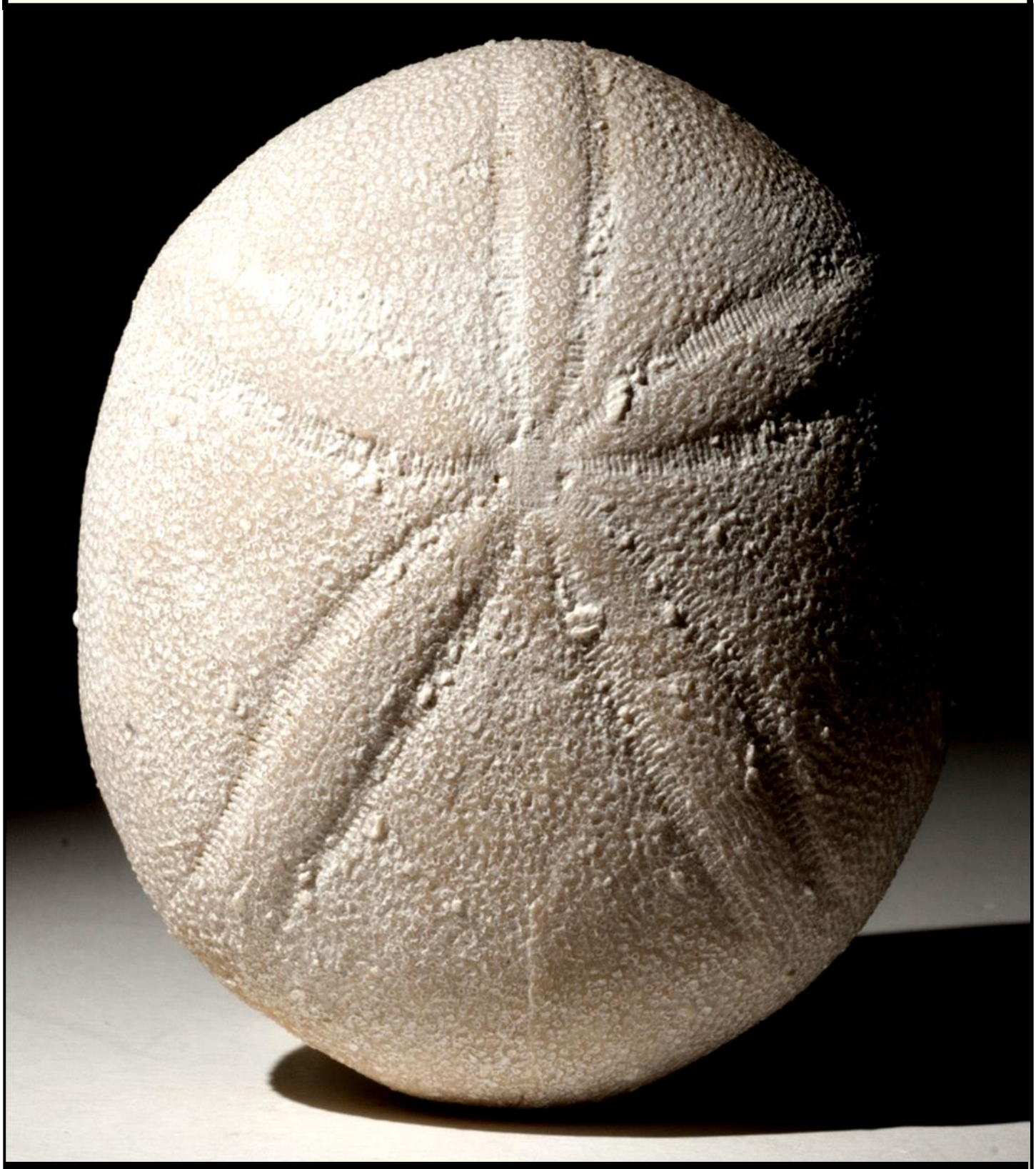
DAISY MOUNTAIN ROCKCHIPS

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.

VOLUME 6, ISSUE 5 **MAY 2021**



Echinolampas burdigalensis from Couqueques/Medoc, France (2.2” long)

Photo by Stan Celestian

FOSSILS: PART XVII

Kingdom: Animalia
Phylum: Echinodermata,
Sub-Phylum - Echinoidea

By Susan Celestian

Class Echinoidea include pencil urchins, sea urchins, heart urchins, sea biscuits, and sand dollars. Echinoid characteristics are as follows:

- The geologic record begins in the Ordovician (450 mya), with the class rising in dominance during the Mesozoic, after other classes (such as crinoids) declined. True sea urchins did not appear in the fossil record until the Triassic (252-201 mya), heart urchins in the Cretaceous (145- 66 mya) and sand dollars the Paleocene 66-56 mya).
- The shell (or *test*) is composed of tightly packed, interlocking plates of calcium carbonate. See Figure 1. The test is covered in short to long spines -- with those of the heart urchins, sea biscuits and sand dollars being very short, and hair-like to felt-like.

FIGURE 1 SEA URCHINS This assortment of sea urchins from Western Australia illustrate the radial symmetry, globose form, interlocking plates, and spiny-ness of regular echinoids.

Photo by Stan Celestian

Each of the bumps (seen in Figure 1) on the plates is a spot to which a spine was attached during life. These quickly fall off upon death of the individual. (You can see some still clinging to several of the urchins in Figure 1 - enlarge the view to see more clearly). There is wide variation in the length, color, and shape of the spines -- something largely missing from the fossil record -- particularly among the sea urchins and club urchins, who spend their lives roaming atop the sea floor. See Figures 2a-f.

Echinoids continued on page 9...

VANADINITE

By Susan Celestian

Chemical Formula - $Pb_5(VO_4)_3Cl$
Crystal System - *Hexagonal (3 horizontal axes of equal length, at 120° to each other, and a 4th at 90° to them). Go to https://www.minerals.net/mineral/vanadinite.aspx for interactive vanadinite crystal graphics.*
Growth Forms/Habits - *Usually Crystalline: tabular, acicular, stubby, with flat terminations most common, pyramidal terminations more uncommon.*
Hardness - *2.5-3*
Luster - *Sub-adamantine, resinous*
Streak - *White-pale yellow*
Colors - *Red, orange, orange-red, red-brown, brown, pale yellow, colorless*
Diaphaneity - *Translucent to opaque*
Specific Gravity - *6.7-7.2*
Cleavage - *None*
Fracture - *Irregular, uneven, conchoidal*
Occurrence - *Alteration mineral in the oxidized zone of lead deposits found in arid climates.*
Uses - *Source of Vanadium, sometimes Lead*
Other - *Often display hopper crystal growth.*

A.M. del Rio (a professor at Mexico's Royal School of Mines and Mining) discovered vanadinite in 1801, and dubbed it "brown lead". He recognized that it contained an as yet unknown element. It was not until 1830 that Nils Gabriel Sefström isolated this new element, and named it vanadium,

Vanadinite continued on page 16

ZOOM MEETING
June 1, 2021

BE SURE TO ATTEND

Our speaker will be Mary Lou Redinger, an archaeologist credited with discovering lost sources of Maya jade, in Guatemala, where she has lived for 47 years. She operates JadeMaya in Guatemala and the Museum of Jade and works to protect ancient Maya wisdom through the non- profit: The Maya Conservancy.

There will be a Show & Tell segment, so be prepared to share with the group, any new or old rock finds. Let's stay involved!

INSIDE THIS ISSUE

Each item is now hyperlinked to the page on which it is found

MAY SPEAKER
LESLIE HALE
Collection Manager of Rocks & Ores
Department of Mineral Sciences
Smithsonian National Museum of Natural History

Leslie Hale gave a very interesting overview of the Rocks and Ores Collection at the Smithsonian, in Washington, D.C. The whole collection is stored at 3 separate sites in D.C. and Virginia. The National Rocks and Ores Collection is divided into 13 subcollections -- localities, volcanological reference, ore, seafloor rock, ultramafic xenolith, E. Dale Johnson, petrographic reference, lithologic reference, petrologic features, building stones, fulgurites, impactites, and drill cores -- and within those there are sub-categories. The catalog database is at least partially accessible online, however there are few photos (go to collections.nmnh.si.edu/search/ms/ to browse).

