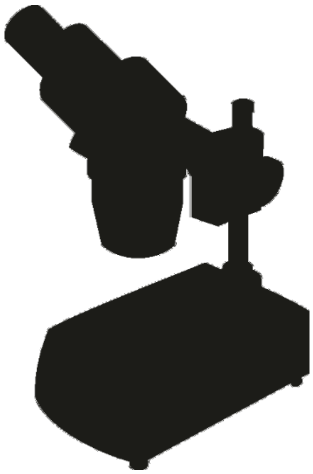
Northwest

Micro Mineral

Study Group

Micro Probe



SPRING. 2025 **VOLUME XIV #1**

SPRING MEETING

MAY 10, 2025 9 AM to 4 PM

Sons of Norway Columbia Lodge

2400 Grant St,

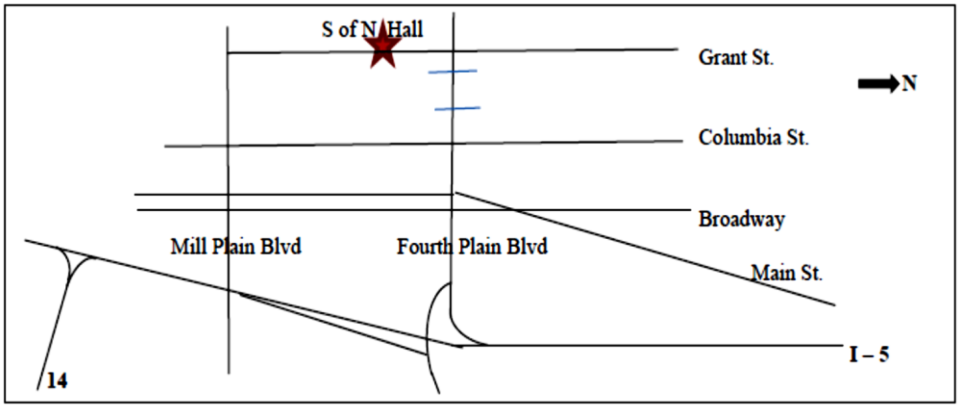
Vancouver, WA 98660

Please read the President's message on page 2 for important meeting information!

Directions:

FROM WASHINGTON HWY 14: Continue west to Interstate 5, keep right and take I-5 North. Then keep right and continue to Exit #1D -Fourth Plain Blvd

FROM INTERSTATE 5: In Vancouver, take Exit #1D to Fourth Plain Blvd. Head west on Fourth Plain Blvd. to Grant St. and turn left. Go two blocks to 24th St.



In this issue:

Coming next month: Gismodine on the Oak Grove Fork

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President's Message:

I sent an email about a month ago encouraging all members to come to the next meeting because the free tables will be loaded. They still will be but due to health reasons, I will not be at the meeting until the afternoon. I have some nerves pinched in my back and it takes quite a while (two hours or more) to get me up and ready to meet the world. I will still be there, and so will the minerals, just a bit late. Julian Gray will be there to take my place in the morning.

Remember to bring your lunch sandwich, or whatever, and a salad, desert or snack item to share with the other members. Coffee, water, ice and soda pop will continue to be provided.

Also very important, 2025 DUES ARE DUE at the May meeting. $15 per year. Please see the last page for instructions. If not paid by June, you will be dropped from the Newsletter list. Thank you!!!

Again, I remind you to please submit article and pictures for the Micro Probe. We all need your input.

I look forward to seeing all of you at the next meeting, May 10th. Please bring lots of flats, boxes and buckets of minerals for the free tables. Also, any reports/projects/eye candy photos that you can share with the group.

I will have a presentation on a locality along Highway 14 in Washington state.

Beth Heesacker, President/Editor

Ellestadite – Jensen Quarry, Riverside Co., California

Don Howard

For those of us that have been collecting minerals on the West Coast for a number of years, the name ***Crestmore*** is very familiar. The limestone quarries in and around Riverside have produced a variety of unusual and interesting minerals that were relatively easy to etch out of the calcite. The Jensen Quarry is one of the set that comprises Crestmore. It is located a few miles southwest of the town of Riverside. It was operated off and on during the last century, mainly to produce limestone for the cement industry. In the late 90's it was taken over by the Landmark Golf Club and converted into a posh golf course under the new name *Oak quarry*. Many of the features were given fanciful names associated with minerals, and a display case was placed in the clubhouse showing some of the things that had been found there.

To be sure, collecting ceased at that point. But one can come across odd boxes of pieces that are still labelled "Jensen Quarry". This whole investigation began as I was going through just such a box that had come from the free table at NCMA in El Dorado, California. I was doing a bit of etching away some of the calcite to reveal the other minerals embedded within.

Calcite is not something that can be melted at ordinary atmospheric pressure. When heated, calcite decomposes, giving off CO_2 and leaving lime, CaO . But when buried sediments rich in $CaCO_3$ are heated by intrusions of molten rock, the trapped material can be melted. This is the process we refer to as metamorphosis. The molten $CaCO_3$ is apparently a pretty good solvent, dissolving some of the other components of the sediment. Upon slow cooling, the calcite crystallizes, and other minerals often form within it.

Exactly what forms depends on the other materials that were present in the original sediments. At the site of the Jensen Quarry, there were small amounts of magnesium (perhaps as dolomite) and aluminum oxide (bauxite?) that combined to give tiny purple octahedrons of **spinel**, often with rather rounded edges (fig. 1). Organic material provided the carbon that later formed small, thin, hexagonal crystal plates of **graphite** (fig. 2). Potassium (feldspar) and silica (quartz) provided the necessary

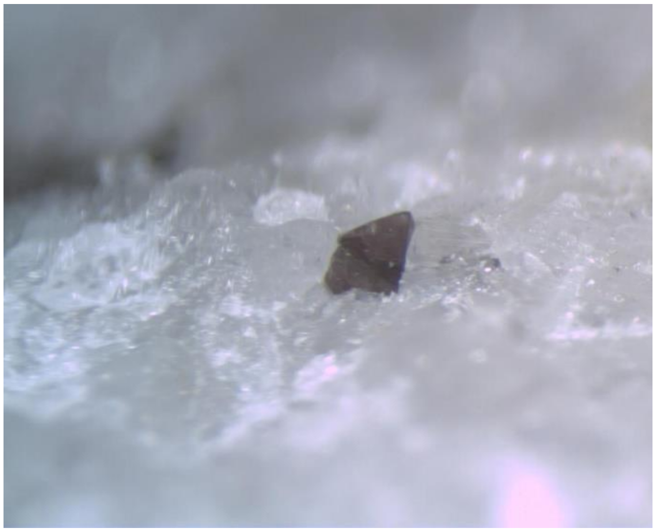


Fig. 1. **Spinel**. Purple octahedron. *(4 mm FS)*
Jensen Quarry, Riverside Co., CA.

Fig.2. **Graphite.** Hexagonal platelet. *(8 mm FS)*
Jensen Quarry, Riverside Co., CA.

components to produce **muscovite** as booklets of colorless parallel plates. In this way, the calcite became the medium in which a wide variety of unusual minerals could be easily exposed through acid etching.

You may have already noticed the rose-red mineral present with the graphite in fig. 2. I became very interested in identifying it. My first impression was that it was probably some garnet mineral. I carefully looked for evidence in the form of identifiable faces that usually are present in garnets. The red material was clearly crystalline, but it was difficult to find any instances of the dodecahedral or trisoctahedral faces that are usually characteristic of garnets. So this was something else.

The lists of minerals from this location included ellestadite. The pictures, however, all showed a yellow mineral. Now ellestadite is a rather odd material. It is a group of minerals belonging to the super group of apatite. As such, it has a hexagonal crystal structure like apatite, but instead of being a phosphate, it is a sulfate silicate. The formula is $Ca_{10}(SiO_4)_3(SO_4)_3(F,OH,Cl)_2$.

The structure of apatite consists of a group of calcium ions that have overall hexagonal symmetry. The phosphate ions that stabilize them are in the form of a central phosphorus ion of charge +5 that are surrounded by four oxygen ions, charge -2 arranged tetrahedrally, thus forming a $(PO_4)^{-3}$ ion. Three of these nearly balance the charge on five Ca^{+2} ions. The remaining single charge needed is supplied by either an F^- ion or an $(OH)^-$ ion. Whichever of these two balancing ions make up over 50% determines the mineral name: fluorapatite or hydroxyapatite.

Now there are other anions that have the shape of a central positive central ion surrounded tetrahedrally by four O^{-2}. One of these is $(SiO_4)^{-4}$. But since the silicon ion only carries a charge of +4, the resulting tetrahedral group carries too much charge to replace the phosphate, and additional balancing ions will not fit in the structure. Another one is $(SO_4)^{-2}$, but again, the sulfur with a charge of +6 yields an ion of too little charge to balance five calciums. However, by using one of each, the *average* charge is once again -3 and the whole system is electrically in balance. Thus we have the ellestadites.

So could the red mineral be ellestadite? I had trouble finding any crystals that seemed to fit the hexagonal designation. But at one of our monthly Wednesday afternoon get-togethers, Julian Gray spotted one embedded grain that had a smooth face. I kept looking at it7 afterward and decided to etch away a bit more of the surrounding calcite to see what the neighboring faces were like. That was when I discovered what appeared to be right angles between faces. That convinced me that there was no way that these could be garnets. I thought that the original face might be the c-face of a hexagonal crystal, but I could still not account for some of the faces I was observing.

So I took several of the remaining small pieces and etched away some more calcite. On one of those pieces, I finally found a crystal that I could make sense of. This is shown in fig. 3. The light is set to just reflecting off the face that would be a c-face. Notice that it is half of a hexagon. Half? The other side of it slants away at a low angle. Then comes another face parallel to the first reflecting light. Next comes a face parallel to the second. Now I saw why the apparent c-face was cut in half. I was observing a twinned crystal.

