Breccia and Conglomerate are both coarse-grained clastic rocks. They share a lot of textural characteristics, but do have somewhat different environment-of-deposition implications. See Figure 1.

**COARSE-GRAINED CLASTIC SEDIMENTARY ROCKS — Breccia and Conglomerate**

*By Susan Celestian*

**FIGURE 1 Clastic Sedimentary Rock Chart**
*Chart by Susan Celestian*

Sedimentary **BRECCIA** (pronounced brechia) is a very poorly-sorted, immature rock. It is composed of predominately large angular rock, randomly-oriented fragments (> 2 mm), within a matrix of fine-grained particles (sand to clay) or cement (such as calcite or quartz). These characteristics indicate that the rock has undergone very little transportation, and has been deposited quickly and close to its source.

**Breccia Environments of Deposition:**

Sedimentary environments in which breccia is deposited include talus slopes, alluvial fans, landslides, debris flows, some glacial deposits, and along fault planes. See Figures 2-6 for photos of “future breccia” sediments in their environments of deposition. See Figures 7-10 for breccia rocks.

**CLASTIC SEDIMENTARY ROCKS**

<table>
<thead>
<tr>
<th>Coarse-grained (pebbles, cobbles, boulders)</th>
<th>Medium-grained (cobbles)</th>
<th>Fine-grained (silt, clay)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BRECCIA</strong> - large, angular fragments, with fine matrix</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CONGLOMERATE</strong> - large, rounded fragments, with fine matrix</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>QUARTZ SANDSTONE</strong> - mostly quartz sand; looks sandy; may shed loose grains of sand</td>
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<td></td>
</tr>
<tr>
<td><strong>ARGILDE</strong> - assorted sizes, w/ visible feldspar; often reddish</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GRAYWACKE</strong> - assorted sizes, w/ mica and rock fragments; dark gray or greenish-gray</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SHALE</strong> - composed of clays, which lead to fine layers; dull luster; soft</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SILTSTONE</strong> - composed of fine particles of quartz and feldspar; massive; gritty feel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MINERAL MUSEUM UPDATE**

From Mike Conway, AZGS (Copy of email Re: Update on MMNRE Museum Status at the Univ. of Arizona (24 June 2017))

Good day all:

We have big news to report regarding the status of the MMNRE (Mining, Mineral and Natural Resources Education) Museum. UA’s higher administration is transferring the museum from the College of Science, where AZGS staff managed it for the past year, to UA’s Research, Discovery & Innovation, effective July 2017.

The Research, Discovery and Innovation team manages three museums on the UA campus: Arizona State Museum, University of Arizona Museum of Art, and the University of Arizona Center for Creative Photography. Kimberly Espy, Senior Vice President for Research, and R. Brooks Jeffery, Associate Vice President of Research, will take the lead on MMNRE moving forward.

Professor Jeffery is the likely candidate to do the initial staffing and planning of the museum. His extensive experience in museum management, landscape architecture, and heritage conservation makes him particularly well-suited for a leadership role moving the museum from the conceptual stage to reality.

This past Friday, AZGS Director Phil Peartree spoke with VP Kimberly Espy regarding the museum transfer. He was encouraged by Dr. Espy’s interest in keeping AZGS staff involved. We hope to play a role assisting Professor Jeffery in the early planning.

Mineral Museum continued on page 9……

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| Minerals in Our Everyday Lives - Light Bulb | 12 |
Board Meeting Minutes — June 6, 2017

The meeting was called to order by President Ed Winbourne at 5:00 P.M. Those present were Sue and Stan Celestian, Ed Winbourne, Bob Salter, Cynthia Buckner and Victoria Peterson (late arrival).

Education Committee: There was no report from Bill Smardo.

Social Media: Facebook and Meet-Up were discussed.

Financial: Cynthia reported on the following:
An inventory needs to be completed on items in storage. The U-Haul rental price is increasing to $69.95 per month.

The Wire Wrapping Class was discussed. Because the class day and time interferes with the Club Executive Board meeting, it was decided to ask Jennifer to choose another day and time for the class. The class will accept donations to cover the cost of the room and supplies. This donated amount will be paid to Jennifer. Ed to discuss this with Jennifer.