Ms. Hale, who has worked at the Smithsonian for 31 years, obviously loves her job! *All photos courtesy of the Smithsonian, available under the Creative Commons CCO 1.0 license.*

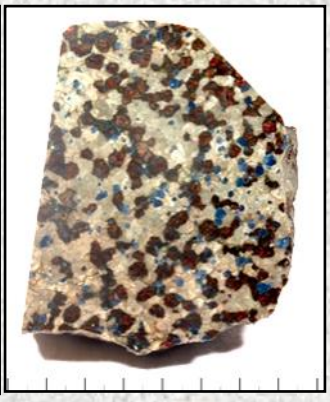
NMNH 116689-1 Basalt Pillow, Juan de Fuca Ridge. If you go to here, you can see pillow basalt forming off the coast of Hawaii.

NMNH 108543 Orbicular Granite, New Zealand. By Julie Hoskin

NMNH 76079 Banded Iron, Minnesota.

NMNH 116492 71 Manganese Nodule, Pacific Ocean.

NMNH 87375 Kyanite & Garnet Eclogite. Roberts Victor Mine (now Rovic Diamond Mine), near Boshof, Orange Free State, South Africa.



NMNH 116653 Breadcrust Bomb, Mt. St. Helens.

NMNH 53072 Orbicular Diorite, Corsica, France.

NMNH 116536 2 Geyserite or Siliceous Sinter, Yellowstone National Park

NMNH 38124 Folded Gneiss, New York.

Zoom Board Meeting Minutes
May 3, 2021

- Attendance: Bill F., Bob E., Cynthia B., Deanne G., Don R., Ed W., Nancy G., Rebecca S., Stan C., Sue C., and Tiffany P.
- Bill F. called the meeting to order
- April meeting minutes approved
- Next board meeting will be May 31
  - Board okay with meeting on Memorial Day
- Cynthia B. discussed the financials
  - New membership doing well
    - ◊ Online form is helping
  - Mine fees coming in
  - Refunds from cancelled show still need processing
- Tiffany P. talked about membership
  - The new online form has brought another 25 members to the club
    - ◊ 1 was even a 13 year old
  - New badges are in
    - ◊ Another order is on the way
  - We have 54 Instagram followers
  - We have 422 followers on Facebook
- No news on the claim
  - Still processing dig paperwork
- Jennifer G. will not have a wire wrapping class this month
  - Email her if you would like a class
  - jennifer@eliteshuttersandblinds.com
- Bill F. talked about the field trips
  - Date Creek had over 30 ppl show up!
  - Mix of midweek trips, weekend trips, several day trips, and tours
  - Check the newsletter, website, and emails for latest news on field trips
  - You can upload your own photos from club field trips on Facebook or Instagram if you would like
  - The Prescott Show is scheduled for August
    - ◊ Popular and large like the Tucson and Quartzsite shows
  - Always try and wear your nametag on field trips so we can get to know everyone
- Ed W. discussed our next show
  - Contacted Deer Valley schools
    - ◊ No response yet
  - Still looking for a new location
    - ◊ Park with tents might be a good possibility
- The board welcomes Nancy Gallagher as a member. She has won awards for our website and thank her for all her hard work on the Facebook, Instagram, and website.

Respectfully submitted, Rebecca Slosarik, secretary

Zoom General Meeting Minutes
May 4, 2021

- Open attendance – 32 zoom participants
- Bill F. called the meeting to order
- Leslie Hale did an amazing presentation from the Smithsonian
  - The Rock and Ore Collection in Washington D.C.
  - Was originally going to be a live tour of the building, but Covid has closed the building for now
- Cynthia B. talked about the financials
  - Lapidary fees coming in
    - ◊ You can use our machines at North Mountain Visitor's Center
      - Will need lessons before use
      - We have saws, grinders, and tumblers available
- Stan C. discussed the club's claim
  - Mineralogical society went out to claim
    - ◊ 1st outside club allowed at our claim
      - They were very happy with the trip
  - The weather might be too hot for anymore trips to the claim until fall
- Bill F. talked about upcoming field trips
  - No more Phoenix area trips until fall
  - Check emails, website, Meetup, and newsletter for latest trips
- Tiffany P. discussed membership
  - New form launched in mid-April
  - 179 current club members
    - ◊ 25% growth during pandemic
      - This is much better than other clubs in the area
- Ed W. talked about our next club show
  - Looking for March 2022 show location
    - ◊ Will talk with new principle at high school
    - ◊ Asked the outlet malls one more time
  - We have about 10 months before next show
    - ◊ Any location suggestions are welcomed
- Wire wrapping classes were discussed
  - Jennifer G. can upload videos to YouTube if anyone would like
- Show & Tell
  - Do not forget to bring your favorite rocks/gems/minerals/fossils that you have rockhounded to show off to the group
  - Next meeting will be June 1st through Zoom again

Respectfully submitted, Rebecca Slosarik, secretary

FIELD TRIP TO LYNX CREEK

Wednesday, May 5, 2021

Text by Bill Freese, Photos by Susan Celestian & Bill Freese

Thirteen club members made the trip to Lynx Creek, near Prescott, to pan for gold. It is an area that has been commercially mined twice, and has been set aside by the National Forest Service for recreational gold panning There is still a lot of gold to be had. Some attendees spoke with Don, who was panning in the same area, and he had many nuggets and flakes that he had taken out of Lynx Creek. Most people (if not all) found at least a bit of color.

Stan provided a pre-dispersal orientation and panning tutorial.

Bob wears his "gold" shirt -- but I think it saw him coming :-)

Theresa's blue thing is called a "banjo" -- sort of a mini pan/sluice.

Stan's haul -- should've brought a bigger bucket.

Field Trip continued on page 6...

Field Trip continued on page 7….

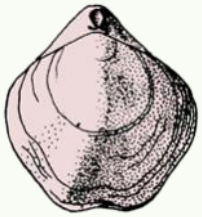
FIELD TRIP TO PAYSON

Saturday, May 15, 2021

Text by Bill Freese, Photos by Bill Freese & Susan/Stan Celestian

We had a total of 11 folks including me and we met up in Payson then headed to the Paleo site. We hunted for fossil sea creatures and when everyone got their fill we headed down the road to the Zebra Jasper/Chert site. Of course, everyone got some cool stripey stuff there. The weather was great and don't think it went above 80 degrees where we were. Some of us ended our trip by driving up to the Rim Road overlooks (only 68 degrees up there) to have a lunch or snack and enjoy the view before heading home.

Henri shared a display of fossils he has collected at the Paleo Site



That bulge in the rock is an inarticulate brachiopod encrusted by bryozoa

Always "eyes on the ground"!

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...Field Trips continued from page 6

Hydrate

Field Trips continued on page 8….

Field Trip continued from page 7….

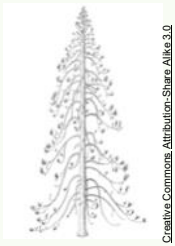
FIELD TRIP TO DOBELL RANCH

Wednesday, May 26, 2021

Text and Photos by Bill Freese

What a great day everyone had at DoBell Ranch in Holbrooke, AZ. We had a total of 22 people including Bill (from 5 different clubs) met up in Holbrooke and headed down to Rhonda DoBell's place for some Petrified Wood. Almost everyone was a first-timer, and everyone had fun and collected some awesome specimens. The weather was great in the 70's with a breeze. It was the ladies of the DoBell family that did all the work today (the boys were off doing other things). Rhonda (yellow Tweety shirt) had her daughter Edna and her 3 daughters, all helped people find perfect specimens. Then they had lunch of hot dogs and hamburgers and other stuff waiting for us as we finished collecting. It was good!

By T-rex wiki:, licensed Creative Commons Attribution-Share Alike 3.0 Unported license.



