



Wickenburg Gem & Mineral Society, Inc.

P.O. Box 20375, Wickenburg, Arizona, 85358

E-Mail — wgmsociety@gmail.com

www.wickenburggms.org

The purpose of this organization shall be to educate and to provide fellowship for people interested in rocks and minerals; to foster love and appreciation of minerals, rocks, gems, and the Earth.

Membership shall be open to all interested people.

When Enough is Enough

At the September meeting, Jim Koenig gave a presentation on safety in the field. Jim worked for the Morristown fire department for a long time, and participated in many desert rescues. Safety and preparedness on a rockhounding trip is especially important in Arizona, where one may be in remote areas, on bad roads, without cell phone coverage, and subject to sunny high temperatures/low humidity.

He emphasized the need to stay hydrated - to drink sufficient water (not alcohol or caffeine). But he provided a different perspective on hydration, and that is drinking too much water. This could result in water intoxication (aka water poisoning or dilutional hyponatremia). Especially when you are sweating a lot, and drinking a lot, you may dilute your electrolyte (such as sodium) levels to the point that your brain begins to suffer physically. Children are particularly vulnerable. First symptoms include headache, irritability, and drowsiness. These may be followed by muscle weakness/twitching/cramping, nausea or vomiting. At the worst, the condition may lead to brain damage, including coma or death.

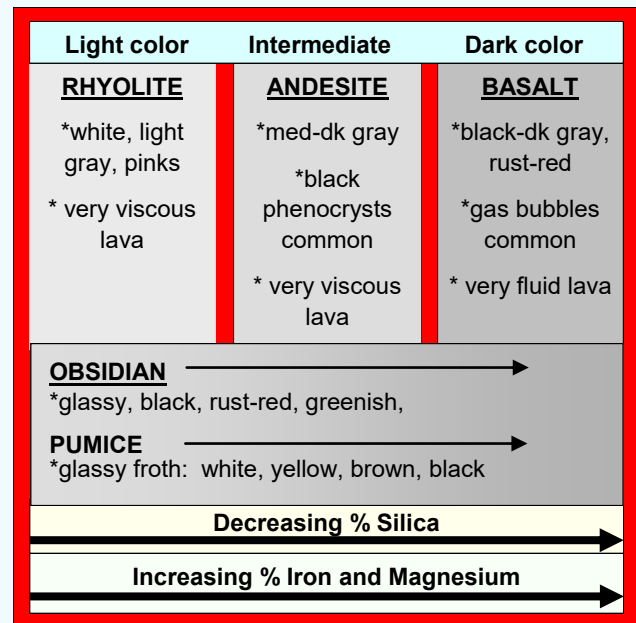
Safety continued on page 5.....

It is with sadness that we say good-bye to Dave Perry. He died in August from a brain tumor. Dave was an enthusiastic rockhound and active club member, conducting a tree-making workshop and giving a presentation on Leland Blue, a Michigan slag worked as a lapidary material. He will be missed!

If you would like to express your condolences, the address of his wife, Karen, is 14795 Mallard Dr., Traverse City, MI 49686

SILICIC VOLCANOES OF AZ OR VOLCANO GO BOOM!!

In past issues, I described and discussed Mafic or Basaltic Volcanoes. Those lavas erupted at high temperatures (1000°-1200°C or 1832°-2192°F), and are very fluid (non-viscous). Looking at the rock chart below, we can see that there are two other types of lavas — Rhyolite and Andesite.



Silicic continued on page 6.....

INSIDE THIS ISSUE

Rockhound Safety	1, 5
Silicic Volcanism in Arizona	1, 6-7
Meeting Minutes	2
New Mineral Museum - Pinal Geology & Mineral Mus.	2
Announcement for Bracelet-making Workshop	3
Photos	4
Minerals Shows, Field Trips, General Club Info	8
Rhyolite and Andesite: domes and pointy peaks	9-11
Rhyolite, Andesite, Pumice & Obsidian in Everyday Lives	11

Meeting Minutes — September 11, 2015

The meeting was called to order by Debbie Keiser, and after the pledge of allegiance a moment of silence in remembrance of 9/11. The minutes of the May meeting and the treasurer report were both read and approved.

