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GEOLOGICAL REPORT

on the

D. M. GROUP OF CLAIMS

TABLE OF CONTENTS

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INTRODUCTION

This report consists of a brief description of the geology of the D. M. Group of claims which was mapped on a scale of one inch to 400 feet in the period between mid-June and early September 1957. The map may be found in the pocket at the back of the report.

LOCATION AND ACCESS

The D. M. Group of claims is made up of about 120 claims in a block of ground approximately three miles square lying about 9 to 12 miles west of Kamloops, British Columbia. Most of the claims lie in Tp. 19 R. 19, the intersection of the township and range lines, one separating Ranges 18 and 19, the other separating Townships 19 and 20 lies in the northeast quarter of the block of ground.

The claims are reached by the Trans-Canada Highway from either Kamloops or Savona, the highway crossing the property about 9 miles west of Kamloops. A suitable car or truck may be driven almost anywhere within the area, through the low sagebrush and sparse grass. A few thickly wooded areas, particularly in the southeast and southwest corners, are not so easy to travel in.

METHOD OF MAPPING

For the purpose of geological mapping, the whole of the block of ground covered by the claims was traversed as a map-area without regard to claim boundaries. A few previously staked claims lie in an irregularly shaped block at almost the centre of the D. M. Group, but all of this area was mapped.

Grid lines previously established for earlier geophysical and geochemical surveys were used to locate the position of outcrops and geological features. Traverses were made by one man travelling along the grid lines and locating points by pacing from marked pickets visible for 300 or 400 feet in the open country. The grid lines are 400 feet apart and trend about N. 30° E. They are picketed at intervals of 100 feet with wooden laths about 3 feet long, but many of the pickets had been dragged away by cattle, so that some parts of the grid were repaired by replacing pickets at points located by pacing. (Later checked by stadia survey H. W. D.)

The whole grid, together with the three base lines, is drawn on the accompanying geological map, although only the Centre Base Line is labelled with the co-ordinate system. Claim boundaries are not shown in the map, but the geology of any claim can be seen by superimposition of the claim map and geological map with a match between the co-ordinate systems.

TOPOGRAPHY

The area is characterized by rounded gravelly rocky knolls, many more than half a mile long, giving a local relief of a few hundred feet. Many of these knolls are either large drumlins or gravelly ridges forming a tail trending southeastward from the rock knolls. That the ridges indicate the direction of flow of glacial ice is confirmed by the observation of glacial stria in the same direction.

The drainage of the area appears related to a system of three lineaments trending in general N. 20° to 25° W., N. 60° W. and eastwest.

The largest depression in the area, however, bears no relationship to these lineaments. The large dry ravine in the northeast corner of the map area may be a glacial lake spillway, draining water northeastward to the trench occupied by Kamloops Lake.

Cherry Creek and a second stream about a mile to the north, tributary to Cherry Creek, occupy marked depressions which are not parallel. The course of Cherry Creek trends roughly N. 25° W., whereas the course of the tributary is more along N. 60° W. A lineament, marked by a series of depressions and dry stream courses, crosses the centre of the map area, trending about N. 20° W., and is roughly parallel to but about two miles east of the course of Cherry Creek. A less well-marked parallel lineament lies about a mile further east.

Many smaller dry water courses and depressions in the southeastern and eastern parts of the map area give several parallel lineaments with a trend of roughly N. 60° W., drainage being generally to the northwest. This trend is parallel to the direction of glacial flow, but both depend on structural control.

A well-marked irregular east-west lineament connects Pothook Lake to Hughes Lake, with drainage to the west. A less well-marked, but parallel lineament, lies half a mile to the north.

OUTCROPS

Most of the outcrops are on high ground, but some rock is exposed in gully bottoms. Outcrops generally are scattered small rocky knolls projecting from piles of glacial debris. Most of them are so deeply weathered and frost-shattered that it is difficult to expose a fresh surface with an ordinary hammer.

GENERAL GEOLOGY

The map area lies within the Nicola Map area described by Cockfield (1948), whose map shows that in the vicinity of the D. M. Group of claims volcanic rocks of Triassic age (Nicola volcanics) are intruded by the plutonic complex of the Iron Mask batholith of probably Jurassic age.

Unconformably overlying these older rocks is the Kamloops assemblage of volcanic and sedimentary rocks of Miocene age. The contact between the batholith and Nicola volcanic rocks trends northwestward across the property, the batholith lying to the northeast. The unconformity between these older rocks and the younger Kamloops rocks which bury them trends roughly east-west across the northern part of the property, Kamloops rocks lying to the north. The batholithic rocks are, therefore, confined in exposure to a triangular area in the eastern part of the property. Nevertheless, they very likely extend northwards and westwards beneath the cover of Kamloops rocks.

The more detailed mapping has added to this general picture of Cockfield's a group of rocks later in age then the batholith, but earlier than the overlying Kamloops rocks.

This additional sequence is made up of agglomerate and overlying brown-weathering basalt. The agglomerate contains fragments of syenite from the batholithic suite; and the brown basalt is cut by granite dykes which do not cut the Kamloops rocks. At one point, too, there is some evidence that the agglomerate unconformably overlies the Nicola rocks.

The agglomerate is cut by hornblende diorite or lamprophyre, some of which is found in association with batholithic rocks, but which seems to represent a later pulse of intrusive activity. Feldspar porphyry dykes and trachyte dykes cut the hornblende diorite and are, therefore, later still.

The geological relations are summarized in the following Table of Formations.

TABLE OF FORMATIONS

CENOZOIC (Miocene?)		
Kamloops Group	Kamloops volcanic rocks	Basalt and agglomerate
	Tranquille beds	Conglomerate sandstone and siltstone
	Unconformity	
LATE MESOZOIC or EARLY CENOZOIC		
Copper Creek intrusions?		Granite
	Intrusive contact	
Cretaceous or Tertiary volcanic rocks?		Brown weathering basalt
	Unconformity?	
Intrusive rocks later than Iron Mask batholith		Feldspar porphyry, quartz-feldspar, porphyry, trachyte, trachyte, felsite hornblende diorite pyroxenite and gabbro
	Intrusive rocks	
Cretaceous? volcanic rocks		Agglomerate
	Unconformity?	
MESOZOIC		
Iron Mask Batholith		Magnetite dykes syenite diorite gabbro
	Intrusive contact	
NICOLA GROUP (Triassic)	Volcanic rocks	Greenstone and red coloured fragmental rocks.
	Sedimentary rocks	Limestone and argillite.

