State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

GLASS BUTTES PROSPECT, NORTHEASTERN LAKE COUNTY, OREGON

The Glass Buttes prospect is on the isolated hills of that name in the northeast part of Lake County, Oregon. It is about 3.5 miles by road south of the highway between Bend and Burns, in Tps. 23 and 24 S., R. 23 E. (pl. 6). The property is owned by Charles E. Miller, of Bend, Oregon., and comprises 48 claims, as shown on plate 8. Quicksilver has been known for several years to occur here.5/ Test pits and short tunnels are scattered over the property, but so far there has been no production. The part of the Miller property from No. 1 tunnel to about 2,000 feet to the north was visited by the writer August 23, 1940.

According to Waters,6/ the buttes are composed of three groups of lava flows. The highest and lowest of these groups are basaltic. The intermediate group, which is more than 400 feet thick and forms the greater part of the Glass Buttes, includes dacite and several other kinds of andesite, as well as perlite, obsidian, and vitrophyre. Only these glassy lavas are exposed at the quicksilver prospects. According to Waters, the volcanic rocks of the Glass Buttes form a broad anticline broken by many normal faults of diverse trends and magnitude.

The property, which has an area of about 1.5 square miles, is underlain by lava that originally consisted almost exclusively of flow-banded glass. This lava has been extensively opalized along broad zones of northwesterly trend that extend beyond the limits of the area shown on plate 8. Halloysite, a clay mineral, is mixed with the opal, locally in some abundance. Cracks and holes in the opaline material are lined with fine-grained quartz. Other and presumably later cracks are lined with cinnabar grains. The opaline material locally has horizontal bands that may represent the flow bands of the lava which it has replaced. Most of the pits and other excavations seen by the writer show cinnabar but generally in very small amounts. The cinnabar darkens on exposure, and it can therefore be detected only by chipping the surface of the opaline material.

In several places the opaline material is broken by fractures and breccia zones that are comparatively rich in cinnabar. These trend N. 55° - 65° W. and most of them dip rather steeply northeastward, though a few dip toward the southwest. The largest ones thus far exposed - in No. 1 tunnel and in the bottom of a 43-foot shaft 850 feet northeast of the portal of that tunnel - are 2 to 5 feet wide and have been followed only short distances along the strike.

The quicksilver content of a few representative samples is shown on plate 8. The samples designated by G. O. and a number were taken by the writer; the others were furnished by Mr. Miller, who also reports two samples not recorded on plate 8. One of these, from a "broken zone" 1 foot wide, contained 0.675 percent of quicksilver; the other, from a "brecciated seam," contained 0.550 percent of quicksilver. Sample G.O.2, from the bottom of the 44-foot shaft, contained

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5/ Schuette, C. N., Quicksilver in Oregon: Bull. 4, State of Oregon, Department of Geology and Mineral Industries, p. 168, 1938.

6/ Waters, Aaron, A Structural and petrographic study of the Glass Buttes, Lake County, Oregon; Jour. Geology, vol. 35, No. 5. pp. 441-452, 1927.

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0.10 percent of mercuric chloride. As the total amount of quicksilver in this sample was only 0.22 percent, a large proportion of the metal was present as chloride, and this may be true of other parts of the deposit. This possibility should be taken into account in planning the reduction plant, and other samples should be tested for chloride. On the other hand, sample G.O. 7, which is from a comparatively rich band 2 feet wide in No. 1 tunnel, yielded only 0.05 percent of mercuric chloride. This sample contained 0.68 percent of quicksilver.

The assays, together with observations on the ground, indicate that the quicksilver content of the opalized material ranges from a trace to about 15 pounds to the ton. Most of the samples recorded on plate 8 are from the richer parts of the deposit, so that the assays probably do not fairly represent the average tenor. It seems improbable that more than a small part of the deposit could be mined profitably at the prices that prevail under normal circumstances, but as the deposit is very large and certainly contains some fairly rich ore, further work may show that it could serve as a source of quicksilver under emergency conditions.

Ref: U.S.G.S. Bulletin No. 931-B "Some Quicksilver Deposits in Adjacent Parts of Nevada, California, and Oregon.

CRIB MINERAL RESOURCES FILE 12

RECORD IDENTIFICATION
- RECORD NO..... M054994
- RECORD TYPE..... XIM
- COUNTRY/ORGANIZATION. USGS
- INFORMATION SOURCE... 12
- MAP CODE NO. OF REC..

