



Wickenburg Gem & Mineral Society, Inc.

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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.

Sedimentary Structures: Crossbedding

By Susan Celestian

One of the diagnostic characteristics of sedimentary rocks is they are deposited in a sequence of essentially horizontal layers, getting younger from the bottom of the stack toward the top (unless they have been overturned during some tectonic event). The exception to this horizontality is *crossbeds*. **Crossbeds** are beds that lie at some angle to that of the main bedding planes. See Figure 1.

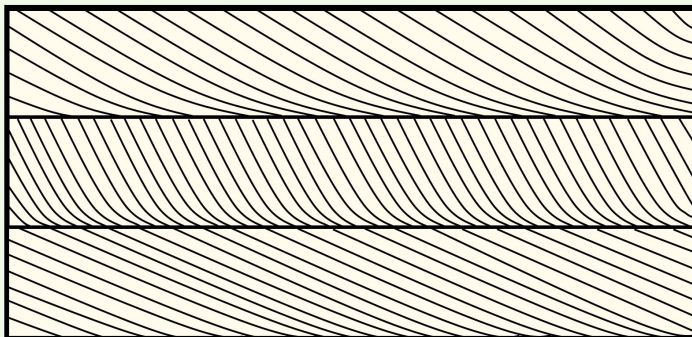


FIGURE 1 Crossbeds Within the main bedding planes, there are smaller beds that are inclined from the horizontal. *illustration by Susan Celestian*

Wind and water both transport sediment, in the direction of a moving current. Should an obstacle disrupt the flow, and slow the current, sediment is deposited. The initial obstacle may be a pebble (or larger clast), a plant, or other object. Once enough sediment is deposited, the "pile of sediment" -- and that is usually sand -- will become the obstacle. As the transporting medium moves across the irregularity, sand is deposited on the down-current (lee) side, ripple marks, sand bars, tidal channels, deltas, and sand dunes form and migrate in the direction of the current. And as sand falls down the lee side of the landform, crossbeds are created. See Figure 2.

Crossbeds continued on page 3.....

FEBRUARY FIELD FORAYS

FEBRUARY 3, 2018 - Vulture Mine & Reserve Bank Mine

Photos by George S



WGMS member, Joyce R., is a tour guide at the Vulture Mine. Here she is dressed in her western finery, welcoming our group to the mine.

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Meeting Minutes — February 2, 2018

The meeting was called to order by Craig Jones 7:00. The pledge of allegiance was recited. Alyson read minutes from last meeting (Accepted by Joyce -seconded by Bill). Debbie read the Treasurer's Report (Accepted by Joyce-seconded by Irma).

Jim and Alice talked about recent trips. The fluorite trip had about 33 people. Some places are badly picked over. The Fourth of July Peak had about 9 people looking for drusy and agate. The Dragon Mine for jasper had 7 vehicles and 6 ATV's. Tomorrow is the Vulture Mine. Meet at 9:30. Afterwards we will go back to Gary and Joyce's home. Joyce asks that each person collects no more than one 5 gallon bucket.

New Business

Send Sue pictures from trips for newsletter.

Having a printed schedule of future trips is a good idea.

Old Business

Helicopter Air Advantage is \$35 per year. There are discounts for larger groups and more years. They do not operate in Utah and Colorado. For group discount, everyone must turn in forms at the same time. It's best to have 2 companies to ensure complete coverage. Medicare covers around \$2000 - one trip can cost thousands. There has been conflicting info received by different people. Karen got some brochures from the hospital. Best to check online. Phone for Air Advantage is 855-877-2518.

It was voted to continue the Pot Luck Dinner before meetings.

Monday, Feb 12, will be Dale's Scavenger Hunt. Meet in the Park adjacent to the Library at 9:00AM to get the Hunt List. Teams are to be up to 4 people each (at least one a club member). Hunt begins at 9:30AM sharp. The finish cut off is 4:00PM. Judging begins at the park at 4:00. Each team will receive a list of rocks and minerals to find and bring back to our judges. You must field collect all specimens. Go to any mineralized area (like an abandoned mine, dump or wash). Possibly review a book such as *Rocks and Minerals* by Chris

Pellant. You choose where to go. No pre-collecting or hiding specimens. No collecting from Al and Irma's yard. There will be 3 prize buckets. First bucket for teams that didn't find everything; second for teams that found everything, and the third for teams who finish the list, and bring additional specimens. A random drawing will determine the winner from each bucket. Afterwards, everyone will go to La Canasta for dinner and discussion of day.