An announcement of Dave Perry passing away in Michigan, and a thank you note from the friends of the Wickenburg library for \$50 in honor of Helen Dudly were read.

Our Gem Show will be Nov 28 & 29 this year. We have 26 vendors with 100 tables paid for the show. Beth announced we will be needing donations for the hourly door prizes as well as for the silent action table. We are also needing volunteers to take charge of the Kid's area, spinning wheel, grab bags, garnet find, and extra.

Scholarship recipient Laken Yargus will be holding his funds to be used for the second semester of his classes. He would have lost a grant he was also awarded if he used our scholarship this semester.

The Web site is up and looking great. Dale asked for members to send him news and pictures to be added to the site.

Dale has made an application form to join the WGMS, it is ready for approval before being sent in for printing. Mel Canter will be doing the October program and Joyce Ramage has requested to do her November program before the meeting at 5 o'clock. She will have kits and giving instruction on making a bracelet. There will be a signup sheet and \$5 per kit will be collected.

The next meeting will be October 9.

Show and tell prize was won by Steve and the door prize winner was Al.

Jim Koning gave a program on Desert Safety, reminding us all of the dangers of the heat that cell phones do not always work.

Respectfully submitted,
Debbie Keiser, Substitute Secretary

New Mineral Museum

The Pinal Gem and Mineral Society, in Coolidge, has opened a mineral museum, as part of the larger Copper State Heritage Museum. The Flag Mineral Foundation has supported it with donations of minerals and some cases. Dr. Ray Grant is currently the curator. The club is also partnering with the Earth Science Museum, and readying to present programs/lessons to school groups. It is a pretty exciting time for them!

PINAL GEOLOGY & MINERAL MUSEUM

Artisan Village of Coolidge
351 N. Arizona Boulevard, Coolidge, AZ 85128
*(Arizona Boulevard; turn Left on Pima Avenue
 proceed one block to open gate on left to
 parking area.)*

Hours of Operation: Tues-Fri 10-2; Sat 10-1

1-520 251-5419

<http://www.pinalgeologymuseum.org/>

email: info@PinalGemandMineralSociety.org

NOTES FROM THE EDITOR

Have a geological interest? Been somewhere interesting? Have pictures from a club trip? Collected some great material? Write a short story (pictures would be great). I'd like topic suggestions also.

Deadline for the newsletter is the end of the month.

Mail or Email submissions to:
 Susan Celestian, editor
 6415 N 183rd Av
 Waddell, AZ 85355
azrocklady@gmail.com

<http://www.wickenburggms.org/>

If you ever have photos from a club field trip, send a couple to Dale, for posting on the website.

JOIN IN THE FUN!

WHAT: *Bracelet-making Workshop*
By Joyce Ramage

WHEN: *November 13, 2015*
(regular meeting night)

5:00 pm (tentative, but it will be earlier than usual)

WHERE: *Coffinger Park banquet room*
(regular meeting room)

COST: *\$5 for each bracelet*

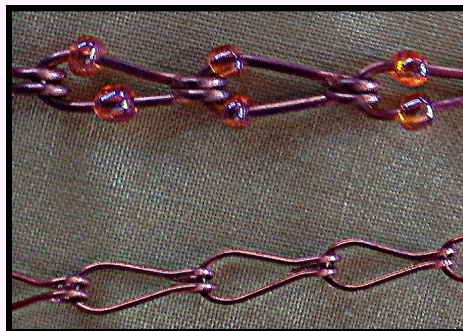
All supplies included
Bring your own tools (needle-nose pliers at least,
preferably with no teeth)

To assure adequate materials: RSVP to
www.wickenburggms.org — let us know you are coming
and how many bracelets you want to make.



Socialize with your fellow club members.

Make gifts for friends and family!



