

CALCITE OCCURRENCES NEAR THE OWYHEE RESERVOIR, MALHEUR COUNTY, OREGON

Introduction

A number of veins of calcite occur in the vicinity of Dry Creek where it empties into the Owyhee Reservoir (see figure 1). They occur in lake beds and basalts and are restricted to an area approximately 9 miles square in the southwestern part of the Mitchell Butte quadrangle, T. 23 S., R. 43 and 44 E., Malheur County. This area has a semi-arid climate.

The veins are fillings in roughly vertical faults or fractures which in most cases appear to have only small displacements. Individual veins are fairly uniform in width throughout their lengths. Widths of the veins are from several inches to 10 or more feet wide and one vein widens to 25 feet at one place. The veins are from several hundred feet to nearly half a mile long.

The size of the calcite crystals varies with the deposit and also within each vein. Crystals several inches through are not uncommon and one 9 inches on a side was taken from one vein. The veins have not been developed to depths more than several feet. Most of the crystals at this depth are weathered and are unsuited for optical use, though some crystals containing clear portions as much as one inch long and nearly 1/2 inch in other dimensions were obtained from these shallow depths and are probably suited for certain optical instruments.

The basalts in which some of the deposits were emplaced belong probably to the Steens Mountain basalt of Miocene age; the overlying lake beds are probably a part of the Payette formation of somewhat later Miocene age. The faults or fissures in which the calcite was deposited were probably formed when the region was folded into broad basins and anticlines. The date of this folding is assigned

to the Pliocene and is thought to have taken place before the beds of the Idaho formation of Pliocene-Pleistocene age were laid down. The calcite is believed to have been derived from an underlying limestone area and deposited in faults and fractures by ascending hot waters. If these age relationships are correct, the date of the mineralization may be either Pliocene or Pleistocene. A Pliocene age is more likely as judged from the amount of erosion which has taken place in the basalts and lake beds since the veins were formed. There is no evidence of post-mineral faulting. The comparatively recent geologic age of these veins suggests the relatively short length of time during which groundwater may have affected the calcite.

Not all of the occurrences were visited, though the ones examined were reported to be the more important deposits. The veins west of the reservoir in or adjacent to Dead Horse Canyon, which is south of Dry Creek and north of Sand Hollow (see Mitchell Butte, U.S. Geological Survey topographic map), will be discussed first and the discussion of those east of the Owyhee Reservoir will follow. The examinations were made between May 24 and May 29, 1943. Harry Butler pointed out two of the deposits, in which he has an interest, at the time of the examination.

Deposits West of the Owyhee Reservoir and South of Dry Creek

The two and possibly only deposits in this group are known as Island Spar no. 1 and no. 2 claims (which are located on the same veins) and the Iceland Spar no. 3 claim (see figure 2).

Island Spar no. 1 and no. 2

These claims include one large and two lesser veins that were discussed in a report by N. S. Wagner, field geologist of the Oregon Department of Geology and Mineral Industries, April 9, 1943. Consequently only the essential features of this occurrence will be repeated here.

Owners: William Matevia, 1410 N. 11th St., Boise, Idaho,
and M. P. Tanning, Boise, Idaho.

Lessees: W. M. Schmeykal & F.L. Muckensturm (S. & M.
Associated Mines), 919 N. 19th St., Boise, Idaho.

Location: NE $\frac{1}{4}$ sec. 28, T. 23 S., R. 43 E. W.M., near Dead
Horse Canyon about half a mile west of the Watson Road
and about 2 $\frac{1}{2}$ miles south of Dry Creek (see figure 2).
The veins are located on the steep southwest slope of
a butte; the main vein is at 3600 \pm feet elevation and
the lesser ones are several hundred feet down the slope.

The property is reached from Vale as follows:
It is about 8 miles west on the Vale-Burns Highway
(State highway 20) past the Malheur River bridge to a
fair road leading south about 20 miles across the desert
to Twin Springs. From Twin Springs it is about 4 miles
south by poor road to Dry Creek and from there about
5 miles south on the Watson Road (see figure 2) and up
a creek bed to the west to the base of the butte on which
the veins are located.

Area: Two mining claims.

History and Development: Wagner* reports that these deposits
caused a small boom about 15 years ago. It soon died down
due probably to the ample supply of optical calcite from
other sources. No record of production is available. The
present claims were located February 20, 1942, and later
were leased to the present operators.

* Wagner, N. S., Iceland Spar Claims, Oregon Department of Geology & Mineral
Industries, April 9, 1943.

Development consists of several shallow pits scattered over the property and one short cut on the main vein. No prospecting to depths greater than several feet had been done at the time of the examination. On July 5th the operators reported that they had done some work on the deposit and planned to continue development.

