

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 5, ISSUE 1

JANUARY 2020



Selected forams from the sand of Lumahai Beach, Kauai, Hawaii The field of view is about 1/2" x 3/8". Photo by Stan Celestian

FOSSILS: PART III

Kingdom: Protoctista

By Susan Celestian

The second Kingdom at which we will look is the Protoctista (or Protista). This is a group of micro- and macroscopic eukaryotes -- organisms with nucleated cells (unlike those of the Kingdom Prokaryotes discussed in December) -- that are not plants, animals or fungi. Included are many mostly-unrelated organisms: amoeba, algae, diatoms, dinoflagellates, foraminifera, radiolarians, coccolithophores, acritarchs, *Giardia*, water molds, *Plasmodium* (the cause of malaria), and slime molds.

The algae groups are quite diverse, and many of them secrete calcareous coatings, and cysts, that increase their chances of being fossilized. They are often used to help reconstruct the environment of deposition of the rocks in which they are encased.

And Acritarchs belong to an artificial grouping of capsule-like organisms, not necessarily related to each other, including cysts and egg cases. In fact, once an acritarch is classified, it at once becomes aligned with its true biological group. They range back nearly 2 billion years, and are quite diverse -- therefore, possible index fossils¹, even if their affinity is unknown.

However, I think you will find the diatoms, radiolaria, coccolithophores, and foraminifera to be more interesting. And you may even be able to collect some, as you pick up rocks and even beach sand. SO I will concentrate on these.

¹ Index Fossils are used to identify the relative geologic time frame of the rocks in which they are found. The ideal index fossil

- has a short range of time during which they exist
- is widely geographically distributed
- must evolve quickly into distinct species
- should be common
- should be abundant
- is easily identifiable

As a result, the presence of index fossils in a rock unit can be used to fairly specifically define a narrow time frame, for the relative age of the rock -- and by association, any other fossils found therein.

Protista continued on page 8....



GYPSUM

By Susan Celestian

Gypsum's first known mention occurred in 300-325 BC, when Theophrastus referred to it as *gyposos*, Greek for 'plaster'. In fact, calcined (or burnt) gypsum is the basis of *plaster of Paris*. It is an evaporite mineral, forming after calcite and dolomite in the evaporation of a salt-water body -- at a point when about 20% of the original body remains.

Chemical Formula - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

(Hydrous Calcium Sulfate)

Crystal System - Monoclinic (3 axes of unequal lengths, none perpendicular to any other) .

<http://webmineral.com/crystal/Monoclinic-Prismatic.shtml#.XiPKB8hKg2w>

Growth Forms/Habits - Massive, flattish crystals, fibrous

Hardness - 2

Color - Clear, white, gray, orange

Luster - Vitreous, sub-vitreous, silky, pearly

Streak - White

Specific Gravity - 2.312-2.322

Cleavage - Perfect in 1 direction; good in 2 directions

Fracture - Conchoidal, splintery

Other - Moderately water-soluble; when heated it loses water, converting to bassanite and eventually anhydrite; fluorescent SW & LW -- orange yellow.

Gypsum continued on page 13....

INSIDE THIS ISSUE

Fossils: Part III Kingdom Protoctista	2, 8-13
Gypsum	2, 13-17
Minutes (Board, General, & Show Meetings)	3-4
Words of Wisdom from Bob Evans	4
Cartoon of the Month by Laurie Manifold	5
December Meeting Report	6
Field Trip Report: Little Horn Mts Area	7
Field Trips, Wire Wrapping, Announcements	17, 18
Show list, Club Information	19-21

January 7, 2020

Board of Trustees Meeting Minutes

- In attendance: Bob E., Clark L., Claudia M., Cynthia B., Deanne G., Don R., Ed W., Howard R., Jessica C., Jonathan M., Rebecca S., Stan C., Susan C., Tiffany P. and Bill F.
- ▶ **Happy 9th year of operations for DMRMC!**
- December minutes approved
- Cynthia B. discussed our finances
 - * Net income for the year \$5,609.58
- Bill F. talked about all the exciting field trips to come
 - January
 - ◊ Little Horn Peak
 - ◊ Sheep's Bridge
 - ◊ Quartzsite club meeting
 - February
 - ◊ Burrow Creek Crossing
 - ◊ Contact Mine
 - March
 - ◊ Bullard mine
 - Summer
 - ◊ Lost Onyx mine
 - ◊ Possibly an overnight to Tucson
 - ◊ Possibly a couple day trip to Wyoming, Utah, New Mexico, or Idaho
- Our coalition has been dissolved, there will no longer be coalition trips
 - ◊ Bill F. will work with clubs to try and keep some of our shared field trips
 - * DoBell Ranch is a great place to try an unsanctioned coalition trip
- Welcome to our new board members
 - Jessica Caltabiano
 - Jonathan Mitchell
- Thank you to Clark and Marie L. for the amazing Christmas party
- Show preparations are coming along nicely
 - Marketing is going smoothly in the subcommittee
 - ◊ Leaflets need to be handed out at as many clubs shows as possible
 - ◊ Currently 6 spots open for vendors, have a long waiting list though
 - ◊ Dr. Rocks (Doug and Shirley D., Stan and Sue C., and Herb J. may all appear) will be a great addition
 - * Children's corner outside in shade