But wait; hexagonal crystals cannot twin on a plane containing the c-axis! So what is this stuff?

Mindat currently lists all three members of the ellestadite sub-group as hexagonal. Fortunately, I was using a 2018 edition of *Fleischer's Glossary of Mineral Species*, and while it listed fluorellestadite as hexagonal, it listed hydroxylellestadite as monoclinic, pseudohexagonal. That describes the crystal group shown in fig. 3 exactly. Pseudohexagonal describes a structure where the plane exhibits overall sixfold symmetry, but where what would be the c-axis is tilted away from being perpendicular to that plane. Twins result when that axis is tilted a few degrees to the right, or to the left.

What might cause this tilting? In the apatite structure, the monovalent ions form strings parallel to the c-axis. The planes of ions perpendicular to the c-axis stack exactly one on top of the other. To say the axis is caused to tilt is equivalent to saying the planes of ions do not stack exactly, but rather are offset slightly. So there must be a strain set up that causes a lack of precise alignment.

In addition to differences in the size of the ions, hydroxide differs from fluoride and chloride ions in that it is not spherically symmetric: namely there is a hydrogen ion to accommodate in addition to the oxygen ion. Could, perhaps, a line of $(OH)^-$ take more room and therefore buckle a bit?

And would that occur in all examples of hydroxyellestadite? Let us remember that the name is based on *whichever anion is over 50%.* Consider the following thought experiment. Suppose we start with 100% F^- and the system is hexagonal. Now we gradually introduce $(OH)^-$, The material remains fluorellestadite until the concentration of F^- drops to 49%, But suppose that is insufficient to cause the necessary strain, in which case the crystal is still hexagonal. It will remain hexagonal until some lower concentration of F^- is reached, say for instance 20%, at which point the crystal will shift to monoclinic in order to relieve the strain. So we would have hexagonal hydroxyellestadite between 50% $(OH)^-$ and 80%, and monoclinic hydroxyellestadite at higher $(OH)^-$ concentrations.

Remember that in reality, all ellestadite sample probably contain all three anions. There is a note on the photo of hydroxyellestadite on Mindat that an EDS spectra showed some chloride but *no fluoride.*

So now it becomes clear why I had such a hard time finding a recognizable set of faces: I had been dealing with a mineral that twins easily. We are left with a system that warrants considerable more study.

I hope this article illustrates that careful examination and follow-up can succeed in identifying material that you pick up off the free table at meetings, and that it will encourage you to risk picking up something interesting at out meeting this Spring and working on it. I intend to have some pieces of rose-colored hydroxyellestadite available there to add to your collection.

See you soon!

Fig. 3. Hydroxylellestadite. Twinned monoclinic crystals about a vertical plane perpendicular to the page. Notice the hexagonal shape of the individual nearest the center. (*4 mm FS)*
Jensen Quarry, Riverside Co., CA.

What I Found

Steve Ullrich

[Editor's note: Each month, or almost every month, there is a small group of us that get together to talk and exchange minerals. Steve Ullrich (one of our members) always sends out a wonderful message about what he has found in these exchanges. To me they are almost poetry. This is one of the kinds of input we need for this newsletter. Your write-up of your finds does not have to be this long or on multiple minerals. Just closely examine one and do a short write-up. Steve has given permission to include this email in the Micro Probe. Thank you, Steve, very much for letting me share this.]

Dear Beth,

The next set of minerals begins with an unexpected twist. A sample from the Mc Dermitt Mine bears the simple identification "Cinnabar"; the red mercuric sulfide is found in quartz matrix. Some of the quartz seems agatized, like glazed porcelain. There's more to it than that; there are black places on the piece as well. I first thought the black might be metacinnabar, which has the same chemical composition as cinnabar, but is black because the atoms are arranged differently…but there is no metacinnabar at McDermitt. There is no manganese, a frequent source of black color.

I decided to look at quartz for McDermitt, and found photo QNC-FGR, that shows both red cinnabar and gray corderoite. Mike Cox, an expert on mercury minerals, explains in the text for this photo: "The red cinnabar and corderoite ore rapidly turns gray in the sun, perhaps because of the corderoite and/or chlorine content." The corderoite is decomposing to finely divided mercury in the light, just as silver minerals decompose. There are pinkish-brown places on our sample as well, corderoite that is closer to its original color. I promptly hid the sample away in a box to take it out of the light, halting decomposition.

In his text to corderoite photo TCN-QM5 for McDermitt, Mike Cox tells us:"Solutions rich in chloride invaded host rock, partially altering cinnabar to corderoite".

A sample labeled "Sulfur" came from Dixie Valley in Churchill Co., NV —which is actually the Dixie Valley power plant; there are other Dixie Valley localities in Churchill Co., NV that have no sulfur on their checklists. This sample has sparkling clean sulfur yellow gladsome crystals that pass the sniff test—they smell like sulfur, too.

A specimen labelled "Junitoite, Kinoite" from the Christmas Mine actually has a number of other minerals along for the ride. As we examine specimens from the Christmas Mine, there are more than one colorless mineral at Christmas; many have fluorapophyllite or hydroxyapophyllite as associates, others have junitoite. (The latter was named after the Japanese-born mineralogist Jun Ito.) In his text to 1YD-ELY, Stephan Wolfsried remarks that the apophyllites form prismatic crystals, while junitoite forms tabular crystals. Looking carefully at the colorless crystals on our piece, both kinds appear. Beautiful tiny deep blue crystals that must be kinoite appear, but there are a larger number of black spots on the sample. Are these sphalerite (MY0-XH3), or tenorite (PHG-JLQ), or something else? There are reddish-brown spots that I am inclined to think are ruizite, which is found with kinoite (7MH-Q5H, CNV-23E; cf. 8XC-M79,TUU-4XA, 6MN-19E, 8YU-E64, G53-G45, JLG-0R4) on Mindat specimens from Christmas. (Joe Ruiz, after whom the mineral is named, must have been a fabulous character: pharmacist, justice of the peace, and mineralogist in Mammoth, AZ!) A pink, earthy portion of the specimen might be sauconite (U9R-6VG).

A sample from the Kiggins Mine is layered with crystal chunks disturbing the layering. Some of these gently flowing, wavy layers are off-white, some are brown, some are pink or red. The pink/red comes from cinnabar, for the Kiggins was a mercury mine. The off-white layer has crystals growing perpendicular to the plane of the layer. Of what minerals are the off-white and brown layers composed? The Kiggins homepage has baryte, while the Oak Grove Fork has calcite for the Kiggins. (That's right: calcite is not mentioned on the Kiggins homepage, while pictures of calcite with cinnabar appear on the Oak Grove Fork homepage [C1Y-C71, RR2-MRW, 2E1-0H8] . Another weirdity of Mindat!) It would take a person with more crystal savvy than I have to tell which crystals are calcite, and which are baryte. One hind portion of a crystal might be a calcite rhomb, or it might be baryte's Goldschmidt #35 given among Mindat's crystal pictures. I wish someone could explain the layering!
A Clear Creek specimen has red parts and dark green parts and brown parts and black parts. The red portion is easily identified: Clear Creek is a mercury mine, and the red is cinnabar. The green portion requires more work; deanesmithite, donharrisite, edoylerite, gaildunningite, hanawaltite, montroydite, peterbaylissite, reevesite, rozenite, schuetteite, szymanskiite, tedhadleyite, terlinguaite, vasilyevite, and wattersite all are not green. In X47-ENF, eglestonite is green…but eglestonite's color is not given on the Mindat color list. Edgarbaileyite, by elimination, is our dark-green mineral; green is a color listed for edgarbaileyite (222-G2Q, HAM-8PU, 5XR-66D). I wrapped the specimen in tissue paper to keep it out of the light. Perhaps the brown portion is montroydite. Shiny silvery points of light appear often; these must be metallic mercury.

A sample from the Markey Mine was labeled "Andersonite, Natrozippeite, and Gypsum"; layers of yellow were found in a black matrix; small white spots appear here and there. The white spots are the gypsum… but the gypsum doesn't cause identity problems. Andersonite is said to be green or yellowish green; natrozippeite is said to be yellow or yellowish green. There are pure yellow spots on my specimen, but there are also yellowish green mixed with brown…whatever color that is. So there is clearly natrozippeite here, and perhaps some andersonite. Under the SW UV, we get green fluorescence…while natrozippeite is supposed to give yellow fluorescence and andersonite pastel green fluorescence, according to Mindat. I have never been able to see the fine color distinctions that Mindat reports for uranyl mineral fluorescence. I realize that I do not know what I am looking at here; I may have a mix of a number of uranyl minerals here, andersonite and natrozippeite among them. The black matrix is probably petroleum, or bitumen, whatever the distinction Mindat makes between those two.

A sample labeled Gismondine from the US Forest Service Road 57 in Clackamas County, OR has little crystal-lined craters with little white balls in them. Under the microscope, those little balls look more like dumplings; they are aggregates of white crystals. Oak Grove Fork is close enough to serve as a guide to the mineralization here; gismondine makes up the dumplings (P3J-91F, 7RC-1CQ, T27-PR9), and the crystal lining of the craters is chabazite…even though those crystals are so small that it's hard to tell what they are.