MESOZOIC ROCKS

NICOLA GROUP

Rocks of the Nicola group are, according to Cockfield (1948), dominantly greenstones, which are easily recognized from little-altered later volcanic rocks. Agglomerate, breccia and tuff are also abundant in the Nicola group, according to Cockfield, but sedimentary rocks are not common, occurring only as thin lenses probably at several stratigraphic levels in the sequence. Limestone is the most abundant rock in the lenses, but is, in some cases, associated with argillite and tuff.

Sedimentary Rocks A few scattered outcrops of limestone and argillite occurring close to an imaginary line extended eastwards from Hughes Lake along S. 60° E. indicate that a narrow belt of sedimentary rocks extends through this part of the map area. Dips and way-up determinations show that the beds dip steeply to gently to the southwest with argillite overlying limestone, but exposures are so sparse that neither estimate of thickness nor ordering of the stratigraphic succession can be attempted.

Limestone is a dark grey to black rock, very fine grained, weathering brown to reddish brown.

Poorly preserved ammonite fragments were found in one outcrop near line 16 E. about 2100 feet south of Centre Base Line. A few carbonized fragments in the same rock might be fossils but could not be identified. The ammonites are identified by Dr. G. E. G. Westermann as Discotropites sp. (Tropitaceae) indicating an upper Triassic (Carnian) age for the Nicola group as suggested by McLearn (1953).

A finely banded greenish grey and brown siltstone or tuff overlies the limestone, but is interbedded with coarser gritty rocks that maybe tuffaceous.

Bedding in these rocks strikes 120° to 140° and dips are 60° to 70° southwest, but become much less steep rapidly to the southwest. Prominent jointing crosses the bedding, striking 025° with vertical dip.

Volcanic Rocks Volcanic rocks occur to the southwest of the belt of sedimentary rocks, which they apparently overlie if the dip continues to the southwest.

The volcanic rocks occupy about a third of the map area, mostly in the southwest corner. But, apart from the few good exposures in the cliffs southwest of Cherry Creek, the outcrops are few, small and sparsely scattered. A very small exposure of what may be Nicola greenstone occurs in the northeast corner of the map area, near an outcrop of diorite of the Iron Mask batholith.

Two distinct volcanic rocks are recognized, the one a red-stained agglomerate or tuff, and the other a moderately to well schisted greenstone. If the dip to the southwest continues to the southwest corner of the map area, the greenstone then overlies the red coloured rocks, which in turn overlie the sedimentary rocks.

Greenstone in the southwest corner of the map area is part of a larger area of Nicola greenstone exposed on Greenstone Mountain to the southwest as shown on Cockfield's (1948) map.

The red-stained rock is a very fine-grained greenish-grey to pink rock, much shattered and cut by carbonate stringers. The weathered surface is characteristically terra-cotta red. Apart from the cataclastic fragmentation, some enclosed fragments of slightly different colour or texture from the matrix suggest a pyroclastic origin for some of this rock.

Greenstone is a dull grey-green coloured rock of fine to medium grain size, in some places well schisted, in others moderately schisted. In some places the rock appears to be an altered volcanic rock, in others irregularly shaped inclusions suggest a pyroclastic origin.

Schistosity strikes, in general about N. 40° W. roughly parallel to the course of Cherry Creek, and suggests a possible major shear zone of this trend in the vicinity of Cherry Creek.

THE IRON MASK BATHOLITH

According to Cockfield (1948) the Iron Mask batholith is 12 miles long and roughly 2-1/2 miles wide, with the long axis trending northwest. Rocks similar to these found in the batholith occur further northwest, and it is possible that these areas of exposure show rocks of the same mass, which is continuous beneath the inconformable cover of later volcanic rocks.

Mathews (1947) recognized five types of rock in the Iron Mask batholith ranging in composition from ultrabasic to acidic. These five types are:

(i) the most abundant type, which is intermediate in composition, a gabbro or diorite.

(ii) a basic differentiate.

(iii) an alkaline differentiate.

(iv) hydrothermally altered rocks intermediate of alkaline in composition.

(v) red coloured rocks.

All of the rocks are deficient in quartz, potash feldspar is not abundant, but angite and magnetite are commonly found.

Rocks of the Iron Mask batholith occupy a roughly triangular area of slightly more than a quarter of the map area. The apex of the triangle lies slightly west of the centre of the map area, and the base of the triangle lies along the eastern boundary. The map area covers the northwestern tip of the area of exposure of the batholith described by Cockfield.

Three original rocks and two altered phases of the batholith are recognized. A narrow band of hornblende diorite occurring along the southwest side of the triangular area has been separated from the batholithic rocks because it appears to be a later intrusion. The five types of rock recognized correspond only approximately to those recognized by Mathews. The unaltered or slightly altered rocks are gabbro, diorite and syenite, and are distributed in a rude layering from gabbro through diorite to syenite from southwest to northeast. Cockfield suggested that a basic differentiate occurs along the southwest margin of the batholith.

The two altered phases are an albitised phase, which is generally bleached, and a propylitized phase which is a dull grey-green colour and contains abundant chlorite and carbonate with sparse disseminated sulphides.

<u>Gabbro</u> A few small patches of darker rocks in the batholithic suite occur in the southeast corner of the map area. These rocks are medium grained and dark coloured, being composed largely of feldspar and pyroxene with accessory magnetite. They resemble the diorite closely, but contain more pyroxene and may represent a basic seggregation.

<u>Diorite</u> Diorite is best exposed on the north-facing slope of Sugarloaf Mountain, but good exposures also occur on the high ground in the northeast part of the map area. Scattered outcrops of diorite occur between these areas and further to the west.

Diorite is a fine grained to medium grained rock, grey to dark grey in colour, and composed of white fresh-looking plagioclase feldspar and pyroxene in subhedral crystals. Hornblende or biotite are locally abundant in place of pyroxene. Magnetite and apatite are commonly accessory and sulphides less commonly.

The rock is heterogeneous, varying in colour or grain size, or both, with the space of a few feet. In some places large angular fragments of darker coarser grained diorite are separated by reticulated dyke-like bodies of lighter coloured diorite without clear contacts between the two.

Although diorite generally appears fresh, it shows alteration in many places. A slight alteration involving the mafic minerals is widespread, the pyroxene is dull green, and probably partly altered to chlorite. Two areas of more intense alteration are shown separately on the map. Near the old Pothook shaft the diorite is altered to a fine grained dull grey-green rock with abundant carbonate and sparse sulphides, the process possibly being that of propylitization suggested by Cockfield. In an area southwest of Sugarloaf Mountain, the diorite is bleached and carbonate has been introduced, again with sparse sulphides. The process may have been that of albitisation.