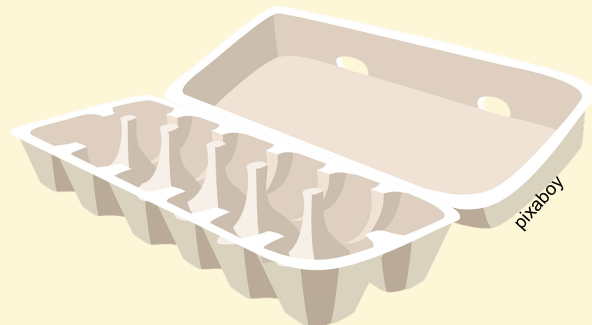
Board Minutes continued on page 4....

January 7, 2020

General Club Meeting Minutes

- Thank you to Jay Yett, one of the co-creators of this amazing club, for his great presentation on the intricate compact of the Colorado River
- Raffle was led by Robin S. and Deanne G.
 - Thank you to everyone who donates
- Cynthia B. discussed the financial report
 - \$180 raised from the raffle this month
- Thanks again Clark and Marie L. for hosting the delightful Christmas party for 2019!
- Welcome on Jessica C. and Jonathan M., new board members
- Bill S. talked about S.T.E.A.M. nights
 - Volunteers were given paperwork at the meeting
 - The nights are typically 2-3 hours around 5pm -7:30pm
- Upcoming field trips
 - They will all be listed on the newsletters, can be accessed through our website (dmrmc.com), and through GroupWorks
 - If you would like to join the field trip committee, contact Bill F. bfreeese77@cox.net
- Stan C. updated us on the claims committee
 - This will take time to find an ideal location
- Ed W. discussed the show
 - Marketing and admissions are filled
 - There will be sign up sheets for:
 - ◊ Raffle
 - ◊ Membership
 - ◊ Admissions
 - ◊ Kid's corner
 - ◊ Security

Respectfully submitted by Rebecca Slosarik



PLEASE DONATE THOSE EGG CARTONS!

....Board Minutes continued from page 3

- Ad changes this year will help save money
- Dan J., Jim R., and Ed W., will do overnight security
 - ◊ Still need one or two more volunteers
- Membership exhibit will need to begin construction soon
- We are looking at a new venue for next year already
- Claudia M. discussed S.T.E.A.M. nights
 - Jan 23 – New River
 - Jan 29 – Anthem Elementary
 - Jan 31 – Black Mountain Elementary (Cave Creek)
 - March 25 – Canyon Springs
 - ◊ Need volunteers for setup and take down
 - * Contact Claudia if you would like to help cmarek2@cox.net
- Stan C. reported on the claims meeting
 - Claims must still have material on them, and be accessible by standard vehicle
 - Will be visiting potential areas in the future
 - ◊ Purple Passion area
 - ◊ Date Creek Ranch
 - ◊ Contact Mine
 - ◊ Banded Iron in New River
 - Another subcommittee meeting will be coming up, so check emails for details

Respectfully submitted by Rebecca Slosarik



Apache Tears, pebbles of obsidian, were one target of January's field trip. Although these are from Superior, they still illustrate the glassy luster, and high polish one can achieve by tumbling them. Photo by Stan Celestian

Wire Wrapping Class Is.....

SO.



MUCH.



FUN.

