

RECORD IDENTIFICATION

RECORD NO..... M061056
RECORD TYPE..... XIN
COUNTRY/ORGANIZATION. USGS
MAP CODE NO. OF REC..

REPORTER

NAME..... JOHNSON, MAUREEN G.
UPDATED..... 80 12
BY..... FERNS, MARK L.; (BROOKS, HOWARD C.)

NAME AND LOCATION

DEPOSIT NAME..... BRISTOL LIMESTONE

MINING DISTRICT/AREA/SUBDIST. GOLD HILL

COUNTRY CODE..... US

COUNTRY NAME: UNITED STATES

STATE CODE..... OR

STATE NAME: OREGON

COUNTY..... JACKSON

QUAD SCALE QUAD NO OR NAME
1: 62500 GOLD HILL

LATITUDE LONGITUDE
42-23-17N 123-06-34W

UTM NORTHING UTM EASTING UTM ZONE NO
4692659.1 490984.2 +10

TWP..... 37S
RANGE.... 03W
SECTION.. 06
MERIDIAN. WILLAMETTE

LOCATION COMMENTS: NW 1/4

COMMODITY INFORMATION

COMMODITIES PRESENT..... LST

OCCURRENCE(S) OR POTENTIAL PRODUCT(S):
POTENTIAL.....
OCCURRENCE..... LST

ANALYTICAL DATA(GENERAL)

EXPLORATION AND DEVELOPMENT
 STATUS OF EXPLOR. OR DEV. 2
 PROPERTY IS INACTIVE

DESCRIPTION OF DEPOSIT

DEPOSIT TYPES:

SEDIMENTARY

FORM/SHAPE OF DEPOSIT: LENTICULAR

SIZE/DIRECTIONAL DATA

MAX LENGTH.....	1000	FT
MAX THICKNESS.....	600	FT
STRIKE OF DREBODY....	N20E	
DIP OF DREBODY.....	90	

DESCRIPTION OF WORKINGS

COMMENTS(DESCRIP. OF WORKINGS):
 SHALLOW PITS AND CUTS

PRODUCTION

NO PRODUCTION

23 LST SAMPLE

LIMESTONE (97+CaCO3)

GEOLOGY AND MINERALOGY

AGE OF HOST ROCKS..... PERM-TRI
 HOST ROCK TYPES..... METASEDIMENTS

LOCAL GEOLOGY

NAMES/AGE OF FORMATIONS, UNITS, OR ROCK TYPES

1) NAME: APPLGATE GROUP

AGE: PERM TRI

GENERAL REFERENCES

- 1) MINERAL AND WATER RESOURCES OF OREGON, 1969, ODGMI BULL. 64, P.251
- 2) TREASHER, R.C., 1940, BRISTOL LIMESTONE; ODGMI UNPUBLISHED FILE REPORT

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

BRISTOL LIMESTONE

Gold Hill Area

Owner & Operator: No operation. Claims held by location, August 1937 by F. I. Bristol, Rogue River, W. B. Sullivan, and Kenneth E. Hamblen, Portland, Oregon.

Location: NW $\frac{1}{4}$ sec. 6, T. 37 S., R. 3 W.; and SW $\frac{1}{4}$ sec. 31, T. 36 S., R. 3 W., Jackson County, north of the Left Fork of Fooths Creek, at elevations ranging from 1800' to 2200'.

Area: Nine placer claims, named Limestone No. 1 to Limestone No. 9, unpatented, recorded at Medford, Oregon.

History: Property was located in 1937 by studying maps of limestone outcrops, and then following the trend of these.

Development: The heavily brushed hillsides have been made accessible by trails around the deposit and across it. Several pits and cuts have been made in the limestone to expose the rock and permit sampling. Work has been started at the south (lower) end of the lense, to open a quarry floor. Some exploratory work has been done on a second lens a few hundred feet to the southeast.

Equipment: None.

Transportation: The property is 5 miles by road from the railroad siding at the town of Rogue River. The route is via Pacific Hwy. #99 to Fooths Creek, up Fooths Creek to the forks, up the Left Fork to road to Cervany's ranch. The remainder of the road is not good, but passable. Grades are not over 7%.

Mining Facilities: Water appears to be scarce; power is on Left Fork road, a distance of not over 1 mile from quarry site; there is plenty of timber, mostly fir. Climate is similar to that at Grants Pass. No data on water rights, or

length of water season.