Two small samples in perky boxes are located as “Drachenho”hlen Harz”; one is identified as “Brochantite”, the other as “Serpieriet” –I think we mean “Serpierite”. “Drachenho”hlen” means “Dragon’s Lair”. When you put this location into Mindat, you find that It-does-not-compute. The Harz is a well-known location, though; after a few Harz locations, I came to Harz Mountains. If you look up brochantite here, you will find that there is a Drachenho”hlental slag locality, Dragon’s Lair Valley, if you will. (The Drachenho”hlental slag locality, Lautental, Langelsheim, Goslar District, Lower Saxony, Germany, to give the place its full name.) The sole brochantite photo, LKV-6H2, shows the mineral with linarite, and my specimen has green crystals on pits in the black glassy matrix, but blue mineralization on other parts of the sample. The blue is a bit peaked for linarite, though, so we probably have the paler blue schulenbergite or caledonite, both of which are on the location’s checklist. There is no serpierite reported for Drachenho”hlental, but we do have schulenbergite; since the one is $Ca(Cu,Zn)4(SO4)2(OH)6.3H2O$, and the other is $(Cu,Zn)7(SO4)2(OH)10.3H2O$, perhaps this is what the labeler should have written. Perhaps the labeler knew better than Mindat, and both minerals should be included on the checklist. The black glassy matrix is likely the slag from the Dragon’s Lair.

I have some intergrown and/or perhaps twinned water-clear quartz crystals from the Finch Mine. Usually, Finch Mine quartz provides sugar crystal spangling for, or completely replacing wulfenite crystals. I like mine better; perhaps I am not sophisticated enough.

A sample of celadonite from Little Jack [or is it Jock?] Falls, Goble, Columbia Co. is basalt with pits that are filled with a green coating. Green is the color of celadonite, so we’re in luck! Mindat does not know Little Jack Falls, but it does know Goble. The sole photo from Goble shows a spiky green ball of celadonite; mine must be the poor cousin.

A sample from the Baird Creek Quarry has a wonderland of clear, shining needle-like crystals emanating from radiant points in many places on the specimen. From some radiant points, the needles stuck up, while from others, they veered to the side. Scolecite from Baird Creek Quarry, as the label calls these needles, looks like this: L9K-VH6, HQY-WPA, 958-XR0, 433-YVW). A source of astonishment!

A sample from the Centennial Eureka Mine in Juab Co. (LP ’94) is labeled “Quartz cast of Calcite”. (The label is as elegant a piece of penmanship as I have ever seen on a mineral label.) I think that this is supposed to mean “pseudomorph after calcite”…but the shape that the two pieces have doesn’t look like any kind of calcite I’ve ever seen. One piece is almost shaped like petrified wood, while the other is six-sided hollow polygonal. Both are frosted on the outside with tiny quartz crystals, and the hollow portion of the second is also covered with little quartz crystals. I can’t describe either piece properly; ah, well! Fascinating!

The “Nissonite San Benito, Co., CA” sample is of the sort that only a species collector could love: there are green crusts on gray to black matrix, with green pimples. It turns out that nissonite is a rare mineral indeed, found in only five places on the globe. Here in San Benito Co. the Llanada Copper Mine appears to be the only possible location. The nissonite, a copper-containing species, forms the green crusts. The dark matrix is glaucophane, as more than one text to Mindat photos notes; the article “Phosphate Minerals of the Palermo #1 Pegmatite” in *Rocks and Minerals Sept/Oct 1981, p. 202, limits brazilianite’s colors to pale hues. Although libethenite is reported for the Llanada, Mindat does not suggest botryoids as a possibility. They are a possibility for chrysocolla…and, yes, chrysocolla can sometimes be green.

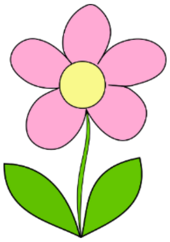
Seigler Canyon in Lake Co., CA is a set of two locations for a single mineral: tridymite. You have to look through many photos of tridymite to get the overall impression that the mineral prefers crystals, that most of the crystals are colorless hexagonal (actually, trillings, which is what the meaning of the “tridymite” name—“triplet”—refers to), that some of these crystals are more complicated. Look for crystals. The microscope is a necessity, because the crystals don’t jump out at you. I think I saw two half-buried hexagons in the course of examining the specimen. If you click the circle to the left of the Mindat listing “tridymite” for Seigler Canyon, you will find the words: “Occurs as druses and sharp crystals in vugs and seams in andesite and coronas about quartz inclusions in basalt.” There may be more tridymite in the specimen because I don’t know what I am looking for. (Rule #1 in specimen examination is: know what you’re looking for!)

A specimen in a tiny perky box received the label “Brazilianite Palermo #1 Groton NH Bob Whitmore”. (The label’s penmanship is impeccable; like that of the Centennial Eureka sample cited above!) Wow! The mine owner collected this specimen! It’s then a shame that it is falling apart. Beautifully colored orange crystals are all over the floor of the perky box, with a larger clear crystal still intact. Examining the brazilianite photos for Palermo #1, all have pale color; it is likely then that the clear crystal is the brazilianite. Now brazilianite photo KXH-UUL has associated orange crystals, but no ID for them—them’s the breaks.

A sample was labeled “Smithsonite Wulfenite area, Lead Mountain Mine, near Barstow, San Bernardino Co., CA”. Big surprise: wulfenite is not on the Lead Mountain checklist. There are three outstanding features for this specimen: clear colorless crystals, dark brown earthy coatings and rust colored earthy matrix. The introduction to Lead Mountain mentions iron oxides as a common constituent of the vein material; the rust-colored stuff is limonite. One suspects manganese whenever dark minerals are present; Lead Mountain has three manganese minerals: coronadite, cryptomelane, and haeterolite. Since both coronadite and haeterolite are some shade of black, it is likely we have cryptomelane here. The smithsonite mentioned on the label must be the clear colorless crystals; these provide a fine contrast to their earthy surroundings.

A piece from the Hamburg Mine, Trigo Mountains, La Paz County, AZ is identified as “Vanadinite, Galena, Fluorite”. The fluorite part is confirmed easily enough: the piece gives a blue-violet color under LW UV. There are spots that gleam with a silvery glow in the light; these must be galena...there are no oxide or sulfide species that are as reflective as galena at Hamburg. Vanadinite here can be orange red (HWX-UUC, G93-4YF, XFH-YTN) or red; these colors can be found on my specimen. Really odd is the robin’s-egg blue spot I see. Copper is not reported for the Hamburg…do we have an occurrence of the rare vanadyl ion (VO+2) here (as in cavansite or pentagonite)?

Steve



Carpathite Occurrence, Cook, Skamania County, Washington USA

Jon Gladwell

Location:

This locality extends for about 100 meters along the northeast shoulder of Washington State Highway 14 between mileposts 55 and 56. The shoulder is two meters in maximum width, and abuts a steep and partially terraced roadcut/scree slope rising several hundred meters vertically.

Coordinates (WGS84):

The center of the collecting area is at 45.708179°N., 121.680079°E. (45.708179, -121.680079)
The western edge of the collecting area is at 45.870967°N., 121.683350°E. (45.708179, -121.693350)
The eastern edge of the collecting area is at 45.709670°N., 121.677365°E. (45.709670, -121.677365)

The upper cliff areas of the roadcut frequently shed locally vesicular boulders and cobbles of the Eocene- to Miocene-aged Columbia River Basalt Group; some may eventually come to rest on the highway shoulder. Road maintenance crews periodically move the rockfall to other clearings near the roadcut. Mineral collectors can access the specimen-bearing matrix both from these dumping grounds and from the shoulder itself. Roadside collecting is hazardous due to the high traffic speed a few feet away. Productive matrix also occurs just outside the east and west boundaries, scattered along the railroad right-of-way downhill from the listed area to the Columbia River shoreline.

All the mineral species at Cook occur as microcrystalline to one-centimeter single crystals, and/or as groups or clusters of crystals up to three centimeters in greatest dimension. SEM and XRD analyses by Dr. Joy Desor (Mineralanalytik in Germany) have confirmed the identification of questionable species.

Carpathite:

Jon Gladwell discovered the rare hydrocarbon species carpathite at this location during the summer of 2020. Here, it occurs as (1) colorless to very-pale-yellow anhedral to euhedral crystals two millimeters or less in length, (2) in groups of <0.5 millimeter anhedral grains, and (3) as <0.1 millimeter microcrystalline specks. Occasional eye-visible larger individuals appear pale-green. Carpathite crystals are found (1) in close association to quartz within relict gas vacuoles, (2) as random emplacements in otherwise empty amygdules, and (3) scattered upon basalt parting surfaces. It is hypothesized that carpathite was deposited from circulating solutions very late in the hydrothermal mineralization sequence; or it may have been transported as a vapor. The source of the required carbon, and the subsequent carpathite migration into the basalt amygdules, are unknown. Investigations of these dynamics are currently (2025) underway and will be presented in a professional paper currently in press. Carpathite is very rare at Cook.

Fluorescence:

Carpathite specimens from Cook fluoresce an intense, brilliant neon-green under both short-wave and long-wave ultraviolet light. This is in contrast to the sky-blue emission of carpathite from California, U.S.A.; neon-green is the emission color from the type locality in Ukraine and from all other worldwide carpathite occurrences.

Quartz:

This location is noted for colorless, transparent quartz prisms up to three centimeters in length. Scepters, reverse scepters, and a variety of unusual quartz habits and formations are also reported. Amethyst in pale to medium shades of lilac, lavender and purple occur locally as short prismatic crystals and clusters up to two centimeters in largest dimension.

Mineral List:

Zeolites

- Analcime (uncertain)
- Chabazite-(Ca) (uncommon)
- Epistilbite (rare)
- Ferrierite-(K) (one specimen)
- Heulandite-(Ca) (uncommon)
- Mordenite (several specimens)
- Phillipsite-(K) (three specimens)

Others

- Calcite (common)
- Carpathite
- Chamosite (one specimen)
- Clinochlore (several specimens)
- Ferroactinolite (several specimens)
- Ferrosaponite (four specimens)
- Goethite (common)
- Hedenbergite (rare)
- Microcline (uncommon)
- Orthoclase (uncommon)
- Pyrite (common)
- Quartz (common)
- Quartz var Amethyst (uncommon)
- Siderite (uncommon)

References:

Gladwell, Jonathan D. (2022) *On the occurrence of an organic bitumen mineral near Cook, Skamania County, Washington, U.S.A.* Portland State University Thesis.