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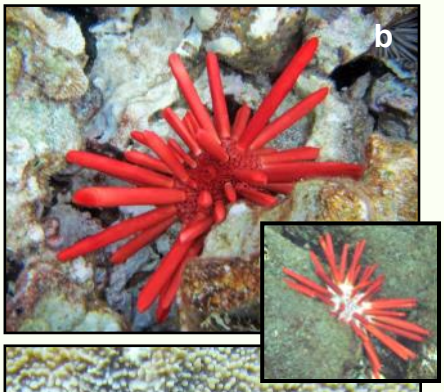
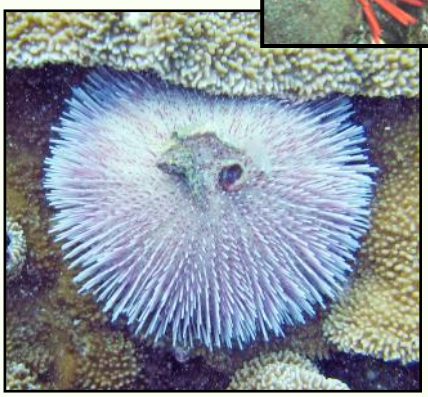
….Echinoids. continued from page 2

FIGURE 2 SPINES OF MODERN URCHINS *Photos by Stan Celestian*

a Purple Sea Urchin (*Strongylocentrotus purpuratus*) at Cabrillo Beach, Los Angeles, CA.

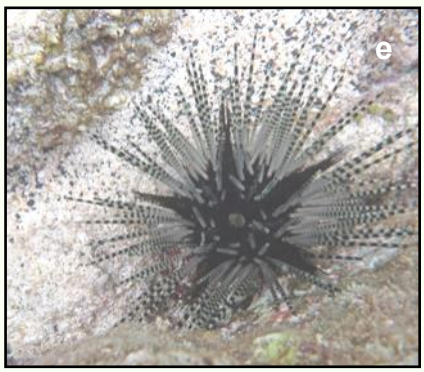


b Red Slate Pencil Urchin (*Heterocentrotus mamillatus*) from Kapoho Tidepools, Hawaii, Hawaii.

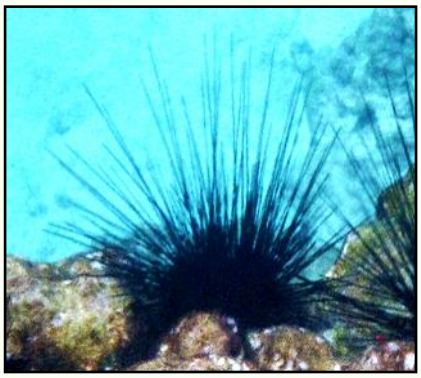


c Sea Urchin (might be albino Collector Urchin) at Kapoho Tide Pools, Hawaii, Hawaii.

d Rough-Spined Urchin (*Chondrocidaris gigantea*) Kapoho Tidepools, Hawaii, Hawaii.



e Banded Urchin (Echinothrix calamaris) at Kapoho Tidepools, Hawaii, Hawaii. This genus has 2 kinds of spines, and those dark bundled ones are poisonous, but not dangerous.



f Blue-Black Sea Urchin (*Echinothrix diadema*) at Kapoho Tidepools, Hawaii, Hawaii.

► Besides spines, echinoids have very slender tube feet, used or walking, grabbing food, or extracting oxygen. See Figure 3.

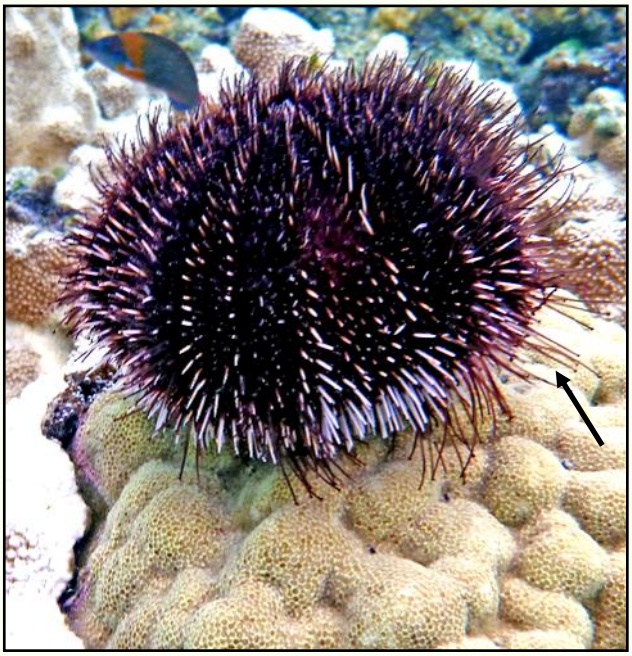


FIGURE 3 SEA URCHIN TUBE FEET The arrow points to the very slender tube feet of the Collector Sea Urchin (*Tripneustes gratilla*) at Kapoho Tidepools, Hawaii, Hawaii.
Photo by Stan Celestian

► "Regular" echinoids -- this includes the club urchins and sea urchins. They are globular and radially symmetrical (no front or back), the mouth is on the underside, and the anus is on the top (illustrated in Figure 7). They have club or needle-like spines for defense and use as walking stilts. Additionally, they have sturdy, powerful, multi-part feeding mechanism, called "Aristotle's Lantern". See Figures 4 -6.

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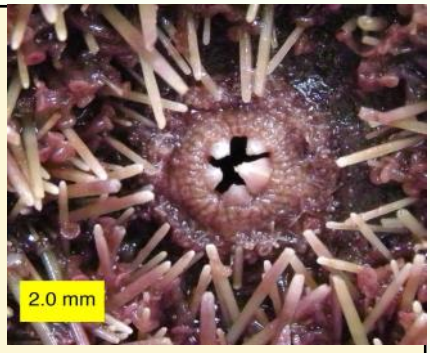

FIGURE 4a This is a view of the mouth on the underside of a sea urchin (*Strongylocentrotus purpuratus*). The beak-like portions of "Aristotle's Lantern" are beginning to open. Photo by Wilson44691 is used with permission under CC0 1.0

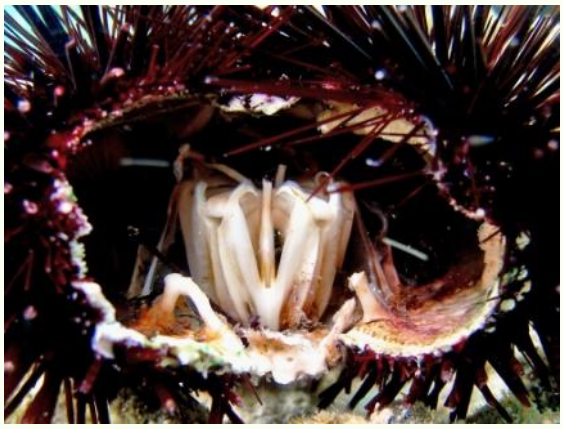

FIGURE 4b In this image, the test of a sea urchin has been chipped away to reveal the mouth parts -- Aristotle's Lantern. *Photo by Phillippe Bourjon, used with permission under license CC BY-SA 4.0*

FIGURE 4c "Aristotle's Lantern" -- the mouth parts of a sea urchin. *Photo by MAKY.OREL is used with permission under CC0 1.0*

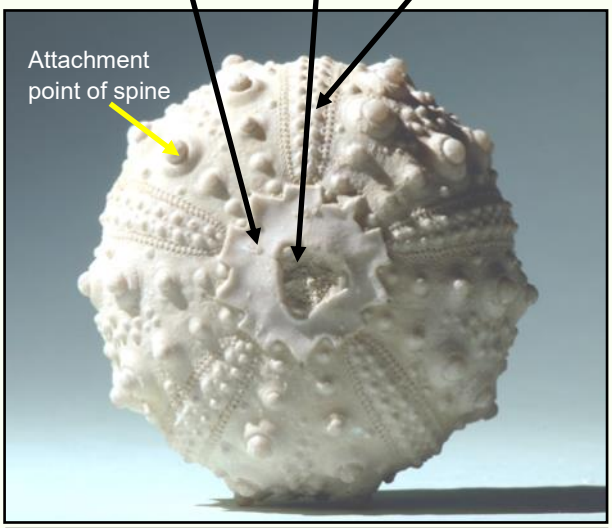

FIGURE 5 ANATOMY OF A REGULAR ECHINOID This is the top view of a fossil sea urchin -- *Hemicidaris* sp., Novion Pordein, France. *Photo by Stan Celestian*

- "Irregular" echinoids -- This includes the heart urchins, sea biscuits, and sand dollars. Their overall shape is ovate to flattened, and so they are more bilaterally symmetrical. Their spines are much reduced in size, and used to help in burrowing, in gathering food, and in generating currents within the burrow. The mouth is in usually toward the front, and the anus toward the back (or both on under surface).

