QUARTZVILLE DISTRICT

Location

The Quartzville district lies in Linn County in Ts. 11 and 12 S., R. 4 E., in the drainage area of Quartzville Creek, a major tributary of the Middle Santiam River (figure 57). The district is reached from Foster on U.S. Highway 20 by way of the Green Peter dam and reservoir road, a total distance of 27 miles.

The region is steep and heavily timbered; elevations range from 1500 feet on Quartzville Creek to about 3500 feet on the ridges. Gold Peak and Galena Mountain are about 4000 and 5000 feet in elevation, respectively. The area is covered by the 15-minute Quartzville topographic map.

Geology and Mineralization

The district is underlain by volcanic rocks assigned to the Sardine Formation by Peck and others (1964). The following summary is quoted from Department Bulletin 14-D (1951, p. 96):

> "As in other Cascade mining districts, rocks of the area are made up of andesite and rhyolite flows and interbedded tuffs and breccias in about equal amounts. There are scattered dikes and plugs of dacite porphyry with narrow contact aureoles of hornfels. Vein systems are markedly uniform in strike, averaging N. 40° W., with steep dips in either direction. Although individual ore shoots are of rather small dimensions, the shear zones of the system to which they belong usually have considerable lateral extent, several of them being traceable for several thousand feet, with widths of 50 feet or more.
>
> "Much of the underground workings are now inaccessible, and those that are open are usually in the upper weathered portion of the veins, so that knowledge of the sulfide zones is scanty. Depth of oxidation varies greatly and in places unaltered rock containing sulfides crops out at the surface. Most of the veins contain mixed sulfides with sphalerite and pyrite common. Bournonite and tetrahedrite have been recognized. Pyritization is widespread, and pyrite is found streaking some vein walls. Concentrations of metallic gold in the oxidized zone at or near the surface have been the incentive for much of the prospecting, so that development work, except in a few cases, has been principally in following small ore shoots. Almost no systematic crosscutting which would show the potentialities of the large shear zones has been done. Many exceptional specimens of wire gold have been found in pockets."

History and Production

Mineralization was discovered in 1863 and the area was organized as a mining district in 1864. The Lawler and Albany mines were operated during the 1890's. The district has been relatively inactive since that time and less than 200 ounces of gold has been produced since 1896. Total production for the district reported in Department Bulletin 14-D (1951, p. 96) is $181,255, which included 8557 ounces of gold and 2920 ounces of silver.

Some small-scale lode and placer mining was done in the district during the 1930's.

Principal Mines

Lawler mine: The Lawler mine, located on White Bull Mountain and Dry Gulch, was the original discovery in the district; it was said to have been found by Dr. E. O. Smith in 1861. A company was organized and it optioned the property to W. B. Lawler, who interested English capital. A 20-stamp mill was built and considerable development work done. The mill is reported to have ceased operations in 1898. Total production was about $100,000.

Albany mine: The Albany mine, near the head of Dry Gulch in sec. 23, T. 11 S., R. 4 E., was first prospected in 1888. In 1892 a Tremain two-stamp mill was built and used to mill good oxide ore from two small shoots. Recovery was poor. Later a 10-stamp mill was installed by the Lincoln Mines Co., and U.S. Mint records for 1890, 1892, and 1893 credit the property with 653 ounces of gold. In 1925 a Lane mill was installed and ore brought down to it by a cable tramway.

Lode Mines of the Quartzville District

Albany mine — Quartzville District, 1

Location: Linn County, sec. 23, T. 11 S., R. 4 E. Workings are between about 2570 and 3070 feet elevation. Three patented claims.

Development: In 1931 a total of 1090 feet of tunnels was accessible. In addition, there are several cuts and shallow shafts. (Maps of workings in Callaghan and Buddington, 1938, plate 19.)

Geology: Country rocks are andesite, rhyolite, and tuffs. Mineralization occurs along four main, northwest-trending, brecciated and altered silicified zones containing some clay gouge and drusy and cherty quartz veinlets. The most abundant sulfide is pyrite with some sphalerite, galena, and chalcopyrite.

Production: The property was first prospected in 1888. Ore was processed in three mills: The first was a 2-stamp; a 10-stamp mill operated by steam in 1892; and a chilean mill was installed in 1925. Total production is not reported, but may have been about $50,000.

References: Parks and Swartley, 1916:141; Stowell, 1921; Callaghan and Buddington, 1938: 103-105; Department Bulletin 14-D, 1951:97.

Bob and Betty (Smith & McCleary) mine — Quartzville District, 2

Location: Linn County, SE¼ sec. 14, T. 11 S., R. 4 E., about 3100 feet elevation.

Development: Workings include about 1650 lineal feet of tunnel, plus a large open cut and 100-foot shaft (caved).

Geology: Mineralization occurs along a fairly wide and sheared and altered zone in andesite and tuff. The zone strikes N. 55° to 80° W. and dips 70° S. Clay gouge, reticulating quartz veinlets, calcite, and spots of sulfides occur in the zone. Sphalerite, galena, pyrite, and minor chalcopyrite are found. A sample of hand-sorted sulfides assayed 0.20 oz./ton gold, 1.0 oz./ton silver, trace copper, 2.8

percent lead, and 2.95 percent zinc.

Production: Discovered in 1881. In 1885, 100 tons were milled in a steam-operated 10-stamp mill. Recovery was poor and production small.

References: Stowell, 1921; Callaghan and Buddington, 1938:105-106; Department Bulletin 14-D, 1951:98.

Galena mine — Quartzville District, 3

Location: Linn County, NW¼ sec. 11, T. 12 S., R. 4 E., between 3400 and 3700 feet elevation.

Development: Two crosscut tunnels with some drifting total 725 feet plus 2 small open cuts.

Geology: Seams of quartz and disseminated sulfides occur in a northwest-trending, brecciated shear zone in andesite and tuff. The following assays were reported by Stowell (1921, p. 34-36):

Location	Width	Ounces per ton Gold	Ounces per ton Silver	Percent Copper	Percent Lead	Percent Zinc
North drift	18 inches	0.56	2.44	0.65	0.20	4.25
6' South drift	12 inches	0.02	3.68	0.15	8.85	2.4
Open cut 3500' elevation	4 feet	0.10	0.4	0.35	4.65	1.6
Face south drift lower adit	16 inches	0.03	0.31	0.45	0.20	2.0
100'x50' outcrop 650' north of upper cut elev. 3750'	4 feet	0.10	0.4	0.05	2.6	3.7

Production: Some development work was being done in 1921. Production not reported.

References: Stowell, 1921; Callaghan and Buddington, 1938:106.

Lawler mine — Quartzville District, 4

Location: Linn County, secs. 21, 22, 23, 26, and 27, T. 11 S., R. 4 E. from about 1600 to 3280 feet elevation. Two large placer and 11 lode claims patented.

Development: By 1903 a total of 2000 feet of tunnel had been driven. There are four principal adit levels. Stopes extend from the main level 155 feet to the surface. There are numerous open cuts as well.

Geology: The vein strikes about N. 50° W. and dips steeply NE. It is a gouge and quartz-cemented breccia of rhyolite, andesite, and tuff containing some sphalerite, galena, chalcopyrite, and pyrite. Caved stopes indicate a width of 8 feet. Most of the ore mined was oxidized and showed no sulfides.

Production: First discovery in the district in 1861. Reported production is about $100,000. Ore was ground in a 20-stamp mill which shut down in 1898.

References: Stafford, 1904:58; Callaghan and Buddington, 1938:107-108; Department Bulletin 14-D, 1951:101.

Lucille (Snowstrom & Bell, formerly Edson Group) mine — Quartzville District, 5

Location: Linn County, NE¼ sec. 22 and south edge sec. 15, T. 11 S., R. 4 E. between about 2480 and 3400 feet elevation.

Development: About 650 lineal feet of tunnels and several cuts. One cut 40 feet long, 12 feet wide, and 15 to 20 feet deep at the face.

Geology: Rhyolite, tuff, and andesite are cut by a northwest-trending shear zone with silicified, iron and manganese oxide-stained rock and gouge. The zone is as much as 70 feet wide with values in narrow seams.

Production: Discovered by Edson in 1897. Most of the development work was done prior to 1920. A $2000 pocket was reportedly mined.

References: Stowell, 1921; Callaghan and Buddington, 1938:111-112; Department Bulletin 14-D, 1951:102, 106-107.

Munro (Mayflower) group — Quartzville District, 6

Location: Linn County, SW¼SW¼ sec. 23, T. 11 S., R. 4 E., at about 2800 feet elevation.

Development: Main adit tunnel had 263 feet of crosscut and 217 feet of drift, along with several other tunnels with short drifts, winzes, and so forth, on both sides of the ravine, as described by Callaghan and Buddington (1938, p. 109).

Geology: Country rocks are altered, iron-stained andesite and rhyolite. Two or three narrow veins or mineralized seams trending N. 20° to 40° W. are described. Vein matter is partly silicified, brecciated, and leached rock with very little quartz and no sulfides other than pyrite.

Production: Discovered about 1890. Owner reported production of 72.56 ounces of gold. In 1931 owner was using a small prospector's mill; an old, dismantled arrastra was on the property.

References: Callaghan and Buddington, 1938:109; Department Bulletin 14-D, 1951:102-103.

Paymaster claim — Quartzville District, 7

Location: Linn County, SW¼ sec. 1 and NW¼ sec. 12, T. 12 S., R. 4 E., about 3600 feet elevation.

Development: In 1916 a drift 130 feet long was reported.

Geology: Mineralized zones in tuff and andesite strike northwest. They contain altered silicified rock with sulfide-bearing quartz veins a few inches wide. A sample of the sulfide-bearing quartz taken by Stowell (1921) about 8 inches wide assayed 0.04 oz./ton gold, 0.86 oz./ton silver, 0.5 percent copper, 3.2 percent lead, and 4.0 percent zinc. A one-foot sample from the vein in the main tunnel assayed 0.76 oz./ton gold, 1.94 oz./ton silver, 0.10 percent copper, 10.1 percent lead, and 8.4 percent zinc.

Production: Developed by a capital-stock promotion about 1913 called the Paymaster Mining & Milling Co., dissolved by proclamation in 1917. Production not reported.

References: Parks and Swartley, 1916:178; Stowell, 1921; Callaghan and Buddington, 1938: 109-110; Department Bulletin 14-D, 1951:103.

Red Heifer (Silver Signal) claim — Quartzville District, 8

Location: Linn County, near line of secs. 14 and 23, T. 11 S., R. 4 E., about 3300 feet elevation. On north side of ridge.

Development: Two tunnels and several cuts. Lower adit is caved. Upper has a 60-foot crosscut, short drift southeast, and 30-foot raise.

Geology: A sheared and silicified breccia zone trending N. 50° E. in andesite contains comb quartz, iron and manganese oxide-stained gouge, and residual sulfide cores chiefly of sphalerite, a little pyrite, chalcopyrite, and minor galena. A selected sample of sulfides assayed 0.32 oz./ton gold and 4.90 oz./ton silver. A sample of leached ore assayed 0.92 oz./ton gold and 6.2 oz./ton silver. Vein is about 3 feet thick.

Production: In 1921 the vein was reported to have produced a high-grade pocket. In 1938 the owner had installed a small mill and was working the property. Total production is not reported.

References: Callaghan and Buddington, 1938:110-111; Department Bulletin 14-D, 1951:104.