Geology: The three veins are roughly parallel and strike about N. 65° W. and dip steeply to the south. They differ in width from several inches to several feet. The largest is from 2 to 4 feet wide and dips 75° south. It crops out more or less continuously over a distance of some 2500 feet.

The mineralization took place in faults of little displacement. The country rock is tuffaceous sandstones that lie nearly flat and in places show torrential cross-bedding. The beds overlie the Steens Mountain (?) basalt of Miocene age without any apparent angular unconformity. Though the basaltic series includes tuffaceous interbeds, the beds in which the mineralization has occurred are members of a thick series of basin or lake sediments that overlie, probably disconformably, the basaltic lavas. One tuffaceous sandstone bed along one part of the large vein contains fresh-water gastropods and pelecypods and another layer contains fragments of carbonized wood. The fossils have not yet been identified. A slab of tuff found at the intersection of the Watson Road and Dry Creek shows fragmentary fossil leaf imprints. Dr. Ethel I. Sanborn, Assoc. Prof. of Botany and Paleobotany of Oregon State College, thinks one leaf may be

Potentilla salmonensis Brown and another Quercus
consinulus. These genera belong to Miocene floras.

Harry Butler of Ontario, Oregon, reports that a camel's jaw was found in similar beds in the Sucker Creek section which is in the southeastern part of the quadrangle. The lake beds probably belong to the Payette formation of Miocene age. At this locality, they form the northeast side of a breached domal anticline that trends northwest.

Mineralogy: As Wagner* stated, the vein matter is nearly all calcite. The crystals are as much as 6 inches on a side, though commonly several inches thick. Size varies in various parts of the vein. Where cuts have exposed the large vein, crystals, though large, are diversely oriented and thus are difficult to remove without flawing. Though some crystals show sizeable portions (several inches in diameter) that are clear, the majority are milky or incipiently cleaved due to weathering effects. Where the vein is widest (about 4 feet), it is somewhat open textured and the calcite has been weathered considerably by exposure to the air and movement of groundwater. The diverse orientation of the crystals at the wider places in the vein is probably the result of growth outward from many centers of crystallization.

Equipment: A few poor hand tools were available.

Iceland Spar no. 3

Owners: William Matevia, 410 N. 11th St., Boise, Idaho, and

* Wagner, N. S., Iceland Spar Claims, Oregon Department of Geology and Mineral Industries, April 9, 1943.

M. P. Tanning, Boise, Idaho.

Lessees: W.M. Schmeykal and F.L. Muckensturm (S. & M. Associated Mines), 919 N. 19th St., Boise, Idaho.

Location: NE $\frac{1}{4}$ sec. 21, T. 23 S., R. 43 E., in Dead Horse Canyon about $\frac{2}{5}$ of a mile west of the Watson Road and $\frac{1}{4}$ miles south of Dry Creek. This is about a mile north of Igland Spar claims nos. 1 and 2 (see figure 2). The veins crop out on both the west and east sides of a small canyon that runs northeast. The elevation is more than 3200 feet.

Area: One mining claim.

History and Development: The deposit was located on April 20, 1942. A few shallow pits constitute the development. In order to get some satisfactory samples from this property, a cut about 2 feet wide, 2 to 3 feet deep, and 8 feet long was made. There was no equipment on the property.

Geology: The veins, three in number, occur in the same series of lake beds as those at Igland Spar claims nos. 1 and 2. The veins are a few inches to nearly a foot in width and from several hundred feet to as much as 1200 feet long. Their strike is N. 30° W. and the dip is nearly vertical.

The northernmost vein is 10 inches wide and contains rhombohedral crystals as much as 8 inches on a side. In places the vein matter is made up of tuffaceous country rock and somewhat banded, yellow-colored calcite. The wall rock on the northeast wall is impregnated with calcium carbonate to a depth of several inches; the southwest wall only slightly. As a whole, the vein is tight and the crystals tend to be similarly oriented. The turbidity and imperfections of the crystals

decrease very noticeably from the surface to the 3 foot depth reached.

Several normal, or untwinned, crystals contained clear portions as much as 1 to 2 inches long and 1/2 inch on each side. Some of these were flawed in their removal. Though some pieces of float showed clear portions 1 inch long and nearly half an inch through, most of them were milky or cloudy, and some were stained slightly brown.

The relative percentage of clear to clouded portions increased noticeably to the 3 foot depth attained. The fact that pieces of nearly clear float were found on the surface suggests that the depth at which clear calcite may occur is of the order of tens of feet. As the region has a semi-arid climate, the vein material below the surface will be much less affected by weathering due to exposure (oxidation and frost action effects); and the alteration of the calcite at depth is probably caused largely by groundwater. The depth to which this is effective depends not only on the amount and rate of the fall of rain or snow, but on the permeability of the wall rock and the compactness of the vein material.