  Most do not have "Aristotle's Lantern", as they aren't "chewing" as vigorously as do the wandering sea urchins and club urchins; however sand dollars and sea biscuits do have modified jaw-like structures. See Figure 6. Heart urchins have cilia surrounding their mouths instead.

  The ambulacra (that 5-petaled star or flower pattern) is more distinctly flower-like, so is called a *petaloid ambulacra* (See Figure 7).

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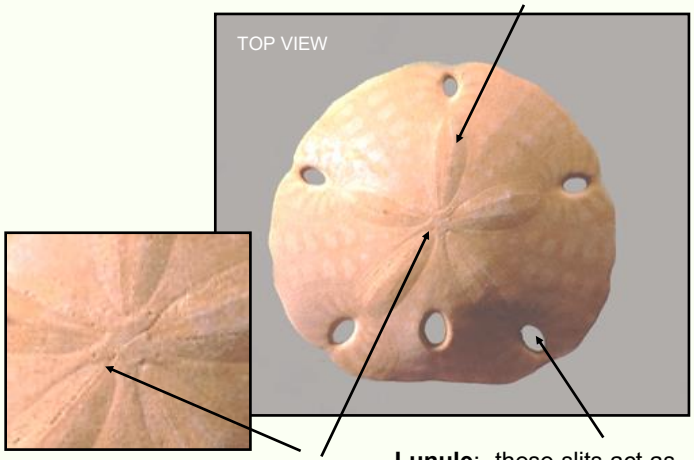
FIGURE 6 SAND DOLLAR MOUTH PARTS Here, I have exposed the mouth parts of a modern sand dollar. There are 5 dove-like "teeth" arranged radially around the mouth. A sand dollar may chew for 15 minutes before swallowing (https://www.montereybayaquarium.org/animals/animals-a-to-z/sand-dollar) .

Photo by Stan Celestian



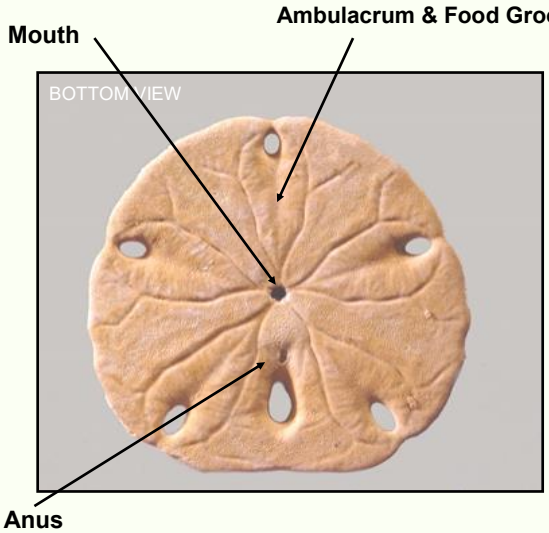


FIGURE 7 ANATOMY OF A IRREGULAR ECHINOID This is a Pliocene sand dollar (*Encope borealis*) from El Golfo de Santa Clara, Baja California, Mexico. *Photo by Stan Celestian*

Echinoid habitat:

- Echinoids are exclusively marine.
- Echinoids occupy nearly every marine environment, including tropical & polar, shallow to deep (known to over 4 miles down); however, as the photic zone hosts the most organic matter, they are most abundant in shallow (less than 100 feet), warm water areas.

Echinoid habit:

- Feeding habits:
  - regular echinoderms - roam about on the surface searching for food (mostly algae or other plant matter, plus sea cucumbers, molluscs, sponges, worms, brittle stars).
  - Irregular echinoids - They are filter feeders, and burrow through the sediment, ingesting sediment, and extracting nutrients. Spines and cilia (hairs) move food to the mouth. Food consists of plankton, copepods, algae, diatoms, and detritus. See Figure 8.

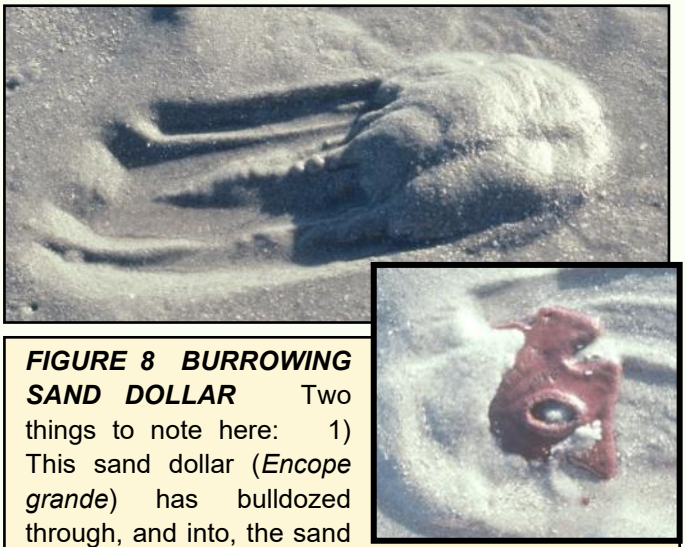


FIGURE 8 BURROWING SAND DOLLAR Two things to note here: 1) This sand dollar (*Encope grande*) has bulldozed through, and into, the sand of Cholla Bay, at Puerto Peñasco, Mexico. 2) The maroon color is from the fine, short spines covering the test. Short spines facilitate burrowing. Go here for a video of a sand dollar. *Photos by Stan Celestian*

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- Regular echinoderms do tend to cram themselves into cracks and crevices, and some drill out pits into rock -- even granite and basalt! -- into which they can hunker for protection from waves. See Figures 9-10.

FIGURE 8 URCHIN IN HIDING Despite the armor of thick club-like spines, this club urchin has been able to cram itself into a fairly tight spot. A good place to get away from predatory fish! *Photo by Stan Celestian*

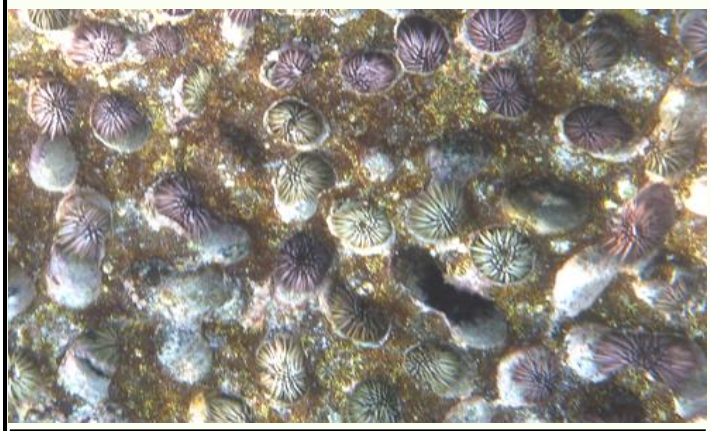

FIGURE 9 URCHINS DRILL FOR PROTECTION Unbelievable as it may be, using only their calcium carbonate 'teeth' and spines, sea urchins are able to drill out pits into rock. Of course, it is easier and faster in soft rock, like mudstone; however, these urchins at Two Step Beach, Hawaii, Hawaii, have excavated pits into basalt -- a pretty hard rock. They flatten out their spines, and hold on with their tube feet, and waves roll over them, without dislodging them.