Riverside group — Quartzville District, 9

Location: Linn County, E½ sec. 27, T. 11 S., R. 4 E. Workings are from about 2500 to 3000+ feet elevation.

Development: About 500 lineal feet in 9 tunnels and several open cuts.

Geology: Brecciated, altered andesite with iron-stained gouge and bunches of quartz with sphalerite, pyrite, and galena strikes about N. 30° W. and is vertical. A 4-foot sample of vein taken by Stowell (1921) assayed 1.32 oz./ton gold and 0.98 oz./ton silver.

Production: First located in 1912 and operated in small way for many years. Ore was ground in a Gibson prospector's mill. Amount of production is not reported.

References: Stowell, 1921; Callaghan and Buddington, 1938:110; Department Bulletin 14-D, 1951:105.

Savage (Vandalia) group — Quartzville District, 10

Location: Linn County, SE¼ sec. 34, T. 11 S., R. 4 E. between 2700 and 3100 feet elevation.

Development: There is development of about 600 lineal feet in 6 tunnels, a caved shaft 80 feet deep, and several open cuts.

Geology: Country rocks are andesites and tuffs, with a mineralized shear zone about 50 feet wide with branching quartz veinlets, disseminated pyrite, and small bunches of other sulfides. The zone strikes northwest and dips steeply southwest. A 2½-foot sample across the vein in east drift of upper tunnel assayed 0.16 oz./ton gold and 0.74 oz./ton silver with traces of lead, zinc, and copper. A 3½-foot sample across the vein in Golden West tunnel assayed 0.36 oz./ton gold and 0.34 oz./ton silver.

Production: Discovered in 1900. Combined production of the Vandalia of two claims and the Golden West group of five claims in 1921 was about $7000. The mine was being worked in a small way during the 1930's.

References: Stowell, 1921; Callaghan and Buddington, 1938:110-111 (includes map); Department Bulletin 14-D, 1951:105-106.

Tillicum and Cumtillie (Golden Fleece) claims — Quartzville District, 11

Location: Linn County, SW¼ sec. 23, T. 11 S., R. 4 E., about 3000 feet elevation.

Development: Early development in oxidized ore is inaccessible. Later workings 100 feet lower total about 300 feet.

Geology: Workings follow both walls of a dark-colored diorite dike trending N. 40° W. in altered andesite. The soft, pyrite-bearing gouge seam (about 20 inches wide) on the southwest side of the dike carries some gold.

Production: Property was owned by the Advance Mining & Milling Co. in 1916. A later owner worked the property with a small, two-stamp, water-powered mill during the 1930's. Production is not reported.

References: Parks and Swartley, 1916:7; Callaghan and Buddington, 1938:106; Department Bulletin 14-D, 1951:107.

USGS Bulletin 893, "Metalliferous Mineral Deposits of the Cascade Range in Oregon." Pp. 102-103. 1938

Mineralogy and Types of Veins

The veins of the Quartzville district are much less extensive and contain much less sulphide than those of the Bohemia district. They differ from those of the North Santiam district in having less sulphide but more gold and silver. Most of the prospects and mines have developed only the upper weathered parts of the veins. Some large stopes were made on the Lawler vein and a smaller one on the Albany, but the production from the others has been largely from pockets - rich streaks within a few feet of the surface - which have been found at various times since the discovery of the metalliferous area. Some of these pockets are reported to have yielded as much as $5,000 in gold and a little silver, but generally a few hundred dollars is the limit. No large shoots of sulphide ore were open to view in 1931.

Few of the veins have been prospected below the zone of oxidation and leaching, but it appears that most are complex sulphide veins in which sphalerite predominates. Some of the veins, such as the Mammoth Reef, Snowstorm, or Edson, and to a certain extent the Bob and Betty, consist of broad zones of brecciated country rock cemented by massive or vuggy quartz veinlets without appreciable sulphides. Some, such as the Golden Fleece and Munro, consist of altered rock, chertz quartz veinlets, and no sulphide except pyrite. Those with appreciable sulphides occuring in streaks and lenses include parts of the Bob and Betty, Silver Signal, and Winter. Material on the dump indicates that the Galena and Paymaster, in the southern part of the district, contain sulphides in appreciable quantity. Small grains of bournonite and tetrahedrite were recognized in sulphide vein matter of the Bob and Betty. Barite occurs on the surface of vugs in vein matter from the Galena and Winter veins and in one of the veins at the mouth of McQuade Creek. Ankerite occurs in the Winter vein, and clear calcite is intimately associated with the sulphides in the Bob and Betty. In the Bob and Betty a breccia of cherty quartz or silicified pyritized country rock is cemented by the sulphides and calcite. Gold occurs as little plates and wires in the pockets. The Riverside vein reveals postmineral brecciation. There is no definite evidence of zonal arrangement of sulphide minerals.

Large areas of bleached and iron-stained altered rock occur on White Bull Mountain. Zones of altered rock are commonly present along the veins.

Though prospecting has been rather extensive it seems probable that small pockets yielding gold will continue to be found in unexplored parts of known veins or in veins that have heretofore escaped attention because of soil and forest litter. If worked in a small way with a minimum of cost in plant and development work, these small ore shoots might possibly be made to yield a profit. There is nothing to indicate the probable development of large shoots of sulphide ores.

Oregon Bureau of Mines Publication, vol. 2, no. 4. "The Mineral Resources of Oregon." December, 1916, p. 178.

Paymaster Mining and Milling Company (lead, gold and silver).
Quartzville District, Linn County

Local name, Paymaster mine.
Office: 399 East Forty-seventh St. No., Portland, Oregon. H. L. Cox, Pres.; Frank Converse, Sec., both of Portland. Capital stock, $1,000,000; par value $1.00; $594,013 subscribed, issued and paid up. (1913 report).

Property located in Secs. 1 and 2, 11 and 12, T. 12 S., R. 4 E., 28 miles southeast of Gates. An old wagon road leads to within 3 miles of the property. It is reported by the management that a 130-foot drift has been driven upon a vein in which 14 inches will run from 75 to 90 per cent galena and the entire vein will average as much as $25 per ton in lead, gold and silver. Dissolved by proclamation in January, 1917.

SUNSHINE MINING COMPANY

Memorandum for: _____ **Date** Oct. 7, 1960

Quartzville – East of Albany

Copper Pb, Ag, Au — Cu Pb Ag Au

Several openings $12 – $100

7 claims –

Lancaster Claim

Sec. 18, T12S, 4E

DA 3-3094

2385 S.W. Fairview Blvd } Ford Converse

Portland 1,

Telephone presentation by Ford Converse to RLA

Several of the properties, mainly relocations of claims which were worked many years ago, have been active in a small way in recent years. A few operators have built small mills, some homemade, to amalgamate a part of the gold present, and during the 1930's made a living from a partial recovery of the gold present. A little placering by "snipers" has also been done along Quartzville Creek.

Figure 5b, opposite page 45, shows the prospects, veins, and intrusive bodies of the Quartzville District.

Mining Properties

ALBANY MINE (Gold, silver) Quartzville District
(formerly Lincoln Mines Company)

Owners: J. McChesney and A. M. Hammer, Route 1, Turner, Oregon.

Location: Mainly in sec. 23, T. 11 S., R. 4 E. The claims, not all contiguous, are located for the most part in Dry Gulch.

Area: 3 unpatented and 3 patented claims.

History: The property was prospected as early as 1888. In 1892 a Tremaine two-stamp mill was built, and oxide ore said to assay $25.00 to $27.00 was milled from two small shoots, giving a very poor mill recovery. Later the Lincoln Mines Company operated the property and built a 10-stamp mill. Records of the United States mint give the property a production of 653 ounces of gold for the years 1890, 1892, and 1893. In 1925 a Lane mill was installed and ore was brought down to it by cable tramway.

Development: In 1931 a total of 1,090 feet of tunnel was accessible. In addition there are several cuts and shallow shafts. Equipment includes a Lane mill in good condition, a cable tramway, a 10-stamp mill in ruins, and two cabins. The workings on the property are at an elevation ranging from 2,570 feet to 3,070 feet.

Geology: Country rock includes andesites, rhyolite, and volcanic breccias. The lowest tunnel, the Crosscut, was driven in rhyolite about S. 52° E. for 444 feet along a silicified shear zone showing some sulphides. It then turns east for 237 feet in pyritic rhyolite, said to assay $1.20 in gold. The Bonanza tunnel, 400 feet above, was driven on a vein striking about S. 26° E., containing quartz and altered, brecciated country rock with some sulphides. Samples of the vein were reported to show no ore of milling grade. Some of the vein has been stoped. The Queen tunnel in altered andesite and volcanic breccia at 2,670 feet in elevation and northeast of the Crosscut tunnel, has a drift on a steeply dipping vein striking N. 37° W. A stope 60 feet long was carried 30 feet to the surface. A sample across 2 feet at the back of the stope was reported to assay 0.10 ounce of gold and 0.4 ounce of silver to the ton. The Lincoln and Goodman tunnels, driven in a shear zone, are about 1,800 feet northeast of the camp at an altitude of 3,035 feet. The former follows a vein containing a small amount of quartz and some sulphides in altered volcanic breccia. The Goodman tunnel shows gouge and silicified pyritic tuff. Outcrops of the Queen vein are much altered and iron stained, and produced some rich pockets.

Report by: F.W.L., 1938

References: Callaghan and Buddington, 1938:103-105
Parks and Swartley, 1916:141
Stowell, 1921

BOB AND BETTY (Gold, silver, lead, zinc) Quartzville District
(formerly Smith and McCleary)

Owner: Estate of W. S. Risley, Albany, Oregon.

Location: Near the south line of sec. 14, T. 11 S., R. 4 E., on the north side of the divide between Dry Gulch and Canal Creek. It is reached by about 1 mile of the Detroit trail from the Albany mine.

Area: 2 claims.

History: The property was located by T. J. McCleary in 1881. McCleary admitted Don Smith and five others into partnership to form the Portland group. A company was formed and a 10-stamp mill was brought in, together with a boiler and steam engine. No milling was done by this company, but later, in about 1885, Smith leased the property and with four other men, milled about 100 tons of ore from which a very poor recovery by amalgamation was made. The ground was relocated just prior to 1930 as the Bob and Betty.

Development: Tunnels aggregate about 1,650 lineal feet, with about 900 feet open. In addition, there is a large open cut and a caved shaft reported to be 100 feet deep. Elevation of tunnels ranges from about 2,950 to 3,100 feet.

Geology: The country rock is altered andesite, and development tunnels show a wide zone of shearing. Vein filling in the shear zone consists of gray and white quartz, gouge seams, and quartz veinlets in silicified country rock. The strike is N. 55°-80° W., with an average dip of 70° S. A sample of sorted sulphide ore from a pile of a few tons at the portal of the lowest crosscut tunnel gave the following results, according to Stowell (1921): gold, 0.20 ounce; silver, 1.0 ounce; copper, trace; lead, 2.8 percent; zinc, 2.95 percent. Later work, including a winze about 8 feet deep on the ore shoot, shows about 12 inches of nearly solid galena with an additional 30 inches of iron-stained rock containing soft seams and a few bunches of soft sulphides, principally galena.

Report by: F.W.L., 1938.

Reference: Callaghan and Buddington, 1938:105-106
Stowell, 1921

DOODLEBUG CLAIM (Gold ?) Quartzville District

Owner: Deb Devine.