Editor's Note: This location has been added to Mindat and is being populated with photos by Jon Gladwell and Beth Heesacker. Check it out!!

https://www.mindat.org/loc-453046.html

EYE CANDY

Olivenite. Fov 2 mm. Mohawk Mine, San Bernadino Co., CA. Photo and collection of Beth Heesacker

Pyrohotite. Fov 3 mm. Morro Velho, Minas Gerais, Brazil. Photo and collection of Beth Heesacker

Pyrite, pagoda. Fov 2.5 mm. Halls Gap, Kentucky. Photo and collection of Beth Heesacker

A Tale of the Other of Two Rocks
(USFS 57 Slump)

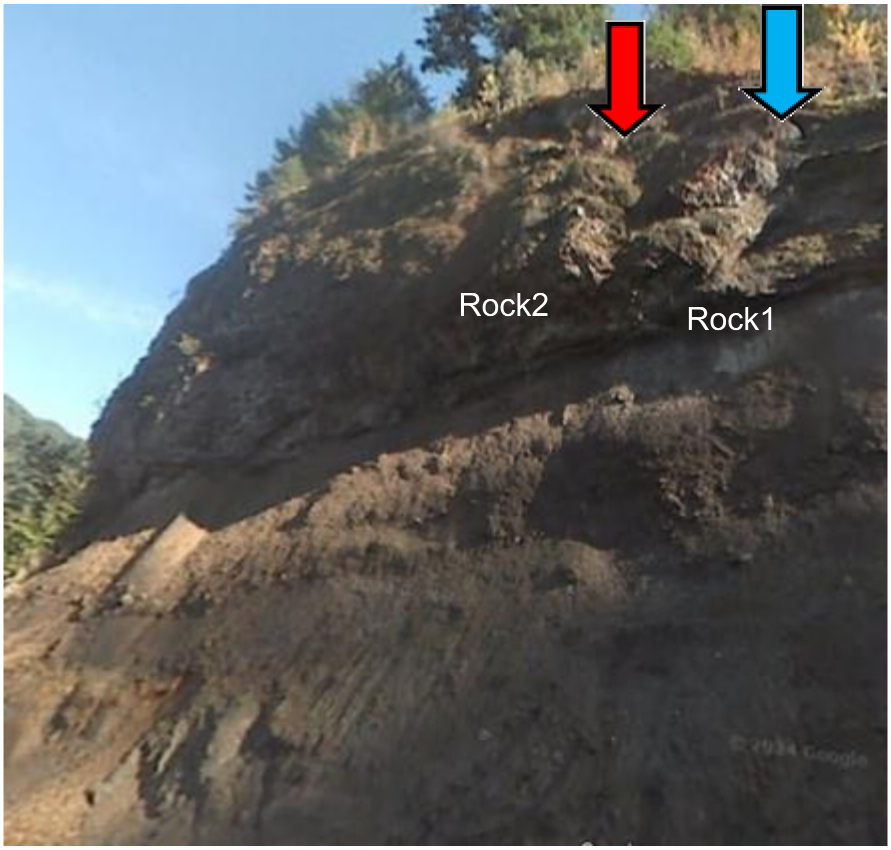
Beth Heesacker

"A Tale of One of Two Rocks (USFS 57 Slump) "

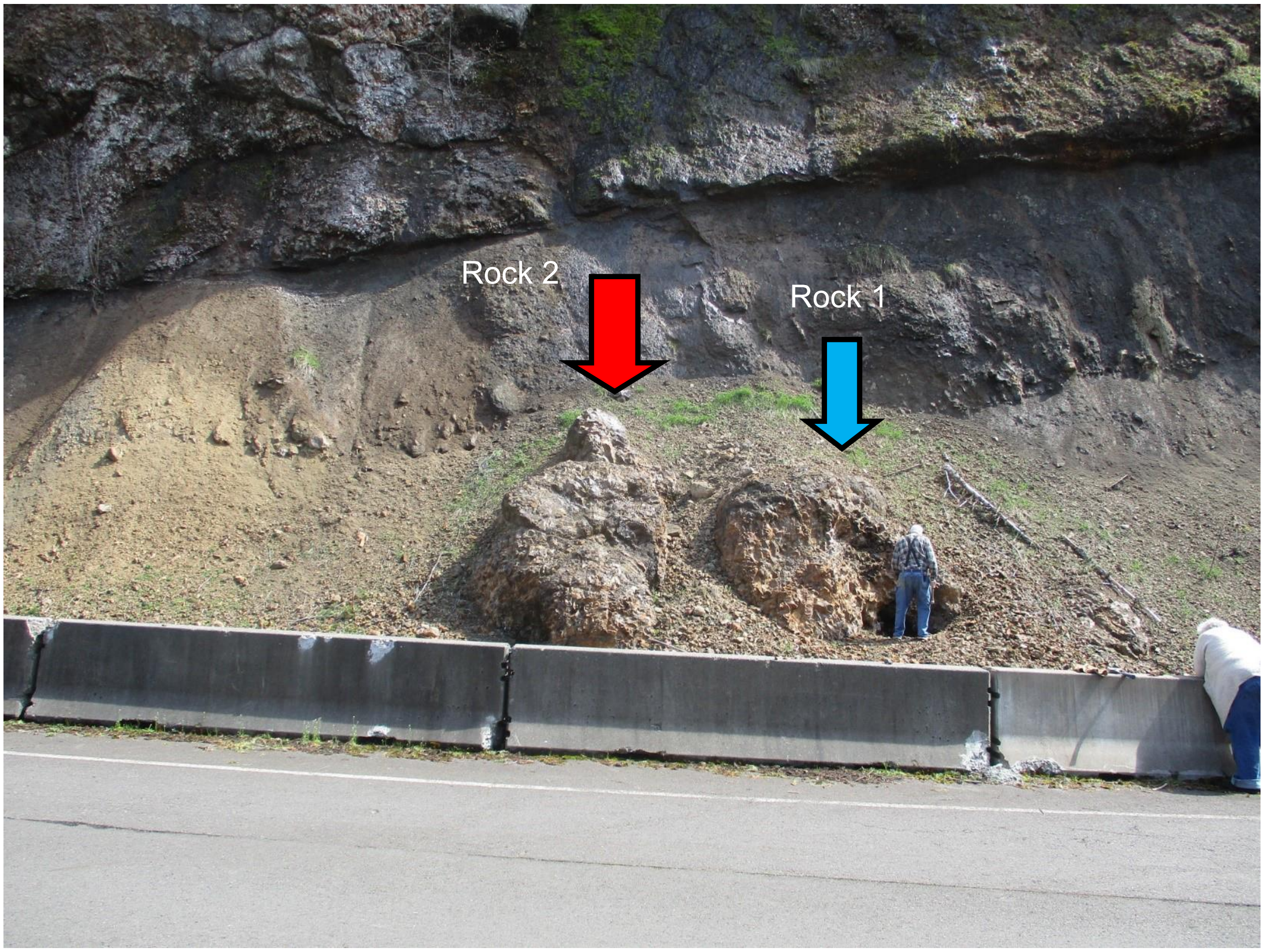
This tale begins with a trip up Highway 224 along the Clackamas River . . ..

You might remember that is how my article in the Fall 2024 issue began. Well, this one begins the same way. My fellow collectors, Paul and Jon, were again with me up-the-Clackamas. Although Rock1 is laying adjacent to Rock2 (the CRBG rock), it is entirely different. It appears to be composed of chert. One geologist I asked said that no chert is to be found along the Clackamas River (he has since recognized my specimen as chert). Another said that there are areas of mélange (see my article on the mélange in this issue) where chert may be found.

I know that these rocks were not moved in and dumped here. They are almost in their original positions. I found out using Google Earth Pro that they were originally up higher on the hillside and had "slumped" straight down, hence giving the name to the location. Note that rock2, with the red arrow, is the one I wrote about in the Fall 2024 issue.



Rock2 and Rock1 location in 2007 from Google Earth Pro.



Paul checking out the two rocks in their current location.

Rock1 is of an entirely different composition from Rock2. While Rock2 is CRBG basalt, Rock1 seems to be chert that is quite heavily covered and infiltrated by iron oxide, with a very heavy pyrite content. The pyrite is found in masses and in veins and stringers in the chert. Zeolites and calcite are also found.

Jon inside a hole in Rock1

Jon’s hole in Rock1 showing the iron oxide staining.

Chert. Fov 4.5mm Beth Heesacker photo and collection.

Wikipedia defines chert as: “Chert is a hard, fine-grained sedimentary rock composed of microcrystalline or cryptocrystalline quartz, the mineral form of silicon dioxide (SiO_2). Chert is characteristically of biological origin but may also occur inorganically as a chemical precipitate or a diagenetic replacement, as in petrified wood.