- Mobility: All echinoids are quite mobile. Using spines and tube feet, they can travel distance, and dig into the substrate.
- Reproduction: There are separate sexes. Males and females release their gametes (sperm and eggs) into the water, where chance takes over, in the fertilization of eggs.
- Respiration:
  - The *madreporite* (pore centrally located on the top of the test) connects the internal circulatory system to the seawater. Internally, echinoids then can absorb oxygen into its organs.
  - Tube feet can also function as gills. In fact, sand dollar tube feet extend up from the upper surface, and function ONLY as gills.
  - Spines can act as gills.
  - Sea urchins generally have 5 gills that surround their mouths.

Interesting facts:

- A little known fact is that many sea urchins are poisonous (although not aggressive). The spines may be hollow and very sharp -- venom-filled needles, that may break off in the flesh of who (or whatever) is poked.

  In addition, sea urchins (and sea stars) have structures, called *pedicellariae*. Huddling among the spines, these are claw-like structures on a flexible stalk. Many are used to clean the test of algae, parasites, and other debris, but some may inflict a very painful, venomous bite.
- In New Zealand, sand dollars are also called sea cookies or snapper biscuits; and in South Africa, pansy shells.
- A sand dollar can survive for 6-10 years in the wild. (https://www.softschools.com/facts/animals/sand_dollars_facts/1945/)
- In rough water, a young sand dollar may ingest heavy grains of sand to weigh itself down (https://www.montereybayaquarium.org/animals/animals-a-to-z/sand-dollar)

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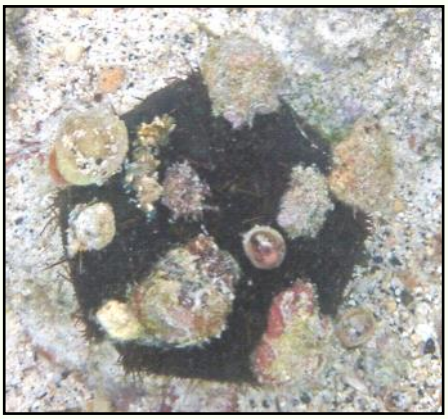
- Collector Sea Urchins (*Tripneustes gratilla),* camouflage themselves by grabbing a hold of sponge & coral fragments, shells, algae, and rocks. (See Figure 11)



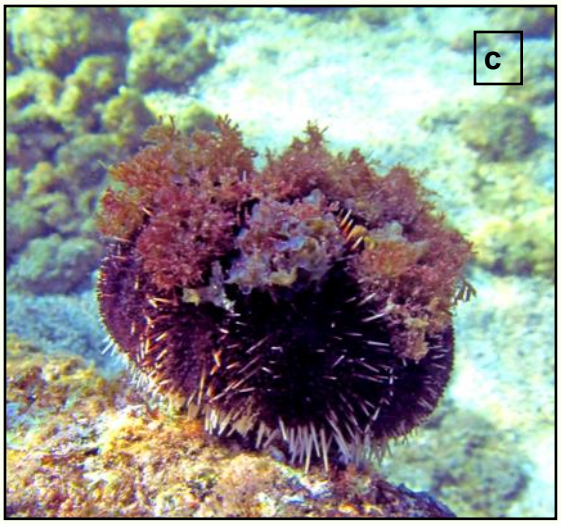


FIGURE 11 DECORATOR SEA URCHIN The Decorator Sea Urchin has evolved a unique form of camouflage. The algae in © is probably growing. *Photos by Stan Celestian*

Images of fossil echinoids follow in Figures 12-21.

FIGURE 12 PENCIL or CLUB URCHIN This pencil urchin was probably not fossilized with the spines attached. The spines were found nearby, and attached by the preparer. *Asterocidaris mendrina* from Boulemane, Mid Atlas, Morocco. *Photo by Stan Celestian*

FIGURE 13 CLUB URCHIN Another club urchin from Morocco. *Gymnocidaris kochlina* from Boulemane, Mid Atlas, Morocco. *Photo by Stan Celestian*

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FIGURE 14 HEART URCHIN Heart urchins are somewhat heart-shaped irregular echinoids. They also are bilaterally (rather than radially) symmetrical. This one seems to have had a rather unique spine arrangement. Note that the mouth is at the top of the left-hand image (the underside view), and the anus is toward the other end of the underside. It is *Lovenia woodsii* from Late Miocene Black Rock Formation in Beaumoris, Victoria, Australia. *Photo by Stan Celestian*

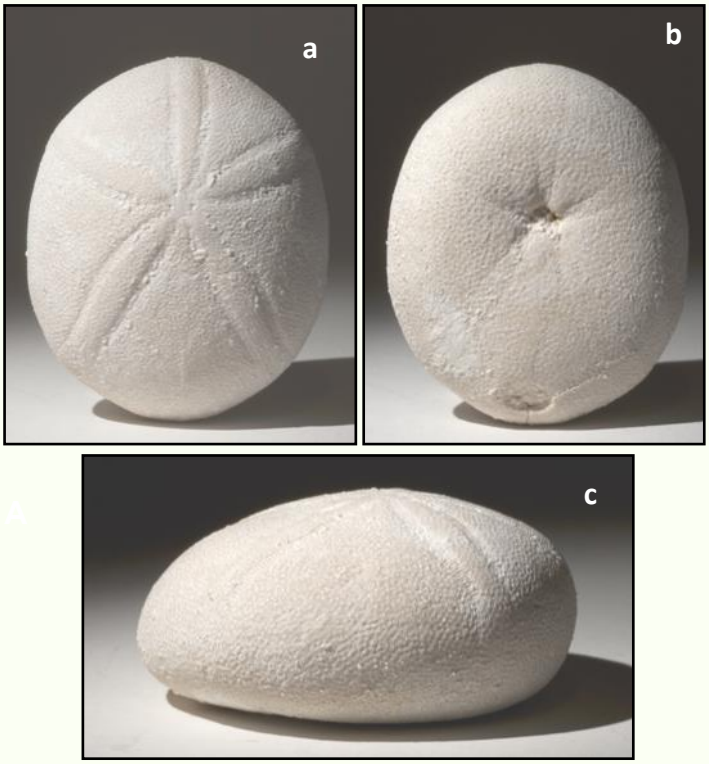


FIGURE 15 SEA BISCUIT This is the specimen on the cover photo. Note the ovate, globose form with the mouth and anus on the underside. *Echinolampas burdigalensis (Eocene?)*, Couqueques/Medoc, France. 2.2 " long. *Photos by Stan Celestian*

FIGURE 16 SEA BISCUIT This robust sea biscuit is 5.5" long. It's high profile boasts a prominent petaloid ambulacra. Note the mouth located centrally on the underside, and anus offset toward one end. *Clypeaster* sp. (Miocene), Miozán, Austria. *Photos by Stan Celestian*