Topography: is semi-mountainous with very steep hillsides. The deposit is virtually bounded by a hillside on the southwest and which would facilitate quarry operations. Vegetation cover is principally brush of the manzanita-buckthorn-madrona type, with widely spaced 12" - 18" fir trees.

Geology: Country rock is Mesozoic (Triassic?) metasediments and metavolcanics. These rocks were classed as greenstone by Diller (14) and assigned a Devonian age. Reinvestigation of paleontological evidence indicates a Triassic (?) age (Wells & Hotz 41). This series includes lenticular limestone that in this region trend about N. 19° - 22° E. Dip is almost vertical. There is some evidence of an east-west fault that displaces the limestone about 500 feet to the west, halfway up the hillside. The lens is reported to be from 200 feet to 600 ft. wide, and over 1000 feet long. Quality is reported to be 97% plus CaCO₃. Very little iron.

The limestone is dark colored, locally called blue limestone. It is twisted and contorted by shearing stresses and somewhat foliated. White calcite is found, generally parallel to the shear lines and there are occasional knots or "augen" of white calcite. Some silicious material is included in the limestone, a feature that is characteristic of southern Oregon limestones. Inclusions of silicious material are to be expected in quarrying.

A second lens occurs a few hundred feet southeast of the main body. Quality is similar to that of the main body but it is of smaller size. Several cuts expose good quality limestone. The

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rock in this second lens breaks into larger blocks than that in the first lens. Probably shearing was not as intense.

These two limestone lenses are shown on the Grants Pass geologic map. Field study shows that the lenses are larger than illustrated and have slightly different shape.

Economics: It is planned to start quarrying limestone at the southwest corner of the deposit, and establish a quarry face along the eastern side which will permit at least 300-600 feet of face. There is a reasonable amount of dump space in the creek canyon. The bunker is to be constructed below the quarry face and farther to the southwest. There is undoubtedly a large quantity of limestone available; whether it is in the order of a million tons or not was not determined within the short time spent on the property. But certainly it is sufficient to justify opening a quarry for agricultural and paper-mill limestone. Quantity and quality seem to be satisfactory; quarrying conditions tend to be favorable for low costs, road construction should be low in cost.

References: Diller 14

Wills & Hotz 41

Informant: RCT Jan. 23, 1940

Feb. 22, 1943

Date: January 23, 1940.

SCAN: 6E1720

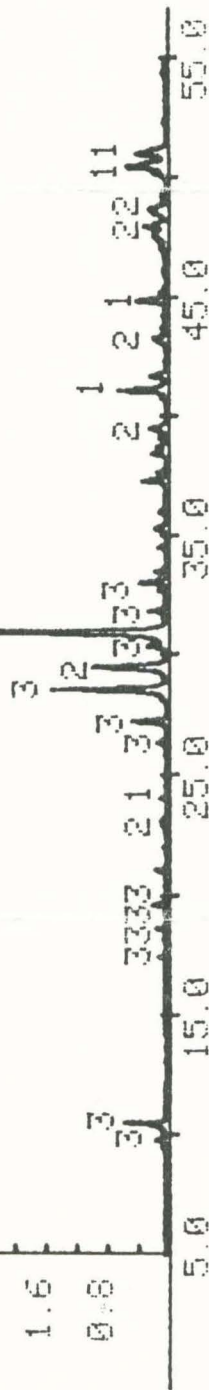
X 10³

1/14/86 10:19:58

4.0 PS1962 CALCITE

3.2
2.4
1.6
0.8

ONLY PRINCIPAL LINES
MARKED



1. = DOLOMITE

11- 78

100
80
60
40
20



2. = CALCITE

24- 27

100
80
60
40
20



3. = RICHTERITE

31-1284

100
80
60
40
20



Report on

THE BRISTOL SILICA DEPOSIT

Jackson County, Oregon

by

Preston E. Hotz

United States Geological Survey
Grants Pass, Oregon
January, 1942.

*State Department of Geology and Mineral Industries*702 Woodlark Building
Portland 5, OregonReport on Bristol Silica DepositIntroduction:

The Bristol Silica deposit is in Jackson County, Oregon in the Gold Hill mining district about 13 miles east of Grants Pass. Two twenty acre claims are in the W $\frac{1}{2}$ Sec. 30, T. 36 S., R. 3 W. Willamette Meridian. A dirt road $1\frac{1}{2}$ miles long was laid out to connect the deposit with the Pacific Highway and the town of Rogue River where a crushing plant was constructed. The deposit was discovered and located during the winter of 1938 and the first shipment of crushed silica was made in August, 1939.