Stuart Willner sent me these pictures of Bill and Karen Coulter working on a Roadrunner claim out of Stanton. In August! They are an ambitious couple of gold hunters!!!! If anyone has pictures of their rockhounding outings, that they would like to share with the club, please send them to me at wgmsociety@gmail.com.



Image courtesy of <http://clipgid.com/>

.....Safety continued from page 1

The symptoms are similar to those of dehydration (too little water), and so you should monitor your (or others') water intake, and urine color. Dark urine - or no urine - indicates dehydration; clear urine - or frequent urination - indicates hyponatremia.

Ways to prevent water intoxication include eating granola, nut bars, or other food to increase your intake of electrolytes. Sucking on a pebble keeps your mouth closed and encourages saliva, thus reducing your desire to drink. Avoid alcohol and

caffeine, as these cause the body to produce more urine, in an attempt to rid the body of these substances.

Other safety hints that Jim suggested are:

- ◆ Be prepared to be out longer than planned. Avoid letting a little problem becoming an emergency.
- ◆ Tell someone where you are going and when you expect to be back. Try not to deviate from this plan. If you run into trouble, rescuers will have an idea where to concentrate their search. Also, stay with your car.
- ◆ Travel with a friend, and multiple vehicles. If you are alone, turn around when the terrain becomes difficult.
- ◆ Take LOTS of water (more than you think you need) and extra food, just in case.
- ◆ Have a jack and good spare tire.

- ◆ Check gas and radiator levels before departing on your outing.
- ◆ Keep blankets in the vehicle.
- ◆ Maintain a basic first aid kit.
- ◆ Have a basic tool kit, including matches or lighter.
- ◆ Consider purchasing and carrying a High Lift Jack. This can be used to get out of a hole, or can be used as a winch.
- ◆ Make sure your cell phone is fully charged when you start out. Have a car charger at hand. But don't rely on cell phone coverage!
- ◆ An additional suggestion that Stan and I have done, for dire emergencies: Purchase a PLB (Personal Locator Beacon). This is a hand-held GPS-enabled device that, when activated, transmits a signal on a monitored frequency. The distress alert is then relayed to a rescue center. You can signal for help no matter where you are.



.....*Silicic continued from page 1*

Both Rhyolite and Andesite are high in silica. Rhyolitic magma erupt at 650°-800° C (1202°-1472° F), and Andesitic magma at 800°-1000° C (1472°-1832° F). As a result of the high silica content, and lower temperatures, these magmas exhibit medium-high viscosity (resistance to flow). In fact, rhyolitic magma is 1 million to 100 million times more viscous than water. In most, cases, these lavas don't really flow, or don't flow far; but rather bulge or ooze to the surface as a dome. This high viscosity results in the magmas choking the volcanic vent, and blocking the escape of gases. Gas pressures build up behind the magma blockage, until they exceed the confining pressures — and the volcanoes explode violently. Mt. St. Helens is a great example of this style of eruption, which involves towering ash columns, formation of large craters and calderas, powerful nueé ardent, and lahar.

Volcanic craters are circular depressions over a volcanic vent, and from which lava, gases, and ejecta erupt.

Calderas are also generally circular, but they are large collapse features, resulting from an explosion that empties the once-supporting magma chamber below.

Nueé ardent or pyroclastic flows are swiftly-moving (up to 450 mph), ground-hugging clouds of hot (1830°F), expanding gases mixed with ash and rock. Pompei was overrun by one of these.

Lahar are mudflows or debris flows, composed of volcanic fragments (clay-size to boulders exceeding 30 feet in diameter). They may be precipitated by heavy rainfall or snowmelt mixing with the abundant loosely-packed fragmental deposits, or by a violent eruption that causes snow to melt (or lakes to drain). The flows generally follow established valleys, and may be quite vigorous!