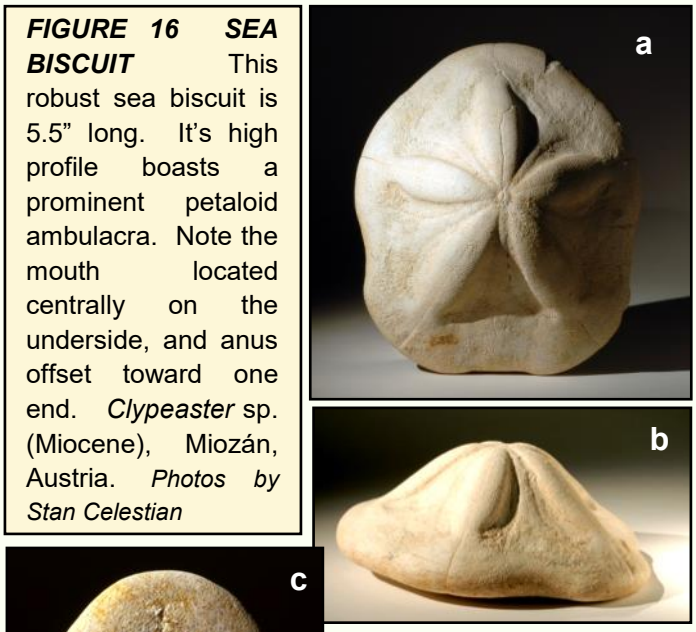
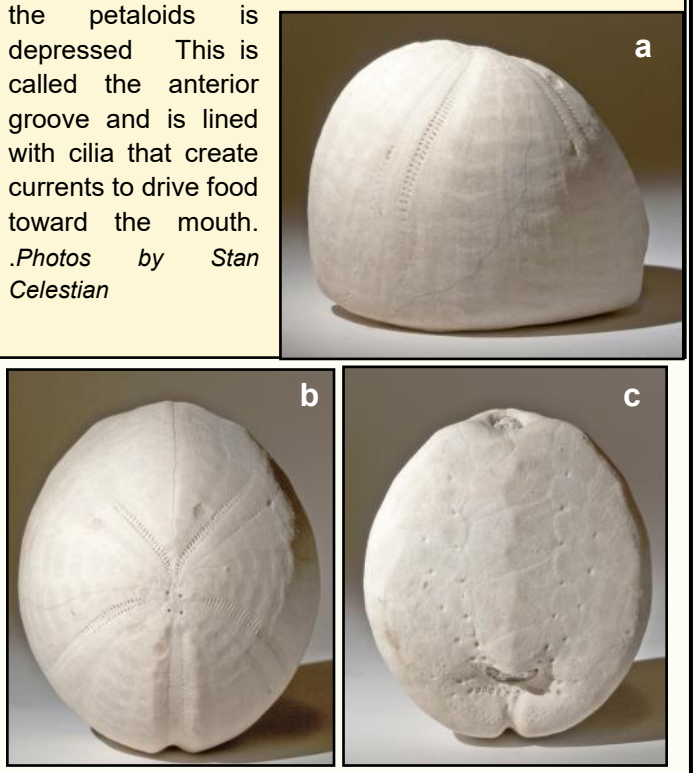


FIGURE 17 SEA BISCUIT This very high-profile sea biscuit is *Hemipneutes radiates* from Maastricht, Holland. It is 3.3" tall. Note in image (b) that one of the petaloids is depressed This is called the anterior groove and is lined with cilia that create currents to drive food toward the mouth. *.Photos by Stan Celestian*



Echinoids continued on page 15….

....Echinoids. continued from page 14

FIGURE 18 HEART URCHIN This fossil urchin from New Jersey has very deeply-set petaloids.

Photos by Stan Celestian

FIGURE 19 SEA URCHIN SPINES In this image, there are spines from two species of sea urchins, out of the Permian Kaibab Formation in Gila County, Arizona. *Photo by Stan Celestian*

FIGURE 20 SAND DOLLAR This small sand dollar has a unique form. It is the Western Africa Sand Dollar (*Heliophora orbicularis*) from Pliocene of Morocco. It is the only species in this genus, and is about 1.5" across. *Photo by Stan Celestian*

FIGURE 21 SAND DOLLAR This is *Clypeus plotti*, a sand dollar (at least that is what I'm calling it) from Stow in the Wold Parish, Gloucestershire, England. It comes out of the Middle Jurassic Clypeus Grits, in The Inferior Oolite. It is about 5" across.

Photo by Stan Celestian

GENERAL RESOURCES FOR ECHINOIDS

https://ucmp.berkeley.edu/echinodermata/echinoidea.html

https://samnoblemuseum.ou.edu/common-fossils-of-oklahoma/invertebrate-fossils/echinoids/

http://www.discoveringfossils.co.uk/echinoids.htm#:~:text=Echinoids%20fall%20into%20two%20categories,move%20in%20a%20particular%20direction.

https://en.wikipedia.org/wiki/Sea_urchin

https://www.newscientist.com/article/2161771-sea-urchins-can-drill-holes-in-solid-rock-with-just-their-teeth/#:~:text=Russell%20says%20the%20sea%20urchins,sculpting%20it%20in%20the%20process.

https://www.montereybayaquarium.org/animals/animals-a-to-z/sand-dollar

https://en.wikipedia.org/wiki/Sand_dollar

https://www.nhm.ac.uk/our-science/data/echinoid-directory/morphology/dollars/lunules.html#:~:text=One%20of%20the%20most%20striking,These%20perforations%20are%20termed%20lunules.&text=Hydrodynamic%20tests%20have%20shown%20that,with%20higher%20water%20flow%20rates.

https://en.wikipedia.org/wiki/Spatangoida

...Vanadinite continued from page 2

after Vanadis, Norse goddess of beauty and fertility.

Vanadinite is named for its chemistry -- it contains vanadium -- and uncommonly occurs in arid climates. As stated previously, vanadinite is a secondary mineral, forming from the alteration of lead minerals, such as galena. It is often associated with barite and/or calcite (among other minerals). It forms in series with both pyromorphite and mimetite. See Figure A.

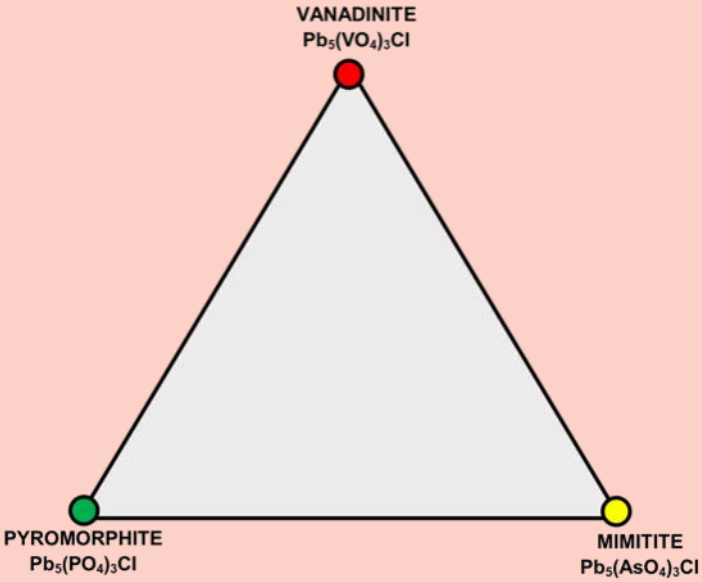


FIGURE A RELATIONSHIP DIAGRAM FOR VANADINITE, MIMETITE & PYROMORPHITE This diagram illustrates the general solid solution series between vanadinite, mimetite, and pyromorphite. As vanadium (V), phosphorous (P) and arsenic (As) substitute for each other, the compositions slide along the axes of the triangle. *Graphic by Susan Celestian*

Today the most notable occurrences of the mineral are in Morocco; however our own state of Arizona, hosts numerous iconic mines that produce vanadinite. If you go to mindat you will find a list of Arizona mines, by county. Other sites include Argentina, Namibia, and Australia.

Images of vanadinite follow in Figures B-R.

