TERRITORY OF ALASKA

DEPARTMENT OF MINES

PROSPECT EXAMINATION REPORT

PE 85-16

SHEEP MOUNTAIN COPPER PROSPECT OF GEORGE FENNIMORE'S UPPER MATANUSKA VALLEY THIRD DIVISION, PALMER PRECINCT

by

M. W. JASPER
Associate Mining Engineer

MAY 1954

CONTENTS

	Page
SUMMARY	1
INTRODUCTION	2
LOCATION AND ACCESSIBILITY	2
TOPOGRAPHY	2
CLIMATE	3
TIMBER AND VEGETATION	3
HISTORY	3
GEOLOGY	4
MINERALIZATION	6
SAMPLING RESULTS	8
CONCLUSIONS	8
RECOMMENDATIONS	9
REFERENCES	
U. S. GEOLOGICAL SURVEY BULLETIN 327, page 65	
U. S. GEOLOGICAL SURVEY BULLETIN 542, page 39	
U. S. GEOLOGICAL SURVEY BULLETIN 592, page 281	
U. S. GEOLOGICAL SURVEY BULLETIN 791, page 73	
U. S. GEOLOGICAL SURVEY BULLETIN 989-C, page 41	
PLATE A, 1953 ITINERARY REPORT. PANORAMIC VIEWS OF SHEEP MOUNTAIN	

REPORT ON
SHEEP MOUNTAIN COPPER PROSPECT
IN
UPPER MATANUSKA VALLEY
PALMER RECORDING PRECINCT, ALASKA

SUMMARY

The preliminary examination of the Sheep Mountain copper prospects, discovered by George Fennimore in 1952 and occurring in the Talkeetna formation volcanics are of interest because of their grade, and one of them - the No. 4 showing - at least may be of possible economic importance. Number 1, 2, and 3 showings, as presently known, are narrow and the copper concentrations appear to be confined to short isolated ore-shoots lacking tonnage potentials. The copper values in No.3 vein showing justify additional prospecting efforts to trace and uncover it along its strike and to determine whether the walls have been impregnated with disseminated copper sulfides similar to area of the No. 4 occurrence.

The copper values present in what appears to be a"residual" talus, resulting from the rapid weathering of the volcanics of the district, is of special interest, as the disseminated mineralization covers a 75 to 100 foot width in the discovery area and offers possibility of a large tonnage potential of better than 3% copper. This section should be given first attention in future investigation of the several occurrences.

INTRODUCTION

Examination of a copper prospect on Sheep Mountain was made at request of George Fennimore, Mountain View, Alaska, during the period from June 22 to 24, 1953.

LOCATION AND ACCESSIBILITY

The copper showings are located at approximately North 61° 50' Latitude and Longitude 147 30' West, within vertical range of 5300 and ~~5580~~ 5750 foot elevations, and are on south side of Sheep Mountain. (Elevations determined by Paulin Altimeter).

The occurrences are on the steep, precipitous slopes on east side of Yellow Jacket creek (sometimes called Iron creek), about 2 miles north of the Glenn Highway at Mile 112½. An airfield, suitable for small aircraft, is located at Sheep Mountain Roadhouse, Mile 114.

TOPOGRAPHY

The south slopes of Sheep Mountain in this area are steep, varying from 30 to 45 degrees and has numerous precipitous cliffs. Escarpments, having a northerly trend for several miles, range from several hundred feet in height ½ mile to the east to an estimated 1200 feet along a ridge on north side of the mountain.

The layered volcanics of Jurassic age "plunge" to the east and southeast in this area at 35 to 50 degree dips. This formation is subject to rapid weathering, forming a thin covering of a small angular talus which is periodically removed by snowslides and washed down by the occassional heavy rainstorms.

Yellow Jacket creek - and Gypsum creek ½ mile west - are in deeply incised gulches, 1500 to 3000 feet in depth.

Elevations in Yellow Jacket gulch ranges from around 3000 at lower end to 5840 feet at summit at head of the gulch. Highest point on Sheep Mountain is given at 6407 feet, which is 2 to 2½ miles to northeast.