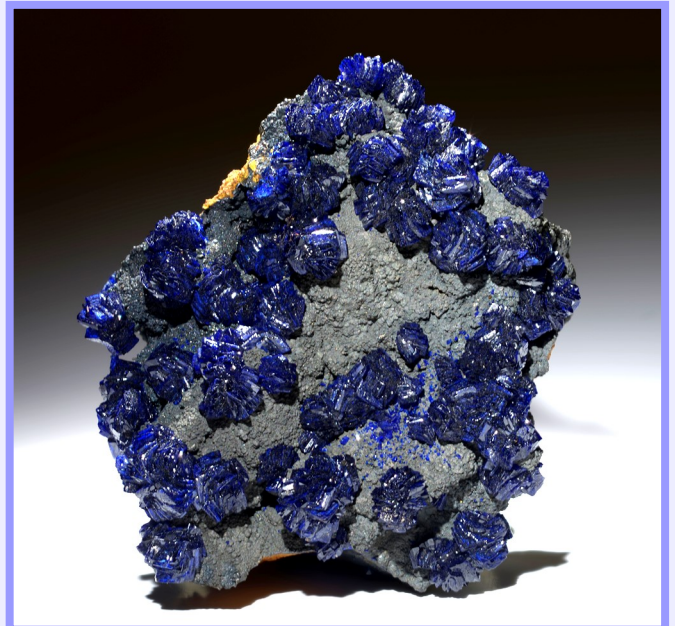
Stan gave a presentation on the Celestian Mineral Collection. They have over 2500 specimens.

Show and Tell was Al, Alice, and Terry. Terry won the drawing.

Door Prizes were won by Jim, Alice, Eric, and Tom.

Meeting was adjourned at 8:30.

Respected Submitted,
Alyson A.



**AZURITE ROSETTES ON MATRIX
MORENCI MINE, PINAL COUNTY, ARIZONA**

Self collected by Stan Celestian.
Photo by Stan Celestian

...Crossbeds continued from page 1

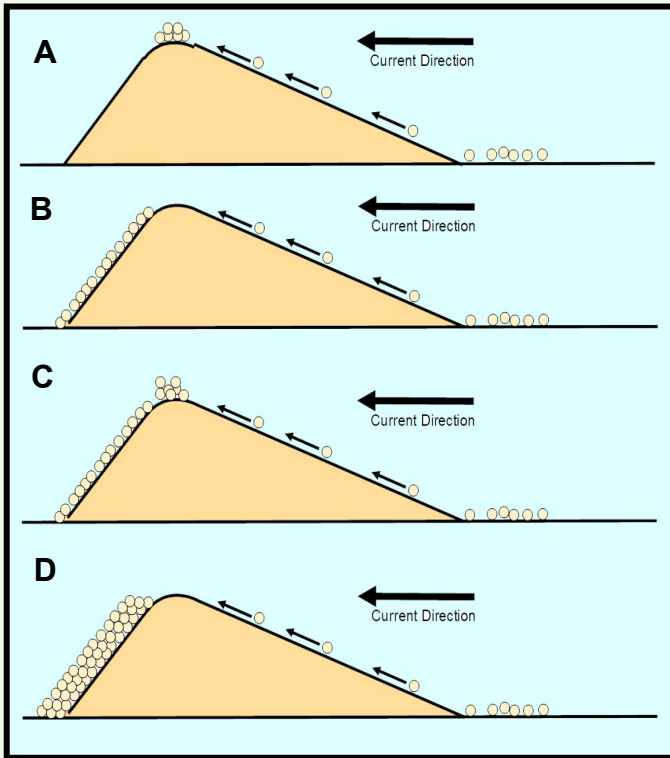


FIGURE 2 The Formation of Crossbeds In A, sand is being transported up the up-current (stoss) slope of the structure, and piles up at the crest, where the current is reduced. When that *angle of repose*¹ at the crest is overcome by the force of gravity, the sand slides down the down-current (lee) slope, creating a thin non-horizontal bed, as depicted in B. This process continues (C), until many many thin non-horizontal beds form as crossbeds (D).

This process also results in the down-current migration of the ripple, sand bar, sand dune, or delta.