<u>Syenite</u> Syenite occurs along the northern margin of the area of exposure of the batholithic rocks. It is a light pink to red weathering medium grained rock composed of feldspar and biotite or hornblende. Magnetite and sulphides may be accessory. The dark red variety is composed

of deep red feldspar laths 1 to 2 mm. long, which are commonly aligned in a sub-trachytic texture. Mafic minerals occur in dark green, dull, irregularly shaped masses which are probably largely chlorite. The light pink variety is composed of a mixture of white and pink feldspar with biotite and hornblende. The rock is medium grained, even grained and granitic in appearance, but lacks quartz. There is continuous gradation by increase of mafic minerals of this rock into diorite.

Locally, however, the syenite can be seen to be intrusive into the diorite. Dykes of syenite cut the diorite in outcrops exposed along the gully bottom near line 4 E. at 2600 feet north of Centre Base Line. Contacts are sharp, but there is no chilling at the margin. Vague remenates of diorite in the syenite suggest some assimilation of the diorite by the syenite. Aplite and pegmatite stringers of pink feldspar also cut the diorite, and a segregation of pink pegmatite occurs near line 4 E. at 1400 feet north.

Along the north margin of the batholith, syenite is overlain unconformably by agglomerate which contains angular fragments of the syenite in a fine grained dark greenish brown matrix.

Magnetite Dykes   Large dykes of magnetite, as much as 10 feet wide, occur in diorite at two places in the map area. The first of these is in the vicinity of line 16 E. at about 1800 feet north of Centre Base Line, the second near the east end of the North Base Line at line 52 E. about 400 feet north of the North Base Line. Smaller injections of magnetite occur in other places in both diorite and syenite.

The magnetite is massive and medium grained, containing minor amounts of pyroxene, calcite and apatite. In both localities several parallel veins lie within a few feet of each other, in the first locality veins being found over a length of 1700 feet.

The veins are probably injections of residual solutions left by the crystallising diorite.

LATE MESOZOIC OR EARLY CENOZOIC ROCKS

Cretaceous? Volcanic Rocks

Cockfield (1948) recognized, in the vicinity of Copper Creek, a series of volcanic and pyroclastic rocks younger than the batholithic rocks, yet older than the Kamloops group. These rocks are cut by the Copper Creek granite intrusions. Cockfield (1948) assigned a late Cretaceous or early Tertiary age to these rocks. Mathews (1947) found that a similar group of rocks were in contact with the Iron Mask batholith at its northeast end, and suggested the name Frederick formation for these rocks.

Agglomerate   Agglomerate containing angular fragments of syenite occurs along the north margin of the Iron Mask batholith, and this agglomerate appears to underlie brown basalt to the north. Agglomerate is exposed in a window extending northward to the ravine in the northeast corner of the map area. Agglomerate and tuff also occurs on high ground west and south of the area of batholithic rocks. This agglomerate may be contemporary with that north of the batholith. The best exposures are on the hill north of Hughes Lake.

Agglomerate consists of volcanic rock fragments, ranging in size from a fraction of an inch to on e or two feet across, set in a matrix of much finer fragments. Bedding is not recognizable at most places, possibly because the dip is not steep, the beds are thick, and bedding planes rarely exposed.

A trachytic andesite, dull grey-green or puple in colour, is the commonest fragment found north of Hughes Lake, but the parent rock was nowhere seen in place.

The stratigraphic position of the agglomerate suggests that it is earlier than the brown basalt. The agglomerate is also older than the hornblende diorite, for, on the hill north of Hughes Lake, agglomerate is cut by hornblende diorite, probably in the form of a sill dipping gently eastward. Veins carrying chalcopyrite, bornite, specular hematite and calcite cut both agglomerate and hornblende diorite.

<u>Intrusive rocks later than the Iron Mask Batholith</u>

<u>Pyroxenite and Gabbro</u> A narrow band of pyroxenite and gabbro, now altered to chlorite and serpentine, lies alorg the southwest margin of the Iron Mask Batholith. The band is about 300 feet wide, as nearly as can be judged from sparse exposures, and is perhaps continuous from the westward limit of the batholith to Pothook Lake. Farther east, however, the band becomes discontinuous. The westward portion of this band separates hornblende diorite from the batholithic rocks.

The pyroxenite or gabbro is a dark greenish-grey to greenish-black rock, composed almost entirely of chlorite or serpentine. In some places, however, pseudomorphs of the alteration products after pyroxene can be recognized.

The age and origin of this rock is uncertain. It may be a basic differentiate of the batholithic rocks, or a later injection.

Certainly this rock has been important in influencing the movement of the rocks under stress, for it has flowed readily and promoted brecciation of the neighbouring more competent rocks. In at least three places, angular fragments of diorite are found enclosed in a chlorite schist presumed to have been derived from the pyroxenite.

<u>Hornblende Diorite</u> Hornblende diorite occurs along a belt about 1000 feet wide at the southwest margin of the batholithic rocks. A narrow tongue of similar rock intrudes agglomerate near line 36 E. at 3100 feet south of Centre Base Line. Agglomerate on the hill north of Hughes Lake is intruded by sills of a finer grained rock containing similar hornblende phenocrysts, which is correlated with the hornblende diorite.

Hornblende diorite is a medium grained grey rock composed of bluish feldspar laths about 2 mm. long, and hornblende needles which are somewhat longer. The hornblende needles are commonly aligned in a fluidal structure. The rock weathers readily to give a limonitic stain, and the hornblende needles weather out to leave holes resembling pipes.

A dyke of trachytic feldspar porphyry cuts hornblende diorite on the hill north of Hughes Lake.

Veins and breccia zones carrying some chalcopyrite and bornite transect the hornblende diorite both in the area north of Hughes Lake and in the area south of the Pothook shaft, showing that the period of copper metallization is later than the intrusion of hornblende diorite.

Felsite Two small areas of fine-grained, rather waxy-looking, light coloured rocks occurring within the diorite of the Iron Mask batholith were mapped as felsite. These rocks are composed of fine-grained feldspar in a finer grained matrix and locally are epidotised. They are probably intrusive into the diorite.

Feldspar porphyry, quartz feldspar porphyry and trachyte.

Small bodies of intrusive feldspathic rocks occur at several points within the map area. Hornblende diorite north of Hughes Lake is cut by a trachytic feldspar porphyry. Both areas of felsite are cut by a quartz feldspar porphyry. This porphyry consists of euhedral quartz and feldspar crystals, about 2 mm. across in a fine-grained dark green matrix.

Cretaceous or Tertiary volcanic rocks

Brown weathering basalt A very fine grained, characteristically red-brown-weathering, grey basalt occurs in the northern part of the map area, along and to the north of the Trans-Canada Highway. Locally, this rock contains amygdules of chalcedony and calcite, suggesting a volcanic origin. The rock is probably a nearly horizontal flow, overlying the agglomerate. It is cut by granite dykes, which suggest that it is earlier than Kamloops.