A chemical analysis of the calcite from this vein by John Beede, Portland, shows:

CaO	55.75%	CaCO ₃	99.49%
MgO	0.18%	MgCO ₃37%

Deposits East of the Owyhee Reservoir and Dry Creek Butte

The two largest veins of calcite examined belong to this group. A third and smaller one, known as the Calcite King no. 1 was located July 1, 1931, on the south

side of Indian Creek, about $1\frac{1}{2}$ miles east of the mouth of Dry Creek, by A.I. Eagle, Harry Butler, and Fred Lackey. This deposit was not visited but is probably in sec. 15, T. 23 S., R. 44 E.

Calcite Miner Claim

Owners: Harry Butler, Box 22, Ontario, Oregon.

Mrs. Fred G. Lackey, Ontario, Oregon.

Mrs. O. M. Castleman, Merrill, Oregon.

Joe W. Jarvis, 1416 Dodge St., Omaha, Nebraska

Location: SW $\frac{1}{4}$ sec. 22 and NW $\frac{1}{4}$ sec. 27, T. 23 S., R. 44 E., about

one mile east of the Owyhee Reservoir and nearly two miles

due east of the summit of Dry Creek Butte (see figure 2).

The vein runs from the top of a ridge (elev. 3600 \pm) north-

west down a drainage gulch (elev. 3150 \pm) across to the

top of a butte (elev. 3550 \pm).

The property may be reached from Nyssa, Oregon by driving to the Owyhee Dam (31 miles), taking a boat up the reservoir to a point on the east bank opposite Dry Creek Butte (11 miles), and from there walking more than a mile to the property. Permission to go on the reservoir during the present emergency must be obtained from the proper authority. The property may also be reached from Nyssa by road to Adrian (13 miles) and thence south by road 15 miles up the Sucker Creek road. An old and possibly impassable road leads west to Board Corral Spring (\pm 15 miles) and then west about 4 miles to within 2 miles of the property. The claim is then 2 miles north. There is no trail.

Area: One mining claim covering part of the vein to be described.

History: The Calcite Miner claims part of the vein located on December 2, 1929 by Fred G. Lackey and Harry Butler of Ontario, as the Crystal nos. 1 and 2. On December 14, 1929, they located the Calcite nos. 1 and 2, about a mile to the east, and included M. P. Tanning of Boise, Idaho, as a partner on the Calcite nos. 1 and 2. It is reported that several thousand dollars was raised to build a road into the Crystal nos. 1 and 2, but the money was misappropriated.

It is reported that the Union Carbide Co. was interested at one time in obtaining the calcite from these properties but gave up the idea when they obtained less pure material from a closer source.

On March 8, 1941, Butler and Lackey relocated the properties as the Calcite Miner and Sheep Horn, refiled on them as indicated under ownership.

Developments: Several shallow pits and cuts have been made along the west side of the vein.

Geology: The vein is a fault or fracture filling in basalt and interbedded and underlying volcanic breccia which probably belong to the Steens Mountain basaltic series of Miocene age. The basaltic flows and volcanic tuff and breccia beds dip several degrees to the northwest. The strike of the vein is N. 30° W. and the dip, nearly vertical. The vein is about 2500 feet long and over most of that distance is well defined. It averages about 10 feet in width and at one place near its southeastern end it is 25 feet wide. The vein narrows at the northwest end and finally disappears at or very near the hill-top. The continuity of the vein appears to be interrupted

near the middle where a small drainage gulch cuts through and partly covers it.

The calcite crystals on the surface of the vein are small for the most part, generally less than 2 inches. No material from a depth greater than several feet was obtained due to lack of development. The calcite crystals occur as aggregates arranged in rudely aligned bands parallel to the strike of the vein. The crystals are badly weathered on the outside, though the centers of the larger crystals in most cases are, in part, clear. Northwest of the drainage gulch, which cuts through the vein, crystals are larger and one measured 7 inches on a side. Some of the crystals are quite clear except for surface alteration. A cleavage fragment from a larger crystal contained a clear portion 1 inch square. The best crystals occur along the vein 100 to 200 feet northwest of the drainage gulch.

Sheep Horn Claim

Owners: Harry Butler, Box 22, Ontario, Oregon.

Mrs. Fred G. Lackey, Ontario, Oregon.

Mrs. O. M. Castleman, Merrill, Oregon.

Joe W. Jarvis, 1416 Dodge St., Omaha, Nebraska.