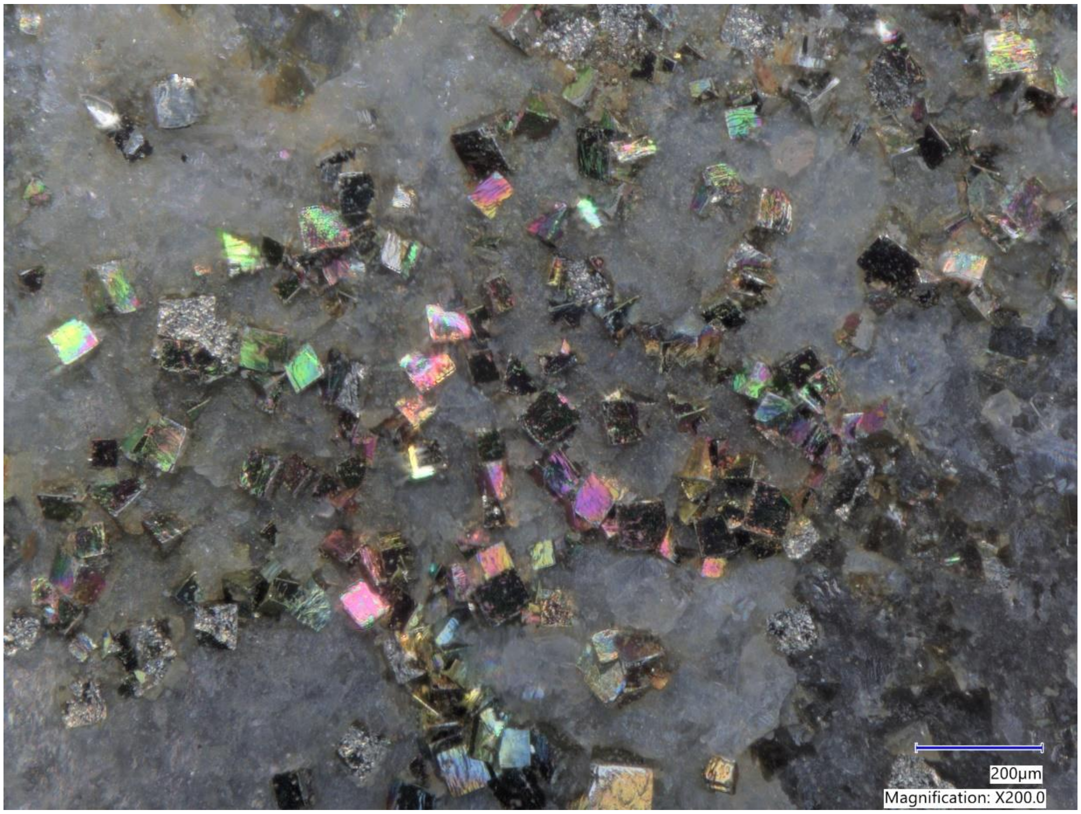
“Chert is typically composed of the petrified remains of siliceous ooze, the biogenic sediment that covers large areas of the deep ocean floor, and which contains the silicon skeletal remains of diatoms, silicoflagellates, and radiolarians. Precambrian cherts are notable for the presence of fossil cyanobacteria. In addition to microfossils, chert occasionally contains macrofossils. However, some chert is devoid of any fossils.”

Chert can also develop in a hot spring environment, but I have not found any identified hot springs close to this area. The Lake Harriet Fault runs through here though so hydrothermic fluids could have traveled from a greater distance away (three are on the other side of the Oak Grove Fork).

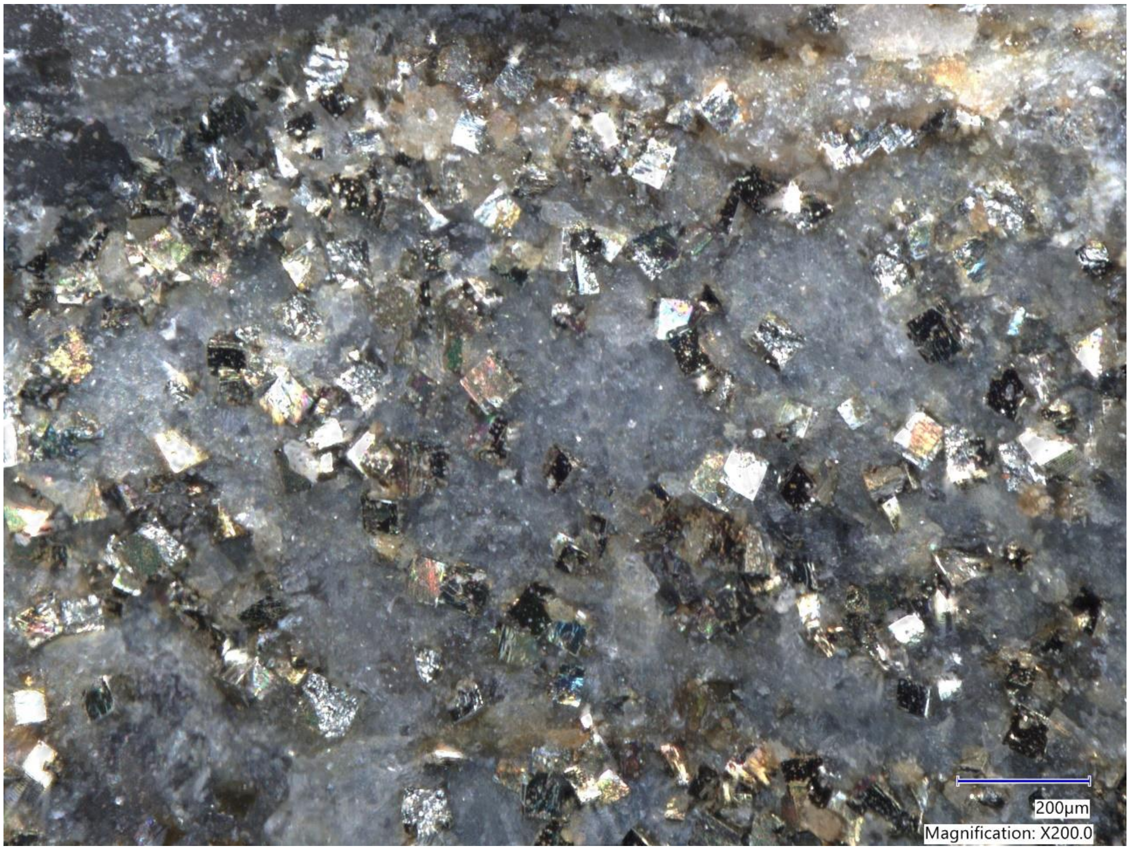
Pyrite in chert. Fov 4.5mm. Beth Heesacker photo and collection.

Pyrite in chert. Fov 4.5mm
Beth Heesacker photo and collection.

Pyrite in chert. Fov 4.5mm Beth Heesacker photo and collection.

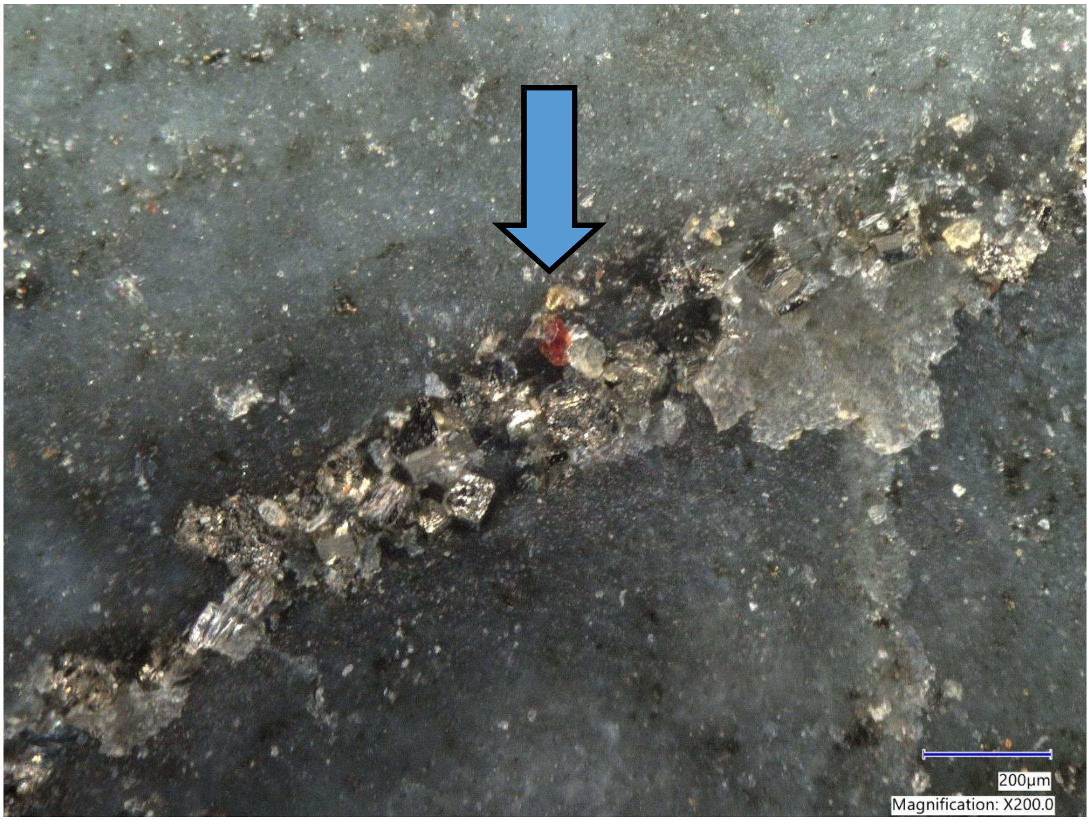


Pyrite in chert. Fov 200um. Photo by Michael Cox. Beth Heesacker collection.