REPORTER
- NAME..... PETERSON, JOCELYN A.
- DATE..... 75 08
- UPDATED..... 81 03
- BY..... FERNS, MARK L. (BROOKS, HOWARD C.)

NAME AND LOCATION
- DEPOSIT NAME..... GLASS BUTTES
- SYNONYM NAME..... INCLUDES POLARIS, RYAN, AND GLASS RIDGE GROUPS

MINING DISTRICT/AREA/SUBDIST. GLASS BUTTES

- COUNTRY CODE..... US
- COUNTRY NAME: UNITED STATES

- STATE CODE..... OR
- STATE NAME: OREGON

- COUNTY..... LAKE
- DRAINAGE AREA..... 17070303 PACIFIC NORTHWEST
- PHYSIOGRAPHIC PROV..... 10 HIGH LAVA PLAINS
- LAND CLASSIFICATION..... 49

QUAD SCALE	QUAD NO OR NAME
1: 250000	BURNS

LATITUDE	LONGITUDE
43-31-59N	119-56-30W

UTM NORTHING	UTM EASTING	UTM ZONE NO
4824000.	262300.	+11

- TWP..... 023S
- RANGE.... 023E
- SECTION.. 34
- MERIDIAN. WILLAMETTE

ACCURACY OF LOCATION
ACCURATE

PRODUCER(PAST OR PRESENT):
MAJOR PRODUCTS.. HG

ORE MATERIALS (MINERALS,ROCKS,ETC.):
CINNABAR

MAIN ORE MINERALS:
CINNABAR

EXPLORATION AND DEVELOPMENT
STATUS OF EXPLOR. OR DEV. 6
PROPERTY IS INACTIVE
YEAR OF DISCOVERY..... 1933
BY WHOM..... P. L. FORBES
YEAR OF FIRST PRODUCTION. 1956
YEAR OF LAST PRODUCTION. 1968
PRESENT/LAST OWNER..... VERNE E. RYAN, W. H. JUSTROM, JOHN MC MAMMAN, 1963
PRESENT/LAST OPERATOR.... JACKSON MOUNTAIN MINING CO., 1968

EXPLOR. AND DEVELOP. COMMENTS:
DMEA CONTRACT RECOMMENDED DENIED IN 1955

DESCRIPTION OF DEPOSIT

DEPOSIT TYPES:
MINERALIZED FAULT ZONES, OPALITE
FORM/SHAPE OF DEPOSIT:

SIZE/DIRECTIONAL DATA
SIZE OF DEPOSIT..... SMALL

DESCRIPTION OF WORKINGS
SURFACE AND UNDERGROUND
DEPTH OF WORKINGS BELOW SURFACE. 100 FT
LENGTH OF WORKINGS..... 1000 FT

COMMENTS(DESCRIP. OF WORKINGS):
RYAN AND GLASS RIDGE ORE BODIES HAVE BEEN MINED BY OPEN PIT; POLARIS DEPOSIT IS DEVELOPED BY ABOUT 1000 FT OF UNDERGROUND WORKINGS

PRODUCTION
YES
SMALL PRODUCTION

CUMULATIVE PRODUCTION (ORE,COMM)).,CONC.,OVERBUR.)

PRODUCTION YEARS..... 1956 - 1958, 1961

SOURCE OF INFORMATION (PRODUCTION).. USBM AND COMPANY RECORDS VIA BROOKS, 1968

PRODUCTION COMMENTS.... PRODUCTION INCLUDES 119 FLASKS FROM GLASS RIDGE MINE, 368 FL FROM THE RYAN GROUP AND 109 FROM THE POLARIS PROPERTY