So far as is known this deposit is the only one of its kind and purity in Oregon. There are several other bodies of silica in the Pacific Northwest, but the only one that compares with the Bristol property in purity and magnitude is north of Spokane, Washington. The chief use of the silica mined from the Bristol deposit has been for poultry grit though some has been shipped for use as building sand, filter rock, refractory silica, core sand and the manufacture of soap. With the coming of Bonneville power to the Pacific Northwest this deposit assumes greater importance as a source of high grade silicon for the manufacture of ferro-silicon and certain types of glass.

The deposit was mapped in detail by the writer and Robert T. Littleton under the direction of Francis G. Wells, geologist of the United States Geological Survey. A plane table map was made by Littleton assisted by employees of the Bristol Silica Company. The writer is responsible for the preparation of the geologic map.

Mr. F. I. Bristol, owner and operator, rendered invaluable assistance in the preparation of this report.

General geology:

The country rocks comprise altered volcanics, argillites, quartzites and marbles. These rocks are exposed over a large area in southwestern Oregon. Originally classified as Paleozoic by Diller* and Wells*, they have recently been re-assigned to the Triassic.*

*Diller, J. S., and Kay, G. F., Mineral resources of the Grants Pass quadrangle and bordering districts, Oregon: U. S. Geological Survey Bull. 380, pp. 48-79, 1908.

*Wells, Francis G., and others, Preliminary geologic map of the Medford quadrangle, Oregon: Oregon Dept. Geol. and Min. Indust., 1939.

*Wells, Francis G., and others, Preliminary geologic map of the Grants Pass quadrangle, Oregon: Oregon Dept. Geol. and Min. Indust., 1940.

*Wells, F. G. and Hotz, P. E.

Marble is the only unit of the country rocks which is sufficiently exposed at the Bristol deposit to warrant special mention. The other rocks have been adequately described by Wells*. Small, lenticular marble masses lie in several discrete belts which strike N-NE parallel to the

*Wells, F. G. and others, op. cit. (1939 and 1940).

structural trend of the region. As seen in figure _____ a pod-shaped mass of marble borders the silica deposit on the north and northwest. Several smaller marble lenses lie along the lower portion of the western contact. The marble is normally fine-grained and gray. In some places along the contact with the silica body it becomes slightly coarser-grained and is pure white. Elsewhere it is metamorphosed to a tremolite rock which in turn is replaced by blue quartz.

General structure:

The attitude of the country-rock conforms to the general structure of the rocks in this part of Southwest Oregon. The principal trend is N 30° E. and the dip varies from 45 to 65 degrees to the southeast. The marble occurs as small pods which lense rapidly and are seldom more than a few hundred feet thick and a few score wide. The contact between marble and the enclosing rock is faulted in several places, for example the contact between marble and the volcanics northwest of the silica body. The actual displacement is not known but probably it is but a few feet. The fracture zone commonly is parallel to the contact and is a bedding-plane fault developed between rocks of differing competency at the time of deformation.

The ore body:

There are two kinds of quartz in this deposit. White quartz forms the main mass of the deposit while a blue variety borders 2/3 of the deposit as a narrow band 15 to 75 feet wide. The blue rock contains an undesirable amount of impurities but is of interest in considering the origin of the deposit.

The white silica is dense, very fine-grained quartz. It is translucent, milky to cream-colored and not glassy. Seen under the hand lens the rock is very finely crystalline with a sugary appearance on fresh surfaces. No inclusions other than tiny grains of magnetite can be seen. In some places narrow discontinuous gray bands and streaks of included magnetite are visible.

Thin sections examined with the microscope show that the rock is 95 per cent quartz with accessory magnetite and apatite. The magnetite does not exceed 1 per cent while the apatite, which is responsible for the phosphorus content of the silica varies from 1 to 1.5 per cent. Apatite is more abundant in specimens taken from the borders of the deposit than it is in the center. Hematite pseudomorphs of pyrite are occasionally seen.

The blue quartz, unlike the white, shows some variation in character. All specimens are translucent and have a distinctive bluish cast. Small included streaks and clots of magnetite dust give it a mottled appearance. Some specimens, such as those from the northeast side of the deposit, are massive and even-grained; others, which occur along the western contact, have a distinct lineation due to alternations of quartz with foils and laminae of tremolite. This rock grades very rapidly to massive rock in one direction and to calcite-tremolite rock in the other.