Location: NW¼ sec. 23, T. 11 S., R. 4 E., on Quartzville road.

Development: A 10-foot cut and a 4-foot tunnel.

Geology: There is a northwest-trending shear zone in altered andesite, with disseminated pyrite in silicified rock stained with manganese and iron. No assays are available.

Report by: F.W.L., 1938.

HOUF PROPERTY (Gold) Quartzville District

Owner: James Houf.

Location: SW¼ sec. 19, T. 11 S., R. 4 E., on the Quartzville road at Yellowbottom Creek.

Area: 40 acres patented timber land.

History and development: Acquired in 1937. There are no improvements except a small cabin, and no development work has been done.

Geology: A wide zone of pyritized andesite is exposed in the bed of Yellowbottom Creek, along one side of a rhyolite dike. Specimens of andesite were said to assay 0.07 ounce of gold.

Report by: F. W. L., 1938.

LAWLER MINE (Gold, silver) Quartzville District

Owner: G. C. Howard, 107 Old Broad Street, London, England.

Location: Secs. 21, 22, 23, 26, and 27, T. 11 S., R. 4 E. The claims extend from the bed of Dry Gulch southeastward over White Bull Mountain into the basin of Silver Creek.

Area: 2 large placer claims in the bed of Dry Gulch and 11 lode claims extending southeast from the gulch, all patented. Placer acreage is 238.8; lode acreage is 164.8.

History: The original discovery of lode gold of the district is said to have been made by Dr. E. O. Smith on Lawler ground in 1861. A company was organized and it optioned the property to W. B. Lawler, who interested English capital. Considerable development work was done and a 20-stamp mill built. Production was in the neighborhood of $100,000,

It is reported that the mill closed down in 1898, and that 2,000 feet of tunnels and raises had been driven.

Development: There were four main adit levels with a difference in elevation of 500 feet between the upper and lower levels. These are now largely inaccessible. Stopes extend from the 155 or bottom level to the surface on a vein 8 feet wide in places. Shoots are said to rake to the southeast. Elevations of the claims range from 2,000 feet in Dry Gulch to 3,755 feet at the top of White Bull Mountain.

Geology: Country rock is rhyolite, andesite, and volcanic breccia. The vein strikes approximately S. 50° E., crossing a spur extending northwest from White Bull Mountain. Vein matter consists of brecciated country rock cemented by quartz. On the dump of one tunnel, fragments of sphalerite, galena, chalcopyrite, and pyrite with quartz were reported. The bottom tunnel is reported to have been driven the last 200 feet in a dark-colored dike rock, and that there was about 8 inches of ore in the shoot before this rock was struck. There is no record of any crosscutting to the walls of the dike. A small pile of tailings, probably less than 2,000 tons, is located below the now ruined Lawler mill. A sample of this material panned a small concentrate of an oxidized lead mineral, probably cerrusite, and a few small colors of free gold.

The placer area consists of rubble of unproved depth, character, and value. It extends for about 2 miles down Dry Gulch in which water flows only during periods of heavy runoff.

Informant: Frank Bevier ? (or Bert)

Report by: F. W. L., 1938

Reference: Callaghan and Buddington, 1938:107-108

Development: Lineal footage of tunnels is about 650 feet.

Geology: Country rocks are rhyolite, tuff, and andesite. The lowest tunnel, the Bell, was sampled by Stowell (1921). He found negligible gold values except in a 4-inch seam of quartz containing chalcopyrite. From this seam a sample assayed 1.72 ounces of gold and 33.3 ounces of silver to the ton. The tunnel is in a pyritic rhyolite breccia, cemented by quartz, and the zone of shearing appears to be about 70 feet wide, trending northwest. Other tunnels show a similar sheeted zone with sparsely disseminated pyrite and quartz stringers. Present work is in a short upper tunnel where the face shows a much-altered, brecciated zone with fractures containing soft, iron-stained gouge, showing considerable manganese stain and some crushed quartz. This face pans a small amount of free gold.

Report by: F.W.L., 1938

References: Callaghan and Buddington, 1938:111-112
Stowell, 1921

TILLICUM and CUMTILLIE CLAIMS (Gold, silver) Quartzville District
(formerly Makelim Group; Golden Fleece and Free Gold;
Advance Mining and Milling Company)

Owner: Frank Bevier, Foster, Oregon.

Location: SW¼ sec. 23, T. 11 S., R. 4 E., on the steep hillside between the Lawler and Albany groups, east of Monroe Mill, upper Dry Gulch; and reached by trail about 2 miles long from Frank Bevier's house in Dry Gulch.

Area: 2 claims.

History: The advance Mining and Milling Company owned 5 claims of the Makelim Group in 1916. The present owner has made his living from these claims since 1931, with a small 2-stamp water-powered mill.

Geology: The workings are mainly in iron-stained, altered rhyolite and andesite somewhat more than 3,000 feet in elevation. Considerable development work was done in the oxidized zone in early days, but much of this is now inaccessible. The present workings lie 100 feet below the old workings and total 300 feet. The working tunnel trends about N. 40° W., starting in altered andesite on the northeast wall of a dike of dark-colored rock, probably diorite. The tunnel has been driven over 125 feet on this wall, but at about 75 feet from the portal a branch of the tunnel crosscuts the dike and follows a soft seam paralleling the dike on the southwest side. The present face shows that this seam contains 8 to 10 inches of white gouge with black streaks of finely divided pyrite. Next to this seam is a soft brecciated mass, from 6 to 12 inches wide, made up of crushed rock and quartz in iron-stained gouge. This mass is wedge-shaped, came in from the bottom, and does not yet reach to the back. It pans a fair amount of free gold. Mr. Bevier believes this is the so-called Becket ledge, which was mined in the workings above.

Informants: Frank Bevier and J.E.M., 1938

Report by: F.W.L., 1938

References: Callaghan and Buddington, 1938:106
Parks and Swartley, 1916:7

FLOW SHEETS
MILL DESIGN

BOISE ASSAYERS & METALLURGY

650 E. AMITY BOISE, IDAHO 83705

PH. (208) 345-6336

FIRE ASSAYS
CHEMICAL ASSAYS
SPECTROGRAPHS
FINENESS TESTING

ASSAY REPORT

Sunshine Mines
815 Park Blvd., Suite 100
Boise, Idaho 83702

June 9, 1988

Attn: Elton Modroo (#117 "B")

	LAB #		SAMPLE ID	Au ppm	Ag ppm	As ppm	Hg ppm
Monument Peak	35049	Rd cut	4521 Cut 150' alt vol	TR	.171	8.2	ND
Thomas Creek	35050	Rd cut	4522 " "	ND	.146	TR	ND
11-4E 17	35051	Rd cut	4523 " 200' " "	ND	.260	6.1	ND
Lawler Claim	35052	"	4524 " 125'	ND	.319	11.8	ND
"	35053	"	4525 cut 18' shear alt	TR	1.409	31.4	ND
"	35054	"	4526 " 35' " " SiO2	TR	.717	6.4	ND
"	35055	"	4527 Grab alt vol	.295	.404	28.2	ND
"	35056	"	4528 Cut 100' Flowbanded vol	ND	.435	10.9	ND
"	35057	Dump	4529 Grab Flowband Rhy	.329	3.537	34.2	ND
Lost Scotsman	35058	Portal	4530 alt Labar	ND	.406	14.6	ND
Savage Creek	35059	Rd cut	4531 5' cut alt shear	.053	.598	59.6	ND
Dry Gulch	35060	Rd	4532 Grab 210' alt Labar	ND	.483	ND	ND
"	35061	Rd cut	4533 Cut 70' SiO2 Py-Limy	.098	1.729	22.7	ND
"	35062	Rd cut	4534 Grab 60' SiO2 vol	.176	.789	22.0	3.2
Christy Creek	35063	Rd cut	4401 40' wide alt vol bx Py	.080	.930	4.1	ND
"	35064	"	4402 6.5' shear alt Py	ND	.843	TR	ND
Borrow Pit	35065	"	4403 40' Fex alt vol	ND	.519	TR	ND
"	35066	"	4404 130' alt vol	ND	.571	2.8	ND
Golden Eagle	35067	Portal	4405 Cut 10x5x5	ND	.948	3.5	ND
"	35068	Dump	4406 Grab dump	ND	.856	TR	ND
"	35069	"	4407 "	ND	.656	5.9	ND
USFS Rd	35070	1925	4408 cut 50' gsc-py-alt	ND	.396	10.8	ND
"	35071	"	4409 cut 10' limy py tuff	ND	.340	5.6	ND
USFS Rd	35072	1825	4410 30' alt + SiO2 vol	ND	.284	11.2	ND
"	35073	"	4411 100' alt vol	ND	.459	8.5	ND
	35074		4412 cut 8' shear alt. dike	ND	.781	235.	ND
USFS Rd	35075	Newman Cr	4413 cut 70' SiO2, alt vol.	ND	.191	32.2	ND
"	35076	"	4414 cut 60 alt vol.	ND	.360	23.0	ND
USFS Rd	35077	1825 Rd cut	4415 cut 40' SiO2 bx-shear	ND	.414	13.2	ND
USFS Rd	35078	1825	4416 cut 25' shear alt vol	ND	.235	21.3	ND
upper Golden E.	35079		4417 Grab dump	ND	.370	8.6	ND
Ironside	35080	Dump	4418 Grab dump	ND	.481	TR	ND
"	35081	F. Pit	4419 Grab	ND	.470	ND	ND
China Hat	35082		4420 Flow banded Rhy	ND	.096	TR	ND
"	35083		4421 "	ND	.135	TR	ND
Highway 20	35084		4422 Grab 300'	ND	.218	58.9	ND
Ironside	35085	F. Pit	4423 2" curly vein	.475	1.187	528.	ND

Quantzville Dist - Orc

Falls Creek Dist, Ore.

TR Au is less than .050 ppm

Roger D. Metz

Roger D. Metz, Lab Manager

ROAD LOG: FROM SWEET HOME CITY LIMITS (WEST SIDE) TO THE QUARTZVILLE MINING DISTRICT.

The purpose of this road log is to serve as a self explanatory guide for the reader, and to introduce the reader to some common interesting and observable aspects of geology. At certain locations, local history is of importance and will be discussed briefly.

Miles

00.0 Sweet Home City limits, west side. Exposed in the road cut on the south or right hand side of the road as one travels east are dense dark slightly columnar basalts.. These basalts have been variously classified as Columbia River Basalts, Stayton Lavas, or time stratagraphic equivalents to the Columbia River Basalts. Stayton Lavas are also considered time stratagraphic equivalents to Columbia River Basalts.

5.8 In the road cut to the right, note the hill shaped feature of bedded sedimentary silt and clay stone covered by a basalt flow. This basalt is reputed to be equivalent in age to the Columbia River Basalts. Note the baked zone along the edge of the sedimentary rock. Some slickensides can also be observed in this zone, indicating movement of the clay, probably due to the flowage of the lava.

6.2 You are now at the junction of highway 20 and the Green Peter Dam-Quartzville Townsite road. Turn left here and drive toward Quartzville. Note the columnar jointed basalt to the right of the junction, in the road cut.

7.1 Note in the road cut to the left, just before you cross the north arm of Foster Reservoir, the paleo-river terraces, indicating that the Santiam River was up at this level. Some of the old river terrace gravels do carry gold, and have been mined in the past.

