minor biotite. Steeply dipping gneissic structure generally is poorly developed, and appears in the photograph with a slightly dark tone having close-spaced NE-trending major joints. The quartz monzonite is grey, medium-to coarse-grained rock, composed mainly of small laths of epidotized plagioclase, orthoclase and minor microcline, quartz and hornblende. This unit is distinguished on the photographs by its lighter shade and more massive, less-jointed appearance. With the aid of these contrasting features the boundaries between the two rock types were outlined on the air photographs. The rocks on the NW side of Christmas Creek are mostly Unit 3, and those at the SE are Unit 4. The younger phase appears to be in direct contact with the Kedahda Formation at the south and extends NNW with a broad tongue-like protrusion into the older phase in the vicinity of Hyland Lake. The E-W trending mass of Unit 3 east of Loon Lake may be an "included" mass surrounded

by the younger phase. A narrow NNW-trending dyke-like mass of Unit 4 traverses over Snook Lake north of the broad tongue-like mass.

A third type of granitic rock, presumably related to the Glundebery batholith intrusions of Upper Cretaceous age, is seen in the map-area. These rocks, consisting of granite, or granite porphyry and syenite, are designated as Unit 5. A common photogeologic feature distinguishing the rocks is their color which is the lightest shade among all the granites. The contact, aside from tonal contrast, can be distinguished by disoriented jointing or fracturing of the intruded older granites which differ from their normal jointing pattern. Three stock-like bodies are seen in the map-area: one at the head of the North Fork of Willie Jack Creek in the vicinity of NW-5 camp, and two north of the NW-3 camp at the head of Christmas Creek. There is apparently a small plug about 1200' NW of the NW-3 camp. This body has a circular plan outline and is about 300 feet in diameter.

There are three major faults in the area. These faults trend in an ENE-WSW direction. There is some indication of a slight horizontal displacement of the north wall to the W relative to the south wall along much of the fault. The Snook Fault cuts thru the granites in the Snook Lake-Twin Lakes area and seems to disappear farther east in volcanic rocks of the Shonektaw Formation. The Hyland Fault originates from the Christmas Creek Valley west of Christmas Lake and extends to the west, cutting diagonally across the ridge towards Hyland Lake farther west. The stock west of Christmas Lake appears to be partly bounded at its north side by this fault. In this locality, the rocks in the stock appeared to be rather intensely sheet fractured. The Shonektaw Fault is one large break that extends to the Shonektaw Creek basin over the ridges east of Christmas Lake.

MINERALIZATION

Copper mineralization presently known, seen along the steep cirque wall and in talus material S and SW of Loon Lake and referred to as the "South Showings" consists of disseminates and specks of bornite and chalcopyrite with predominating pyrite. Malachite staining is widespread occurring in white quartz veinlets which are rather widely-spaced in the slightly chloritized granodiorite host rock. Some mineralization is found close to the quartz veinlet walls. Some mineralized boulders mixed with talus are found along the base of the steep cirque wall for a distance of about 6,000 feet beginning from the quartzite-granodiorite contact near Christmas Creek. The contact zone of Unit 3 and 4, SW of Loon Lake seems to carry more sulfides. This zone is about 500 feet wide and appears to be more closely fractured than the outlying rocks. However, the mineralization does not indicate an orebody. These observations however encourage the writer to recommend a follow-up prospecting survey to determine whether there is indeed a zone in the vicinity of these showings that would make a low-grade large tonnage ore body. A likely target for exploration suggested by the geology of this locality, is the zone where the quartzite-granodiorite-contact intersects the granodiorite-monzonite contact. This zone is talus-covered but forms a shallow depression trending SW.

Several minor occurrences of copper were discovered along the steep slope near the ridge line NW of camp NW-3 near 5800' elevation. These are referred to as the North Showings. Mineralization consists of disseminations and masses of bornite and chalcopyrite in quartz veinlets and some tight fractures in the slightly chloritized/epidotized quartz monzonite host rock. The dominant trend of the mineralized fractures is EW/steep S. Weak mineralization is reportedly seen along the slope for a distance of 600 feet, in far-spaced fractures.

Another reported occurrence of copper is found in the stock of Unit 5 rock about 2000 feet NE from the 600-foot mineralized zone. This showing was not visited by our staff. In the air photographs this showing is about a thousand feet away from the Hyland Fault and appears to be along the southern limit of the sheet-fractured zone in the stock. Further prospecting work is required in this locality.

Two minor occurrences of copper consisting of some disseminations of chalcopyrite with predominating pyrite were reported in the vicinity of camp NW-5 near the lake at the head of the North Fork of Willie Jack Creek.

Malachite and bornite are present in small amounts in narrow quartz-calcite veinlets in a 3 to 15 ft. wide mineralized zone trending about 75°/vertical and traceable for some 500 ft. This is located about 1/2 mile ESE of camp NW-3. The host rock in and near this zone is crumbly due to chlorite and limonite alteration, whereas the quartz monzonite nearby is generally fresh and weather resistant.

Gaslena was found in several places. It occurs in small amounts with narrow white quartz veins located: 1) 2000 feet east of NW-3 camp near the Shonektaw Fault, 2) 3500 feet ESE of camp NW-8 at the base of the first small cirque wall, 3) 4800 feet due E from camp NW-8, at the base of the major cirque wall.

CONCLUSIONS/RECOMMENDATIONS

1. The occurrences of copper mineralization thus far uncovered by our initial prospecting work indicate low grade porphyry type of copper mineralization but do not themselves constitute minable size or grade.

2. The information obtained however indicates that a higher-level prospecting survey is required to determine whether there exists any ore zones in the vicinity of the showings.

3. Two target areas for further prospecting work:
 - (a) The zone of intersection of the granodiorite-monzonite contact and the granodiorite-quartzite contact about 2000 feet SW from the South Showings near Loon Lake.
 - (b) The sheet-fractured zone at the northern side of rock Unit 5 stock bounded by the Hyland Fault 4500 feet N of camp NW-3.
4. The work required involves -
 - (a) detailed geologic mapping,
 - (b) test-sampling of outcrops, (may require some blasting work),
 - (c) some soil-sampling, and
 - (d) reconnaissance I.P. surveying.

The prospective zone near the South showings may best be explored by the I.P. survey because the surface is covered by talus and scree.

5. A ground magnetometer survey may be beneficial in locating contacts.