Locally the rock is sheared, with a well developed vertical schistosity. At other places, slickensided surfaces with diverse attitudes are found, and, at still other places, carbonate breccia zones transect the rock. All this indicates involvement in earth movement, and strengthens the case for considering the brown weathering basalt to be earlier than Kamloops.

Small dykes of rather similar rock cut syenite along the northern margin of the batholithic rocks.

Copper Creek intrusions

Granite Two small dykes of granite about 20 feet wide occur in the northwest corner of the map area, where they cut brown basalt.

The granite is a medium grained pink rock composed of pink feldspar and glassy quartz. In thin section, it is seen to be composed of large grains of microcline, plagioclase and quartz in a fine grained groundmass of the same material.

This granite is considered to be correlatable with the Copper Creek intrusions described by Cockfield (1948).

CENOZOIC

Kamloops Group

Tranquille Beds. Thin beds of light brown siltstone and tuff overlying sandstone and conglomerate occur along the northwestern slope of the ravine in the northeast corner of the map area, where Cockfield (1948) shows outcrops of Tranquille rocks. The rocks are light in colour, and poorly cemented, the thin bedded members showing good bedding dipping 30° to the northeast.

Kamloops Volcanic Rocks Brown weathering rubbly basalts overlying the Tranquille beds in the northeast corner of the map area are considered to be Kamloops in age.

STRUCTURAL GEOLOGY

Folds

Steep dips of some of the Nicola rocks indicate that these rocks have been folded, but outcrops are so sparse that the structures cannot be worked out. Decrease of dip towards the southwest in the southwest part of the map area may indicate that a synclinal axis trending about N 60° W lies to the southwest and that the batholithic rocks may occupy the core of an anticline. Some exposures show that crumpling and small scale folding is to be expected locally. Plunge of axes on drag folds exposed in Nicola greenstone, just north of Cherry Creek, is 30° northwest. If this plunge is regional, and the batholith also plunges with the supposed anticline that it occupies, then the batholith may plunge beneath Nicola rocks to the northwest. Some rocks, considered to be of Nicola age, distributed about the apex of the triangular area of batholithic rocks also suggest this possibility. It is possible, then, that the batholithic rocks plunge at 30° northwestward beneath Nicola rocks and become rapidly deeply buried northwest of the present exposures, before they rise again to be exposed on the shores of Kamloops Lake further to the northwest.

Faults

A complicated system of faulting is indicated by a large number of shatter zones of diverse orientation in all rocks older than the Kamloops. Blocks, with slickensides of different orientations on many of the bounding surfaces, indicate either a widespread area of crushing, or an involved history of faulting of various ages.

Shatter zones and joints plotted on an equal area stereonet give a girdle about the periphery, which probably indicates a preference in recording near-vertical structures over structures with less dip. However, some highs are recognized within the girdle, and these correlate with the three chief directions of lineaments as follows:

Table 1

Attitude of joints and shatter zones compared with lineaments

Lineaments	Average of Joints and Shatter Zones	
	Strike	Dip
120°	130°	80° NE
155°	144°	80° SW
090°	100°	vertical
	060°	vertical

Of these, the roughly east-west set of joints and shatter zones is, within the batholithic rocks, most consistently associated with chalcopyrite mineralization, with the northeast trending set also, in some places, being so associated.

The relative ages of the faulting are almost impossible to work out. The lineaments trending N 25° W can be traced onto the Kamloops rocks and are possibly the result of post-Miocene faulting. Of the other two sets of lineaments, the east-west set can be traced onto the agglomerates north of Hughes Lake, but not onto the brown basalt.

The lineaments trending N 60° W are limited to the batholithic and pre-batholithic rocks. Part of them no doubt represent the "grain" of the country developed by the folding of the Nicola rocks.

Carbonate breccia zones

Carbonate breccia zones occur in the brown weathering basalt and all older rocks. The zones are dyke-like bodies, usually with sharp walls and steep dips, most of them being only a few feet wide. Many of the zones trend north to N 30° W although a few trend northeast. The zones are made up of angular altered fragments of wall rock, a fraction of an inch across, enclosed in brownish to reddish weathering fine grained carbonate which is ankeritic. Several outcrops in the western part of the map area indicate a possible large area of this brecciation.

Some of the zones, particularly northeast striking zones, carry some coarse grained disseminated chalcopyrite and bornite.

ECONOMIC GEOLOGY

Mineral Deposits

Concentration of both iron and copper minerals occurs at many places in the map area, but in most of these places the concentration is too sparse to give much promise of economic mining.

The iron minerals are both magnetite and hematite, with iron carbonates probably occurring in the carbonate breccia zones. Of these, magnetite, in the magnetic dykes, has attracted some interest, and a good deal of work has been done on the dykes. However, as the main showings do not occur in the D. M. Group, no more space will be given to discussing them.

Copper metallization is evidenced by sparsely disseminated chalcopyrite and its alteration product, malachite. These occur at many places in the map area, particularly in the rocks of the Iron Mask batholith.

Four different types of occurrence of chalcopyrite and bornite were noticed and are listed:

1. Fine-grained disseminations in igneous rocks, usually with some pyrite.

2. Deposits of fine-grained minerals along tiny fractures in closely jointed or "crackled" rock, particularly associated with brecciated and shattered zones.

3. As a replacement of the matrix in carbonate breccia zones.

4. In veins with calcite and, in some cases, specular hematite.

In many cases, alteration of primary minerals to malachite, extending to depths beyond the reach of the hammer, obscures the texture of primary deposition.

Exploration for copper and iron has continued intermittently in the area since the end of the nineteenth century. Many small showings have been opened by pits and trenches in many parts of the map area, but the amount of copper metallization exposed in many of these is economically insignificant. Most of the workings are so old that caving and weathering have obscured all signs of a mineral showing.

There is no report of any production from the area.

A brief description of workings from which information could be obtained follows. Description of the old Pothook workings is not included because these do not lie on the D.M. Group.

Description of Workings.

The workings are located with reference to the grid system, and the wall rock and mineralization briefly described.

Location 1.

L52W at 180 feet east of a point 2900 feet south of Centre Base Line.

A short trench 6 feet deep, driven in rock for 10 feet or so into the hillside, exposes a light green to dark green, brown weathering agglomerate containing rounded to sub-rounded fragments of porphyry and other rocks. A few shear fractures show brecciation and slickenoides, and, at one point, a vein follows a zone of intense shearing.

The vein is made up of a number of calcite stringers up to 5 inches wide, but pinching and swelling, branching and rejoining over a maximum width of 17 inches. The general trend of the vein is along 105° with dip 70° N.