Thin sections of the blue quartz from the western contact have relic crystals of diopside and tremolite. One specimen from the northeast side of the deposit has included calcite crystals which are altering to tremolite. Other specimens are similar to the white quartz when seen in thin sections except that they have a little more magnetite. There seems to be no more apatite in the blue quartz than in the white variety.

Structure of the ore body:

The white quartz body is elongate in a north-northeast direction approximately parallel to the structure of the enclosing rocks. The southern half is roughly lense-shaped. The northern half has more or less the form of an isosceles triangle with a long narrow tongue of quartz extending northward from its apex. The surface extent is about 1400 feet and the average width is 280 feet. The widest part is about midway up the slope where it is over 680 feet. The steep outward dipping contacts give the body a wedge-shaped appearance in cross-section.

There are two prominent sets of joints both of which strike about N. 60° W. The joints of one system, which are spaced at intervals of 2 or 3 feet, dip steeply to the southwest while the other, which is closely spaced at intervals of 1 to 4 inches, dips northeast from 45 to 65 degrees. Besides these two major joints the rock is broken by a myriad of closely-spaced irregular and curved fractures which are normal to the other two systems. Thus the rock is broken into small irregularly-shaped pieces which greatly facilitate mining as well as the final crushing.

There is noticeable displacement of the east and west contacts along two faults having a northwesterly trend more or less parallel to the jointing near the middle of the body. Many shiny polished surfaces are visible on the widely-spaced south-dipping joints indicating slight displacement along these planes. Two normal faults with small displacement are well-exposed in the quarry. The lower west contact between the blue quartz and country rock is a fault and it is believed that there has been movement along much of the southwestern contact. The contact between the white quartz body and the fringe of blue quartz is faulted in places as is indicated by narrow zones of fracture and granulation. The displacement along these boundary faults has been small. None of the faults affect the value of the deposit.

Genesis

The relationships of the blue and white quartz to each other and to the enclosing country rock are important to a consideration of the genesis of the deposit.

One of the most important relationships is the general structural concordance between quartz and the country rock. There is a close parallelism of directional trends between the marble and the blue quartz especially along the west border of the deposit where the attitude of the narrow band of blue quartz is the same as that of the marble. Within a few feet of the contact the marble is transformed to a tremolite rock which in turn is replaced by the blue quartz.

In contrast, the contact between the white and the blue quartz is abrupt and although the western contact of the white quartz parallels the blue quartz-marble contact it cross-cuts both the marble and the blue quartz at the upper end of the deposit. Furthermore, there is no concordance along the northeastern contact between the white and blue quartz. Small veinlets of lighter colored quartz cut the blue quartz in a few places, and there is some evidence of slight replacement of the lineated bluish rock by more massive lighter colored quartz.

It is believed that both the blue and the white quartz are of hydrothermal origin. There is nothing which indicates that the deposit is a wholesale replacement of some rock such as marble, though in places there is evidence of partial replacement of the marble by the blue quartz.

There is no evidence to indicate the controlling factors for the emplacements of the siliceous material. Careful examination of the surrounding area has not revealed similar deposits of silica though quartz veins are common.

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There were two separate and distinct periods of quartz deposition. The blue quartz was deposited first as a small lense-like body parallel to the structure of the invaded rocks. It was sufficiently rich in magmatic solutions and vapors to partially replace the marble with which it came in contact. When it had cooled and become solid it fractured and a second wave of siliceous material came in and was deposited. This material had little effect on the invaded rocks. Cooling and contraction combined with outside forces resulted in fracturing and the development of joints and faults.

Quality:

The following are analyses of samples of the white silica:

	1	2	3	4	5
SiO ₂	99.57	99.40	99.58	98.71	99.54
Fe ₂ O ₃	no analysis for this oxide			.48	.15
Al ₂ O ₃	no analysis for this oxide			.27	.06
CaO-MgO	no analysis for this oxide			nil	.14
P ₂ O ₅	.068=.030P	.043=.019 P	.064=.029 P	.089=.038 P	.11=.048 P

-
1. Electro-metallurgical Sales Corp., Portland, Oregon
 2. " " " " " "
 3. " " " " " "
 4. Lerch Bros. Inc., Hibbing, Minn.
 5. Electro-metallurgical Sales Corp., Portland, Oregon

It will be noted that all the samples contain phosphorus. Phosphorus is of concern where the quartz is to be used as a flux, as in the manufacturing of ferro-silicon.