CLIMATE

This area, although within 10 miles of the glacier fields on south side of the Matanuska River, is locally referred to as a "dry belt". During summer months rains are frequent a few miles to east, south, and west in the valley, with Sheep Mountain "by-passed" to large extent.

At time of visit in June 1953 the snow was ~~was~~ gone from the slopes, with only snowslide remnants remaining in the gulches, and the local streams were very low. The annual snowfall is said to be moderate.

Annual precipitation records are not available for this area, but it is estimated to be within limits of 15 to 20 inches.

TIMBER AND VEGETATION

There is only an occassional spruce in the area, the scattered timber being limited with timber line at about the 3000 foot level. There is a fairly heavy growth of willow, alder, and other brush, as well as heather, moss, and grass; this growth extends up the slopes to the 3700 foot elevation. Above this level there is only an occassional patch of heather and moss in spots protected from slides.

HISTORY

The Fennimore copper"prospects" on east slopes of Yellow Jacket gulch were discovered in 1952. So far as is known these are "original" discoveries, and are four separate zones having varied strikes and dips, occurring within the volcanics. (1)*

*(1) Refer to views on PLATE A, Itinerary Report, for locations.

No claims had been located covering the showings at time of the examination, and it is not certain whether any locations have been made upon them to date.

Other copper occurrences were reported on Sheep Mountain in 1913 by the U. S. Geological Survey on East End creek, which is about 2 miles to the east of Yellow Jacket Gulch, and also on the south side of the mountain. Here it is reported "The copper ore apparently occurs as irregular lenticular masses in the more porous and shattered volcanic rocks. The abundance and wide distribution of small fragments of copper ore on the talus slopes indicate that the mineralization is general rather than localized and apparently promise the discovery of many small, lenticular ore bodies rather than a few large, persistent ones." (2)**).

This latter area is presumed to be the copper showings upon which a number of claims were staked in the 1930's or early 1940's, with only limited surface work reported to have been done upon them. The locators are said to have dropped the claims a few years later. It is not known whether this ground is held by anyone at present. Search of the Mining Recorders records at Palmer failed to show any Proofs of Labor filed for mineral claims on Sheep Mountain other than those covering the gypsiferous deposits held by Alaska Gypsum Queen Corporation in the Yellow Jacket and Gypsum gulches area.

GEOLOGY

With one exception the geology of Sheep Mountain to date has been covered only by reconnaissance surveys of the U. S. Geological Survey. (3**).

(2**) U. S. G. S. Bul.s 327, pg 65; Bul. 542, pg 39; Bul. 592, pg 281-282; and Bul. 791, pg 73.

(3**) U. S. G. S. Bul. 989-C.

(The exception noted above covers only the immediate vicinity of the gypsiferous deposits in the lower half of Yellow Jacket and Gypsum Gulches). Sheep Mountain "is made up of a thick section of layered volcanic rocks of Jurassic age (Talkeetna formation). Within most of mapped area (lower Yellow Jacket and Gypsum Gulches) these rocks have been intruded by many mafic (ferro-magnesian rock-forming silicates) dikes. The volcanic rocks have undergone alteration to the extent that they have become green greenstone.... Along part of the south mountain base of the mountain faulting has placed the sandstone and shale of the Matanuska formation of the upper Cretaceous in juxtaposition with the volcanic rocks. The only younger rocks comprise patches of Pleistocene (?) conglomerate that once partly filled the gulches of Gypsum and Yellow Jacket creeks and the alluvial fans built up by these creeks."

Talkeetna Formation

"The volcanic rocks comprising Sheep Mountain consist largely of interbedded tuffs, lavas, and volcanic breccias..... This formation has a wide distribution in and adjacent to the upper Matanuska valley. During the early reconnaissance in 1906, a quartz-diorite boss was mapped as being present in area in which the gypsifereous deposits occur, but the "boss" was not recognized anywhere within the (limited) area covered by the 1951 investigation."

The Fennimore copper showings are within the layered lava flows overlying and within limits of 500 to 1000 feet above the gypsiferous formation, with the gypsiferous zone occurring within the horizon of the volcanics exposed to the most intense alteration in the area. (4**).