7.6 In the road cut below the school house note the graded stream gravels, and fan deposits. This material was deposited by a stream possibly flowing into a slower moving body of water, such as a lake, which caused the formation of a delta or allubial fan deposit. Some shingling is present, which can be used to determine the stream flow direction. Note also that some of the bedding is abruptly terminated or truncated.

7.8 The flat area to the right is known as Green Horn Bar and is an old river terrace. This area was placer mined in the late 1850's and 1860's for gold. The men working the bar were called "green horns" because of their lack of mining experience, and had returned to the Santiam Valley from the California gold fields. Hydraulic type mining was used with California type riffels in the sluice box resulting in the loss of most of the gold.

8.2 To the right and across the river, on the south side, are a series of cliff forming basalt flows locally named the "Green Peter Basalts" by the U.S. Army Corps of Engineers. These basalts are faulted and cut dikes in places.

9.5 Note the zone of alteration on the face of the road cut to the left, and in the curve of the road. This alteration grades from propylitic (epidote, chlorite, pyrite) type alteration to argillic (clay) alteration and phyllic (quartz sericite) alteration within

Miles

center of the zone, along a 1/2 inch wide fracture. Diorite to granodiorite intrusive rock outcrops to the west of this fracture This and associated alteration is indicative of the presence of hydrothermal fluids from a source at depth. The basalt may have acted as an impermeable cap for ascending hydrothermal fluids which rose to the surface only along fractures. This fracture and altered zone would be an example of such a channel.

11.9 You are now just above the Green Peter Dam. There is a road cut in hard rock to your left and a parking area-view point to the right Park here and look at the road cut to the left. At the west end of the road cut are some apparently folded beds. These appear to be basaltic in nature and were apparently folded prior to the later basalt flow, which inundated them. Just left of the center of the road cut is a basalt dike approximately 1 to 2 feet thick and displays columnar jointing perpendicular to the walls of the dike. The white specks in the basalt are amygdules of either quartz or chalcite. Amygdules are origonally gas bubbles in the basalt which are left as voids after the basalt is cool, and are subsequently filled with other minerals.

15.4 Note the alteration in the road cut to the left. This alteration is probably due to hydrothermal processes which have altered the minerals to clay and deposited pyrite. The pyrite has subsequently altered or oxidized producing the oranges and yellows.

19.7 In the road cut to the left at the curve note the slickensides. This is part of a fault zone with these striations caused when one piece of rock moves past another while the two pieces are in contact.

21.0 Note the altered zone with abundent iron staining. This area and the associated river banks (now under water) are locally known as Donnaca Bar. This gravel bar was the site of several large placer mining opperations in the late 1890's and 1930's. Several thousand dollars of gold was removed from these gravels. One possible source for the gold is the alteration you see in the road cut.

22.4 Upper end of Green Peter Reservoir. On the South or opposite side of the creek is a river terrace. Notice the gravel bar on the inside of the bend of the creek. The gravel is deposited here as the velocity of the creek lessons when flowing around the curve. To the left is a road cut inwhich sand-stone silt-stone and volcanic material are exposed as bedded units. Note the eastward dip of all of the beds. At the east end of the road cut, the sedimentary sequence is overlain by a basalt flow with a black layer seperating the two units. This black layer is a paleo-soil horizon which was baked by the heat from the basalt. This layer contained wood fragments, which were subsequently exposed to silica laden water and petrified. Petrified wood fragments can occasionally be found in this layer.

25.1 Dogwood Park. This park is located on a gravel bar which was the site of placer mining operations from the 1890's through the 1930's.

Milage

27.1 Yellowstone Creek. Note the alteration in the road cut. The iron staining is from the oxidation of pyrite and minor chalcopyrite. Some silicification and tourmaline is present. Near

27.2 To the right is a concrete bridge crossing Quartzville Creek. This is the Boulder Creek Road. In a road cut on the left, 1.7 miles up this road, is a medium gray area of alteration, approximately 25 feet wide. In this altered area pyrite crystals can be found up to 3/8 inch in diameter. This pyrite is in the form of a pyritahedron.

Pyrite at 187.225

191.25 Yellow Bottom Creek Recreation Site

31.8 The road cut to the left exposes a light buff colored rock. This rock is course grained with both light and dark minerals present. The rock is dioritic in nature and is part of the plutonic complex in the Quartzville Area.

191.4

31.9 At the curve in the road, note the outcrop to the left, ie the road cut. The rock here has a similar color and is in part the same as the previous location, namely diorite. But in addition, near the center of the road cut is a section of fine grained suggary rock with no mafic minerals. This rock is classified as an aplite, and is a late stage product from the magma chamber. Note too that part of the outcrop is cut by basalt dikes. These dikes are post diorite and aplite and may have intruded the area after the mineralization.

191.5

32. In the road cut to the left a basalt flow conformably overlays an ash deposit. This ash is lacusterine in nature having been deposited in thin layers ar laminae. Interbedded with the lacusterine laminae are layers of air fall ash. Occasional rip up clasts are also present.

192.4

33.2 You are now at a fork in the road. The road streight ahead follows Quartzville Creek. The road to the left follows Canal Creek, and the center road leads to the townsite of Quartzville. Note the columnar basalt in the road cut between the road forks. This basalt is vesicular in nature, contains olivine crystals (the coke bottle green minerals on a freshly broaken surface), and is only a few hundred thousand years old.

192.65

Canal Creek Road.

start 192.65

00.5 You are now on the Canal Creek road. Stop here for a moment and look across the creek to your left. Notice the thin tabular rock formation projecting up from the creek and hill side on the other side. This is a dike. Origonally, the country rock was solid, but forces within the earth caused it to fracture. Subsequent to the fracturing, a body of liquid rock moved up through the crust. In this particular case, the rock was of diorite to granodiorite in composition. It could just as well have been basaltic or andesitic in composition. The molten rock, because of burial, and for other reasons, was under pressure. The fracture acted as an escape route for the magma or molten rock, and it thus followed the fracture to an environment of less pressure. As it passed through the fracture, it cooled and finally solidified, in a tabular shape. The surrounding rock, being softer than the dike rock, eroded away more quickly, leaving the present shape or outcrop pattern.

193.0

Miles

1.0 To the right is a road cut and a small rock quarry. Note the columnar basalt and that it is lower here than on either side of the quarry. This area is a small intercanyon flow. Now walk to the edge of the road and look down to Canal Creek. You should notice the water running out of the ground below you and into the creek. This water source is known as the "Cold Spring" by the old timers. The source of water for this spring is in dry gulch. The gravels of Dry Gulch and those covered by the intercanyon flow of basalt act as a channel way for water. This spring runs all year carrying water from the slopes of Dry Gulch. There is almost never any water in Dry Gulch during the summer as this underground channel way can carry all of the runoff which does occur. But in the fall, spring, and winter, the capacity of this underground channel-way is insufficient and the excess water flows down Dry Gulch.

193.7

#32-34

Driving back to the road forks, we now drive up the center road toward Quartzville.

Quartzville Road — back to other paper.

back on rd 194.8

0.1 At the first major curve or switch-back in the road, notice the road cut to the right. In the upper part of the road cut cinders and basalt is present. It is part of the same sequence of Recent volcanics present at the forks in the road. Below it is a layer of fluvial deposited material. This is glacial drift from one of the last ice ages, and can be used to give a rough maximum age for the lavas, as it is overlain by the lavas and there fore was deposited first.

1.0 To your right is a cinder pit. Unusual? Yes! It is one of the few recorded occurences of recent volcanic cinders occuring this far west of the High Cascades. Notice the layering of the cinders in the pit wall. This would indicate that the cone is up slope and roughly south of this location, which is correct. Scoria, cinders, a few lava bombs, and some inclusions of light colored rock may me noticed. These light pieces are chunks of granitic intrusive rock ripped off of the throat of the magma conduit by the upward flowing magma. Thus this is indicative of at least one type of rock that is present below this location.

Volume 39, No. 6
June 1977

THE ORE BIN

QUARTZVILLE FILE

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DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

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The ORE BIN
Volume 39, No. 6
June 1977

A GEOLOGICAL FIELD TRIP GUIDE FROM SWEET HOME, OREGON, TO THE QUARTZVILLE MINING DISTRICT

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Introduction

This article is designed to be a self-explanatory field trip guide to the geology and mining history of the Quartzville mining district and the area between Quartzville and Sweet Home. Much of the information is taken from unpublished works by Steven R. Munts, consulting geologist, Sweet Home, Oregon, and the unpublished "Linn County Water Resources Study - Mining Subcommittee Report," by A.J. Kauffman, Jr. (1961). More detailed information on individual mines and the geology of Linn County can be found in the sources listed at the end of the article.

All persons taking this field trip are warned of the dangers of entering abandoned mines, caves, and open pits. Remember, you enter any mine at your own risk; and the greatest dangers are those that you cannot see until it is too late.

Location and Geography

The Quartzville mining district is in eastern Linn County, 40 miles east of Albany, on the headwaters of Quartzville Creek, a tributary of the Middle Santiam River. The Quartzville 15-minute topographic map covers the mining district; the entire field trip is covered by the Quartzville, Cascadia, and Sweet Home 15-minute topographic maps. The district is reached by a major access road which leaves U.S. Highway 20 six miles east of Sweet Home. The field trip begins at Sweet Home, which is 27 miles southeast of Albany on U.S. Highway 20.

Most of the actively prospected part of the district lies in the southeastern part of T. 11 S., R. 4 E., but the district extends into the northeast corner of T. 12 S., R. 4 E. Almost all production has come from the ridge south of Dry Gulch in sec. 22 and 23 (Callaghan and Buddington, 1938).

The Quartzville district, which lies in the central part of the Western Cascades, is steep and heavily timbered, with elevations ranging from 1,500 feet on Quartzville Creek to about 3,500 feet on the ridges. The entire district is drained by Quartzville Creek and its tributaries, most of which are characterized by

steep gradients. A series of terraces and alluvial fills extend from the mouth of Canal Creek to Dry Gulch, and bed rock is not exposed in the lower 2 miles of Dry Gulch. As the stream in Dry Gulch flows on the surface only during periods of excessive run-off, mining and prospecting operations have been generally curtailed throughout the summer months.

Geology

The bed rock of the Quartzville mining district is composed primarily of basalt, andesite, and rhyolite flow rock with interbedded tuffs, volcanic breccias, and scattered dacite, diorite, and basaltic intrusives. Peck and others (1964) mapped most of the rocks in the area as Oligocene to early Miocene Little Butte Volcanic Series, middle Miocene Columbia River Basalt, and middle to late Miocene Sardine Formation. Many of the rocks mapped by Peck as Sardine Formation and Columbia River Basalt are classified by Beaulieu (1974) as part of the Little Butte Formation, which he considers the most extensive bedrock unit in the area. The youngest rocks are Recent volcanic flow rock and pyroclastic debris which are found at the confluence of Quartzville and Canal Creeks.

No formal names have been given to individual rock units exposed in the Quartzville area; therefore, modifiers of "lower," "middle," and "upper" are used in describing distinguishable units in the district. The lowest unit exposed in and near the abandoned Quartzville town site consists of several pyroclastic flows, tuffs, lapilli tuffs, andesite flows, and flow-banded tuffs. Resting conformably above the lowest unit is the middle unit, a 200-foot-thick rhyolite flow which thins to the west. The rhyolite is generally gray but in places has been altered to various shades of red, yellow, and orange. Above the rhyolite is the upper unit, which consists of interbedded flows of tuff, lapilli tuff, and volcanic breccia, with a few intercanyon flows of dark-green porphyritic andesite. The Recent volcanic rocks (see Checkpoint 28) lie unconformably above the older units and are basaltic in composition.