Coarse grained calcite is the chief vein mineral, but a little specular hematite and chalcopyrite occur in irregular patches two or three inches across. Chalcopyrite is sparsely scattered in altered wall rock for a foot on either side of the vein. Malachite is evident as a surface stain in many places.

Parts of the vein might, by visual estimation, give an assay 2 to 3% copper over a width of less than 2 feet. But this would be by no means an average grade for the whole vein.

A similar vein is exposed in a shaft, at least 30 feet deep to water, sunk vertically about 200 feet south of the trench. The wall rock is hornblende diorite, which is sheared and altered over a width of 1 foot, the shear zone striking about 110° and dipping 70° N. A few calcite stringers with patches of chalcopyrite, bornite and specular hematite occur on the shear zone.

From neither the shaft, nor the trench, can the veins be traced continuously over the outcrops on the hillside. A few small lenses of similar material are all that is found. So that the chances of finding a mineable vein in the immediate vicinity of these workings do not look good.

Location 2.

Between lines 16E and 28E and between the North Base Line and about 400 feet south of the North Base Line.

A reddish-brown, medium grained syenite with trachytic white feldspar laths is exposed in each of several pits and trenches, a shaft down at least 30 feet, and an adit driven towards the shaft.

Very fine grained pyrite and chalcopyrite are finely disseminated in the syenite, and also are deposited as thin films on tiny joint planes, most commonly on those striking N80°E dipping 80° southeast.

The syenite is closely jointed, with joints of diverse orientations, and weathers to a rubble of angular fragments less than 1 inch across. Many of these joints planes show malachite staining.

The shaft is sunk on a shatter zone 2 or 3 feet wide striking N60°W with near vertical dip. Much malachite and limonite stains the shatter zone, but no primary mineralization could be seen.

Widespread disseminated malachite throughout this small area indicates that most of the rock probably contains some copper, perhaps less than 0.5% in most parts of the area. But there is little evidence to suggest that richer portions would be found, except for a few places which might possibly give a little more than 1% over widths of 1 or 2 feet.

Location 3.

Line 56E at 400 feet north of Centre Base Line.

A shaft at least 20 feet deep to water is sunk vertically in fine grained rusty-weathered diorite which contains much disseminated fine grained and coarse grained pyrite. Two shatter zones cross at the trench, one striking 060°, the other 140° and both vertical. The shatter zones are made up of very closely spaced jointing over a width of 9 inches to 2 feet. Some malachite staining occurs on the walls of the shaft, but limonite staining is more abundant. Malachite occurs in thin seams and fractures in rocks on the dump, and a little coarse chalcopyrite and bornite was found in a calcite vein. From the appearance of the rocks at the shaft, this vein cannot be more than a few inches wide.

A small pit 400 feet northeast of the shaft shows local small masses of chalcopyrite a few inches across contained in fragments of bleached diorite enclosed in a chlorite matrix. Carbonate veins up to 4 inches wide occur in a shatter zone striking 100° and dipping vertically.

The breccia of diorite fragments in chlorite matrix no doubt results from fracturing of the brittle diorite as a result of flow of neighboring peridotite now replaced by the chlorite matrix.

The possibility of finding areas more richly impregnated with copper minerals in the area about the ultrabasic mass cannot be assessed on the geological evidence available.

CONCLUSIONS

Most of the ground favourable for prospecting for copper seems to lie in, or near, the triangular area of exposure of the Iron Mask batholith. Only a few small showings of copper metallization occur outside this area, and these do not give indication of becoming stronger in length or depth.

Within the batholith, the areas near the contacts seem to give the most promise, scattered and dispersed copper metallization being associated with fracturing and brecciation along both the north and south margins. The zone along the south margin is about 2000 feet wide and includes the old Pothook workings. Within this zone, diorite is much altered and locally fractured. The zone along the north margin is, perhaps, less than 1000 feet wide, and is occupied mainly by much-shattered but little-altered syenite.

Copper metallization appears to be associated mainly with east-west or northeast striking fractures. East-west lineaments pass to the north and south of the Pothook shaft, and a weak east-west lineament passes close to the workings on the North Base Line.

Fracturing of the diorite near readily flowing incompetent rocks has influenced deposition of copper minerals. The importance of this factor at the contact of the batholith with enclosing rocks cannot be assessed, for, within the map area, such contacts are covered by glacial debris which in many places must be over 100feet thick.

The age of the copper metallization seems to be at least later than the agglomerate, and may, therefore, be late Cretaceous or early Tertiary. The margins of the batholith are favourable, then, not because the batholith is the source rock, but because fracturing and brecciation of the batholithic rocks have provided loci of deposition.

If the batholith were the source rock, it might be possible that contact with limestone along the southeastern part of the southwest margin of the batholith might have resulted in contact pyrometosomatic deposits of magnetite and possibly copper. Faulting has, very likely, confused the relationships along this contact.

No assays are available for most of the showings, but, from visual estimation, it is doubtful that more than a fraction of 1% copper would be found over widths greater than a foot or so in the exposed areas.

About many of the showings, much little-fractured almost barren rock is exposed, to make it very doubtful that wide and well mineralized fracture or breccia zones might be found beneath overburden between outcrops.

R. E. J.

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McLearn, F. H. (1953) Correlation of the Triassic Formations of Canada. Bull. G.S.A. V. 64, pp. 1205-1228.

<u>CERTIFICATE</u>

I, RICHARD E. JONES, of the City of Hamilton, County of Wellington, Province of Ontario, hereby certify

(1) That I am a practising geologist and reside at 19 Hyde Park Avenue, Hamilton, Ontario.

(2) That I am a graduate of Queen's University, Kingston, Ontario, with B.C. (Hons.) (1949) and M.A. (1953) degrees in geology and have been practising as a geologist for eight years as listed in the "Record of Experience" overleaf.

(3) That I have no direct or indirect interest whatsoever in the properties of the Company referred to in the Accompanying Report; nor do I expect to receive any interest.

(4) That the accompanying Report is based on personal examination and detailed mapping.

(5) That I have been a Sessional Lecturer in Geology on the Faculty at McMaster University in Hamilton for three years.