Illustration by Susan Celestian

¹ *Angle of Repose is the steepest angle at which loose sediment is stable, on a sloping surface.*

Environmental significance of crossbedding: At the most basic level, the presence of crossbedding indicates the presence of a paleo-current. The geometry of crossbeds indicate the direction in which wind or water currents were flowing, at the time the associated rock was deposited. In addition, the size and curvature of crossbeds (associated with the characteristics of the sediment involved), indicates whether a

crossbedded rock formed in a stream, tidal flat, or dune. For example:

- ◆ Crossbeds within an angular, to sub-rounded “dirty”, possibly coarse sandstone was deposited in a stream.
- ◆ Crossbeds within a sandstone composed of rounded, frosted, well-sorted quartz grains, was deposited in a sand dune.
- ◆ In tidal areas, where the current direction reverses during flow and ebb tides, crossbeds form with opposing lee slopes, creating what is called herringbone crossbedding. See Figure 3.



FIGURE 3 Herringbone Crossbeds Where the current reverses frequently, such as in tidal area, zig zag crossbeds, called herringbone crossbeds, form.

Illustration by Susan Celestian

For examples of crossbedding in rocks, see Figures 4-7.



FIGURE 4 These crossbeds in the Coconino Sandstone, in a roadcut along Rte 89, through Oak Creek Canyon, depict the presence of sand dunes in Arizona during the Permian, 260 mya.

Photo by Stan Celestian

Crossbeds continued on page 4...

...Crossbeds continued from page 3



FIGURE 5 Zion National Park All three of these photos show the large-scale crossbeds within the Navajo Sandstone. These formed in fossil dunes in an enormous sand sea that covered much of Arizona, nearly all of Utah, Colorado, Wyoming, and into New Mexico -- a sea that resembled parts of the modern Sahara Desert, and probably the largest sand desert in Earth's geologic history. It was during the Early Jurassic, and the Colorado Plateau lay about 10° north of the equator. *Photo by Stan Celestian*

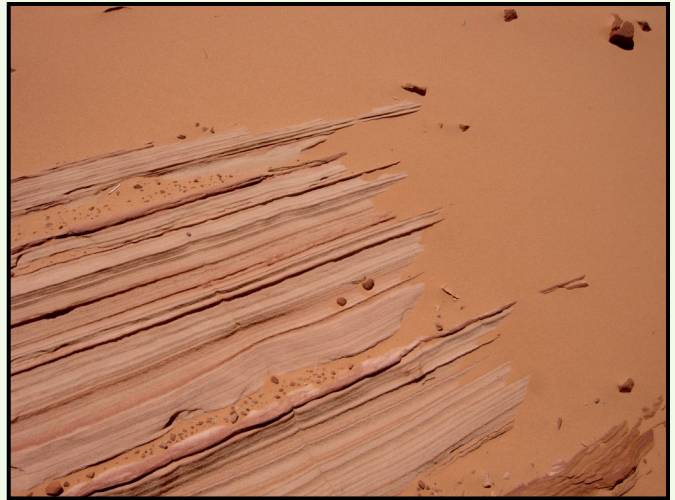


FIGURE 6 Coral Pink Sand Dunes, Utah Here is an exposed section of currently active sand dunes. The sand has not consolidated to the point of being rock, but enough cohesion exists to display the crossbedding one would expect on the lee face of migrating dunes. *Photo by Stan Celestian*



FIGURE 7 Crossbeds in Ripple Marks Remember this one from last month's newsletter? This exposed vertical cross-section of sediments near Port Townsend, WA exhibits the small crossbeds formed by ripple marks. The coin-for-scale is a quarter. *Photo used with permission of Dan McShane (<https://washingtonlandscape.blogspot.com/search?q=port+to+wnsend>)*

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Engine built by Fairbanks Morse Company. The company began in 1830, building balance scales. It branched out into washing machines, power mowers, water heaters & conditioners, storage batteries, and air conditioners. In 1893, their gasoline engine was the first to be successfully marketed in the U.S. Their products expanded with technology, and the company remains innovative today.



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Jewelry crafted by Joyce R, from wire she draws out of copper she smelts out of ore mined at the Reserve Bank Mine

FEBRUARY 12, 2018 - Scavenger Hunt

Photos by Susan Celestian

On a cold and rainy February morning, some WGMS members gathered at the Wickenburg Library, and enjoyed a repast of fancy donuts. Then with lists in hand, groups headed into the wilderness to gather the specified rocks, and all the different minerals they could spot. Returning chilled and shivering, everyone's finds were verified, awards were distributed, and then all retired to La Canasta for Mexican food and chat.



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FEBRUARY 21, 2018 - Robson Mining World

Photos by Craig J, Robbie C-B, Debra M



An arrastra -- ore is crushed, as horses or mules pull the heavy around and around...