The volcanoes built up by lava flows that do not flow far from the vent, alternating with layers of tephra (volcanic debris), are called **stratovolcanoes**. They are high-profile mountains, with very steep, conical peaks. The mountains of the Cascade Mountains in Northern California up through Washington are all examples of stratovolcanoes. **Lava Domes** are also typical. These are rising bulges of lava (there is one forming in Mt. St. Helens caldera). Also, **Tuff**, **Obsidian** and **Pumice** are typically associated with these magma compositions.

In Arizona, there are ten centers of silicic activity, including Aquarius Mts., Chiricahua Mts., Superstition Mts., Tucson Mts, and volcanic centers in the San Francisco Volcanic Field — San Francisco Peaks (a stratovolcano), lava domes Mt. Eldon and Sugarloaf Mountain (0.09 mya), O'Leary Peak, and the White Horse and Hochdorffer Hills.

"The Peaks" erupted between 1 million and 0.1 million years ago. The Inner Basin is a probably a caldera, a result of collapse, mass wasting or erosion, or a combination of these actions. During the last Ice Age, the Inner Basin supported several glaciers, that scoured out valleys. The highest peak is Humphrey's Peak, that rises to an elevation of 12,633 peak. See Figures 1-3.

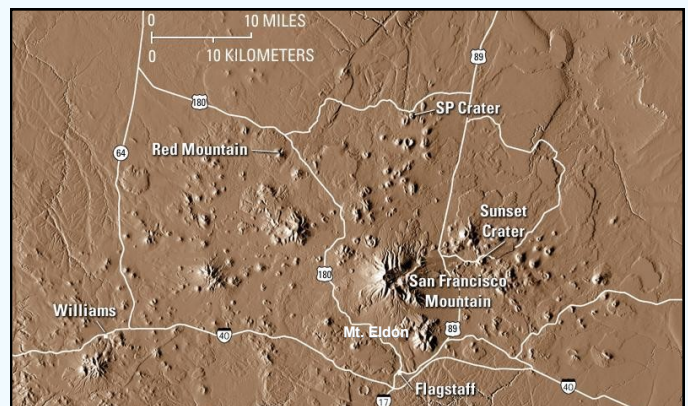


FIGURE 1 Digital Elevation Model (DEM) of the San Francisco Volcanic Field, showing silicic San Francisco Mountain and Mt. Eldon, centrally located within the field of over 600, mostly basaltic volcanic vents.

Image courtesy of the USGS

Silicic continued on page 7.....

.....Silicic continued from page 6

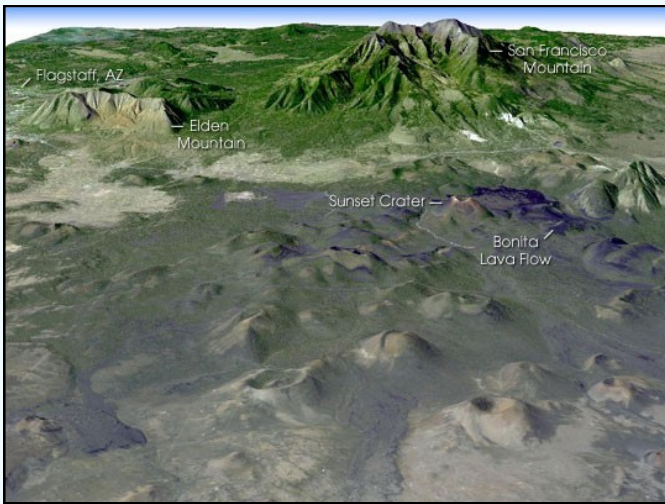


FIGURE 2 A composite view of San Francisco Mountain and Mt Eldon. *Image courtesy of NASA*