R. E. JONES

R. E. Jones

RECORD OF EXPERIENCE

1947	Summer Student Assistant Geological Survey of Nfld.
1948	" " " " " " "
1949	Summer Assistant Geologist - Preston East Dome Gold Mines Ltd.
1949-50	Winter Graduate Student Assistant - Queen's University
1950	Summer Assistant Geologist - Preston East Dome Gold Mines Ltd.
1950-51	Winter Instructor - Queen's University, Kingston, Ont.
1951	Summer Geologist (Party Chief) - Kennco Exploration Canada Ltd.
1951-52	Winter Graduate Student Assistant - University of Toronto
1952	Summer Senior Assistant - Ontario Department of Mines
1952-53	Winter Graduate Student Assistant - University of Toronto
1953	Summer Senior Assistant - Dr. F. G. Smith, Consultant Geologist
1953-54	Winter Instructor - Queen's University, Kingston.
1954	Summer Geologist (Party Chief) - Quebec Bureau of Mines
1954-55	Winter Sessional Lecturer - McMaster University, Hamilton
1955	Summer Geologist (Party Chief) - Quebec Bureau of Mines
1955-56	Winter Sessional Lecturer - McMaster University, Hamilton
1956	Summer Research grant - McMaster University, Hamilton
1956-57	Winter Sessional Lecturer - McMaster University, Hamilton

G.D.D.

AFTON CLAIMS

DRILL LOGS

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-1	Afton #1	190	Intrusive	E85087	10-20	0.37	Alongside DDH #6
				E85088	20-30	0.19	Values mainly as
				E85089	30-40	0.21	native copper
				E85090	40-50	0.34	
				E85091	50-60	0.41	
				E85092	60-70	0.37	
				E85093	70-80	0.55	
				E85094	80-90	0.63	.58/120
				E85095	90-100	0.58	
				E85096	100-110	1.31	
				E85097	110-120	1.46	
				E85098	120-130	0.13	6.42
				E85099	130-140	0.24	
				E85100	140-150	0.14	
				E85101	150-160	0.14	
				E85102	160-170	0.20	
				E85103	170-180	0.16	
				E85104	180-190	0.13	

Composite Assays:

	Au		Ag	MoS
85087-91	0.02	0.70	Tr	0.01
85092-96	0.02	0.70	Tr	0.01
85097-101	0.02	0.70	Tr	0.01

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-2	Afton #1	210	Intrusive	E85105	10-20	Tr	Alongside DDH #7
				E85106	20-30	0.54	Values mainly
				E85107	30-40	0.63	as chalcopyrite
				E85108	40-50	0.28	
				E85109	50-60	0.82	
				E85110	60-70	0.85	.61/80
				E85111	70-80	0.90	
				E85112	80-90	0.60	
				E85113	90-100	0.36	
				E85114	100-110	0.24	108
				E85115	110-120	0.07	
				E85116	120-130	0.07	
				E85117	130-140	0.37	
				E85118	140-150	0.20	
				E85119	150-160	0.13	
				E85120	160-170	0.43	
				E85121	170-180	0.11	
				E85122	180-190	0.10	
				E85123	200-210	0.10	
				E85124	190-200	0.09	

Composite Assays:

	Au		Ag	MoS
85106-115	0.02	0.70	0.1	0.01

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-3	Afton #3	210	Syenite	E85125	14-20	Tr	
				E87576	20-30	Tr	
				77	30-40	Tr	
				78	100-110	0.03	
				79	110-120	0.03	
				80	130-140	0.01	
				81	140-150	0.04	
				82	150-160	0.01	

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-3	Afton #3	210	Syenite	E87583	160-170	0.03	
				84	170-180	0.06	
				85	180-190	0.01	
				86	190-200	0.01	
				87	200-210	0.01	
Q-4A	Afton #3	60	Overburden	--	--	--	
Q-4	Afton #3	230	Syenite	E87588	32-40	Tr	
				89	40-50	Tr	
				90	50-60	0.01	
				91	60-70	Tr	
				92	70-80	0.01	
				93	80-90	0.15	
				94	90-100	0.04	
				95	100-110	0.01	
				96	110-120	0.06	
				97	120-130	0.06	
				98	130-140	0.10	
				99	140-150	0.11	
				E87600	150-160	0.07	
				01	160-170	0.04	
				02	170-180	0.01	
				03	200-210	0.04	
				04	210-220	0.04	
				05	220-230	0.06	
Q-5A	Afton #3	50	Overburden	--	--	--	
Q-5	Afton #3	160	Syenite	E87606	23-30	Tr	
				07	30-40	Tr	
				08	40-50	Tr	
				09	90-100	Tr	
				10	100-110	Tr	
				11	120-130	Tr	
				12	130-140	Tr	
				13	150-160	Tr	
Q-6	Afton #1	170	Picrite	E87614	10-20	0.06	IP anomaly -
				15	20-30	0.06	considerable
				16	30-40	0.13	pyrite
				17	40-50	0.10	
				18	50-60	0.08	Very wet hole
				19	60-70	0.07	
				20	70-80	0.06	
				21	80-90	0.06	
				22	90-100	0.07	
				23	100-110	0.07	

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-6	Afton #1	170	Picrite	E87624	110-120	0.10	
				25	120-130	0.08	
				26	130-140	0.15	
				27	140-150	0.11	
				28	150-160	0.18	
				29	160-170	0.10	
Q-7	Afton #1	170	Altered Picrite	E87630	10-20	0.04	On I.P. anomaly - moderate pyrite.
				31	20-30	0.06	
				32	40-50	0.06	
				33	60-70	0.03	Wet hole.
				34	150-160	0.10	
				35	160-170	0.07	
Q-8	Afton #1	100	Picrite	E87636	10-20	0.06	
				37	20-30	0.06	
				38	30-40	0.24	
				39	40-50	0.08	
				40	90-100	0.19	
Q-9	Afton #1	300	Picrite syenite	E87641	0-10	0.03	
				42	10-20	0.03	Contact about 170'
				43	20-30	0.04	
				44	70-80	0.03	
				45	120-130	0.04	
				46	130-140	0.01	
				47	150-160	0.03	
				48	160-170	0.06	
				49	190-200	0.06	
				50	200-210	0.04	
				51	210-220	0.07	
				52	220-230	0.11	
				53	270-280	0.07	
				54	280-290	0.24	
				55	290-300	0.15	
Q-10	Afton #1	140	Syenite	E87656	0-10	0.10	
				57	10-20	0.14	
				58	20-30	0.07	
				59	30-40	0.08	
				60	40-50	0.18	
				E87726	50-60	0.13	
				27	60-70	0.21	
				28	70-80	0.36	
				29	80-90	0.22	
				30	90-100	0.21	1.00
				31	100-110	0.07	