Within this district are areas of propylitic alteration surrounding small stocks, dikes, and plugs (Peck and others, 1964). Many veins follow faults and shear zones that are also present, and all of the ore mineral deposits that have been worked to date have occurred along these fissures and faults (Munts, 1976).

Mining History

The Quartzville mining district has been the site of both hard-rock and placer mining for gold. Dr. E.O. Smith is credited with the original discovery of lode gold in the district. Jeremiah Driggs located the first claims, the White Bull and Red Bull claims, on September 5, 1863; and a mining district was organized in 1864. Several large stopes in the Lawler mine and a small stope in the Albany mine were worked, and mills were installed in the early 1890's.

Although most mining operations ceased by 1900, hard-rock prospectors have been in the district almost every year since; and some of them have recovered small quantities of gold from pockets, as Table 1 shows.

Table 1. *Known hard-rock mine development in the Quartzville district*

[in feet]

Mine	Drifts	Open cuts	Shafts	Cross cuts	Raises	Total
A - Albany group	1,500	-	-	-	60	1,560
B - Bob & Betty	700	-	100	550	300	1,650
D - Lawler	1,050	-	-	250	700	2,000
I - Riverside	303	700	-	-	-	1,003
J - Savage (Vandalia)	600	-	80	-	300	980
E - Snowstorm (Edson)	570	-	-	80	-	650
F - Munro	217	-	-	263	-	480
G - Paymaster	150	-	-	-	-	150
C - Galena	-	-	-	725	-	725
H - Red Heifer	-	-	-	60	30	90
K - Tillicum & Cumtillie	300	-	-	-	-	300
Others	690	40	-	370	-	1,100
Total	6,080	740	180	2,298	1,390	10,688

Gold has also been recovered from placer deposits. Gravel bars along the Quartzville Creek drainage and parts of the Middle Fork of Santiam River were placered in the middle 1800's, and small-scale placer mining has continued to the present.

During the depression of the early 1930's, miners using hand-placering mining equipment were able to recover enough gold to survive. Merrill and others (1937) reported that during 1935 eleven mines were being worked on three creeks in Linn County. Small gold miners in Oregon in 1935 sold bullion buyers 8,032 parcels of gold with total weight of 4,021 ounces and value of $140,730. Average daily gross income for all miners was $1.19 per day, and their average annual income from mining was $44, since miners worked an average of 37 days per year.

Table 2 summarizes small-scale gold placer operations in 13 of Oregon's 36 counties and in 358 creeks and dry placers in the State during 1935. The two principal placer mining counties were Jackson and Josephine. The only other counties with more than 100 miners were Baker, Grant, and Douglas.

Table 2. *Small-scale gold placer operations in Oregon in 1935*
[Production and income of all placer miners, by counties]

County	No. miners working	No. creeks worked	Gold produced		Ave. gross ann. income per miner
			Fine ounces	Value	
Baker.....	490	61	339.23	$11,873	$27
Coos.....	17	9	10.65	373	25
Curry.....	75	15	110.28	3,860	57
Douglas....	145	26	169.06	5,917	46
Grant.....	313	37	235.99	8,260	29
Jackson....	1,454	84	1,563.53	54,724	43
Josephine..	1,039	110	1,496.56	52,380	56
Lane.....	1	1	.84	29	33
Linn.....	11	3	12.96	454	46
Malheur....	28	6	27.05	947	38
Marion.....	2	1	8.73	305	172
Umatilla...	10	2	14.16	495	56
Union.....	21	3	10.96	383	20
Unallocated	25	-	20.86	730	33
Total	3,631	358	4,020.86	140,730	44

Present Status of Exploration Activity

Prospecting and hard-rock and placer mining in the Quartzville district are now undertaken only as hobbies. The prospecting, claim work, and portable dredge operations take place during weekends and vacation time.

Production

According to U.S. Mint reports for the years 1884 through 1886, the Quartzville district has been credited with production of 8,359.33 ounces of gold valued at $172,786.35 based on gold value of $20.67 per ounce. Silver produced during this period was valued at $2,869.00. No production was recorded from 1897 through 1924.

U.S. Bureau of Mines data show that from 1925 through 1940 seven operations produced 281 tons of crude ore which yielded 112.53 ounces of gold and 56 ounces of silver. No production has been recorded for the Quartzville district since 1940. Unofficial estimates put the production of the Lawler mine alone at $1 million.

Road Log

(Refer to map, p. 100-101.)

(1)	(2)	(3)*	
1	0.0	0.0	West city limits of Sweet Home, on Highway 20, 0.6 miles east of milepost 26. (At the time of publication, the city limits sign had been taken down because of road construction.) Dense, dark rocks with columnar jointing that are found on the south or right-hand side of the road are basalts that have been classified by various authors as Columbia River Basalt, Stayton Lava, or Little Butte Volcanics. Drive east through town on Highway 20.
2	4.6	4.6	On the left side is the Foster Reservoir viewpoint.
3	1.3	5.9	In the roadcut on the right-hand side of the road at the traffic separator sign, just before the road curves to the right, note the irregular contact between underlying sedimentary beds of siltstone and shale and an overlying basalt flow (see Figure 1). Note also the baked zone along the edges of the sedimentary rocks, caused by the heat of the basalt. Slickensides (scratches or grooves) occur in this zone, indicating movement of the sediments, probably from the weight and flowing motion of the lava.
4	0.5	6.4	You are now at the junction of Highway 20 and the Green Peter Dam-Quartzville townsite road. Note the columnar jointed basalt to the right of the junction. Turn left here and drive toward Quartzville. After you have crossed the bridge, you again see basalt overlying sediments, as at Checkpoint 3.
5	0.8	7.2	Before you cross the north arm of Foster Reservoir, note the paleoriver terraces in the roadcut to the left, indicating that the Santiam River was once at this level. Some of the old river terrace gravels contain gold and have been mined in the past.
6	0.5	7.7	In the roadcut on your left, below the schoolhouse, you can see graded stream gravels and alluvial fan deposits. This material was probably deposited by a fast-moving stream which flowed into a slower-moving body of water and

*(1) Checkpoints; (2) Mileage intervals; (3) Cumulative mileage.

dropped its load of sand and gravel. Imbrication (shingling or overlapping) of the rocks can be used to determine stream-flow direction. Note also that some of the bedding is abruptly terminated or truncated.

7 | 0.2 | 7.9 | The Sunnyside Park entrance is to the right. The park is located on an old river terrace known as the Green Horn Bar, which was placer mined for gold in the late 1850's and 1860's. The men working the bar were called "greenhorns" because of their lack of mining experience. In their hydraulic mining, they used California-type riffles in the sluice boxes, resulting in the loss of most of the gold.

8 | 0.6 | 8.5 | Across the river to your right are a series of cliff-forming basalt flows, locally named the Green Peter Basalts by the U.S. Army Corps of Engineers. These basalts are faulted and cut in some places by dikes.

9 | 1.0 | 9.5 | Note the zone of alteration in the roadcut to the left. Stop at the small turnout on the right, just before the road curves to the left. In this outcrop you are looking at the mineralization of the Quartzville mining district in miniature (see Figure 2). Notice the three types of alteration that occur here, ranging from propylitic (hydrothermal alteration that has produced epidote, chlorite, and pyrite) at the edges through argillic (alteration producing clay minerals) to phyllic (alteration to quartz and sericite) at the center of the zone. The phyllic alteration occurs along a very narrow fracture which acted as a channel for ascending hydrothermal fluids through otherwise impermeable basalt. Dioritic and granodioritic intrusive rocks are exposed to the west (left) of this fracture. This intrusion and associated alteration are indicative of the type of hydrothermal fluid at depth that was the carrier for the mineralization in the Quartzville mining district. The zonation of alteration that you see here is present in most large mining districts, but it usually covers hundreds of feet, rather than inches, as here.

10 | 2.0 | 11.5 | Green Peter Dam. To your right is a parking area and viewpoint. Work on the dam and its reservoir lasted from 1961 to 1967. The dam, which used 1,142,000 cubic yards of concrete, is 320 feet high, with deck elevation of 1,020 feet.

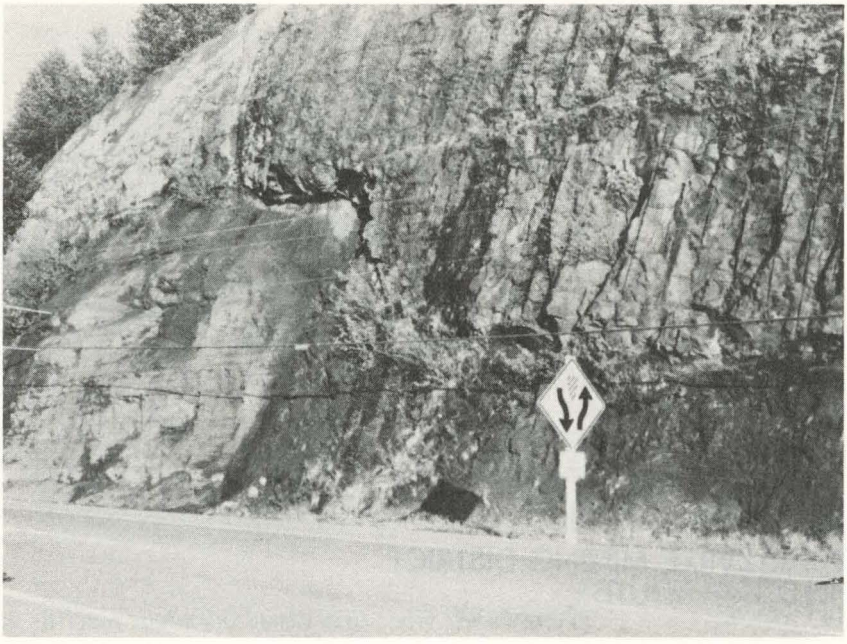
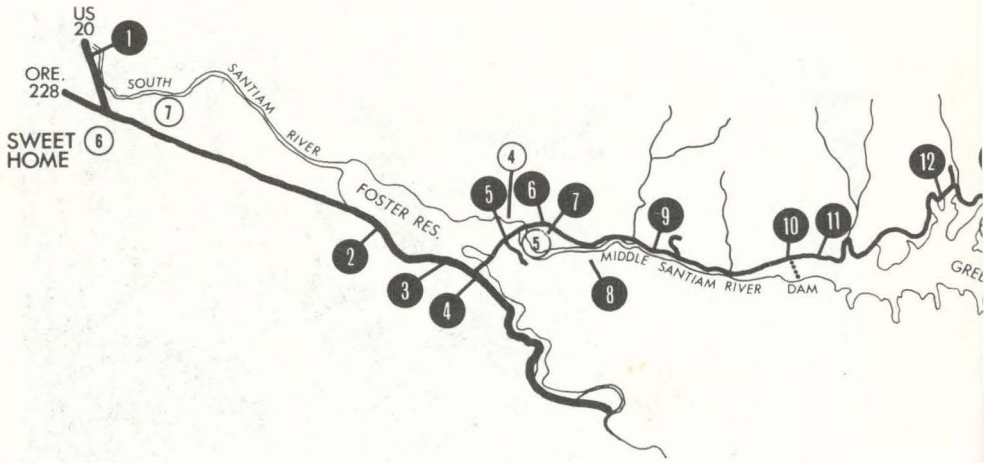
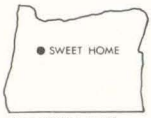


Figure 1. Checkpoint 3. Irregular contact between basalt and sedimentary rocks.