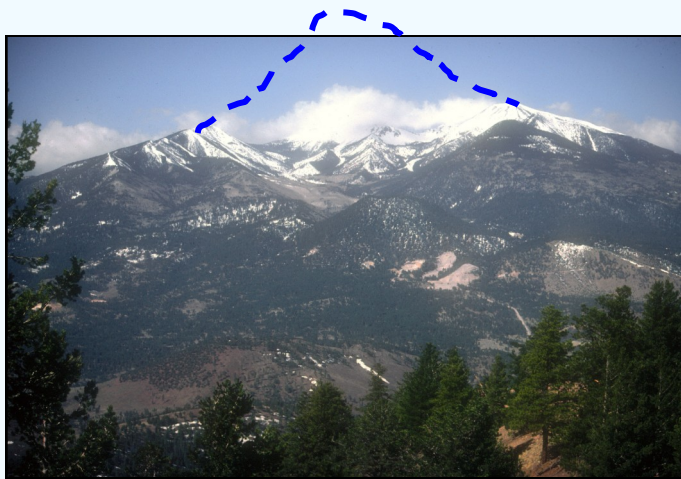


FIGURE 3 San Francisco Mountain This is a view from the east, and looking into the Inner Basin. The dashed blue line shows what the profile of the mountain might have looked like before it was altered by explosion and/or erosion. *Photo by Stan Celestian*

Mt. Eldon (Figure 4), on the northern outskirts of Flagstaff, is a dacite (rock equivalent to andesite, with free quartz) lava dome, and was built up by a series of overlapping flows, over a period of a few months. In fact, some of the bulges, did not break the surface, but tilted up the sedimentary rocks above it.



FIGURE 4 Mt Eldon This aerial view of Mt Eldon highlights the lobes of overlapping lava flows. Note that the viscous dacite lava did not flow far from the vent(s). *Image courtesy of the USGS*

O'Leary Peak (Figure 5) erupted 0.17-0.23 mya, and now stands guard over the volcanic field at Sunset Crater.



FIGURE 5 O'Leary Peak is a steep-sided mountain, formed when very viscous rhyolite lava oozed to the surface, and explosive eruptions formed layers of ash and vent-hugging lava flows. In the foreground is the Bonito Flow — an a'a' basalt flow, issued from Sunset Crater. *Photo by Stan Celestian*

A further description of rhyolite and andesite is found on page 9.

UPCOMING AZ MINERAL SHOWS

October 2-4 - Clarkdale, AZ Elks Club Lodge; 100 S Broadway; Fri-Sat 9-5, Sun 10-4; Admission \$2, children free with adult. www.mingusclub.org

October 9-11 - Buckeye, AZ Helzarockin' Rodeo Arena ; 802 N 1st St & Miller Rd; Fri-Sun 9-4, Admission \$3, children under 12 free; Snacks and beverages available. www.westvalleyrockandmineralclub.com

October 10-11 - Sierra Vista, AZ Cochise College; 901 N Columbo; Sat 9-5, Sun 10-4, Admission free. huachucamineralandgemclub.info

October 17-18 - Sedona, AZ Sedona Red Rock High School; 995 Upper Red Rock Loop Rd; Sat 10-5, Sun 10-4, Admission \$3, children under 12 free. www.sedonagemandmineral.org

October 30-November 1 - Black Canyon City, AZ High Desert Park; 19001 Jacie Lane; Fri-Sun 9-4; Admission Free; Food and beverages available. hgihdeserthelpers.org

November 21-22 - Payson, AZ Longhorn Gymnasium, Payson High School; Corner of W Longhorn Rd & S McLane Rd; Sat 9-5, Sun 10-4, Admission \$2, children under 12 free.

November 21-22 - Apache Junction, AZ Apache Junction High School cafeteria; 2525 S Ironwood Dr; Sat 9-5, Sun 10-4, Admission: Adults/Seniors \$3, Students \$1, children free.

January 8-10 - Mesa, AZ Flag Gem and Mineral Show, Mesa Community College, Dobson Rd, just north of Rte 60; Fri-Sun 9-5; Admission/Parking free.