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-10	Afton #1	140	Syenite	E87661	110-120	0.25	
				87662	120-130	0.15	
				87663	130-140	0.06	
Q-11	Afton #1	150	Syenite	E87664	0-10	0.43	
Composite Assays:				87665	10-20	0.31	
87674-87673	Au	Ag	MoS2	87666	20-30	0.15	
0-100'	0.01 $0.35	Tr	0.01	87667	30-40	0.22	
				87668	40-50	0.36	
				87732	50-60	0.65	
				87669	60-70	0.32	
				87670	70-80	0.26	
				87671	80-90	0.19	
				87672	90-100	0.22	
				87673	100-110	0.76	3.7
				87674	110-120	0.17	
				87675	120-130	0.06	
				87733	130-140	0.06	
				87734	140-150	0.11	
Q-12	Afton #1	150	Syenite	18935	10-20	0.55	Values mainly native copper. Lost circulation. at 150'.
				18936	20-30	0.32	
				18937	30-40	0.25	
				18938	40-50	1.30	
				18939	50-60	0.95	
				18940	60-70	0.23	
				18941	70-80	0.40	
				18942	80-90	0.46	
				18943	90-100	0.50	4.96 .55/100
				18944	100-110	0.23	
				2901	110-120	0.05	
				18945	120-130	0.57	
				2902	130-140	0.30	6.11 .47/130
Q-13	Afton #1	160'	Syenite	2903	20-30	0.15	Values mainly native copper. Lost circulation, at 160'.
				18915	30-40	0.20	
				18916	40-50	0.63	
				18917	50-60	0.65	
				2904	60-70	0.25	
				2905	70-80	0.20	
				18918	80-90	0.70	
				18919	90-100	0.38	
				2906	100-110	0.40	
				2907	110-120	1.40	.67/140
				18920	130-140	0.80	
				18921	140-150	1.70	
				18922	150-160	1.25	8.71

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-14	Afton #1	250	Syenite	2908	20-30	0.20	Values py. and
				2909	30-40	0.13	cpy. to 60' then
				18909	40-50	0.10	native copper.
				18910	50-60	0.35	
				18911	60-70	0.25	
				18912	70-80	0.43	
				2910	80-90	0.35	
				2911	90-100	0.05	
				2912	100-110	0.12	
				2913	110-120	0.08	
				18913	120-130	0.38	
				18914	130-140	0.35	
				2914	140-150	0.73 3.09	.30/100
				2915	150-160	0.13	
				2916	160-170	0.10	
				2917	170-180	0.20	
				2918	200-210	0.30	
				2919	210-220	0.32 NS	
				2920	230-240	0.23	
				18946	240-250	0.35	
Q-15	Afton #1	200	Syenite	18931	10-20	0.40	Values mainly
				2921	20-30	0.18	cpy to 60' then
				2922	40-50	0.15	native copper
				2923	70-80	0.25	
				18932	80-90	0.60	.46
				18933	90-100	0.58	
				18934	100-110	0.40	1.83
				2924	110-120	0.10	
				2925	140-150	0.20	
				2926	160-170	0.20	
				2927	190-200	0.03	
Q-16	Afton #1	220	Picrite to 140' then syenite	2228	130-140	0.20	Picrite holds sulphides, syenite native copper.
				2229	140-150	0.27	
				18929	150-160	0.15	
				18930	160-170	0.18	
				2230	180-190	0.18	
Q-17	Afton #2	110	Basic intrusive becoming picrite.	--	--	--	Slight pyrite throughout.
Q-18	Afton #4	180	Basic intrusive, porphyry?	--	--	--	Picrite zones 60' to 110'.
Q-19	Afton #1	140	Picrite, some syenite bands	2935	40-50	0.10	Moderate py below 80'.
				3018	70-80	0.10	
				2936	80-90	0.18	

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-20	Afton #1	100	Picrite becoming syenitic	2931	20-30	0.17	Considerable py.
				2936	90-100	0.18	
Q-21	Afton #1	170	Picrite to 80' then syenite	2933	60-70	0.17	Picrite holds sulphides, syenite holds native copper.
				2934	80-90	0.08	
				18901	90-100	0.25	
				18902	100-110	0.70	
				18903	110-120	0.50	.48
				18904	120-130	0.10	1.45
				18905	130-140	0.18	
				18906	140-150	0.18	
				18907	150-160	0.13	
				18908	160-170	0.15	
Q-22	Afton #1	130	Picrite to 120', then syenite	2937	40-50	0.30	Sulphides to 120'.
				2938	70-80	0.23	
				2939	110-120	0.25	
				3019	120-130	0.20	
Q-23	Afton #1	150	Syenite	2940	20-30	0.09	Cousiderable py. to 96' then native copper
				2941	30-40	0.20	
				2942	80-90	0.20	
				2943	100-110	0.10	
				2944	110-120	0.03	
				18923	120-130	0.15	
				18924	130-140	0.13	
				18925	140-150	0.12	
Q-24	Afton #1	220	Syenite	18926	20-30	0.45	Considerable py. to 50'. Barren below 160'.
				18927	30-40	0.45	
				18928	40-50	0.23	
				2945	50-60	0.12	1.13 .38
				2946	60-70	TR	
				2947	70-80	0.10	
				2948	80-90	0.10	
				2949	100-110	0.05	
				2950	110-120	0.12	
				2951	120-130	0.05	
				2952	130-140	0.18	
				2953	140-150	0.13	
				2954	150-160	0.10	
Q-25	Afton #1	210	Syenite	2955	40-50	0.37	
				18947	50-60	0.50	.37 .43/20
				2963	70-80	0.20	
				2964	80-90	0.28	
				2965	90-100	0.20	
				2966	100-110	0.47	

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-25A	Afton #1	50	Overburden				
Q-25B	Afton #1	40	Overburden				
Q-25C	Afton #1	50	Overburden				
Q-26	Afton #1	210	Syenite	2972	20-30	0.10	Values as native
				18948	30-40	0.50	copper. Syenite
				18949	40-50	0.47	has salmon-colored
				18950	50-60	1.05 2.02	feldspar.
				18951	60-70	0.35	
				18952	70-80	0.30	
				2973	80-90	0.40	
				18953	110-120	0.30	3.30 .48/90
Q-27	Afton #1	130	Syenite	W18954	30-40	0.27	
				18955	40-50	0.30	
				18956	60-70	0.50	.51/60
				18957	70-80	0.60	
				18958	80-90	0.80	2.47
				18959	90-100	0.28	
				18960	100-110	0.37	
				18961	110-120	0.25	
				18962	120-130	0.13	
Q-28	Afton #1	270	Syenite	2974	40-50	0.18	Barren below 90'
				2975	50-60	0.18	Salmon-colored
				2976	60-70	0.20	feldspar, greenish
				W18959	70-80	0.28	feldspar, epidote,
				2977	80-90	0.20	magnetite.
				2978	90-100	0.30	
Q-29	Afton #1	230	Syenite	W18997	40-50	0.28	Barren below 80'.
				18998	50-60	0.25	Values as cpy,
				18999	60-70	0.25	native copper.
				19000	70-80	0.10	
Q-30	Afton #1	145	Syenite	W18960	20-30	0.37	Values as native
				18961	30-40	0.25	copper.
				18962	40-50	0.13	
				18963	50-60	0.50	
				18964	60-70	0.20	
				* 18965	70-80 88-90	0.47 0.33	
				2956	90-100	0.50	2.75
				2957	100-110	0.10	
				2958	110-120	0.30	
				3074	120-130	0.20	
				3075	130-140	0.18	
				3076	140-145	0.40	
				* 3083	80-90	0.33	