(4**). Refer to View No. 1, PLATE A, attached to 1953 Itinerary Report.

The four copper occurrences observedare located in red and green volcanic's, and for most part are "tite" veins occupying fissures in fairly strong fissured (sheared)zones. The veins where exposed do not appear persistent for any considerable distance, with individual irregular lenses having a maximum estimated observed length of 150feet. Silicification and alteration of the wall rocks is pronounced, with its maximum development in vicinity of the heavier mineralized sections of the veins.

The No. 2 showing is faulted at right angle to its strike; its displacement was not determined. Several other faults were noted in the area.

Mineralization

The 4 veins have similarity in vein filling and copper mineralization. Within the fissured zones the quartz and silicified volanic wallrock ~~with~~ contain abundant epidote. Walls of the veins show silicification to maximum depths of 3 feet at several points.

Copper minerals in order of their abundance are chalcocite, bornite, and little chalcopyrite, malachite, and azurite. Minor pyrite was observed. The copper sulfides are present as small lenses, "bunches", and "blebs". Samples taken were checked for radioactivity and with Mineral Light for scheelite with negative results.

Vein No. 1. This showing, located at 5520 elevation and 10 feet below ridge crest, has a strike of N30E and dip of 80°NW. The sheared zone has width of 5 feet, with width sampled confined to 21 inches, which latter was extent of copper minefalization.

Vein No. 2. This outcrop is about 300 vertically below and an estimated 400 feet southwest of No. 1 showing. Its strike is also N30E and dip 60NW. The width of the exposure is 6 feet. Mineralization was confined (largely) to 39

inches on footwall side and represents the section sampled. Little malachite stain is present across an adjoining 24 inches on the footwall, as well as in about 30 inches on hanging-wall side of the sample. Along the strike mineralization is limited to a 40 foot length. This vein may be a faulted continuation of the No. 1 showing.

Vein No. 3. Outcrop of this vein at 5580 elevation is along crest of ridge an estimated 400 feet (hor. dist.) from the No. 2 showing. Its strike is N75E and dip is 60°NW. Vein width is 10" and it is exposed for only 20 to 30 feet, being largely obscured by residual talus. The gangue is principally epidote, with little quartz and some calcite. The footwall is a dark gray amydaloidal volcanic, and the hanging-wall a "purplish" volcanic.

Vein No. 4. This is the most promising exposure of the four examined. It is at 5750 elevation, and an estimated 1200 to 1500 feet N30W of No. 2 showing. Here (at No. 4 showing) on a steep rounded ridge is a roughly semi-circular area of small residual talus, composed largely of epidote and altered silicified material, which carries disseminated and fine veinlets and "blebs" of chalcocite, bornite and chalcopyrite. This residual"float" (talus) was traced to northwest for horizontal distance of 50 feet and down that slope for vertical distance of about 40 feet, and on the southeast slope for horizontal distance of 150 feet and for a vertical distance of 30 feet at time of the examination.(Mr. Fennimore advises he extended this area considerably one day later in the season). This area is roughly 75 to 100 feet in radius. On the upper side of this area there is a narrow vein of 10 to 12 inch width, whose apparent strike is N20 to 30W; its strike and dip is not definite as the vein is exposed at only a few points and while probably "in place" it was loose and may have slid downhill few feet. The narrow vein was not sampled, but its copper content is estimated as equal to No. 3 vein.

A "grab" sample was taken from numerous points throughout the low-grade semi-circular area.

Sampling Results

Sample No.	Width in.s	Au oz	Ag oz	Cu %	Remarks
29W	21	nil	1.12	4.59	No. 1 Vein. Chalcocite, chalcopyrite, and little malachite
30W	39	nil	tr	6.02	No. 2 Vein. Chalcocite, chalcopyrite, and little malachite
31W	grab	nil	tr	3.45	No. 4 Vein. Chalcocite, bornite, chalcopyrite; grab from numerous ppints in large residual talus area.
32W	10	nil	3.72	14.77	No. 3 Vein. Bornite, chalcocite, little chalcopyrite, malachite and azurite.
33W	54	nil	nil	---	Oxidized cropping in next draw east of Yellow Jacket Gulch

The above samples were assayed by R. C. Rowe, Assayer, Anchorage office, Territorial Department of Mines.