Figure 2. Checkpoint 9. Alteration zone.



QUARTZVILLE MINING DISTRICT FIELD TRIP ROUTE



LOCATION MAP

(3) CAMPGROUNDS, PICNIC AREAS & OTHER RECREATIONAL FACILITIES

1. Dogwood (B.L.M.), 14 sites, picnic
2. Yellow Bottom (B.L.M.), 12 sites, picnic
   22 sites, camp
3. Whitcomb Creek (Linn County), 60 sites, picnic
   34 sites, camp
4. Lewis Creek (Linn County), picnic
5. Sunnyside (Linn County), 65 sites, camp
6. Sankey Park (City), picnicking, ballfield, playground equip.
7. Northside Park (City), tennis court, handball court, basketball court, softball field, swimming, picnicking, 18 sites

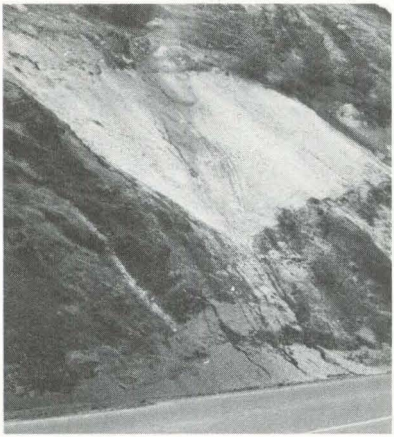


Figure 3. Checkpoint 12.

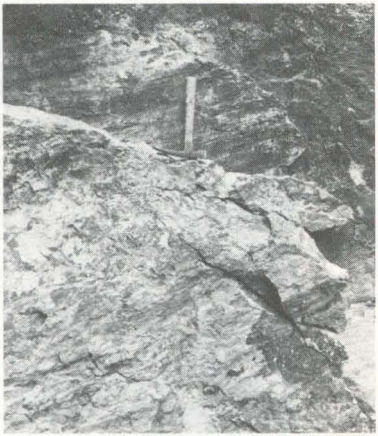
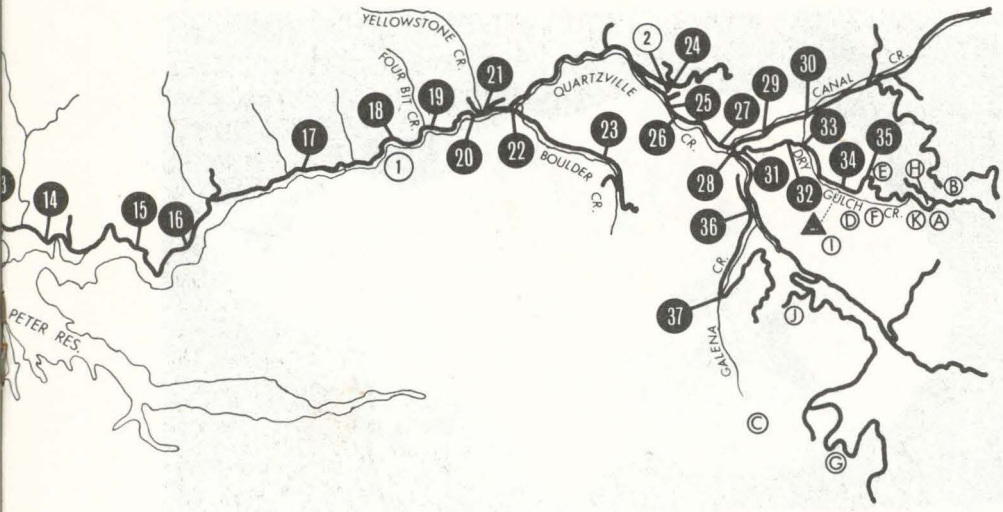


Figure 4. Checkpoint 15. Slickensides on fault plane.



END

14 CHECKPOINT

(B) MINES & PROSPECTS

A. Albany	G. Paymaster
B. Bob and Betty	H. Red Heifer (Silver Signal)
C. Galena	I. Riverside
D. Lawler	J. Savage (Vandalia)
E. Lucille (Snowstorm)	K. Tillicum & Cumtillie (Golden Fleece)
F. Munro (Mayflower)	

Do not enter any mines except E

N

0 1 2 3

SCALE IN MILES

▲ QUARTZVILLE TOWNSITE

Figure 5. Checkpoint 18. (Photo courtesy Albany Democrat-Herald.)

Figure 6. Checkpoint 23.

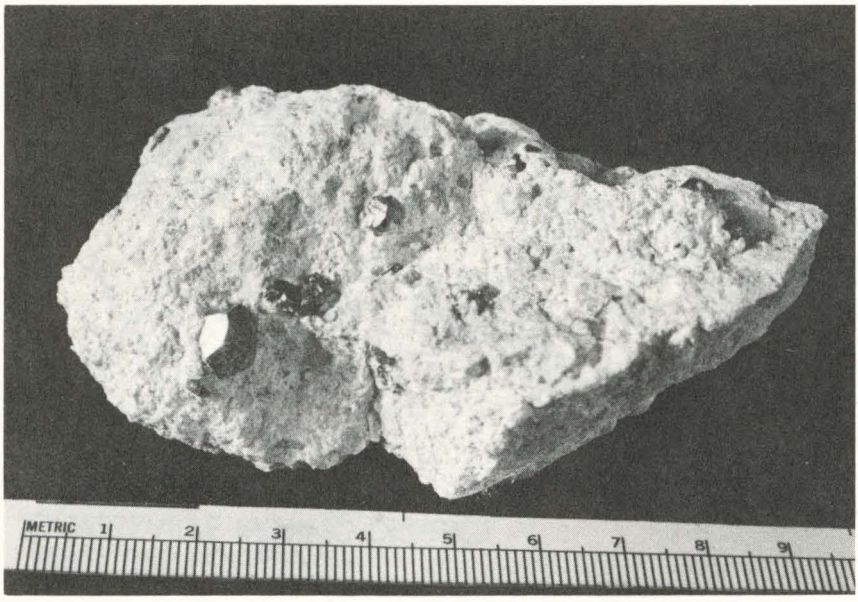


Figure 7. Checkpoint 23. Pyrite crystals found in alteration zone.

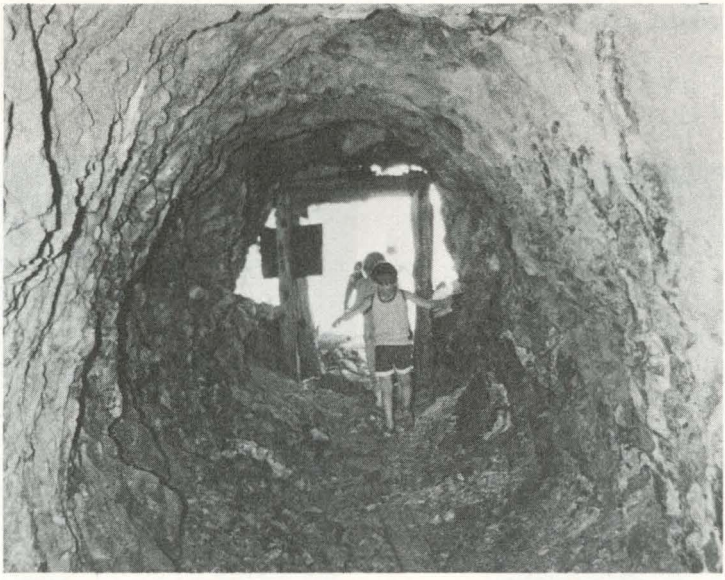


Figure 8. Checkpoint 35. Snowstorm tunnel. (Photo courtesy of Albany Democrat-Herald.)

The reservoir holds 430,000 acre-feet of water and covers 3,720 acres of land. During construction of the dam, emery boulders were uncovered at the bottom of the river. The original emery outcrop was located by tracing emery "float" (loose boulders of emery) back to the source, 36 river-miles up the Middle Fork of the Santiam River.

11 0.5 12.0 Park in the pulloff to your right and look to your left at the basaltic lava flow rock which is cut by several vertical basalt dikes. The dikes, which look very much like the flow rock because of similarities in composition, can be identified by their horizontal jointing which formed perpendicular to their cooling edges. At the west end of the roadcut are southeastward-dipping basalt flows which were deformed before being covered by the younger basalt flow you can see above them. The white blebs in the basalt are amygdules (secondary quartz, calcite, or zeolite minerals that filled small cavities left in cooling lava by escaping gas bubbles).

12 3.3 15.3 Just after crossing a small stream, the road curves to the right. In the roadcut to the left, note the orange and yellow alteration, which is due to hydrothermal processes that have altered the minerals to clay and deposited pyrite, which in turn weathered to various iron oxides (rust) (see Figure 3). Because the alteration has affected all of the different types of rock exposed here, you can see that it is younger than they are.

13 1.7 17.0 You are now crossing an arm of the Green Peter Reservoir.

14 0.8 17.8 On the right is the entrance to Whitcomb Creek Park.

15 1.7 19.5 At the curve just past milepost 12, note the slickensides in the rocks to your left (see Figure 4). Slickensides are polished and striated (scratched) surfaces resulting from rocks moving past one another along a fault plane. This particular fault plane has been exposed to weathering; therefore the striations and polish are not as distinct as those on a freshly exposed surface.

16 1.2 20.7 Note the alteration zone with abundant iron staining. This area and the associated river bank (now under water) are known locally as the Donnaca Bar, the site of some large placer-mining operations in the late 1890's and again in the 1930's. Several thousand dollars in gold was removed from

these gravels. One possible source for the gold is the bright yellow and chocolate-brown alteration zone you see in the roadcut.

17 2.2 22.9 Upper end of the Green Peter Reservoir. On the south or opposite side of Quartzville Creek is a river terrace. Notice the gravel bar on the inside of the bend in the creek. Gravel is deposited here because the velocity of this side of the creek drops as the creek flows around the curve. To the left is a roadcut in which sandstone, siltstone, and volcanic material are exposed as bedded units. Note the eastward dip of the beds. At the east end of the roadcut the sedimentary sequence is overlain by a basalt flow. The black layer which separates the two units is a paleosoil horizon which was baked by the heat of the basalt flow. This soil zone contains some petrified wood fragments.

18 1.8 24.7 You are now at Dogwood Park, located on a gravel bar which was the site of placer-mining operations from the 1890's through the 1930's.

During the summer you can see weekend miners using small dredges, sluice boxes, and gold rockers here and all along the creek. Figure 5 shows gold-panning and a gold rocker powered by a gasoline engine.

19 0.7 25.4 After you cross Four-bit Creek, the BLM road shops are on your right.

20 1.0 26.4 The rocks in the stone quarry on your left contain much pyrite and some tourmaline, indicating a highly mineralized area. At least one rock sample taken from here contained a trace of silver.

21 0.2 26.6 Just before the Yellowstone access road and Yellowstone Creek, notice the alteration in the rocks to your left. The iron staining is from the oxidation of pyrite and minor amounts of chalcopyrite. Some silicification has occurred, and tourmaline is also present.