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-31	Afton #1	220	Syenite	18995	40-50	0.15	Mainly barren
				18996	70-80	0.10	
Q-32	Afton #1	120	Syenite	18992	10-20	0.32	Slight native copper through-out
				18993	50-60	0.10	
				18994	70-80	0.13	
Q-33	Afton #1	235	Syenite	18966	30-40	0.40	Cpy 60-90 other-wise native Cu. Cpy also 220-235'.
				18967	40-50	0.80	
				18968	50-60	2.00	
				18969	60-70	1.20	
				18970	70-80	1.20	
				18971	80-90	0.90	
				18972	90-100	0.30	.83 / 90'
				18973	100-110	0.40	
				18974	110-120	0.30	
				2967	120-130	0.09	7.50
				2968	130-140	0.10	
				2969	140-150	0.30	
				2970	150-160	0.20	
				2971	160-170	0.10	
				3077	170-180	0.20	
					180-190		
				3078	190-200	0.30	
				3079	200-210	0.15	
				3080	210-220	0.23	
				3081	220-230	0.09	
				3082	230-235	0.15	
Q-34	Afton #1	270	Syenite to 70' picrite to 160', sye-nite to 270'.	W18989	80-90	0.10	Sulphides confined to 70-170'; 250-270'.
				18990	110-120	0.15	
				18991	120-130	0.17	
				18975	130-140	1.25	
				18976	140-150	1.45	
				18977	150-160	0.18	
				18978	160-170	0.10	
				18979	170-180	0.30	
				18980	180-190	0.50	
				18981	190-200	0.15	
				18982	200-210	0.10	
				18983	210-220	0.20	
				18984	220-230	0.37	
				18985	230-240	0.20	
				18986	240-250	0.75	
				18987	250-260	4.05	
				18988	260-270	2.70	
							12.30

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-35	Afton #1	140	Picrite becoming syenite	2979	20-30	0.15	Contact about 110' py and cpy in picrite. Native Copper in syenite.
				2980	30-40	0.23	
				2981	40-50	0.09	
				2982	50-60	0.15	
				2983	60-70	0.23	
				2984	70-80	0.20	1.05 .19
				2985	80-90	0.05	
				2986	90-100	0.13	
				2987	100-110	0.10	
				2988	110-120	0.18	
				2989	120-130	0.20	.35 120-1[illegible]
				2990	130-140	0.50	
Q-36	Afton #1	230	Picrite becoming syenite	2991	20-30	0.20	Contact about 40'.
				2992	30-40	0.17	
				2993	40-50	0.15	
				2994	120-130	0.18	
				2995	130-140	TR	
				2996	140-150	0.10	
				2997	170-180	0.20	.25/40
				2998	180-190	0.40	
				2999	190-200	0.15	
				3000	200-210	0.32	1.07
				3001	210-220	0.15	
Q-37	Afton #1	220	Syenite	3002	150-160	0.10	Very low values in native copper
				3003	200-210	TR	
Q-38	Afton #1	60	Overburden				
Q-39	Afton #1	100	Syenite				Barren, hematitic 60-80'.
Q-40	Afton #1	200	Syenite				Barren, hematitic 140-180'.
Q-41	Afton #1	150	Picrite	3020	40-50	0.10	Slight sulphides
Q-42	Afton #1	140	Altered syenite? to 50' then syenite.	3044	10-20	0.12	Values as native copper
				3045	20-30	TR	
				3046	30-40	TR	
				3047	40-50	0.05	
				3048	50-60	0.12	

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-43	Afton #1	220	Picrite to 120' syenite to 220'	3030	40-50	0.14	Values mainly as cpy.
				3031	50-60	0.05	
				3032	100-110	0.18	
				3033	110-120	0.46	
				3034	120-130	0.10	
				3035	130-140	0.75	
				3036	140-150	0.15	
				3037	150-160	0.47	
				3038	160-170	0.20	
				3039	170-180	TR	
				3040	180-190	0.10	
				3041	190-200	TR	
				3042	200-210	0.18	
				3043	210-220	0.10	
Q-44	Afton #1	240	Picrite to 170' then syenite to 240'	3049	50-60	0.17	
				3050	60-70	0.32	
				3051	70-80	0.28	
				3052	90-100	0.30	
				3053	100-110	0.18	
				3054	140-150	0.20	
				3055	150-160	0.45	
				3056	160-170	0.20	
				3057	189-190	0.52	
				3058	190-200	0.18	
				3059	200-210	0.30	
				3060	210-220	0.50	
				3061	230-240	2.05	
Q-45	Afton #1	250	Syenite	3062	60-70	0.43	Slight native Cu to 100'.
				3063	90-1000	0.15	
Q-46	Afton #1	260	Syenite to 90' picrite 90 to 120' syenite to 260'.	3021	30-40	0.20	Cpy confined to picrite.
				3022	40-50	0.10	
				3023	50-60	0.17	
				3024	80-90	0.20	
				3025	90-100	0.23	
				3026	100-110	0.25	
				3027	110-120	0.17	
				3028	120-130	0.18	
				3029	220-230	0.20	

Hole No.	Location	Depth Feet	Geology	Sample No.	Interval	Assay Cu %	Remarks
Q-47	Afton #1	70	Dark green syenite	3004	20-30	0.15	Considerable pyrite, values as chalcopyrite.
				3005	30-40	TR	
				3006	40-50	0.18	
				3007	50-60	0.20	
				3008	60-70	0.10	
Q-48	Afton #1	260	Picrite becoming syenite	3009	40-50	TR	Contact about 200'. Moderate sulphides throughout.
				3010	80-90	0.02	
				3011	100-110	TR	
				3012	130-140	TR	
				3017	140-150	0.15	
				3013	180-190	TR	
				3014	190-200	0.16	
				3015	230-240	0.13	
				3016	240-250	0.08	
Q-49	Afton #1	260	Syenite to 160', picrite-syenite mix to 240', picrite to 260'.	3064	90-100	0.18	Values 90-130', native copper remainder cpy.
				3065	100-110	0.50	
				3066	110-120	0.27	
				3067	120-130	0.30	31/30
				3068	150-160	0.15 1.07	
				3069	160-170	0.23	
				3070	210-220	0.40	
				3071	220-230	0.27	
				3072	240-250	0.05	
				3073	250-260	0.05	