FIGURE B VANADINITE This specimen of vanadinite exhibits the classic red color, and hexagonal prismatic crystals. Locality: Boulmadeen Mine, Mibladen, Morocco. Specimen is 1.13" wide. *Photo by Stan Celestian*

FIGURE C VANADINITE Another specimen of vanadinite from the Boulmadeen Mine, Mibladen, Morocco. Specimen is 0.8" tall. *Photo by Stan Celestian*

FIGURE D VANADINITE on BARITE This lovely specimen is red vanadinite on white bladed barite. Locality: Mibladen, Morocco. *Photo by Stan Celestian, and by permission of the Natural History Museum of Los Angeles County, Gem & Mineral Hall Collection.*

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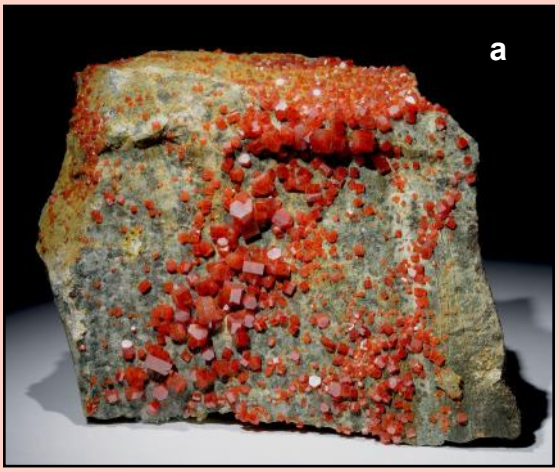
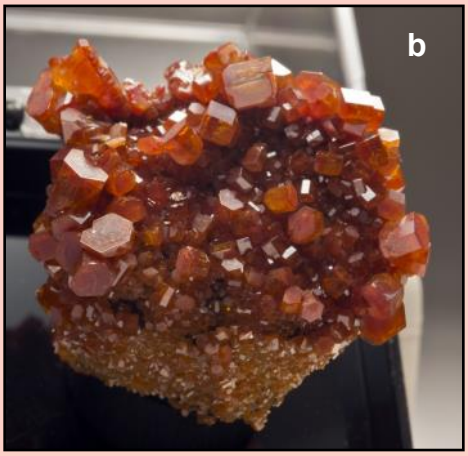
...Vanadinite continued from page 16

FIGURE E VANADINITE A bit more unusual than the classic red, this brown vanadinite is from the ACF Mine, Mibladen, Morocco. Specimen is 1.9" wide. *Photo by Stan Celestian*

FIGURE F VANADINITE This specimen, from the Apache Mine (Gila County), illustrates how vanadinite occurs along water courses. The rock is brecciated along faults, and these porous pathways allowed mineralized hydrothermal water to penetrate. Vanadinite was deposited in the spaces between fragments, and on the surfaces of the fragments. *Photo by Stan Celestian*





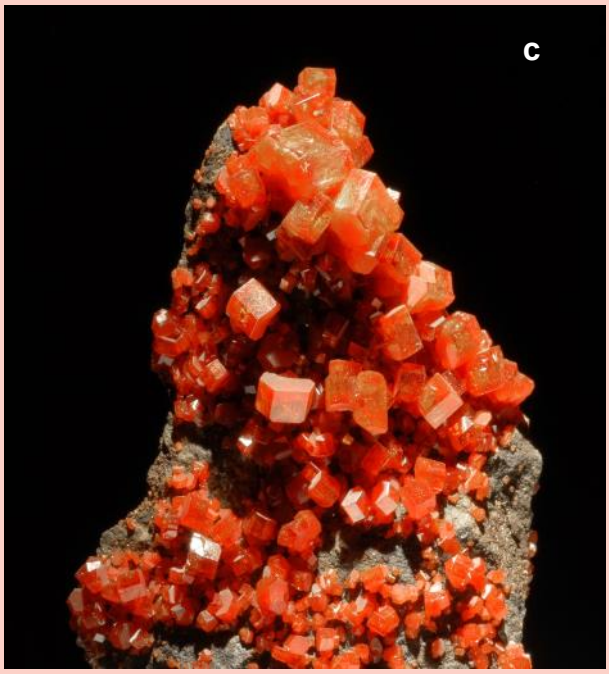


FIGURE G VANADINITE While there are many vanadinite localities in Arizona, the most iconic is that from the Apache Mine, in Gila County. *Photo by Stan Celestian*

Vanadinite continued on page 18….

...Vanadinite continued from page 17

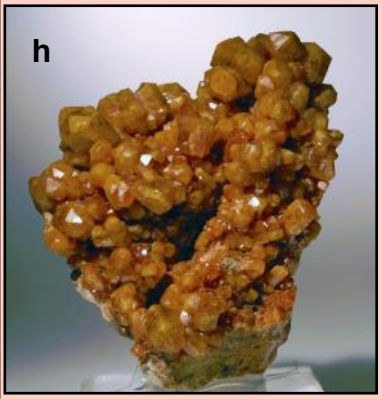
FIGURE H VANADINITE Vanadinite from the Western Union Mine, Mohave Co., Arizona exhibits a more acicular grown habit than those in previous figures. It is so distinctive, that it virtually identifies the mine.

Photo by Stan Celestian

FIGURE I VANADINITE This "rocket-shaped" crystal cluster is also from the Western Union Mine (Mohave County). Instead of the more normal flat terminations, these crystals have pyramidal terminations -- reminiscent of quartz crystals. *Photo by Stan Celestian*

FIGURE J VANADINITE Vanadinite from the Puzzler Mine, in the Castle Dome Mountains, Yuma Co., AZ, is a distinctive brownish green. *Photo by Stan Celestian*

FIGURE K VANADINITE These 2 specimens come from the Rowley Mine, Maricopa Co., AZ. It is a mine best known for its clear, bright orange wulfenite and orange balls of mimetite. Images f & g are both pseudomorphs -- vanadinite after wulfenite Interesting that one is orange and one is yellow. *Photo by Stan Celestian*



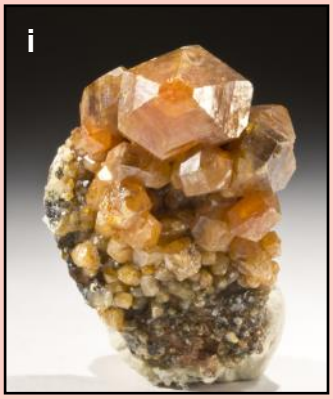


FIGURE L VANADINITE This another Arizona vanadinite that is confused with quartz, as it is pyramidally terminated. It is from the JC Holmes Claim, north of Patagonia, Santa Cruz Co, AZ.

Photo by Stan Celestian

Vanadinite continued on page 19….

...Vanadinite continued from page 18

FIGURE M VANADINITE A cute cluster of elongated vanadinite crystals from San Carlos, Chihuahua, Mexico. The specimen is 0.6" tall. *Photo by Stan Celestian*

FIGURE N VANADINITE A little bit different habit, these ball-like clusters of vanadinite are from Taouz Er Rachidia Province (Errachida Province), Meknès-Tafilalet Region, Morocco. *Image by géry60, licensed under CC BY-ND 2.0.*

FIGURE O VANADINITE This arsenic-bearing variety of vanadinite is called endlichite. Locality: Touissit, Touissit District, Oujda-Angad Province, Oriental Region, Morocco

Image by géry60, licensed under CC BY-ND

FIGURE P VANADINITE This is another specimen of the variety endlichite, from Santa Eulalia, Chihuahua, Mexico.

NOTE: The crystals are cavernous, or hollow in the center. This is called *hopper growth*, and occurs when the edges of the crystal grows faster than the rest of the crystal. *Photo by Stan Celestian*

FIGURE Q VANADINITE Another example of hopper crystals, seen in this image of endlichite, from Sierra de Los Lamentos, Chihuahua, Mexico. *Photo by Stan Celestian*

FIGURE R VANADINITE variety Endlichite This is a cool feathery growth habit, from San Carlos, Chihuahua, Mexico. *Photo by Stan Celestian*

Vanadinite continued on page 17….

...Vanadinite continued from page 19

GENERAL RESOURCES FOR VANADINITE

https://en.wikipedia.org/wiki/Vanadinite

https://www.mindat.org/min-4139.html

http://webmineral.com/data/Vanadinite.shtml#.YJSSXrVKg2w

https://geology.com/minerals/vanadinite.shtml

https://www.rockngem.com/the-story-of-vanadinite/

https://www.minerals.net/mineral/vanadinite.aspx

This is pretty cool. A sculpture, of vanadinite on barite, in polymer clay. *By PetitPlat - Stephanie Kilgast , and is licensed under CC BY-NC-ND 2.0*

MOLTEN MINI

About 30 miles north of Flagstaff, there is an abandoned pumice mine that straddles AZ89. The pumice has been dated at 0.89 +/- 0.11 Ma.[1] This is potentially a third stop on the club's Volcanics Field Trip on June 12, 2021. See Figures AA & BB.

This was known as the Bonner Deposit, and in 1959 a mill and storage tank was built on the site.[2] During construction (1964) of Glen Canyon Dam, much of the 210,000 tons of pumice was hauled from here 110 miles to the site of the dam construction (the balance of the pumice came from Sugarloaf Peak).