Membership Meeting: Ed discussed the upcoming meeting, stating this meeting will not have a speaker. A collection of mineral and rock specimen will be available for viewing and purchase. At the meeting any suggestions on Club operation will be gratefully accepted. This meeting will afford the opportunity of members getting to know one another. This meeting will be the last meeting before summer hiatus. Membership Meetings will resume September 5 at 6:30 p.m.

There being no further business, the meeting adjourned at 6:20 p.m.

Respectfully submitted,
Victoria Peterson, Secretary

General Meeting Minutes — June 6, 2017

The meeting was called to order at 6:35 p.m., by President Ed Winbourne. Ed stated there would be no speaker this evening and that this would be a social meeting.

The Club presently has $24,000 in our checking account.

The Wire Wrapping class facilitated by Jennifer Gecho and Robin Shannon has been continuing for two years very successfully. This success is attributed to all the work by Jennifer and Robin, thanks!!

The annual scholarship to a Boulder Creek High School student was presented earlier in the month at a special scholarship presentation night at the School to Jacqueline Shay in the amount of $1,000. Ed, Cynthia, Nancy and Victoria were present.

Ed also stated this year’s Gem and Mineral Show was the most successful to date. Bill Smardo and Bob Salter facilitated the STEM night at the school. Great job you two!

The Club needs to systematize our social media including the website, Facebook and Meet-up,

The Club needs more volunteers to serve on the Field Trip Committee. Ed commented that the Club should conduct more over-night field trips. In October the Albuquerque Club holds their annual show and this might be a possible time to schedule an over-night trip to New Mexico to coincide with the Show.

Stan Celestian gave a power point presentation on collecting of hour glass crystals in the Great Salt Plains, Oklahoma. Stan provided samples of the crystals for those present which was a treat for everyone. Thanks Stan!!

A raffle of chalcedony from Lake Pleasant, obsidian samples, necklaces, magnifiers, etc. were donated by Tammy, Dave, and Howard. Winners were Robin, Ed, Arabella, Bob E., Nancy and Ann. Thanks to all who provide raffle items!

Ed reminded those present that this is the last meeting for the summer as the Club is on hiatus until the September 5 meeting.

There being no further business, the meeting adjourned at 7:40 p.m.

Respectfully submitted,
Victoria Peterson
FIELD TRIP TO LYNX CREEK

It was a hot day (although much cooler than at home!). The air was redolent with the vanilla-y scent of Ponderosa Pine pitch. There was water in the creek. Gold fever was in the air. Some gold even made it into the pans! All photos by Susan Celestian

Trip leader, Stan Celestian, helps look for gold in a pan of Deeanne Gosse and George Campbell.

Bob Evans digs into the tails of previous commercial mining.

HAPPY PANNERS

Au

Bob Salter

Cheryl Mauler

Claudia Marek

Vanessa Campos

Golden or Yellow Columbine (Aquilegia chrysantha)

Juniperus deppeana (alligator or checker-bark juniper)
Gold conjures up a mist about a man, more destructive of all his old senses and lulling to his feelings than the fumes of charcoal"

*Quote from “Nicholas Nickleby”, by Charles Dickens*

*It is Gold Fever!!*
Coarse-grained continued from page 1

**FIGURE 2  Talus Slope near Omak, Washington**
Large, angular blocks of basalt have tumbled a short distance down a steep slope, forming a cone of debris.  
*Photo by Susan Celestian*

**FIGURE 3  Hope Landslide, British Columbia**
This landslide occurred at 7am on January 9, 1965. An estimated 47 cubic meters of mud and huge, angular rocks quickly roared down the mountainside and up the other side of the valley. This photo was taken from the debris pile left across the valley from the failed slope — and 180 feet above the original land surface!  
*Photo by Susan Celestian*

**FIGURE 4  Alluvial Fan in Death Valley**
Large fan-shaped piles of rock debris are common in arid environments. Braided streams snake across the porous material, quickly losing their momentum, and depositing their load, which ranges from angular to rounded, small to very large.  
*Photo by Stan Celestian*

**FIGURE 5  Glacial Terminal Moraines**
When stationary glacial ice melts, a pile of angular, unsorted debris builds up at the ice front. Since the rock has been trapped in ice, there has been no opportunity for rounding by abrasion, and ice is capable of transporting extremely large blocks of rock. Both photos were taken in Teton National Park: 'A' is on Mt. Moran, 'B' is off Teton Glacier.  
*Photos by Susan Celestian*