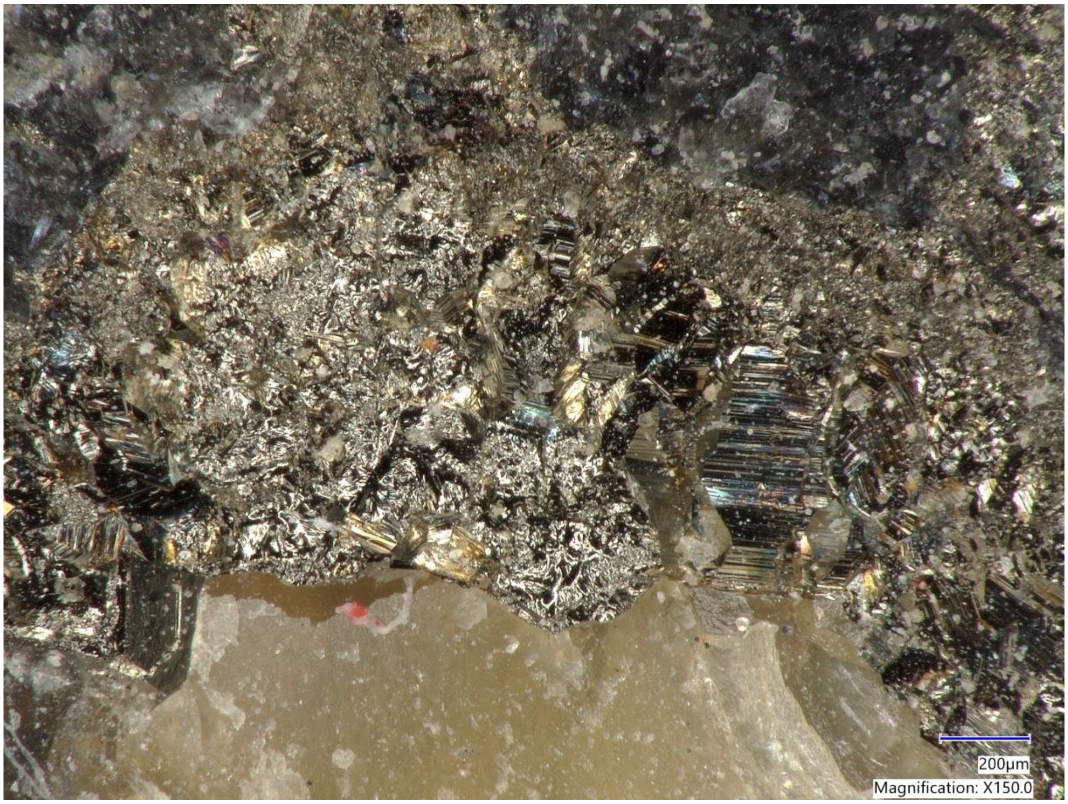


Pyrite in chert. Fov 200um. Photo by Michael Cox. Beth Heesacker collection.

Pyrite in chert. Fov 200um. Photo by Michael Cox. Beth Heesacker collection.



Pyrite in chert and possible cinnabar (blue arrow). Fov 200um.
Photo by Michael Cox. Beth Heesacker collection.



Pyrite in chert. FOV 200um.
Photo by Michael Cox. Beth
Heesacker collection.

Additional USFS 57 Slump Site Pictures, 2024

References:

Google Earth Pro. Version 7.3.6.9796 (64-bit), build Thursday, February 22, 2024 10:13:06 PM UTC

Wikipedia, accessed 10/24/2024

USFS 57, Clackamas County, Oregon - Mélange? BVF?

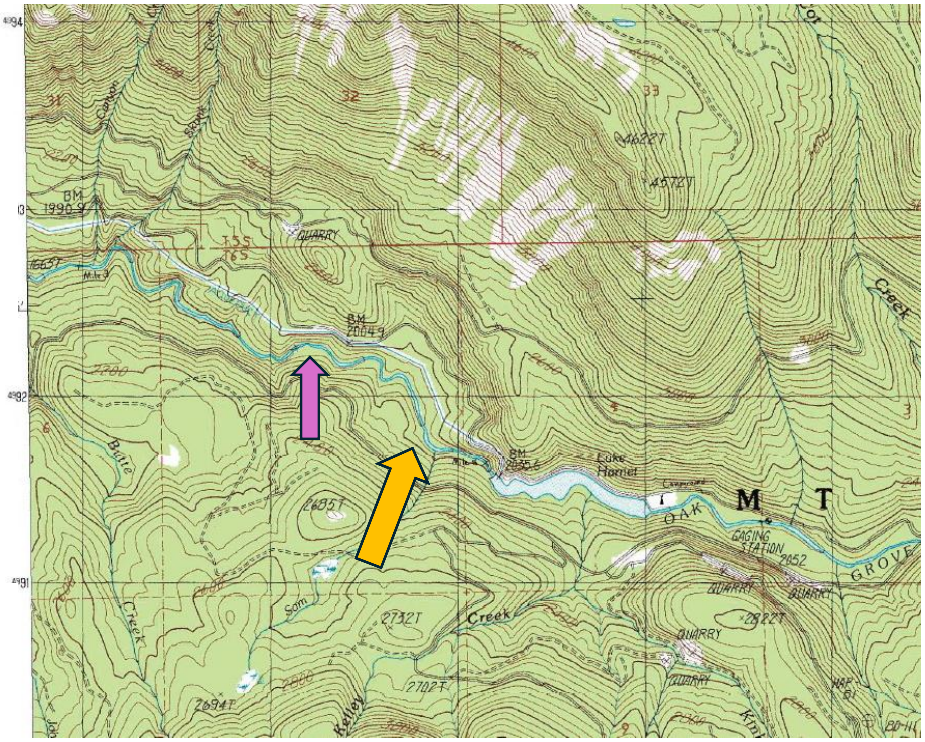
Beth Heesacker

First, we found chert [Rock1], then we found basalt of the Columbia River Basalt Group (CRBG) [Rock2] and now we have found what looks like lava of the Boring Volcanic Field (BVF), all within a couple of miles of each other on USFS 57 (between MP 4 and MP 6). A geologist friend told me that finding a situation like this would be called a "mélange".

I had to look up the word "mélange". In general, Meriam Webster says it is "a mixture often of incongruous elements". That makes sense. But to be more specific, lets see how a geologist would define mélange.

In geology, a mélange is a large-scale breccia, a mappable body of rock char-acterized by a lack of continuous bedding and the inclusion of fragments of rock of all sizes, contained in a fine-grained deformed matrix. The mélange typically consists of a jumble of large blocks of varied lithologies. Both tectonic and sedimentary processes can form mélange.
https://en.wikipedia.org/wiki/Melange (accessed 11/11/24)

I have not investigated the area to find out about "a jumble of large blocks" but this small ar-ea is definitely made up of a variety of different types of geologic features - "varied lithologies". In the Fall 2024 issue of the Micro Probe, I wrote about "A Tale of One of Two Rocks (USFS 57 Slump)". This was about the CRBG portion of this "mélange". In this issue you will also find another article about the chert portion. In this article though, I want to try to describe the possible BVF area.



US Geological Survey, Mt. Mitchell Quadrangle, 7.5 Minute Series. 1:24000, 1985

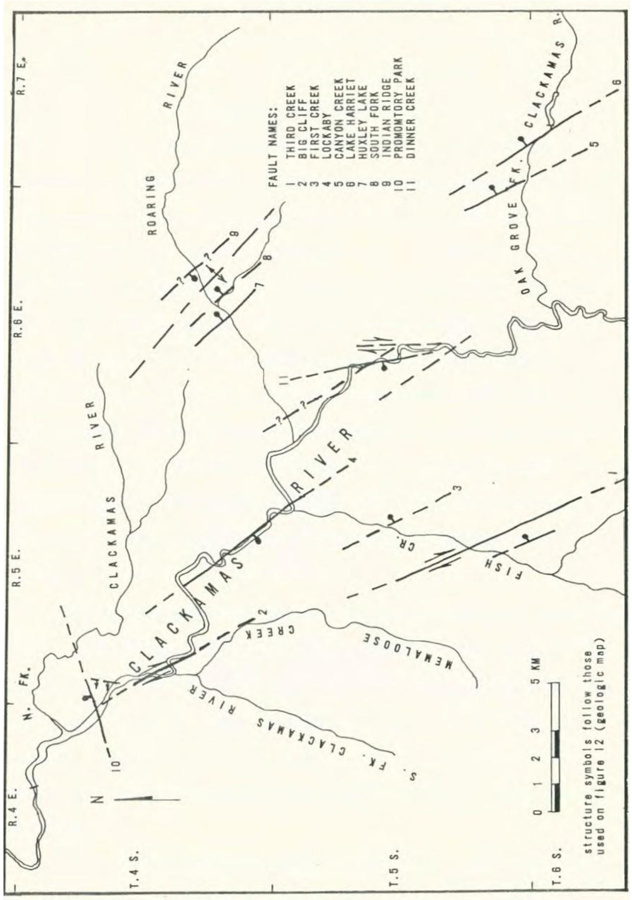
Purple Arrow - USFS 57 Slump - chert and CRBG

Orange Arrow - Boring Volcanic Field site (BVF), approximate

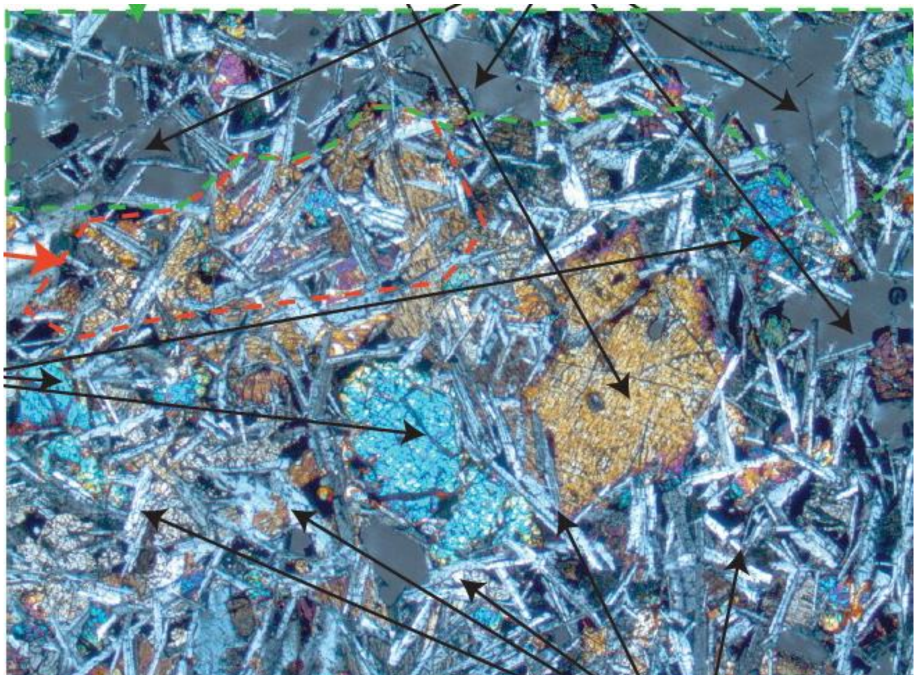
The Lake Harriet fault runs right through the area and it is acknowledged as adding to the complication. See the Anderson (1978) quote on the next page of this article.