Location: NW $\frac{1}{4}$ sec. 26, and NE corner sec. 27, T. 23 S., R. 44 E., about 3 miles due east of Dry Creek Butte and 1 mile east of the Calcite Miner claim (see figure 2). The elevation of the vein where it crops out on the northeastern slope of the butte in sec. 27 is 3400 feet; elevation is 3650 feet to the east where it crosses the top of a small knoll and about 3350 feet at its eastern limit.

Area: One lode mining claim.

History: See Calcite Miner.

Development: Surface cuts have been made at several places along the vein, generally on the downhill side where the vein in places rises several feet above the general surface.

Geology: The vein is a fissure filling of calcite in beds of volcanic tuff and breccia and associated basalt which are the same age as those to the west at the Calcite Miner. They are probably part of the Steens Mountain basaltic series of Miocene age. The beds strike N. 50° E. and dip 15° W. It is about 2000 feet long and averages 6 to 8 feet in width. In places, it stands several feet above the main surface. The vein is quite well defined along most of its northwestern half but branches into five or more veins, each a foot or less wide, at the draw immediately northwest of the knoll it crosses.

The crystals are generally small but some measured as much as 4 inches on a side. The crystals are much weathered and most are milky or turbid. Inclusions of tuffaceous material are present at some places along the vein. Travertine occurs along with the calcite crystals at one spot. The larger crystals are not restricted to any particular portion of the vein.

Report by: Wallace D. Lowry, 7/8/43

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Three samples of calcite taken from the Iceland Spar no. 3 claim were sent on May 28, 1943, to Bausch & Lomb Optical Co., Rochester, New York. One was about three inches long and half an inch through and though twinned, was sent to suggest the size of crystals available. Two smaller cleavage fragments, slightly turbid in a spot or two, were not large enough to meet specifications. In the letter of transmittal, it was explained that the samples probably would not meet their specifications and that we wished to know if they looked promising.

They replied June 16, 1943, that the samples were of no optical value to them as they contained flaws, cracks, and striae. This we knew and had explained to them but either they ignored or did not receive the letter. However, they stated that they would be glad to inspect any further samples that appeared to meet their specifications.

Other specimens were shown to a Mr. Kaiser (?), who is an expert on certain minerals here in Portland. Though a perfectionist when it comes to the judging of crystals, he said one small cleavage fragment about $3/4$ of an inch long and more than $1/4$ of an inch on the other two sides would probably be satisfactory for use in dichroscopes.

This crystal, another also from the Iceland Spar no. 3 claim, and one measuring about 1 inch on each side from the Calcite Miner claim, were sent to Gordon Taylor, Chief of the Miscellaneous Minerals Division, War Production Board. Mr. Nixon saw him in Washington, D.C. in July, 1943, and Taylor urged our Department to promote the development of these deposits.

I feel that most of the deposits contain some calcite of optical grade at

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depth. The depth at which it will be found will vary with the deposit. Whether or not it can be profitably extracted is another question. The veins in the lake beds can be worked most easily. The calcite at Island Spar nos. 1 and 2 claims and the Iceland Spar no. 3 claim probably can be examined to depths of 20 or 30 feet without much difficulty as both are situated on rather steep slopes. Of course, only hand methods can be used.

The sale of non-optical grade calcite for use as poultry grit, stock feed, standardizing spar, etc. will not be feasible until the roads are much improved.

It has been suggested to the operators of Island Spar nos. 1 and 2 claims that they prospect elsewhere along the vein and that they might employ a small circular saw to cut around and thus remove desirable crystals.

Joe W. Jarvis, supervisor of agricultural development for the Union Pacific Railroad, 1416 Dodge Street, Omaha, Nebraska, reported certain information regarding the quantity sale of this calcite. He is co-holder of the Calcite Miner and Sheep Horn claims. He states that the freight rate on material shipped from Adrian, Oregon or a siding 5 miles from there, is based on the Lime, Oregon rate which is \$2.65/ton to Portland. Thus the freight rate would be about \$3.35/ton from Adrian to Portland. He says that this calcite would sell for use as poultry grit for about \$15/ton wholesale, Portland. For use in livestock mineral feeds, he states the material is worth about \$20/ton, Portland. For use in agriculture, he thinks it could be sold without trouble for probably \$7/ton, Oswego, Oregon. Jarvis says similar calcite taken from a small deposit at Indian Head, Idaho, was sold readily to Crown Mills, but that the deposit was soon worked out.

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Attached hereto is the letter from Bausch & Lomb Optical Co., Rochester, New York, regarding the samples submitted to them from the Iceland Spar no. 3 claim. Attached to it is a list of their specifications. Also attached is the June, 1943, issue of "The Ore.-Bin" which contains an article on Iceland Spar.

Wallace D. Lowry
July 22, 1943

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