Coarse-grained continued on page 6...
CONGLOMERATE is similar to breccia, except it is composed of predominately large rounded to sub-angular, randomly-oriented fragments (> 2 mm), within a matrix of fine-grained particles (sand to clay) or cement (such as calcite or quartz). These characteristics indicate that the rock has undergone transportation, but has been deposited fairly close to its source, and in a
Coarse-grained continued from page 6

A high-energy environment (one with strong currents or waves) is necessary to move the large rock particles. Conglomerates can exhibit better sorting than breccias. Often size range is not as broad as that in breccias, and sometimes the large fragments are in roughly the same size range.

**Conglomerate Environments of Deposition:**

Sedimentary environments in which conglomerate is deposited include alluvial fans (fanglomerates), debris flows, some glacial water-laid deposits, nearshore shallow marine (such as beaches), streams, and sometimes deep marine turbidites (underwater landslide deposits). See Figures 11-14 for ‘future conglomerates’. See Figures 15-17 for conglomerate rocks.

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**FIGURE 11** Gravel of the Yellowstone River, Billings, Montana

This is a photo of the coarse, rounded gravels forming the bed of the Yellowstone River. Note that there is some orientation of the cobbles, resulting from moving water. Inset: The Garter Snake (*Thamnophis elegans vagrans*) is included for scale 😊, Photos by Susan & Stan Celestian

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**FIGURE 12** Milky Creek Draining Emmons Glacier, Mt. Rainier National Park

Despite having been locked in ice for the trip down the mountain, once released and transported by meltwater, the cobbles quickly begin to round. Photo by Stan Celestian

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**FIGURE 13** Beach Cobbles on Lake Ontario, Oswego, New York

Strong storm waves pounding the shore has effected rounding and imbrications of these cobbles. Photos by Stan Celestian

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Coarse-grained continued on page 8...
Coarse-grained continued from page 7

**FIGURE 14 Alluvial Fan/Stream Deposits in Titus Canyon, Death Valley National Park** Deposited fairly rapidly by flash floods, and carried not far from their source, these large, poorly-sorted sediments exhibit sub-rounding to good rounding. Note that the sediments show some stratification (layering) and size segregation (sorting), due to the influence of moving water and gravity.  
*Photo by Stan Celestian*

**FIGURE 15 Conglomerate** This conglomerate is predominately composed of quartz pebbles, which indicates that there has been quite a bit of transportation, to remove unstable minerals. Yet the rock is not well sorted, with a fairly range of grain sizes (clay/sand to pebbles up to 1.25” long). This is probably a stream deposit.  
*Photo by Stan Celestian*

**FIGURE 16 Conglomerate** This is a stream cobble, composed of stream cobbles — a great example of a rock taking a second trip through the rock cycle. The largest cobble is about 3” across. Note how the clay/sand, that binds the larger fragments, wears away faster than do the cobbles, and thus eventually the cobbles will be released to proceed on their own.  
*Photo by Stan Celestian*

**FIGURE 17 Pudding Stone** This rock is similar to that in Figure 18, however it has undergone slight metamorphism, making it denser. The pebbles are very rounded, and there is a distance contrast between the pebbles and the finer material. Note that the size range of the pebbles is narrower than that in Figure 15. Seemingly the environment of deposition was energetic enough to selectively transport large particles.  
*Photo by Stan Celestian*

Coarse-grained continued on page 9...
Coarse-grained continued from page 8

Figure 18  Pumice Conglomerate  This is a very unusual rock. Bits of pumice were transported by a stream and deposited in an area remote from the volcano of origin — to near Wupatki National Monument. Calcite binds the pebbles together.

Photo by Stan Celestian

Mineral Museum continued from page 1

stages and in content development that support’s the museum’s mission to provide an informative and educational environment showcasing the nature, scope, and future of Arizona’s natural resources.

Catie Carter, MMNRE Museum Curator, will remain with MMNRE and she’ll transfer from AZGS to Research, Discovery & Innovation. Catie’s transfer assures continuity of institutional memory and a deep knowledge of the mineral and mining artifact assets of MMNRE. As you know, Catie is well-known to the museum community in the Phoenix-area, which should aid Professor Jeffery in communicating UA’s vision for the museum.