If you are travelling, a good source for out-of-state (or in-state) gem and mineral shows AND clubs is <http://www.the-vug.com/vug/vugshows.html> or <http://www.rockngem.com/ShowDatesFiles/ShowDatesDisplayAll.php?ShowState=AZ>

For out-of-the-country shows:

<http://www.mindat.org/eventlist.php>

A good source for a list of Arizona Mineral Clubs and contact information is

http://whitemountain-azrockclub.org/Public_AZ_Clubs_Links.html

UPCOMING WGMS FIELD TRIPS

NO FIELD TRIPS ARE SCHEDULED, DUE TO SUMMER BREAK

DATES SUBJECT TO CHANGE

CONSIDER VOLUNTEERING TO PLAN OR HELP PLAN TRIPS. YOU WOULD NOT NEED TO LEAD EVERY TRIP, BUT KEEP THINGS ON TRACK.

If you all have some place that you would like to go, let Bob Bartlett [623-388-0749](tel:623-388-0749), Marty Hagan [602-469-7770](tel:602-469-7770), or Craig Jones [208-681-4770](tel:208-681-4770) know. We have some dates to fill in. This is your club. Let's go out and have some fun.

Check the website for field trip announcements, especially if you don't have email!

Officers and Chairpersons

President: Craig Jones208-523-9355
Vice President: Martin Hagan 602-469-7770
Secretary: Sue Jones 208-523-9355
Treasurer: Debra Keiser 928-684-1013
Program Director: Dale Keiser 928-684-1013
Publicity: currently open position
Membership: Roma Hagan 602-469-7662
Editor: Susan Celestian 602-361-0739
Field Trip: Craig Jones, Bob Bartlett, Marty Hagan
Show Chair: Beth Myerson 480-540-2318
Scholarship Chair: Steve Hill 928-533-3825
Historian: Jeanine Brown 928-684-0489

Meetings are held the **2nd Friday** most months at **Coffinger Park banquet room**. Potluck dessert at 6:30 pm. Business meeting at 7:00 pm. **Exceptions: February and December** meetings are held on the **first Friday of the month**. We do not meet in the summer — **no meetings in June, July or August**.

Membership Dues: \$15.00 Adults per Person
\$ 5.00 Juniors and Students

Meeting Dates for 2015/2016

Wickenburg: Jan 9, Feb 6, Mar 13, Apr 10, May 8, Sept 11, Oct 9, Nov 13, Dec 4, Jan 8, Feb 5, Mar 11, Apr 8, May 13

Stanton meets Thursday after the Wickenburg meetings. Apr 16, May 14, Sept 17, Oct 15, Nov 19, Dec 10, Jan 14, Feb 11, Mar 17, Apr 14, May 19 (subject to change)

RHYOLITE & ANDESITE (the stuff of domes and pointy peaks)

- ▶ Like basalt, rhyolite and andesite are dense and fine-grained, because they cool relatively quickly at the Earth's surface.
 - ▶ *Rhyolite* tends to be light gray or light pastel colors, such as pink, green. But brown and even darker colors are possible. See Figures 6-9.
 - Andesite* tends to be a bit darker than rhyolite, but lighter in color than basalt — medium to dark gray or bluish gray. See Figure 10-11.
- ▶ Both rocks are typically porphyritic (have visible crystals "floating" in the mostly fine-grained background. The phenocrysts (visible crystals) in *rhyolite* are typically quartz or feldspar; while those of *andesite* are typically white feldspars or black ferromagnesian (augite, hornblende, biotite). See Figures 6-11.
- ▶ Being high in low-density silica, and deficient in high-density iron and magnesium, rhyolite and andesite are not as heavy as basalt.
- ▶ Much cooler than basaltic lavas, rhyolitic lavas extrude onto the surface at about 1292-1652°F, and andesitic lavas at 1742-2192°F. As a result, the silicon molecules have begun to interlink, and the lavas are very viscous (not fluid). ***
- ▶ Because rhyolitic and andesitic lavas are so pasty (viscous), the eruptions tend to be explosive; and the volcanoes built up as layers of ash and other fragmental deposits alternate with lava flows that pile up near the vent. As a result, the mountains have very steep slopes (*stratovolcanoes*), and a distinctive profile.
- ▶ Besides stratovolcanoes, another very common topographic feature is the *lava dome* — a steep-sided mountain formed by lava bulging to the surface. In addition, lots of ash (Tuff), large fragments (Volcanic Breccia), pyroclastic flow deposits (Welded Tuff), and lahar deposits (page 6).