BVF flows are generally defined as grey fine-grained, diktytaxitic olivine basaltic andesite. I cannot prove beyond a doubt that the rock found at the possible BVF site on USFS 57 is BVF but it has the characteristics. It is light gray where CRBC is much darker tending towards black.

This possible BVF also has the dik-tytaxitic texture. Diktytaxitic texture is defined as numerous jagged irregular small vesicles whose shapes are determined by the random orientation of small feldspar laths, some of which protrude into the vugs, along with oli-vine crystals and maybe some fine hematite plates(Gavasci (1989). Also see the next page of this article for the origin of the definition of diktytaxitic.



Lake Hariett Fault. Anderson, James Lee.



Diktytaxitic texture example. USGS Publications Warehouse. Disregard the black arrows from the original.

The following are some pictures that I took of areas on the collected rock that I believe has the characteristics of the BVF (color and texture).

A vug from the possible BVF found on USFS 57. Fov 4.5mm. Beth Heesacker photo and collection.

Matrix from the possible BVF found on USFS 57. Fov 4.5mm. Beth Heesacker photo and collection.

A vug from the possible BVF found on USFS 57. Fov 2.5mm. Beth Heesacker photo and collection.

Note: the term Diktytaxitic was coined by Richard Fuller in 1931 (updated 2006) in his study of the Steens Basalts.

https://npshistory.com/publications/geology/state/wa/uw-1931-3-1/sec4j.htm

Keeping in mind that Fuller is writing about the Steens basalts, the description is very close to what I found in the possible BVF.

“ The most striking *characteristic of these minute irregular cavities is the presence of delicate laths of light gray laboraderite, which project into them, and in some specimens, form a network of conflicting plates. These usually range from .5 to 1.5 mm. in length. Less commonly olivine and augite come in contact with these spaces. The angular shape of the cavities resembles the interstitial areas occupied by the glassy mesostasis in some basalts.*

The only established term that suggests this texture is "miarolitic," but this has been previously applied to plutonic rocks and as a rule in reference to the presence of drusy cavities lined with a crystalline coating. In this basalt, however, the cavities are not of the drusy type, and the orientation of the enclosing crystals has no reference to the space they bound. Since this texture apparently has not been previously described, the writer proposes the name "diktytaxitic" (Greek, diktuon, net, + taxis, arrangement)[22] *in reference to the net-like arrangement of the feldspar laths.*

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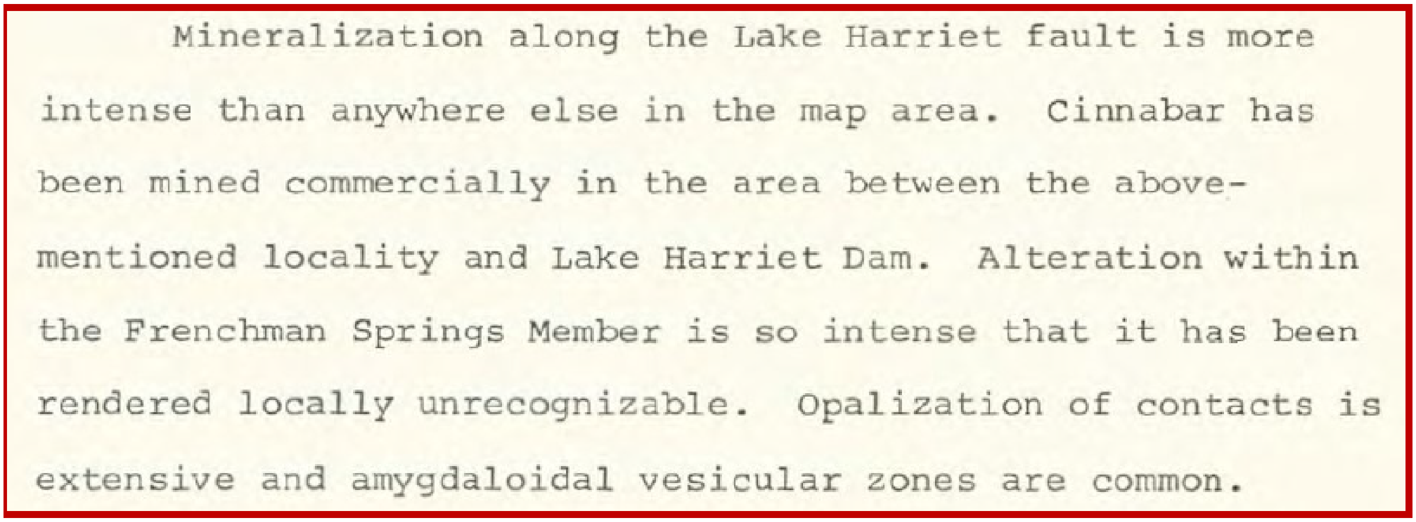
[22] *The writer gratefully acknowledges the advice of Dr. Charles E. Weaver and Professor G. F. Goodspeed in the selection of this name.*

"Diktytaxitic" texture is most clearly defined in coarsely crystalline rocks, where the cavities are usually relatively uniform in their distribution. In this type, however, the examination is necessarily confined to a hand lens . . . for most of the specimens are too friable to preserve their features in thin section, except when the cavities have been subsequently filled with zeolites such as chabazite or thompsonite, which have been derived from the endomorphic alteration of the feldspar.”

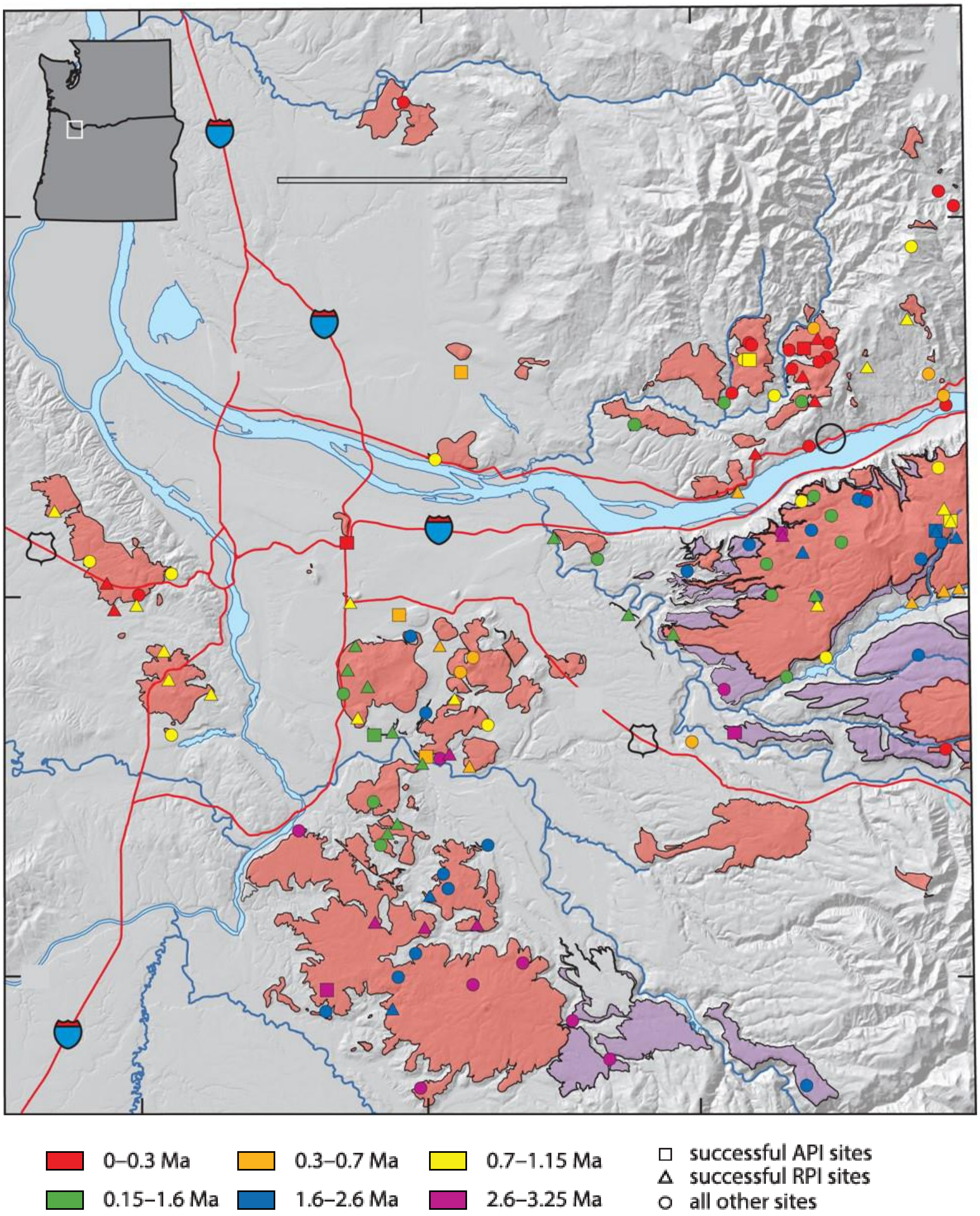


Mineralization along the Lake Harriet fault is more intense than anywhere else in the map area. Cinnabar has been mined commercially in the area between the above-mentioned locality and Lake Harriet Dam. Alteration within the Frenchman Springs Member is so intense that it has been rendered locally unrecognizable. Opalization of contacts is extensive and amygdaloidal vesicular zones are common.