We are going to hand off the task of regular communications to Professor Jeffery and Catie and they will keep you advised as things progress.

Please feel free to reach out with questions or concerns. Thanks for your help and encouragement over the past year.

Mike

Michael Conway | Chief, Geologic Extension Service
Arizona Geological Survey
1955 E 6th St.
PO Box 210184
Tucson, AZ 85721
Ph 520.621.2352 | Ph C 520.971.3688
fmconway@email.arizona.edu

FIGURE 18  Pumice Conglomerate

This is a very unusual rock. Bits of pumice were transported by a stream and deposited in an area remote from the volcano of origin — to near Wupatki National Monument. Calcite binds the pebbles together.

Photo by Stan Celestian

Lynx Creek continued from page 4

This is a microscopic view of Stan’s haul from the Lynx Creek field trip. The black circle is about 1/2 inch. Photo by Stan Celestian

PLEASE SAVE YOUR EMPTY EGG CARTONS!!!
THEY ARE NEEDED FOR THE KIDS GIVE-AWAY AT THE CLUB SHOW.
BRING TO ANY MEETING.
DAN ALLRED WILL BE MISSED

On Saturday, July 8, Daisy Mountain Rock and Mineral Club member, Dan Allred, died. All are welcome to attend his Celebration of Life, that will be held 11 a.m., Monday, July 17, at Best Funeral Service, 501 E. Dunlap, Phoenix, AZ. The club is sending flowers.

Dan was a relatively new member, joining in 2016, but he became involved with gusto. He volunteered to head up security at last year’s show, and enthusiastically participated in the club meetings and field trips, often bringing his father. They also participated in the wire-wrapping class. Dan made rock-containing candles that he donated to the club raffle.

Thank you to the club for so kindly sending the beautiful flowers to the funeral of my mother. It was a very sad time for me, and I really appreciate all your prayers and thoughts.

Susan Celestian

UPCOMING FIELD TRIPS

WHEN: TBD  Maybe next year
WHERE: Royal Peacock Opal Mine, Denio, NV
WHAT: Opal, Black Opal, Opalized fossils
MEET:  TBD
OTHER: Fee: $190/person; Go to the mine website for more information about the site http://royalpeacock.com/fee-digging

WHEN: October 14 & 15
WHERE: Gem-o-rama, Trona, CA
WHAT: Pink Halite, Hanksite, Sulfohalite, Tincalconite after Borax, others
MEET:  TBD
LEADER: Stan Celestian
OTHER: There is a dry campground of sorts in Trona ($8/night), or motels in Ridgecrest, 24 miles away.

Other field trips are being considered and information will be posted in the monthly newsletter and described at meetings, or via email. And if you have somewhere to which you would like to see a field trip scheduled, let your Field Trip Committee know.

DATES SUBJECT TO CHANGE

Stan Celestian has created a page in Flickr where he is posting photos from club field trips. Currently, the Planet Mine trip is the only album there, but he will be adding more soon.

If you have some photos that could be added to the albums, send them to stancelestian@gmail.com.

The site can be found at https://www.flickr.com/photos/149654042@N02/albums/with/72157682683515735

Thank you to the club for so kindly sending the beautiful flowers to the funeral of my mother. It was a very sad time for me, and I really appreciate all your prayers and thoughts.

Susan Celestian
UPCOMING AZ MINERAL SHOWS

Monthly - Tempe, AZ

Gallery TCR, 906 S Priest, #107; Sat 9-6; Free. For dates, go to:
https://www.facebook.com/pg/gallerytcr/events/?ref=page_internal

August 4-6 - Prescott Valley, AZ
Prescott Gem and Mineral Club; Prescott Valley Event Center, 1301 Main;
Fri-Sat 9-5, Sun 9-4; Admission: $5/adult, $4/seniors, children under 12 free.

August 26-27 - Flagstaff, AZ
Karmic Beads and Gems;
Flagstaff Elks Lodge #499, 2101 N San Francisco St.; Sat. 9-5 Sun 10-4; Admission: $3/adult; $2/senior; children free.

October 6-8 - Buckeye, AZ
Helzarock’ Gem & Mineral Show, Helzapoppin’ Arena, 802 N 1st St (Miller Rd); Fri-Sat 9-4, Sun 9-2; Admission: $3/adult; children under 12 free.