22 0.1 26.7 To the right a bridge crosses Quartzville Creek. This is the Boulder Creek road. Cross bridge, turn left, and drive 1.6 miles.

23 1.6 28.3 Note the white-colored, 25-foot-wide alteration zone in the roadcut on your left (see Figure 6). Pyrite crystals up to 3/8-inches in diameter occur in this alteration zone (see Figure 7). Many of the crystals are in the form of pyritohedrons, which means they have 12 crys-

tal faces, each of which has five sides.

After collecting some choice samples, return to the main road, turn right, and continue.

24 5.2 33.5 On the left is the entrance to the Yellow Bottom Creek Recreation Area.

25 0.1 33.6 The roadcut to the left exposes a coarse-grained buff-colored intrusive rock called diorite. The light minerals in it are primarily plagioclase feldspar; most of the dark minerals are hornblende. This diorite is part of the plutonic (intrusive) complex which is probably responsible for the mineralization in the Quartzville area.

26 0.1 33.7 At the curve in the road, note the outcrop in the roadcut to the left. Part of the rock in this outcrop is the same diorite you saw at Checkpoint 25. The diorite formed from the cooling and crystallization of molten rock in an underground magma chamber. In addition, near the center of the roadcut is a section of light-colored, fine-grained, and sugary-textured rock called aplite, which has a different chemical composition (more silica, less iron and magnesium) than the diorite. The aplite formed toward the end of the cooling history of the magma chamber, after most of the iron and magnesium minerals had already crystallized out of the melt. Note that the outcrop is cut by basalt dikes; therefore the basalt is younger than the diorite and the aplite.

27 1.0 34.7 In the roadcut to the left, just opposite the small building on the right, a basalt flow conformably overlies a lacustrine (lake) ash deposit which has thin layers called laminae. The laminae are interbedded with layers of air-fall ash. Occasional rip-up clasts (fragments of partly consolidated sediments that have been ripped up and transported by strong currents) can be found in the sediments.

28 0.2 34.9 You are now at a road junction. The blacktop road (Road 1177) follows Quartzville Creek; the road to your left (Road 1162) follows Canal Creek; the center road (Road 1158) goes up the hill and leads to the Quartzville townsite. Note the columnar basalt in the roadcut. This vesicular basalt, which contains some olivine (the bottle-green minerals on a freshly broken surface), is classified as Recent in age because it is only a few hundred thousand years old.

Follow Road 1162, the Canal Creek road, to your left.

29 0.4 35.3 Stop for a moment and look across the creek at the rock projecting like a wall from the creek and hillside on the other side. The country rock was originally solid; but when deep-seated forces within the earth caused the rock to fracture, molten rock which was under great pressure moved up from great depths through the fractures to an environment where there was less pressure. As the magma passed through the fracture, some of it remained, cooled, and solidified, forming a tabular body called a dike. The surrounding rock, softer than the dike, eroded away more quickly, leaving the diorite dike exposed, as you see it, in the shape of a wall.

30 0.7 36.0 To your right is a quarry of columnar basalt that was a small intracanyon lava flow. Note that the base of the flow is lower than the rocks on either side.

Now walk to the edge of the road and look down at Canal Creek. You should be able to see water running out of the ground below you into the creek. The source of this water, which old-timers call Cold Spring, is in Dry Gulch. The gravels of Dry Gulch and those covered by the intracanyon basalt flow act as a channelway for water. All year this spring carries water from the slopes of Dry Gulch. The underground channelway can carry all of the summer runoff, so Dry Gulch remains dry during summer months. But the capacity of the underground channelway is insufficient during other seasons of the year, and then the excess water flows through Dry Gulch.

Return to the junction, turn left, and take the center road (Road 1158) toward the Quartzville townsite.

31 1.2 37.2 At the first switchback in the road, the cinders and basalt you see in the upper part of the roadcut at the right are part of the same sequence of Recent volcanics you saw at the junction (Checkpoint 28). Below the volcanic material is a layer of unconsolidated glacial drift. This sequence of deposits can be used to give a rough maximum age for the lava, for the lava lies above the glacial drift and is therefore younger.

32 0.9 38.1 To your right is a cinder pit. Few Recent volcanic cinder cones have been found this far west of the High Cascades. Note the dip of the

layers of cinders in the pit wall. Normally all the layers of a cinder cone dip away from the center of the cone; so the dip of these layers indicates that the cone itself should be upslope and to the south of this location, which it is. You will find scoria, cinders, a few lava bombs, and chunks of light-colored granitic rocks which were ripped from the magma conduit by the upward-flowing magma. These granitic fragments are indicative of at least one type of rock present below this location. The extreme youthfulness of the Recent volcanic rocks seen in this part of the Quartzville district suggests that they occurred too recently to have been responsible for the mineralization of the district.

33 0.3 38.4 The bridge crosses Dry Gulch. This is the drainage that feeds Cold Springs (Checkpoint 30). Only during times of high water can flowing water be seen here.

34 0.9 39.3 To your right is a signboard identifying the Quartzville townsite. The district's largest producing mine, the Lawler, is located across the valley but is hard to see because of second-growth timber. IT IS UNSAFE TO ENTER THIS MINE!

35 0.6 39.9 On your left, 10 feet above the road, is the lower Snowstorm (Edson) tunnel, which was driven in a rhyolite breccia cemented with quartz. A second tunnel can be found by walking to the road switchback and entering the upstream side of the stream valley (staying to the left side of the stream valley). Shortly after leaving the road, follow the trail which goes straight up the hillside to the left. Where the trail forks, follow the steeper trail.

Both of these tunnels are reasonably safe to enter if you carry a flashlight. The second tunnel follows a fault gouge seam which you can see overhead in the tunnel. Figure 8 shows why these tunnels are safe to enter. The roof has a natural arch with no loose hanging rocks. The rock is hard and strong and will not cave in. No shafts into which you might fall have been dug below the tunnel floor. No mine timber was left to rot and form bad air. Most other mines, tunnels, and shafts in the Quartzville and other mining districts are NOT safe to enter.

The Snowstorm tunnels are owned by a private party; permission is not needed to enter these tunnels but may be required in the future.

Return to the fork in the road, turn left,

and follow the blacktop road (Road 1177), the Quartzville Creek road.

36 3.6 43.5 Quartzville Creek-Galena Creek road junction. Take the right-hand road (Road 1177-A), which crosses Quartzville Creek.

37 1.7 45.2 At this point the road crosses Galena Creek. The gravel in this creek contains specimens of tourmaline hornfels, fine-grained rocks which have been metamorphosed by contact with a hot intrusive body. These hornfels are indicative of a higher grade intrusive activity; and the original outcrop where the hornfels occurred, if cut by a vein, would be a good place to look for mineral values and interesting mineral and rock specimens.

Turn around and retrace route to Sweet Home.

End of road log.

Additional Reading

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Callaghan, Eugene, and Buddington, A.F., 1938, Metalliferous mineral deposits of the Cascade Range in Oregon: U.S. Geol. Survey Bull. 893, p. 99-113.

Merrill, C.W., Henderson, C.W., and Kiessling, O.E., 1937, Small-scale placer mines as a source of gold, employment, and livelihood: Minerals Technology and Output for Man Studies Rept. E-2, issued by Natl. Research Proj. and U.S. Bur. Mines for Works Prog. Adm., Philadelphia, Pa., p. 22-26.

Munts, S.R., 1976, Geology and mineral deposits of the Quartzville mining district, central Western Cascades, Oregon: Univ. Oregon master's thesis, 150 p.

Peck, D.L., Griggs, A.B., Schlicker, H.G., Wells, F.G., and Dole, H.M., 1964, Geology of the central and northern parts of the Western Cascade Range in Oregon: U.S. Geol. Survey Prof. Paper 449, 56 p.

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CONDUCT YOUR OWN TOURS in Oregon. Order tour guides and descriptions of Oregon State Parks from the list you may receive free of charge by writing to the Department (address on page 93). Be sure to include the zip code in your return address.

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Quartsville Properties Inspected Sept. 21-25, 1938.

ner	Area	Location (Linn County)	Active	Development	Present Working	Treatment Plant	Production	Geology and Ore Deposit
.Mc-llister	1 claim	NE¼ sec.22, T.11 S. R.4 E.,on Quartzville road	Yes	Large open-cut	Open cut	No	About $2000	NW & SE shear zone in altered andesite. MN & FE stained quartzy material and soft seams surrounding hard pieces country rock. Reported $2000 pocket here. No assays.
ine	1 claim	NW¼ sec. 23, T.11 S. R.4 E.,on Quartzville road	No	10' cut & 4' tunnel	-	No	-	Similar to McCallister's, less oxidized material-disseminated pyrite in silicified rock,bottom of face. No assays.
ard tin	1 claim	Mainly NW¼ sec.23 T.11 S., R.4 E., 0.5 mi.NW of Quartzville road	No	Cuts	-	No	-	Shear zone in rhyolite with iron stained gouge and crushed qtz. in well defined fissure 16"-18" wide. Silicified outcrop can be traced several hundred feet. Upper open cut shows bunches quartz with pyrite and sphalerite in silicified breccia.
cy lkins	1 claim	Mainly SW¼ sec.14 T.11S.,R.4E., at top and N.slope of Red Heifer Butte	no	Tunnels & cuts	-	No	?	Country rock is andesite and tuff fractured and brecciated. There is a massive quartz zone up to 50' wide sometimes oxidized & iron stained. Bold outcrop top of butte. Quartz with small amount disseminated pyrite, striking NW dipping NE. Mammoth pocket.
.W. heeler	1 claim	On line sec.14&23 T.11 S.R.4E. on Detroit trail, N. slope RH Butte	Yes	Tunnels & cuts	Tunnel & raise	Yes-amalgamation small hammer mill	?	NW-SE shear zone in tuff. Much altered & iron-stained soft & quartzy material. Some Mn oxide,some soft gouge contains considerable pyrite. Some oxidized material pans gold. USGS bull.893 has sample specimen ox.matl. Au 0.92 oz.,Ag. 6.2 oz.