COMMENTS (RESERVES).. ESTIMATED RESERVES ARE SMALL

GEOLOGY AND MINERALOGY

AGE OF HOST ROCKS..... MIO
HOST ROCK TYPES..... OPALITE DERIVED FROM GLASSY SILICIC LAVAS AND TUFF

AGE OF ASSOC. IGNEOUS ROCKS.. MIO
IGNEOUS ROCK TYPES..... GLASSY SILICIC LAVAS AND TUFF

PERTINENT MINERALOGY..... OPALITE, CLAY MINERALS

IMPORTANT ORE CONTROL/LOCUS.. BRECCIATED ZONES IN OPALITE

GEOLOGY (SUPPLEMENTARY INFORMATION)
REGIONAL GEOLOGY
TECTONIC SETTING..... DISSECTED LAVA PLATEAU

LOCAL GEOLOGY

SIGNIFICANT LOCAL STRUCTURES:
OPALIZED ZONES ARE ALONG NW TRENDING FAULTS

SIGNIFICANT ALTERATION:
OPALIZATION OF HOST ROCKS

GEOLOGICAL PROCESSES OF CONCENTRATION OR ENRICHMENT:
HYDROTHERMAL SOLUTIONS

COMMENTS (GEOLOGY AND MINERALOGY):
THE PRINCIPLE ORE BODIES OCCUR IN AN INTENSELY CRUSHED OPALITE BRECCIA WHICH HAS BEEN RECEMENTED BY SILICA AND CINNABAR.

GENERAL REFERENCES

1) BROOKS, H. C., 1963, QUICKSILVER IN OREGON: OREGON DEPT. OF GEOLOGY AND MINERAL INDUSTRIES, BULL. 55, 223 P.
2) MERCURY IN OREGON, 1965, USBM IC 8252
3) BROOKS, H. C., 1968, GLASS BUTTES MERCURY: ODGMI UNPUBLISHED REPORT
4) REED, G.C., 1946, EXPLORATION OF GLASS BUTTES MERCURY DEPOSIT, LAKE COUNTY, ORE.: USBM RI 3926
5) ROSS, C.P., 1941, SOME QUICKSILVER PROSPECTS IN ADJACENT PARTS OF NEVADA, CALIFORNIA, AND OREGON: USGS BUL 931-D, P. 23-37

R. I. 3926

AUGUST 1946

UNITED STATES
DEPARTMENT OF THE INTERIOR
J. A. KRUG, SECRETARY

BUREAU OF MINES
R. R. SAYERS, DIRECTOR

REPORT OF INVESTIGATIONS

EXPLORATION OF GLASS BUTTES MERCURY DEPOSIT

LAKE COUNTY, OREGON

BY

GLENN C. REED

R.I. 3926,
August 1946.

REPORT OF INVESTIGATIONS

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

EXPLORATION OF GLASS BUTTES MERCURY DEPOSIT, LAKE COUNTY, OREGON[1]

By Glenn C. Reed[2]

CONTENTS

INTRODUCTION

Preliminary examination of the Glass Buttes mercury deposits, Lake County, Oregon, was made in August 1945 at the request of W. S. Lazier, present lessee of the deposit.

Most of the prospect openings in the area were inspected. The more significant workings were sampled and mapped in detail. This report presents the data obtained from the investigation to date.

ACKNOWLEDGMENTS

In its program of exploration of mineral deposits, the Bureau of Mines has as its primary objective the more effective utilization of our mineral resources to the end that they make the greatest possible contribution to national security and economy. It is the policy of the Bureau to publish the facts developed by each exploratory project as soon as practicable after its conclusion. The Mining Branch, Lowell B. Moon, chief, conducts preliminary examinations, performs the actual exploratory work, and prepares the final report. The Metallurgical Branch, R. G. Knickerbocker, chief, analyzes samples and performs beneficiation tests. Both these branches are under the supervision of Dr. R. S. Dean, assistant director.

1/ The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is made: "Reprinted from Bureau of Mines Report of Investigations 3926."

2/ Mining engineer, Albany Division, Mining Branch, Bureau of Mines.

Special acknowledgment is due to S. H. Lorain, chief, Albany Division, Mining Branch and to S. R. Zimmerley, chief, Salt Lake City, Utah, Metallurgical Division, for analyses of the ores.

HISTORY

The presence of quicksilver in the Glass Buttes district has been known since about 1930. The area immediately north of Middle Butte has been superficially prospected by numerous test pits, trenches, shafts, and short adits, which revealed a number of opalized zones. Many of these opalized zones contain weak to strong concentrations of cinnabar. The area has not been explored thoroughly; no mercury has been produced from any of its deposits.

