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DIVISION OF MINES AND MINERALS

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REPORT ON THE BONNELL SILVER-LEAD PROSPECT,

MT. McKINLEY QUADRANGLE

by

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ABSTRACT

The Bonnell silver-lead prospect is on the right limit of Eldorado Creek in the Kantishna District one mile northwest of the boundary of Mt. McKinley National Park. The mineral deposit is a vein that cuts adross a contact between schist country rock and a quartz porphyry intrusion. The vein consists of quartz carrying galena and several other metallic sulfides. Although some high-grade silver samples have been obtained from the prospect, eight samples that were taken during an examination in July, 1963, all assayed less than 12 ounces per ton in silver.

INTRODUCTION

The Bonnell silver-lead prospect is owned by Frank P. Bonnell, who, during the summer months, resides on the property and receives his mail at McKinley Park Station, Alaska. The prospect is covered by the Neversweat lode claim, which originally was staked by John Busia, now deceased, formerly a resident of Kantishna. An examination of the property was made during July 15 through 17, 1963.

LOCATION AND ACCESSIBILITY

The Bonnell prospect is in the east-central part of the Mt. McKinley quadrangle at 63° 30' N latitude and 151° 00' W longitude. It is on the north side of the Alaska Range and a little more than one mile northwest of the boundary of Mt. McKinley National Park. Workings on the prospect lie at 2000 to 2200 feet altitude on the east side of Eldorado Creek, tributary to Moose Creek, in the Kantishna River watershed. The area drained by the headwater tributaries of Kantishna River is commonly called the Kantishna District. Fig. 1 is a map of the vicinity.

From the Denali Highway the prospect can be reached by way of a tractor trail up the valley of Eldorado Creek, a distance of four miles. This trail crosses Eldorado Creek several times, and it cannot be followed during periods of extreme high water. To reach the trail it is necessary to cross Moose Creek; this can be done by means of a cable tramway at the site of the settlement of Knatishna. By road Kantishna is 85 miles from McKinley Park Station on the Alaska Railroad and 250 miles from Paxson on the Richardson Highway. The Denali Highway usually is open to traffic from early June to mid-September.

A small airstrip lies in the valley of Moose Creek about one mile downstream from Kantishna. In the spring of 1963, Friday Creek overflowed its banks and cut channels across the east end of the airstrip. The remaining usable part of the strip is too short for ordinary use, although an experienced bush pilot has landed a Piper Super Cub there.

HISTORICAL SKETCH OF THE KANTISHNA DISTRICT

Placer gold was discovered in the Kantishna District in 1905, and several thousand people rushed into the area in the late summer and fall of that year. The richest ground was mined vigorously during the summer of 1906, but by fall the population had dwindled to about 50. (Capps; 1919, pg. 75-76) Small-scale placer mining continued on several creeks in the area until the government closure of gold mines during World War II. At the end of the war some of the mines reopened, and, since then, from one to three small mines have been operative each summer. There are no longer any year-around residents in the Kantishna, but each summer five to ten miners and prospectors are in the district.

The total placer production of the district is estimated to be more than $800,000. The production of silver and lead from lodes is estimated to be $250,000; most of this came from Quigley Ridge, where more than 25 silver-lead prospects are known. For a few years prior to World War II, gold was produced from a gold-quartz lode on the Banjo claim northeast of Quigley Ridge. The mine was known as the Red Top mine and also as the Banjo mine. It was operated by the Red Top Mining Company, which owns a block of patented claims that covers most of Quigley Ridge. Many stockholders of the company are residents of Fairbanks.

Although some placer mining was done on Eldorado Creek

shortly after 1905, only a small amount of gold was produced. Work has been done on several silver-lead prospects on Alpha Ridge on the northwest side of the lower part of the creek. Of these prospects the best known, and the one on which the most work has been done, is the Alpha, near the top of the ridge one mile from Moose Creek. A small amount of high-grade silver-lead ore was mined from the Alpha prior to 1922. Workings on the prospect at that time were reported to consist of an adit 120 feet long, a shaft (winze?) 60 feet deep, and several open pits. (Davis; 1922, pg. 131)

An antimony prospect, which has been called the Antimony mine and also the Taylor mine, lies at the head of Slate Creek, tributary to Eldorado Creek. This prospect was first staked in 1907. In 1916, 125 tons of stibnite was mined from the property; but, because of a sudden drop in the price of antimony, it was not marketed, although some of it was hauled as far as Kantishna River. Workings on the property at that time consisted of several open pits, a 97-ft adit, and 22 feet of crosscuts. (Capps; 1919, pg. 107-108) During World War II 75 tons of stibnite was mined from this property.