CONCLUSIONS

The showings exposed on Nos. 1, 2, and 3 veins indicates that mineralization is "spotty" and erratic, and that oreshoots were found would probably be too erratic. However, only a very limited amount of prospecting along these three zones has been done, and further efforts directed toward tracing and trenching them may uncover more promising indications.

The No. 4 vein (or zone) showing is considered to be of real interest and warrants a systemmatic and detailed prospecting effort. Should it be definitely proven that what at present is considered to be "residual" talus over a semi-circular area 75 to 100 feet in radius actually overlies its source, an extension of this zone holds a potentially large tonnage of better than average grade copper ore.

Exploration and detailed geologic study will probably prove that certain of the volcanic series present in this area of Sheep Mountain are more favorable than others for ore deposition. The thin beds of carbonaceous shale and tuffaceous sediments noted by geologists of the U. S. G. S. may also bear some importance to the mineralization, but these were not observed in vicinity of the copper showings.

RECOMMENDATIONS

1. First attention should be given to the No. 4 showing.

In this area of 3.45% copper (indicated by above noted grab sample) in talus, a number of points should be stripped and open-cuts made a few feet into bedrock. This work will prove whether or not the talus rests upon its source and contains similar values.

The open-cuts should be extended full width and extent laterally of the copper mineralization. Spacing of the trenches are suggested at 100 feet intervals in the initial program. Failure to find bedrock mineralization in first cross-section would indicate the talus had its source further up the slope.

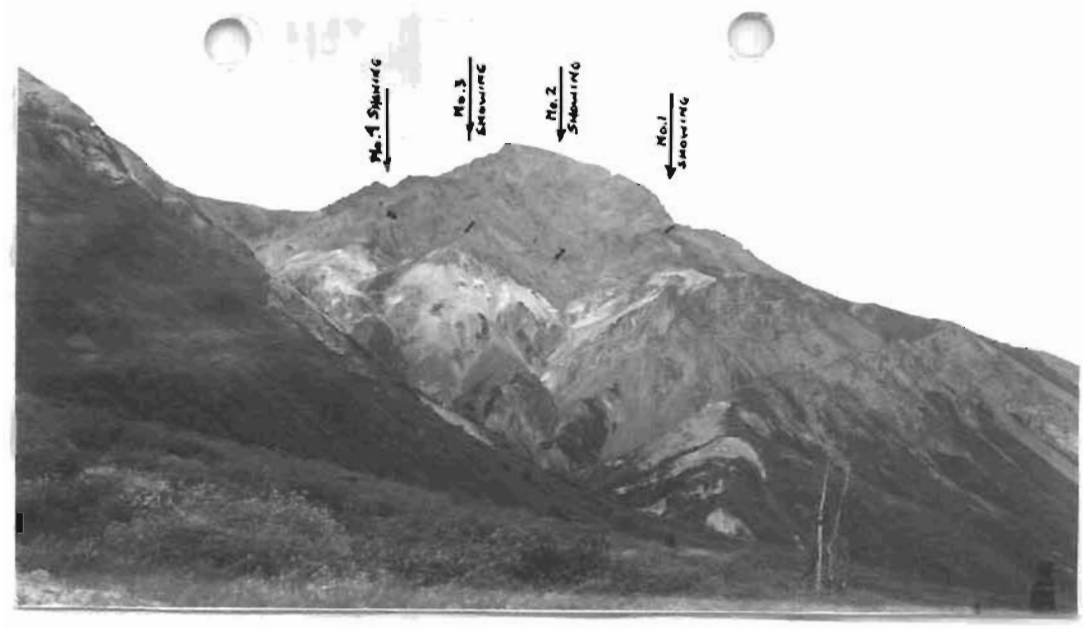
2. Results of a systemmatic sampling of the trenches will determine whether an underground exploration and development program is justified, and, if warranted, will indicate the most practical location for that project.