Continued next column….

The pumice is classified as a *pozzolan* -- a class of siliceous or aluminosiliceous materials, that when finely ground can be added to cement, where it will react with water and calcium hydroxide to form a cement-like material. The advantages of adding a pozzolan (which also includes volcanic ash, zeolite, fly ash, rice husk ash, or diatomaceous earth) to concrete are:

- replace more expensive Portland cement
- opportunity to use waste products
- control setting time
- Increase durability
- decreases the permeability of the end product
- decreases the likelihood of expansive chemical reactions within the concrete
- lowers the pollution (greenhouse gases), associated with the production of Portland cement.

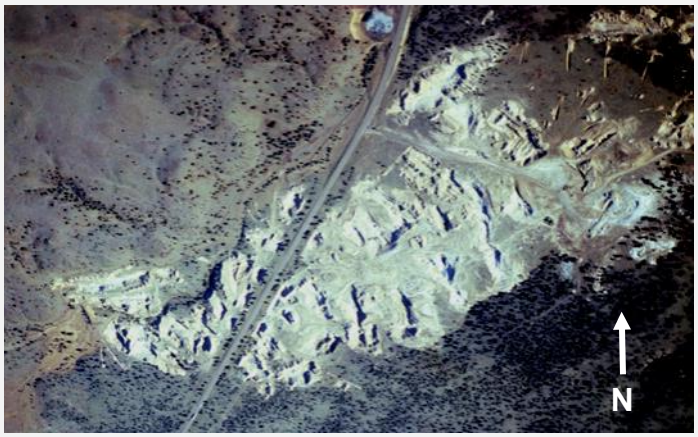


FIGURE AA BONNER PUMICE PITS This is an aerial view of pumice pits where pozzolan pumice was mined as an additive to the Portland cement mixed at Glen Canyon Dam. *Photo by Stan Celestian*

FIGURE BB PUMICE This is a close-up view of a pumice conglomerate collected at the Bonner Pumice Pits. The pumice is probably water deposited. *Photo by Stan Celestian*

[1]Hoffer, Jerry M., Pumice and Pumicite in Arizona, Arizona Dept. of Mines and Mineral Resources, Open File Report 91-8, November 1991.

[2]Ascarza, Williams; *Mine Tales: Pozzolan from Arizona was used in building Glen Canyon Dam*; Arizona Daily Star; Apr 12 2020 .(updated Nov 8, 2020

UPCOMING FIELD TRIPS & MEETINGS

WHERE: DoBell Ranch
WHEN: Wednesday, May 26, 2021
WHAT: Petrified Wood
MEET: meet at Jim Gray's Petrified Wood Shop at 9:45

WHERE: Flagstaff Area
WHEN: Saturday, June 12, 2021
WHAT: Volcanoes (Sunset Crater, Strawberry Crater, maybe Pumice Pits)
MEET: Visitor's Center at Sunset Crater at 9:00 am

WHERE: Springerville Area
WHEN: Saturday/Sunday, June 26/27, 2021 (TBA)
WHAT: Luna Agate
MEET: TBA
OTHER: This is a multi-day trip; camp or motel in Springerville

DATES SUBJECT TO CHANGE

Bill and the field trip committee will be actively looking for productive spots for field trips. If you have any suggestions, you are encouraged to contact him at bfreese77@cox.net

WIRE WRAPPING RESUMES

Tuesday, May 18th, Jennifer conducted an in-person wire wrapping class. Get your wire ready!!

And look what everybody created!

Photo by Tiffany Poetsch

FACEBOOK

Visit and join the club page 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. Share with friends!

AWARD-WINNING WEBSITE

http://www.dmrmc.com/

If you have comments, contact Nancy Gallagher.

INSTAGRAM

Follow the club on Instagram. Go to https://www.instagram.com/daisymountainrockclub/ and follow today. Share with friends!

Officers, Chairpersons, & Trustees

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Johnaton M	Joe G
Clark L	Bob S.
	Nancy G

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

DMRMCLUB@GMAIL.COM

Membership Dues:
First year $30, then $20.00 Adults per Person
First year $45, then $25.00 Family (2 people)

Meeting Dates for 2021

Jan 5, Feb 2, Mar 2, Apr 6, May 4, June 1, Sept 7, Oct 5, Nov 2, Dec 7

MEETING VIA ZOOM ON TUESDAY, JUNE 1. Look for an email with the link.

Words of Wisdom

passed along by our own

Bob Evans

UPCOMING AZ MINERAL SHOWS

May 22 - Apache Junction, AZ Apache Junction Rock & Gem Club; 2151 W Superstition Blvd; Sat 9-3, Admission: free. This will outdoors, masks not required, but recommended.

July 10-11 - Lakeside, AZ White Mountain Gem & Mineral Club; Country Court Event Hall, 3369 W White Mountain Blvd; Sat 9-6, Sun 10-4; Admission: ?.

August 6-8 - Prescott, AZ Prescott Gem & Mineral Club; Findley Toyota Event Center; Fri-Sat 9-5, Sun 9-4; Admission: adults $5, seniors $4, under 13 free with adult.

September 17-19 - Payson, AZ Payson Rimstones Rock Club; Mazatzal Hotel & Casino, Highway 87, Mile Marker 251; More details TBA.

October 8-10 - Buckeye, AZ West Valley Rock & Mineral Club; 902 N 1st St (Miller Rd); Fri-Sat 9-5, Sun 9-2; Admission: $3, under 13 free.

October 16-17 - Sedona, AZ Sedona Gem & Mineral Club; Sedona Red Rock High School, 995 Upper Red Rock Loop Rd; Sat 10-5, Sun 10-4; Admission: ?.

October 9-10 - Sierra Vista, AZ Huachuca Mineral & Gem Club; The Mall, El Mercado Drive; Sat 9-5, Sun 10-4; Admission: Free.

November 27-28 - Wickenburg, AZ Wickenburg Gem & Mineral Society; Hassayampa School, Wrangler Event Center, 251 S Tegner St; Sat 9-5, Sun 10-4; Admission: ?.

If you are travelling, a good source of shows AND clubs is http://the-vug.com/educate-and-inform/mineral-shows/ **OR** http://www.rockngem.com/ShowDatesFiles/ShowDatesDisplayAll.php?ShowState=AZ **OR** https://www.rockandmineralshows.com/Location/?displayShows=true

NEEDED: QUALITY MINERALS (or OTHER) DONATIONS WITH LABELS -- for monthly raffle prizes; and for raffle, door prizes, and sales tables at the annual show. If you have specimens to donate, please see Robin Shannon. The Daisy Mountain Rock and Mineral Club is a 501(c)(3) non-profit organization, and will gratefully acknowledge your donation with a Tax Deduction Letter. Thank You!

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).

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

Visit http://rmfms.org/ for news about conventions, events, and associated clubs. If you are travelling, you might want to contact a club local to your destination. Maybe they have a field trip you could join, while in town.

NORTH MT OPEN STUDIO - JUNE

You are invited to return to NMVC Open Studio. Lapidary & Silversmithing on Thursdays and the first, third and fifth Saturdays in a month, from 8:30 to noon with cleanup starting at 11:45.

NMVC requires that everyone wear a mask while in the building. (Other NMVC requirements will be sent in a later email or on premises.)

Only four people can sign up, and must do so for the full three hours that the shop will be open each day. First come, first served.

Please arrive no later than 8:45 a.m. The center may close to the public at 10.

Email your request for the day(s) you are interested in participating ASAP. Email Shirley Cote at crystalc17@gmail.com

June – Thursday's dates are 3, 10, 17, 24
June – Saturday's dates are 5, 19

If more than four people wish to participate on the same day, please expect to be bumped or rotated to another day as efforts to accommodate everyone will be taken.

We would also like to inquire as to anyone wishing to come in for **Lapidary Only Open Studio on Mondays.** Email Shirley at crystalc17@gmail.com

June - Monday's dates are 7, 14, 21, 28