WORKINGS AND BUILDINGS ON THE BONNELL PROSPECT

Underground workings on the Bonnell prospect consist of three adits with a total length of more than 120 feet. The relative positions of the adits are shown in Figs. 2 and 3. Hand tools constitute the only equipment on the property; the adits were driven by single-jacking. A 10-ft by 15-ft cabin of wood frame construction is used for living quarters. A 7-ft by 8-ft shelter of wood framing covered by sheet

metal has been erected near the portal of one of the adits to house blacksmithing equipment for sharpening picks and hand steel.

GEOLOGY

The most recent and most detailed study of the geology of the area around the prospect was made by Francis G. Wells. (Wells; 1933) Bedrock throughout most of the Kantishna District is a metamorphic series of rocks that is a part of the Birch Creek schist formation and therefore has been assigned to the pre-Cambrian age. Wells divided this series into two units: a quartz-muscovite schist and a limestone-and-chlorite schist. The two units show considerable variation within themselves, and in places they grade into one another. Graphitic schist has been noted, particularly on Quigley Ridge; it is found in both units but is more commonly associated with the limestone-and-chlorite schist. The limestone-and-chlorite schist lies in a belt that trends northeasterly through the district, underlying the area in which most of the lode prospects have been found. This belt is well exposed on Quigley Ridge; its extension on the southwest side of Moose Creek has been offset one mile to the south so that it underlies the lower part of Eldorado Creek.

Metamorphism has obliterated the original bedding planes in the schist, but a color banding that probably is parallel to the original bedding is apparent. The schistosity parallels the color banding and therefore probably parallels the original bedding planes. The schistosity strikes northeast and dips at low angles northwest and southeast away from a central axis that coincides approximately with Eureka Creek and the lower part of Eldorado Creek. It thus appears

that the major structure is an anticline trending northeasterly through the district. The anticline is cut by joints and faults that strike northwest.

Numerous small intrusions of igneous rock occur in the schists. These are of two rock types: quartz porphyry and diabase. No determination of the ages of these intrusives has been made, except that they are, of course, younger than the schists.

In the valley of Eldorado Creek, the southwest segment of the belt of limestone-and-chlorite schist terminates at the contact of a quartz porphyry intrusion. The intrusion is about three-quarters of a mile long, its long axis lying approximately east and west. The Bonnell prospect is in this body of quartz porphyry. The south contact of the intrusion is exposed in the upper adit and in outcrops to the south; it dips 30° south. Apparently the north contact is covered by talus and slide.

Wells describes the quartz porphyry as consisting of phenocrysts of quartz and feldspar in a groundmass of microcrystalline quartz and feldspar. In the intrusion on Eldorado Creek the quartz and feldspar have been altered to sericite and calcite. Weathered portions of the rock are stained brown by the oxidation of fine grains of pyrite, which are scattered through the rock. A similar but smaller quartz porphyry intrusion crops out about one-quarter mile down the valley from the prospect.

MINERAL DEPOSITS

Most of the known mineral deposits in the Kantishna District

are fissure veins. Wells has divided these into three types: (1) gold-quartz veins, (2) galena-sphalerite veins, and (3) stibnite-quartz veins. The main veins strike between N 45° E and N 70° E and dip 50° to 90°. They strike parallel to the foliation in the schists, but, having a different dip, they cut across it. There are many minor lenses and veinlets that are parallel to the foliation. Most of the prospects are within a three-mile-wide belt, the center of which trends northeasterly through Brooker Mountain, Alpha Ridge, and Quigley Ridge. (Fig. 1)

Exposures on the Neversweat claim were examined by Moffitt in 1930 (Moffitt; 1933, pg. 332-333) and by Wells in 1931 (Wells; 1933, pg. 376). There was little or no change in the workings during the interval between those two examinations. Wells gives the following description:

"The Neversweat claim, the property of John Busia, is located on the south side of Eldorado Creek at the junction of Reinhart Creek. Here the side of the valley is covered by a talus of large blocks of quartz porphyry, and in this talus are found many large pieces, consisting principally of coarsely crystalline galena with some pyrite and chalcopyrite. A tunnel a few feet above the creek level was driven for more than 40 feet into an area of schist included in the porphyry but failed to encounter a vein, though a little mineralized schist was found. Two open cuts, one 100 feet and the other 150 feet up the hill, failed to locate the vein in place. A sample of the ore ran 55 percent of lead and 74 ounces of silver and $10 in gold to the ton."