3. It is also recommended that the areas adjoining the othef three vein outcrops be more carefully prospected to determine whether disseminated mineralization of possible economic importance, similar to that apparently present in the altered volcanics at No. 4 showing, is present.

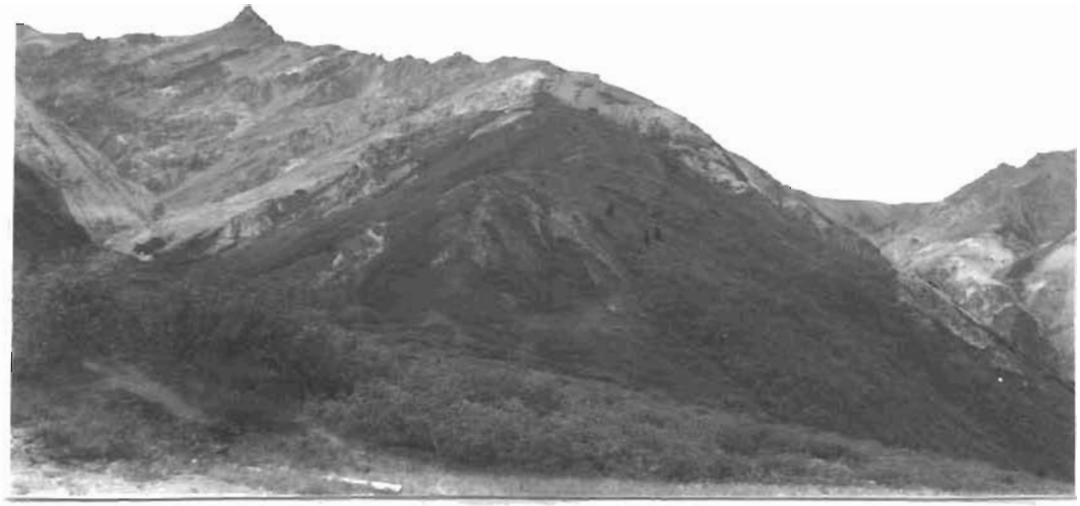
Anchorage, Alaska
May 12, 1954

By- M. W. Jasper

M. W. Jasper
Associate Mining Engineer
Territorial Department of Mines



No. 1



No. 2

No. 3

YELLOW JACKET June 22, 1953

Panoramic views, (Iron) creek gypsum and copper area, Mile 112, Glenn Allen highway. No.s 1 to 3 looking northeast to northwest, from point ¼ mile from highway.

PLATE A

June 22, 1953. 7:40 PM
Looking down (Iron) Yellow Jacket creek from ridge crest at divide, El. 5840. Glen Allen Highway in center background with Matanuska river East Fork "flats" beyond. Light colored (white) areas on nearby slopes and ridge crests are gypsum and kaolin (?) outcrops.

June 23, 1953. Noon
View from ridge crest on east side of (Iron) Yellow Jacket creek at 4980 El. Looking N22E showing red (purple) and gray volcanics and sediments (?). Formations not mapped to date.

PLATE B

No. 1

June 23, 1953. 1:30 PM.