***The temperature of basalt was erroneously listed in the August newsletter as 1100-1200°F. That was Celsius (I forgot to convert) — 1832-2192°F. A big difference!

Silicic continued on page 11.....



FIGURE 6 Porphyritic Rhyolite from the Topaz Mt., Utah. The large crystal in the center is a topaz crystal, that formed in a vug, as hot gases permeated the flow. Look closely at the host rock, and you will see clear, shiny crystals of sanidine (a feldspar). These crystals formed in the cooling magma, prior to eruption. Photo by Stan Celestian



FIGURE 7 This light gray rhyolite is from Graham County, near the Grand Reef Mine. The black plant-like features are manganese oxide dendrites, that crystallized out of water, long after the rock formed. Photo by Stan Celestian



FIGURE 8 A pinkish rhyolite exhibiting flow-banding, resulting from frictional contortion of layers, resulting from the segregation of crystals within the magma. From western Maricopa County. Photo by Stan Celestian



FIGURE 9 A brown porphyritic rhyolite, with well-formed feldspar crystals. Photo by Stan Celestian

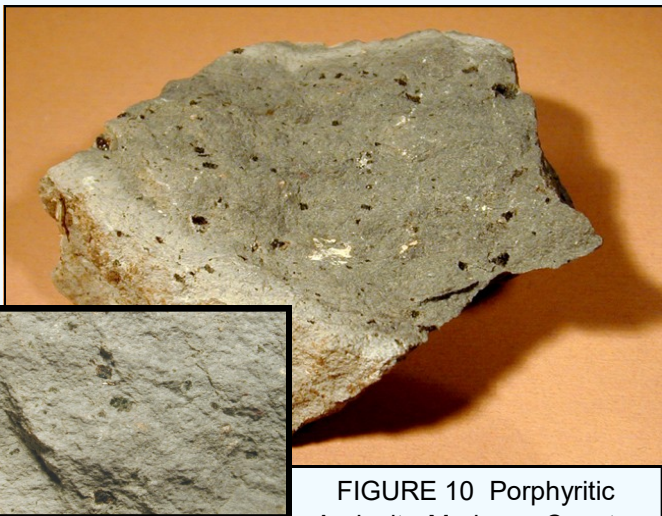


FIGURE 10 Porphyritic Andesite-Maricopa County.

Note that the color is an intermediate gray, and there are numerous visible black crystals of hornblende.

Photo by Stan Celestian



FIGURE 11 This dark gray porphyritic andesite is from the Mule Creek area, in New Mexico, just east of Morenci, Arizona.. It sports huge phenocrysts of white feldspar crystals. Crystals are up to 3 inches long!

Photo by Stan Celestian



FIGURE 12 Volcanic breccia from the Aquarius Mts. in Mohave Co. This rock results from the accumulation of fine-large fragments of pre-existing rocks broken up in a volcanic explosion, perhaps a pyroclastic flow. If the particles are hot enough the particles may weld together to form a very dense rock. (The black fragments are obsidian). Photo by Stan Celestian



FIGURE 13 Obsidian, or volcanic glass.

Glasses have no crystals and exhibit conchoidal fracture. Photo by Stan Celestian

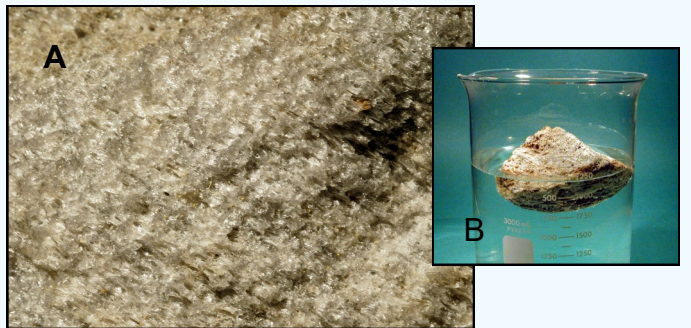


FIGURE 14 Pumice

A - A close up view, glassy and vesicular (up to 90% open space)

B - Pumice is full of weakly-connected holes and will float in water

C - This is a water-deposited breccia, in which the particles are bits of pumice. All samples are from Northern Arizona.