Quartzville Properties Inspected Sept. 21-25, 1938.

wner	Area	Location (Linn County)	Active	Development	Present Working	Treatment Plant	Production	Geology and Ore Deposit
Graves & Bush	35 acres	Mainly sec.22, T.11S.,R.4 E. just N. of Quartzville road	Yes	650' tunnel several cuts	Tunnel	Building mill	-	NW-SE shear zone in rhyolite,tuff, and andesite in ascending series. Crushed & altered rock with MN and FE stained seams & quartz fragments. Ore shoot being worked about 3' wide. Crushed & soft material pans gold. Lowest tunnel (Bell) has 4" seam assays 1.72 oz.Au, 33.3 oz. Ag. (Stowell)
Chesney Hammer	6 claims (3 patented)	Mainly sec.23, T.11S.,R.4E., on road in Dry Gulch	No	Something over 1100' of tunnels besides cuts	-	10-stamp mill in ruins.Unused Lane mill.	In excess of 653.oz Au	Country rock includes andesite, rhyolite and volcanic breccia. Mountain Queen tunnel in altered & iron stained rhyolite about 30' below outcrop. Stope carried to surface where pockets valued at several hundred dollars were taken out. Bonanza Tunnel reported to have ore of milling grade.
Frank Bevier	2 claims	Sec.23 T.11 S. R.4E.,S. of Albany group on SE slope	Yes	Several tunnels & cuts-300' tunnels by present owner since 1931.	Tunnel	Home made 2-stamp mill & converted cement mixer	? Owner has lived off production.	NW-SE shear zone in andesite & rhyolite. Fissures filled with iron-stained gouge & quartz containing bunches of sulphides- vein material pans free gold. So-called Becket ledge being prospected contains white gouge. with black pyritiferous streaks-red crushed rock
W.S. Risley	2 claims	Mainly sec.14 T.11 S. R.4E. near sec.23. N.W. slope from Detroit trail.	Yes	Several tunnels a shaft (caved) and cuts	Building trail	No	?	A wide NW trending shear zone in andesite & tuff silicified iron oxide seams & vein fillings of stained & white quartz.Crosscut tunnel NW of cabin has drift & 8' winze on vein consisting of 12' nearly solid galena & sphalerite with add'l 24" of oxidized rock with few

Quartzville Properties Inspected Sept. 21-25, 1938

wner	Area	Location (Linn County)	Active	Development	Present Working	Treatment Plant	Production	Geology and Ore Deposit
Howard ,107 Broad London and	238 acres placer & 165 lode 11 claims All patented	Secs.21-22-23-26 & 27, T.11S.,R.4E., from Dry Gulch over White Bull Mtn. to Silver Cr.	No	Over 2000' tunnels & raises, several stopes. Caved shaft	-	20-stamp mill in ruins	? Most of district production of 8400 oz. from Lawler	Country rock is rhyolite,tuff & breccia. Ore deposit consists of brecciated rock with soft iron stained quartzy material with comb.quartz. Stopes are 6-8' wide. Rake of deposit said to be SE. Bottom level said to be in dark colored basic rock with no ore. Possibly a dioritic dike.
fover	1 claim	Sec.27 T.11S. R.4 E. near sec.26 line & just S.of Lawler ground & under Riverside tract	No	50' tunnel & cut	-	No	-	Country rock is andesite. Vein forms prominent outcrop of silicified andesite. As exposed in tunnel whole face is siliceous and contains bunches of galena and sphalerite. Tunnel follows wall on W.side which has seams of irony soft gouge.
Oakley	4 claims	SE¼ sec.27, T.11S. R.4 E.,reached from Gov't trail on Quartzville Cr.or trail from Lawler	Yes	Over 400' of tunnels besides cuts. 700' skid way.	Upper Tunnel	Gibson prospectors mill	Something over 50 oz.	Persistent deposit of brecciated and altered andesite containing quartz & sulphides together with free gold.Present working tunnel has 40" vein matter in face showing gouge, iron stained quartz & bunches of sulphides said to assay $8 to $50.00.
.	3 claims	W.½ sec.26,T.11S., R.4 E.,reached by trail from Gov't trail on Quartzville Creek	Yes	A tunnel 115' long with 20' crosscut plus opencuts.	Tunnel	Building mill	-	Fractured zone with iron-stained gouge & siliceous mat'l trending from N.40W to nearly N. at 85 ft. in tunnel. 6' of material said to assay 0.6 oz. Au. At face value said to be low. Face shows disseminated sulphides mainly sphalerite.

Quartzville Properties Inspected Sept. 21-25, 1938.

wner	Area	Location (Linn County)	Active	Development	Present Working	Treatment Plant	Production	Geology and Ore Deposit
es t	40 acres patented timber land	SW¼ sec. 19 T.11 S. R.4 E. on Quartzville road at Yellowbottom creek	No	None except cabin (Development work is planned)	-	-	-	Wide zone of pyritized andesite on one side of rholite dike. Specimens of andesite said to assay 0.07 oz. Au. Exposure in bed of Yellowbottom creek. Heavily timbered area.

Mr. Swartley

MEMO TO MR. NIXON:

Subject: Trip to Quartzville District, Sept. 21-25, 1938.

Submitted by: F. W.Libbey

General.

Mr. James Houf of the Oregon Leather Co., Portland, who owns 40 acres of land on Yellowbottom Creek, a tributary of Quartzville Creek, suggested the trip and provided transportation and food.

The Quartzville District is about 27 miles NE of the town of Foster, Linn County, and is reached by means of a good graveled road. There is no town of Quartzville. Along Quartzville Creek and some of its tributaries are scattered cabins occupied by claim owners and a few "snipers" who are working some gravel bars.

Most of the region is heavily timbered. A considerable area is patented land said to be owned by the Northern Pacific Co., although ownership appears on a county map in the name of the Weyerhauser Timber Co., with a smaller part in the name of Wright-Blodgett Co. It is said that these timber companies own the timber, but that the Northern Pacific holds title to the mineral. This appears to be rather a curious situation, in that the Northern Pacific Co. must have acquired title after the area was known to be mineral land. In order to prospect these areas, it is said to be necessary to get permission of the Northern Pacific Co.

Topography.

The region has steep mountain slopes with elevations ranging from about 1500 feet in Quartzville Creek to about 3500 feet on the ridges, with Gold Peak in the eastern part of the district rising to over 4000 feet and Galena Mtn., in the southern part, to 5000 feet. Drainage is all to Quartzville Creek which joins the Middle Santiam River at a point about half way between the center of the district and Foster.

Geology and Ore Deposits.

The rocks of the area are andesites, rhyolite, and accompanying tuffs in flows. There are andesite dikes and dioritic intrusions. No evidence of major post-mineral faulting was seen.

Extensive shearing and fracturing occurred along northwest and southeast-trending planes. Metallizing solutions deposited gold and silver-bearing sulphides along these planes, forming quartz veins and seams in the fractures of brecciated zones, as well as being disseminated, mainly as pyrite, in less concentrated form in favorable portions of the country rock. Subsequent oxidation and alteration produced much iron-stained gouge and soft material; and the oxidation of sulphides has resulted in forming ore deposits containing native gold, usually relatively close to the surface. The depth of oxidation varies greatly, and, in places, unaltered rock containing sulphides crops out at the surface. Some of the pre-mineral fault planes have considerable light-colored

clay gouge, with dark streaks of pyrite roughly parallel to the walls. These together with striations on the walls indicate post-mineral movement along the old fault planes.

There is a marked uniformity in the trend of the ore zones. The average strike is N. 40 W. The dip is nearly always steep. While in some cases individual shoots of ore are of rather small dimensions, the shear zone of system to which they belong is usually of considerable lateral extent. Several of these zones may be traced for several thousand feet, and may be 50 feet or more wide.

Since the district is an old one, there has been considerable underground prospecting in the form of tunneling, but much of this work is now inaccessible. Those tunnels which are open show, mainly, oxidized areas, so that knowledge of sulphide zones is scanty. However, pyritization is widespread, and, ~~in places, rocks containing sulphides outcrop at or near the surface~~, so that even the oxide ores have a certain proportion of sulphides, which contain gold and silver values. Sphalerite is fairly common and any treatment plant needs to be equipped for concentrating a complex ore in addition to the usual amalgamation of free gold.

Concentrations of metallic gold have occurred at or near the surface; some fairly rich pockets, which held many exceptional specimens of native gold, have been found. Such pockets have been the incentive for much of the prospecting so that development work, except in a few cases, has been principally in following small ore shoots, with practically no systematic crosscutting in order to show the potentialities of the large shear zones. It would appear that such fractured and metallized zones might have possibilities of being developed into economic deposits, but no definite evidence can be presented.

Mining Properties.

On the attached sheets is a tabulation of important features of the properties visited. The following notes are given in the way of additional information.

The largest mine in the district is the Lawler, most of the workings of which are now inaccessible. It produced the bulk of the district's recorded production of about 8400 oz. of gold. There are four main adit-levels with a difference in elevation between the upper and lower of about 500 feet. Considerable stoping was done on an ore shoot said to be 6 to 8 feet wide. A 20-stamp mill with no concentrators was operated in the 1890's and shut down in 1898. It is reported by Mr. Frank Revier, of Quartzville, who worked in the Lawerl Mine, that the bottom tunnel penetrated a dark colored basic rock for about 200 feet and that there was only about 8 inches of ore in the shoot before this rock was struck. There is no record of any cross-cutting to the walls of this reported dike.

There is a small pile of tailings left below the Lawler mill, probably less than 2000 tons. A sample of this material pans a small concentrate of an oxidized lead mineral, probably cerrusite, and a few small colors of free gold.

In addition to the eleven lode claims, the Lawler company owns 238 acres of placer ground extending for about two miles down Dry Gulch. This ground consists of rubble of unknown depth. Water flows at the surface only during periods of heavy run-off. It is doubtful if any prospecting of this placer ground has been done. Locally, it is considered of considerable value, but no definite information is available.

The Albany property is next in size and in quantity of production to the Lawler, although production was very much less (something in excess of 693 oz., which is the recorded production for 1890, 1892, and 1893.) Outcrops of the two main veins, the Bonanza and Mountain Queen, produced several valuable pockets. As described by Stowell in 1921, the ore shoots were small and there was little in the way of exposed ore at the time of his examination. A lower tunnel called the Crosscut, 400 feet vertically below the upper or Bonanza tunnel, was driven 680 feet into the mountain to intercept both the Bonanza and Mountain Queen veins. Stowell believed that the Bonanza vein was cut. The Mountain Queen vein was not reached. Apparently development of this property was, to a great extent, ill-advised.

The Bob and Betty, formerly called the Smith-McClary, is another old property with considerable tunnel work, much of it now inaccessible. In one tunnel, one foot of solid galena is exposed containing sphalerite. The owner is considering mining and shipping this material.

Properties in the southern part of the district near Galena Mountain are said to show a considerable tonnage of sulphide ore, mainly galena and sphalerite. They were not visited. Transportation difficulties would be an obstacle to economic production.

There is a bold quartz outcrop from 10 to over 50 feet wide, with a uniform, steeply dipping hanging wall, striking northwest across several claims. This is the so-called Mammoth ledge. It is said to carry gold values, and at one place on the hanging wall side there is a caved shaft said to have had, near the collar, a rich pocket of gold. In a shallow open-cut on this ledge at the top of Red Heifer Butte, on the Calkins claim, a sample was taken across a section of the quartz, containing a small amount of residual pyrite, 8 feet wide. It assayed 0.02 oz. Au and trace Ag.

In the bed of Quartzville creek at Packers Gulch is an exposure of altered and iron-stained dike rock which was said to have returned an assay of $19.00. This was sampled across a width of about 10 feet. The assay result was Au-trace, Ag-blank.

Assays of two specimens from a pyritized zone in Yellowbottom creek on the Houf property returned traces in gold and no silver.

Several of the properties, mainly relocations of claims which were worked many years ago, are active in a small way, some by men who are evidently making a living from returns on ore. These operators have small mills - some home-made - which amalgamate a part of the gold present. It would appear that they are recovering a relatively small part of the total gold in the ore.

Custom-Mill.

Probably a small custom mill, say of 25 tons daily capacity, equipped to recover the values in the sulphides as well as the metallic gold, and operated by an experienced person, who, in addition, had his own small ore supply, would be a profitable venture. The present operators could each supply a few tons regularly, and undoubtedly such a mill would encourage new prospecting and increase activity.

Conclusions.

Barring new discoveries, it seems now as if the only hope for the district is to determine the possibilities in the shear zones, that is, rather than attempting to make a commercial operation out of the small individual ore shoots, to develope afavorable zone as a unit, with the idea of making a large tonnage project. There is no definite evidence to give concerning possible average assay values of these large zones.