5-stamp mill to crush ore -- weighted pistons pound the ore -- up and down, up and down...



"Going to Heaven/Hell in a handbasket" -- a wicker casket

...Forays continued from page 5

Robson World continued



UPCOMING WGMS FIELD TRIPS

WHEN: Wednesday, February 21, 2018

WHERE: Robson Mine World

WHAT: Old gold mine, mining equipment

WHEN: Wednesday, February 28, 2018

WHERE: Bullard Mine

WHAT: Chrysocolla

WHEN: Wednesday, March 7, 2018

WHERE: Signal City

WHAT: Banded agate, jasper, petrified wood

WHEN: Wednesday, March 14, 2018

WHERE: Mushroom Rhyolite site

WHAT: Mushroom rhyolite, desert roses

WHEN: Wednesday, March 21, 2018 (late afternoon to after dark)

WHERE: Scott Mine

WHAT: Fluorescent outing & potluck (burgers and dogs provided by club)

WHEN: Wednesday, April 4, 2018

WHERE: Bagdad

WHAT: Jasper, Agate

WHEN: TBA

WHERE: Copper Basin/Skull Valley?

WHAT: Copper Minerals, gold

DATES & PLACES 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 Schneiders or Craig J. 208-523-9355 or 208-681-4770. This is your club. Let's go out and have some fun.

Samples of Polished Mushroom Rhyolite from the site of the upcoming field trip, March 13, 2018.

Lots of interesting patterns!

Refer to Gneiss Times, February 2015 for article on mushroom rhyolite.



UPCOMING AZ MINERAL SHOWS

March 10 - Coolidge, AZ Pinal Gem and Mineral Club; Artisan Village of Coolidge, 351 N Arizona Blvd.; Sat 10-4; Admission: free.

March 24-25 - Anthem, AZ Daisy Mountain Rock and Mineral Club; Boulder Creek High School Gym, 40404 N Gavilan Peak Pkwy; Sat 9-5, Sun 10-4; Admission: \$3 adults, \$2 seniors and children, children 12 and under free.

April 28 - Cornville, AZ Verde River Rockhounds; Windmill Park, Cornville Rd; Sat 9-5; Admission: free.

May 5-6 - Kingman, AZ Mohave County Gemstoners; Kingman Academy of Learning (H.S. Gym), 3420 N Burbank; Sat 9-5, Sun 9-4; Admission: free.

June 1-3 - Flagstaff, AZ Coconino Lapidary Club; Silver Saddle Outdoor Market, 9001 US 89 N (US 89N & Silver Saddle Rd); Fri-Sat 9-5, Sun 9-4; Admission: free.

July 7-8 - Pinetop, AZ White Mt. Gem and Mineral Club; Hon-Dah Casino & Resort, 777 Highway 260; Sat 9-6, Sun 9-4; Admission: \$2.

August 3-5 - Prescott Valley, AZ Prescott Gem and Mineral Club; Prescott Valley Event Center, 1301 Main St.; Fri-Sat 9-5, Sun 9-4; Admission: Adults \$5, Seniors/Students \$4, children under 12 free with paid adult.

October 13-14 - Sierra Vista, AZ Huachuca Mineral and Gem Club; Cochise College, 901 N Colombo Av; Sat 9-5, Sun 10-4; Admission: Free.



If you are travelling, a good source of 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/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

Plan a trip to the Trail of Time, in Grand Canyon National Park. The whole trail is 2.83 miles long, but the segment between Yavapai Point and Bright Angel Lodge is a bit shorter - and you can have lunch in the historic dining room at the lodge. The dishware is fabulous!

The portals (to the right) depict the geology of the canyon, and along the trail there are 50 samples of the rocks with explanations.



Officers and Chairperson

President: Craig Jones..... 208-523-9355
Vice President: Mel Canter 502-641-3118
Secretary: Alyson Arnold 517-652-1355
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 J, Alice & Jim S.
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 2018

Wickenburg: Jan 12, Feb 2, Mar 9, Apr 13, May 11, Sept 14, Oct 12, Nov 9, Dec 7

Stanton meets Thursday after the Wickenburg meetings. Jan 18, Feb 8, Mar 15, Apr 19, May 17, Sept 20, Oct 18, Nov 15, Dec 13 (subject to change)

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

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

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.

! would love to have some pictures from field trips! Snap a couple and send them to me.

Deadline for the newsletter is the 27th of the month.

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