The blue quartz is considered valueless for flux. No adequate analyses have been made of the blue variety but it is considered to have a high percentage of impurities. However, there seems to be no reason for its not being mined for use in enterprises in which purity is not a prime element.

Mining:

The Bristol Silica deposit is well-exposed at the surface of a broad, south-facing 20 degrees slope. The present quarry is 50 feet deep, 50 feet wide and has been extended approximately 70 feet in from the original surface to the working face. The quarry is located on the crest-line of the hillside where there is a minimum of overburden. The thin veneer of weathered material, which is seldom more than 6 feet thick, necessitates a minimum of stripping before the quartz is mined. So far there have been only a few tons of waste since everything below the surface is

clean rock. The waste is dumped below the quarry from the end of the tramway.

Sufficient quartz to supply the mill is mined by two men working one shift a day. The holes are drilled by hand using a single jack and 7/8 inch steel drill. The holes are drilled to a depth of 36 inches and are loaded with 40 percent special gelatin.

Approximately 15 tons of rock are broken down for each hole. Because of the closely spaced intersecting fractures the quartz naturally breaks into small fragments which are seldom more than 6 inches across. The material is shot down on to a wooden trap from where it is loaded into a 2 ton car, and is trammed by hand to a 75 ton wooden storage bin. The quartz is then trucked to the company plant at Rogue River where it is crushed.

Crushing plant:

The crushing plant is completely electrified and has a capacity of approximately 48 tons per day. A 9 x 18 inch jaw crusher reduces the rock to a size of 1½ inches after which it passes between two 24 x 14 inch rolls which grind it to the required size. These rolls are adjustable to permit grinding to sizes anywhere from 1 to ¼ inch. From the rolls the crushed product is conveyed and elevated to a bank of two three-deck vibrating screens where it is sized and distributed to the bins in the warehouse. The dust from the rolls is elevated to the dust-catcher.

Development and estimated quantity:

A small amount of development work has been done on the property; only sufficient to remove silica required by the sales department of the company. A number of samples for analysis were taken in order to locate the best grade of quartz. Previous to this survey the deposit had not been mapped in detail nor had its extent been proven by drilling.

The surface of exposed white quartz is approximately 396,000 square feet, which, based on a weight of 165 lbs. per cubic foot, would be 32,000 tons per vertical foot of depth. Assuming a mineable depth of 100 feet, a conservative estimate of minimum tonnage is 3,200,000 tons.

Future of the deposit:

The amount of silica mined, crushed and shipped has been relatively small. However, because of increased industrial activity in the Portland area, this deposit assumes greater potential importance.

The estimated minimum reserve of 3,200,000 tons seems ample to support an industry. It must be remembered that this figure is conservative and there is nothing in the geologic set-up to indicate that depths greater than 100 feet might not be expected.

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Quarrying is probably the cheapest and most practical method of removing the quartz. When a depth of 75 to 100 feet has been attained it would be wise to bench the quarry. Thus a series of open cuts could be established one above the other up the hill in step-like fashion. Gravity chutes or conveyor belts might be used to transfer the rock from the quarries to the bin level.

If future quarrying follows the crest-line of the hill there will never be more than a few feet of overburden to deal with. This can most easily be stripped by hand or perhaps with a bulldozer. On the lower east slope the overburden becomes progressively thicker until in places it is over 15 to 20 feet.

The chief problems to be overcome are those of market and transportation. The distance from the mine to the crushing plant is only 5 miles over good road, but the distance from the crushing plant to the Portland area is over 300 miles by rail. An increased demand for the quartz might overcome this problem since there are no other bodies of similar size and purity closer to Portland.

The uses for and the requirements which must be fulfilled by quartz in industry are given in the U. S. Bureau of Mines Bulletin 266* and Information Circulars 6472 and 6473*.

*Weigel, W. M., Technology and uses of silica and sand, U. S. Bureau of Mines, Bull. 266, 1927.

*Santmyers, R. M., Quartz and silica Part I - General summary. U. S. Bureau of Mines Inform. Cir. 6472, August, 1931.

Santmyers, R. M., Quartz and silica Part II, Quartz, quartzite and sandstone, U. S. Bureau of Mines Inform. Cir. 6473, August, 1931.