Photos by Stan Celestian

—*Silicic continued from page 10*

- ▶ Silicic volcanoes are typically found at convergent boundaries, where basaltic oceanic floor is subducted (dives) down under the continental crust (which has a general composition of andesite). At depths of around 62 miles, the oceanic rocks begin to melt. Remember Bowen's Reaction Series (see below)? When rocks start to melt, the first components that melt are those at the bottom of the Y — the minerals that are highest in silica. This is called **partial melting**.

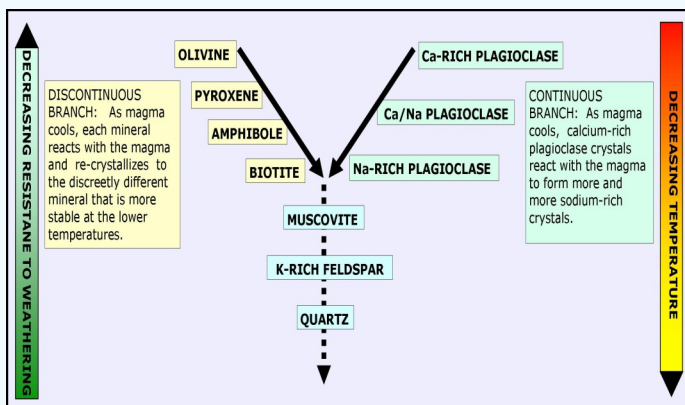


FIGURE 18 Bowen's Reaction Series This diagram depicts the order in which minerals crystallize in a cooling magma. (Enlarge for better view.) *Diagram by Susan Celestian*

Molten rock is lighter than solid rock, so that initial magma will rise toward the surface — and along the way will incorporate components of the continental crust, making the magma even more siliceous (**assimilation**).

In Arizona, older rhyolites/andesites are associated with subduction of the Pacific Plate under North America. Younger rhyolitic/andesitic volcanoes (such as those of the San Franciscan Volcanic Field) occur quite a distance away from any boundaries, and instead are thought to be associated with a hot spot. And, as I wrote last month, one expects basalt to flow over a hot spot. Most of the volcanoes of Northern Arizona are basaltic, but “The Peaks” and O’Leary are not. It is thought that they may be the result of **magmatic differentiation** of all that basaltic magma. As some of the basaltic magma chambers cooled, crystals of the more Mg/Fe-rich minerals crystallized, and settled out, leaving a more silica-rich magma behind. Plus, there may have been some assimilation of continental crust.

RHYOLITE, ANDESITE, PUMICE & OBSIDIAN in our Everyday Lives

Andesite and rhyolite are used:

- ◆ As aggregate/fill in general and road construction
- ◆ Due to their fine-grained texture, andesite and rhyolite have been used historically as projectile points and scrapers

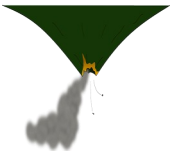
Pumice is used:

- ◆ Primarily used to make lightweight concrete; insulative cinder blocks
- ◆ Pumice is used as decorative ground cover in horticulture/landscaping, and as a substrate in hydroponic gardening
- ◆ As an abrasive: in pencil erasers, in “Lava” soap, for skin exfoliation, in stone-washing denim
- ◆ In tire rubber, for increased traction
- ◆ As a filtering medium: wastewater treatment, reverse osmosis, desalination, potable water

Obsidian is used:

- ◆ Surgical scalpels, fine knife blades (obsidian breaks to form a very thin, non-jagged edge); historically used as arrowheads, knives, scrapers
- ◆ Gemstone

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