PROPERTY HOLDINGS

A block of 48 full-size claims has been located to cover a large part of the area in sections 34 and 3, Tps. 23 and 24 S., R. 23 E., W.M. These claims, held by location, are owned by H. S. Miller, lumberman of Bend, Ore. W. S. Lazier, 10 N. W. 20th Avenue, Portland, Ore., currently controls the property under a nominal leasing agreement. J. W. McDaniel, 44 Lake Place, Bend, Ore., has done much of the underground and surface exploration on the property.

PHYSICAL FEATURES AND COMMUNICATIONS

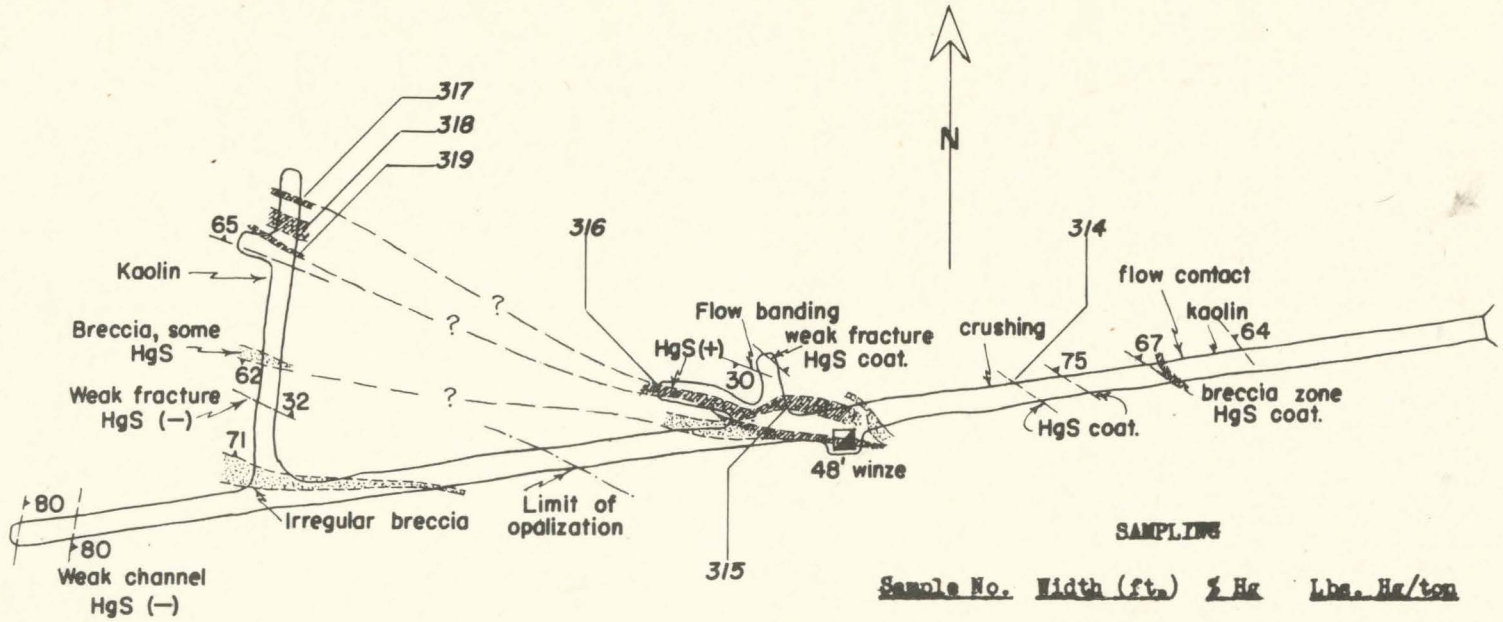
The Glass Buttes district is an area of low relief in the Deschutes River drainage system near the northeast corner of Lake County, Ore. (See fig. 1.) The arid climate is marked by extremes of winter and summer temperature. Water for camp use is not available in the immediate area. Well water, however, can be obtained in limited supply on ranch property 5 miles to the south.

The region is sparsely covered with scrub brush, sage, and juniper. Timber for plant construction and mine support would necessarily be trucked to the property. No electric power is available; hence any contemplated mine plant would require a Diesel or Diesel-electric installation.

The nearest supply point is Burns (population 2,600), 49 miles to the east over State Highway 54 (U. S. 20). Bend (population 9,000) is 83.2 to the west over State Highway 54. Access from the highway to the property is over 3.3 miles of unimproved desert road. Limited spot surfacing, together with an estimated 0.5 mile of grade improvement, would be required to insure year-around access to the deposits at the north end of the property. Rail transportation is available at both Bend and Burns.