Anderson, James Lee, (1978).

Matrix from the possible BVF found on USFS 57.
Fov 2mm. Beth Heesacker photo and collection.

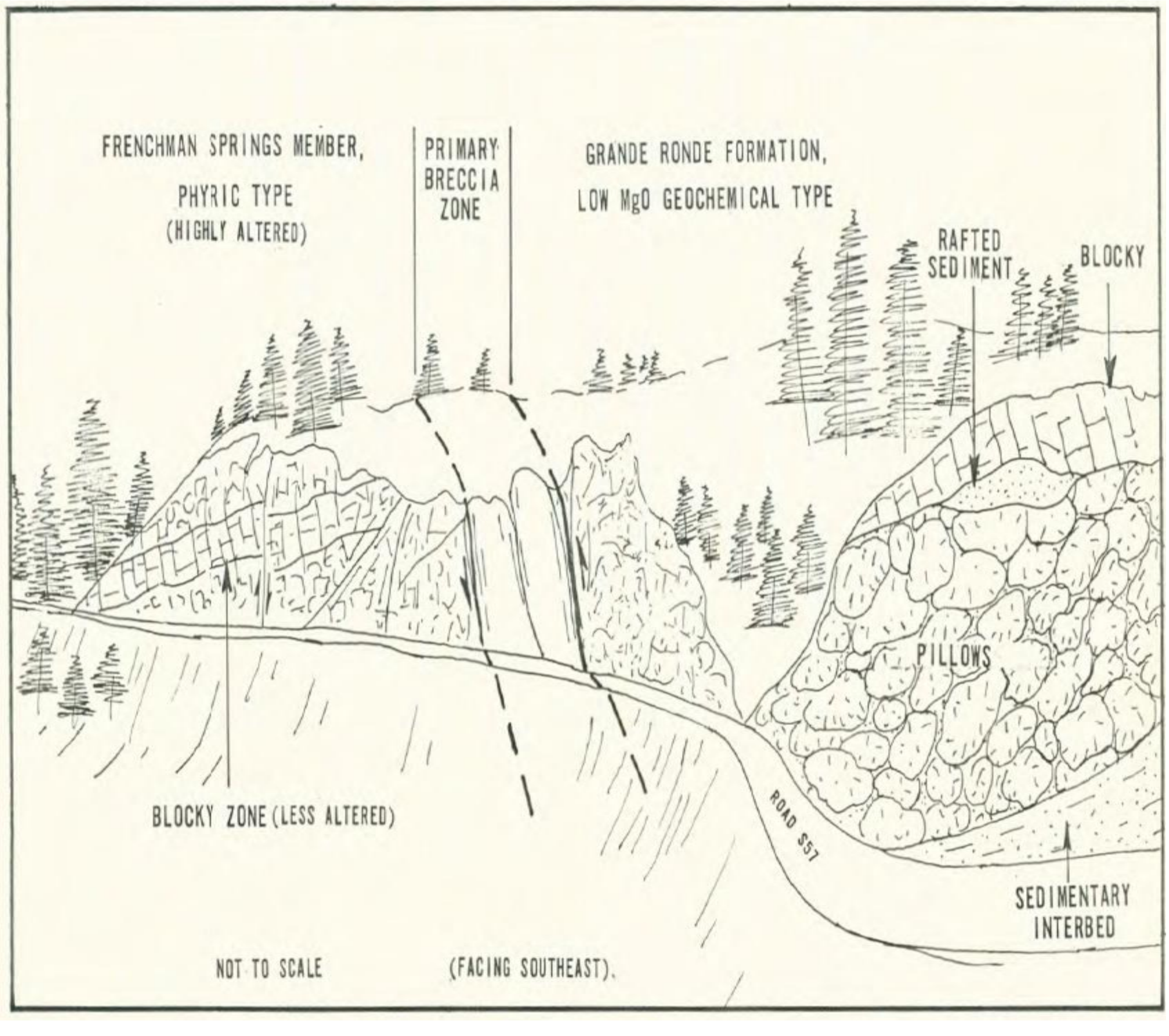
My biggest problem is that BVF has not been previously located in this area but some work has shown that BVF rock has been found close by. A geologic map of the collecting area has not been produced yet (Mt. Mitchell quadrangle) and this quadrangle is located just south of, and off the edge of the map below.



Map showing Boring volcanic rocks in pinkish-orange colour, low-potassium tholeiite flows originating in the Cascade arc to the east in purple, as well as major geographic and cultural features of the region (black squares denote towns and cities and red lines, major roads). Coloured symbols indicate the location of the palaeomagnetic sites as described in the legend. Two sites plot off the map to the east: Site 002 (BL8097) at 45.7549◦N, 121.8311◦Wand Site 013 (T6169) at 45.4156◦N, 121.9851◦W.

Lhuillier, Florian , 2017

As noted earlier, The Lake Hariett fault runs right through and along this area. The drawing below, showing the fault area, from Anderson (1978) looks very much like the USFS 57 Slump location. This complicates the effort to define the area since ground shifting may be obscuring some geologic details.



Lake Hariett Fault tracing, Anderson, James Lee, (1978). Possibly a drawing of the USFS 57 Slump location? Location was not identified in the paper.

I do not know enough geology or its various specialties to fully characterize or define what I have seen along this area but I hope some detail work can done in the future. I am just trying to make some first pass observations.

See the related article in the Fall 2024 Micro Probe and another other article in this issue.

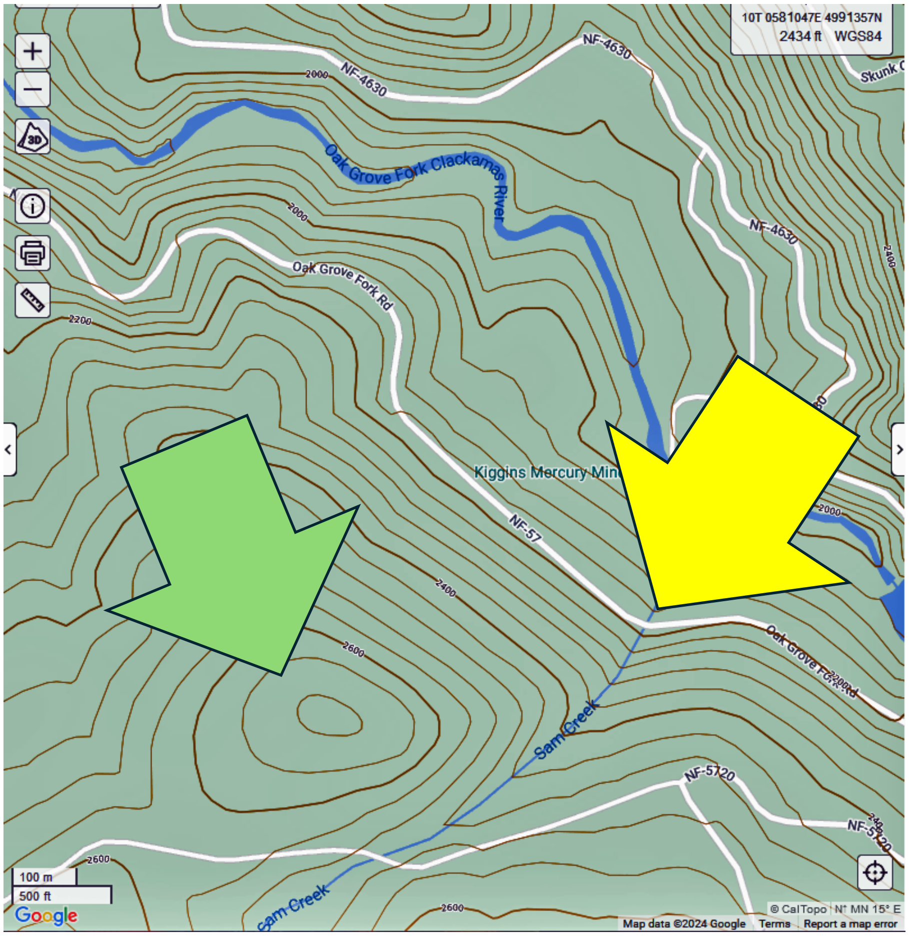
Further questions:

Which other formations are in the two-mile-long area between MP4 and MP6 on USFS 57 (Frenchman Springs CRBG, Troutdale formation and/or others)?

If what I think is a BVF location, what is the source?

What is the source of the chert [Rock1 of the 57 slump]?

One final thought. I did some checking out of topographic maps of the area from Caltopo. The yellow arrow points to the possible BVF site. The green arrow points to a higher elevation hill very close to the site. Note the possible flow path down Sam Creek. Is the elevated site a BVF volcano and perhaps the origin of the BVF rock?



There is a road, USFS 5720 not shown on the map, that originates close to where USFS 57 crosses Sam Creek. That may be a way to access the possible BVF vent. This could need to be checked out on field trips in the future by someone who can traverse the climb to the top on foot.

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