The adit described by Wells is the one designated "Busia adit" in Figs. 2 and 3. The inner part of the adit is now caved, and the outer part is used by Frank Bonnell for food storage. Since the examination by Wells, Bonnell has driven the "middle adit" and "upper adit" shown in Figs. 2 through 5. The total length of underground workings is now more than 120 feet.

The middle adit was driven on a narrow quartz-arsenopyrite vein that ran high in gold content. This graded into a galena-quartz vein, from which a high-grade silver assay was obtained, and this either graded into, or was cut off by, the vein now exposed at the bend in the adit. (Fig. 5, sample 58) In the outer 20 feet of the adit, the geology is obscured by close timbering. A contac t between porphyry and schist is exposed underground at the bend in the adit and on the surface a few feet north of the blacksmith shop. Slickensides on the contact at the underground exposure indicate that at least a small amount of movement occurred along the contact plane, and probably the contact could as well be termed a fault. The juxtaposition of schist and porphyry along this plane could be the result of a relative downward movement of the block on the north side. This contact, or fault, apparently lies north of the upper adit. The place where it should intersect or join the south-dipping contact is covered. Beyond the bend the adit cuts across several small veinlets of quartz and arsenopyrite. At the face of the adit a two-inch-wide veinlet (Fig. 5, sample 57) and two fractures parallel to it are cut by a fault that offsets them one foot to the southwest.

The upper adit was started on a narrow vein of silver-bearing galena and was driven just below the south-dipping contact so that the vein could be observed in both the porphyry and the schist. This was done to check for an ore-shoot along the contact and also to ascertain whether or not the schist overlying the porphyry was a more favorable host rock for ore deposition than the porphyry. Fig. 4 is a sketch of the face of the adit as it was in July, 1963.

The vein exposed at the face of the upper adit is 5 feet wide at the floor and 1½ feet wide at the back. In the center of the face a block of brecciated quartz porphyry extends across the vein from wall to wall. The amount of metallic sulfides varies from place to place within the vein. The parts of the vein cut by samples 62 and 64 are particularly heavy in sulfides. (Fig. 4) The sulfides present include pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, and pyrrhotite. Above the porphyry-schist contact, the vein can be seen for only a few inches; in this small distance it is pinching as it goes upward in the schist. The mineralogical content of the vein appears to undergo no change at the contact that could be attributed to the difference in wallrock.

A narrow copper-stained veinlet is exposed in an outcrop on the south side of the portal of the upper adit.

SAMPLES AND ASSAYS

Eight samples were taken during the examination; Figs. 4 and 5 show where the samples were cut. All of the samples were assayed for gold and silver, and six of them were analyzed by spectroscope. The laboratory work was done by Donald R. Stein at the Fairbanks assay office of the Division of Mines and Minerals. The results of the gold and silver assays are shown in Table I, and the results of the spectroscopic analyses are shown in Table II.

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Table 1. Results of Gold and Silver Assays.

Sample Number	Width Sampled	Ounces per Ton Gold	Silver
57	2 inches	0.06	0.36
58	13	0.20	0.06
59	12	0.02	Nil
60	7	0.02	Tr
61	16	Nil	Nil
62	10	Tr	11.90
63	18	0.02	Nil
64	24	Tr	0.82.

Table II. Results of Spectroscopic Analyses.