LABOR AND LIVING CONDITIONS

With the exception of a number of small stock ranches, the surrounding region is uninhabited. No mine labor is known to be available. Unskilled labor probably could be recruited from Bend or Burns by meeting current local wages. Labor of this type would be adequate for a small-scale operation under the supervision of an experienced foreman.



SAMPLING

Sample No.	Width (ft.)	% Hg	Lbs. Hg/ton
314	2.9	0.025	0.50
315	3.2	0.325	6.50
316	3.7	0.075	1.50
317	0.9	0.310	6.20
318	5.0	0.035	0.70
319	1.1	0.215	4.30

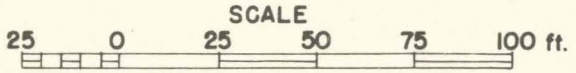


FIG. 3, TUNNEL NO. I, GLASS BUTTES MERCURY DEPOSIT

Living accomodations are provided by three small shacks and a store house at the north end of the property. With a small expenditure for rehabilitation, these shacks would furnish primitive housing for 6 men.

DESCRIPTION OF THE DEPOSITS

The Glass Buttes district is overlain by flow rock and a mantle of recent pyroclastics. The flows, alternating from basaltic to glassy lava, are fractured by faulting that is believed to be normal.

The glassy rocks have been affected locally by hydrothermal action evidently concentrated in and along zones of fracturing. This alteration has resulted in more or less complete opalization of some of the glassy rocks. In a number of places, delicate flow banding is preserved in the opalite.

The opalized zones have been fractured and brecciated along narrow bands usually trending northwest and dipping steeply to the north. Some of these fractures and breccia bands have been filled and replaced with widely ranging concentrations of cinnabar.

A fair degree of presistency for some of these mineralized fractures is suggested by exposures in the No. 1 tunnel (See fig. 3). Strike and dip extensions of about 170 feet may be assumed in this working.

THE ORES

Cinnabar occurs in the Glass Buttes prospects as replacements, fracture fillings, and coatings on brecciated opalite. Many of the more loosely compacted breccias are lightly filmed with cinnabar. Other breccias appear to have been predominantly mineralized by incomplete replacement and fracture filling. A single breccia zone, however, may contain all three types of mineralization.

With the exception of tiny veinlets cutting the opalite, no massive cinnabar was found in any of the openings examined. The highest-grade material appears to be partly replaced opalite. The mercury content of the coated breccia is insignificant.

A number of samples were cut from representative breccias in the No. 1 tunnel. (See fig. 3.) Assays and descriptions follow:

Sample No.	Width	Percent Hg.	Percent Cl_2	Lb. Hg/ton	Description
314	2.9	0.025	0.01*	0.50	Breccia; weakly coated.
315	3.2	.325	.01*	6.50	Breccia; cinnabar replacement.
316	3.7	.075	.01*	1.50	Breccia and stained clay.
317	.9	.310	.01*	6.20	Breccia; cinnabar replacement.
318	5.0	.035	.01*	.70	Breccia; cinnabar coating only.
319	1.1	.215	.01*	4.30	Breccia; replacement

*Indicates "less than."

These samples are indicative of the grade of the several breccia types. It appears that the mining grade obtainable from several of the veins may be raised to some extent by careful hand sorting.

MINE WORKINGS

Numerous test pits, four short prospect adits, and three shallow shafts dot the area. (See fig. 2.) Most of these widely scattered openings have exposed traces of mercury mineralization.

The most significant openings examined were the No. 1 tunnel and the North shaft 950 feet northwest of the No. 1 portal. The No. 1 tunnel (see figs. 2 and 3) has been driven west 380 feet to intersect a mineralized fracture exposed by an open cut 100 feet vertically above the adit level. The fracture has been further explored by a 48-foot winze sunk from the adit sill.

The North shaft has been sunk to a depth of 45 feet. A level has been turned off at the bottom of the shaft and advanced 10 feet to the east. Both shaft and drift expose a mineralized breccia about 2 feet wide.

The underground workings examined are in fair condition, although some of the drift sets have rotted and require timbering. The ground stands well; it requires support only in the breccia zones.