October 14-15 - Buckeye, AZ
Huachuca Mineral and Gem Club; Cochise College, 901 Colombo Av; Sat 9-5, Sun 10-4; Admission: Free.

October 21-22 - Sedona, AZ
Sedona Gem and Mineral Club; Sedona Red Rock High School, Hwy 89A & Red Rock Loop Rd; Sat 10-5, Sun 10-4; Admission: $3; children under 12 free.

November 3-5 - Black Canyon City, AZ
High Desert Helpers Rock-a-Rama Gem and Mineral Show; High Desert Park, 19001 E Jacie Ln; Fri 9-4, Sat 9-5, Sun 9-4; Admission: free.

November 18-19 - Payson, AZ
Payson Rimstones Rock Club, Inc.; Payson H.S./Longhorn Gym, west of Longhorn Rd., east of McLane; Sat 9-5, Sun 10-4; Admission: $2, children 12 and under free.

November 25-26 - Wickenburg, AZ
Wickenburg Gem and Mineral Club; Wrangler Event Center, 251 S. Tegner St.; Sat 9-5, Sun 10-4; Admission: free.

If you are travelling, a good source 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/shows.php?current=1
A good source for a list of Arizona Mineral Clubs and contact information is
http://whitemountain-azrockclub.org/Public_AZ_Clubs_Links.html

NOTE FROM THE EDITORS

Have a geological interest? Been somewhere interesting? Have pictures from a club trip? Collected some great material? Send us pictures -- or write a short story (pictures would be great). We encourage topic suggestions also.

Deadline for the newsletter is the 22nd of the month.

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

Facebook

Visit the club website periodically. See what is happening, and boost our visibility on the web. Go to: The Daisy Mountain Rock and Mineral Club. It is set up so you can post photos of outings or related items.

This is a new site. Join The Daisy Mountain..., and Unjoin Daisy Mountain Rock and Mineral Club. To Unjoin, go to The Daisy Mountain Rock and Mineral Club, click on Groups (in bar at page top). Both the new and old sites should come up with option to Join and Unjoin.

Officers and Chairpersons

President: Ed Winbourne.....ewinbourne@gmail.com
Vice President: Stan Celestian
Secretary: Victoria Peterson
Treasurer: Cynthia Buckner
Publicity:
Membership: Victoria Peterson
g.victoriapeterson@yahoo.com
Editors: Susan & Stan Celestian.................................azrocklady@gmail.com
Field Trip: Stan Celestian
Show Chair: Ed Winbourne

Meetings are held the 1st Tuesday of the month at the
Anthem Civic Building, 3701 W Anthem Way, Anthem, AZ 85086. Business meeting at 6:30 pm. We do not meet in July or August.

The purpose of Daisy Mountain Rock & Mineral Club is to promote and further an interest in geology, mineralogy, and lapidary arts, through education, field experiences, public service, and friendship.

Membership Dues: $20.00 Adults per Person
$25.00 Family

Meeting Dates for 2017
Jan 3, Feb 7, Mar 7, Apr 4, May 2, June 6, Sept 5, Oct 3, Nov 7, Dec 5
WHAT IS IN ....
AN INCANDESCENT LIGHT BULB?

Glass: Silica, Lime, Boron
ORE MATERIALS:
Quartz; Limestone; Trona,

Inert Gas: Argon &
Nitrogen

Contact & Stem Wires:
Copper, Nickel, Iron
ORE MINERALS:
Malachite, Azurite,
Chalcopyrite, etc;
Pentlandite, Pyrrhotite;
Garnierite: Hematite,
Magnetite

Brass Screw Base: Copper
& Zinc
ORE MINERALS:
Malachite, Azurite,
Chalcopyrite, etc;
Sphalerite

Base Contact: Lead
ORE MINERAL: Galena

Filament: Tungsten -
coil of 72" of wire
ORE MINERALS:
"Worframite" & Scheelite

Support Wire: Molybdenum
ORE MINERAL: Molybdenite

Insulation in base:
Cellulose

Fuse:
Nickel, Manganese, Copper
ORE MINERALS: Pentlandite;
Pyrolusite, Mangnite, Rhodochrosite;
Malachite, Azurite, Chalcopyrite