Sample Number	Over 10%	1 to 10%	Under 1%
57	silica	calcium, magnesium, zinc, aluminum oxide, sodium, titanium, iron, manganese.	lead, cadmium, lithium, nickel (?).
58	silica	calcium, sodium, lead, zinc, iron, magnesium, barium, aluminum oxide.	cadmium, titanium.
61	silica	calcium, magnesium, sodium, iron, titanium, aluminum oxide, barium.	chromium.
62	silica	calcium, magnesium, sodium, zinc, lead, iron, manganese.	cadmium, copper (0.01%)
63	silica	calcium, sodium, iron, manganese, lead, zinc, aluminum oxide.	barium, titanium, chromium.
64	silica	calcium, magnesium, iron, zinc, lead, aluminum oxide, sodium.	manganese, titanium, cadmium, copper (0.01%)

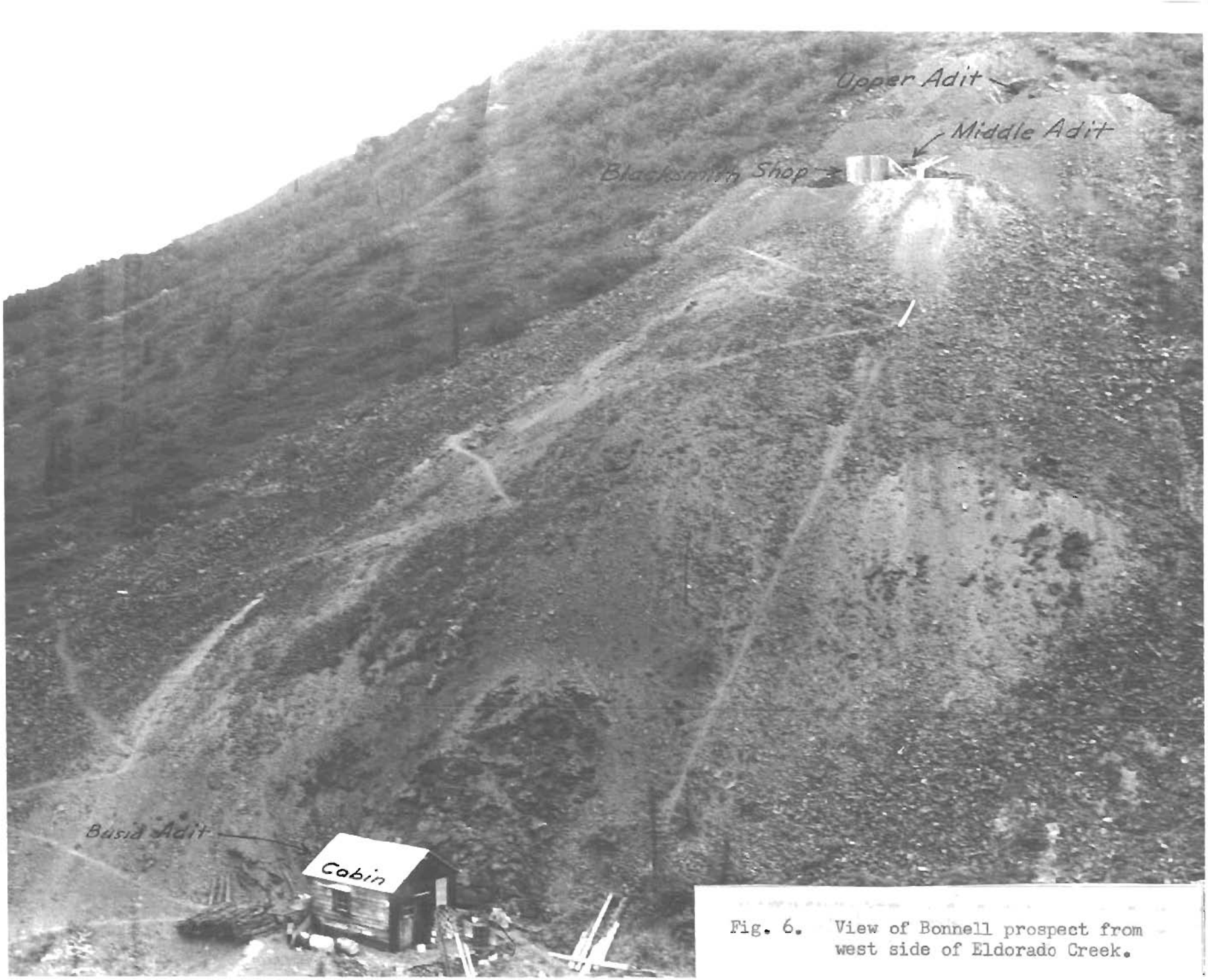

Fig. 6. View of Bonnell prospect from west side of Eldorado Creek.