No. 2

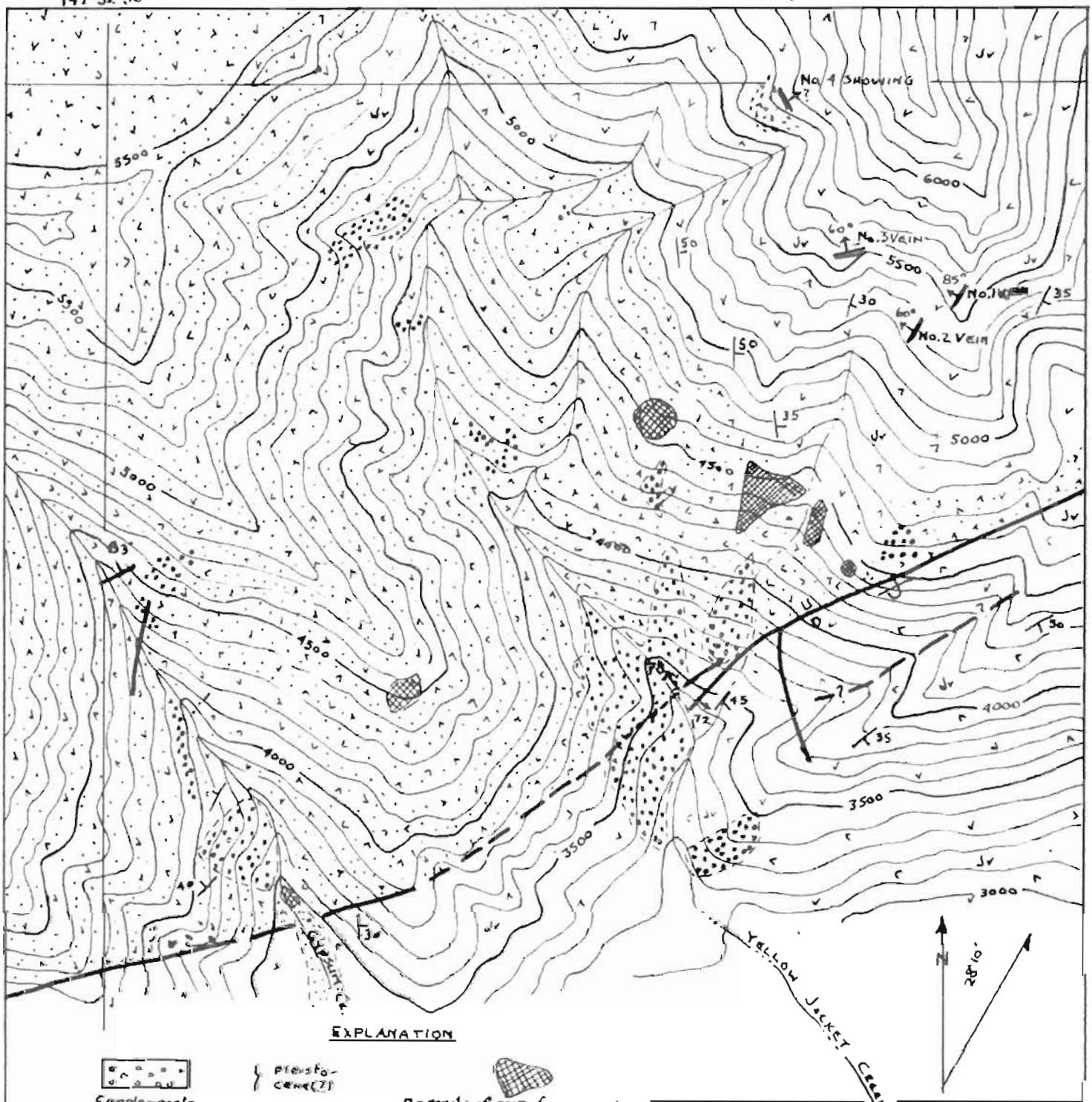
No. 3

YELLOW JACKET
(Iron) Creek area, Mile 112
Glen Allen Highway

Panoramic views, looking S25W, S45W, and S60W from from ridge crest at 5570 El. on east side of Iron Creek, showing gypsum (white) outcroppings. Small copper vein located along ridge in lower left side of No. 1 pix.

YELLOW JACKET

PLATE C



EXPLANATION

Conglomerate } Pleistocene(?)

Matanuska formation; Sandstone and shale } Upper Cretaceous

Talkeetna formation tuffs, breccias, and flows Stippled where altered to greenstone } Lower Jurassic

Quartz-sericite rock Gypsiferous rock & clay

Deposits of gypsiferous rock mapped in detail

Indefinite Contact

U 72 / D Fault showing dip

Probable fault

45 Strike and dip of beds

{Copper prospects in upper right corner}

TERRITORY OF ALASKA
DEPARTMENT OF MINES
YELLOW JACKET GULCH, SHEEP MT.
APPROXIMATE COPPER OUTCROP AREA
MILE 112½ GLEN HIGHWAY
Adapted from USGS Bul. 989, PLATE 4
by- M W Jaeger May 1954
Scale:- 1"=1000'
1000 0 1000 2000
Contour Interval 100 feet

MAP NO. 1