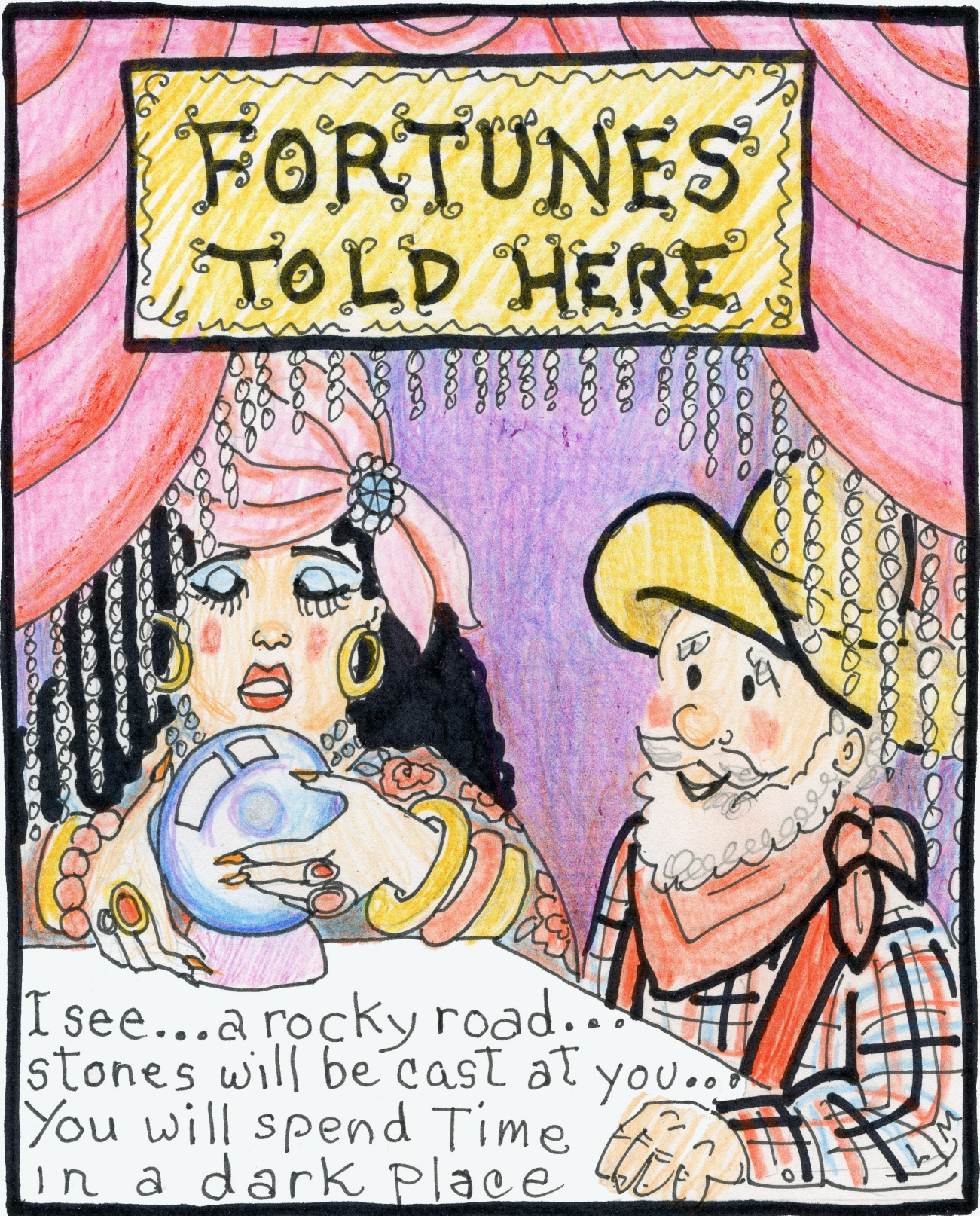
Words of Wisdom

from our very own

Bob Evans



Honestly, I don't intend to interrupt people. I just all of sudden remember things and get very excited.



I see... a rocky road...
stones will be cast at you...
You will spend Time
in a dark place

The Old Prospector gets the best
New Years prediction ever !!!



January Speaker - Jay Yett

The Colorado River:

**“Whiskey is for drinking,
water is for fighting”**

Quote attributed to Mark Twain

Club member, Jay Yett discussed the Colorado River Compact, drafted in 1922, with the purpose of allocating the water in the Colorado River Drainage Basin. The Upper & Lower Basins involve seven states -- Colorado, Wyoming, Nevada, Utah, New Mexico, Arizona, California. Of those states, two have extensively laid claim to Colorado River water -- Arizona and California, the latter of which contributes almost no water to the system. The compact was written in order to protect the interests of all the states involved. Since the implementation of the compact, the states' populations have increased dramatically, and development has increased; both placing demands on available surface water, and raising allocation issues that continue to be controversial/adversarial today.

Goals of the Colorado River Compact:

- ▶ Allocate water
- ▶ Protect the rights of the northern states
- ▶ Protect state control of the water
- ▶ Protect existing water rights (private, Native American)
- ▶ Provide out of basin transfers (especially to California)
- ▶ Flood control
- ▶ Prioritize use of water (#1 agriculture, plus mining, manufacturing, and power)
- ▶ Reduce interstate litigation

Water rights include:

- Riparian rights -- if your property abuts the river, you have a right to water; however you can't hog the water. Everyone shares in shortage
- Prior appropriation rights -- In time of shortage, the first to claim rights is the last to be cut (except California)

Before California could establish prior appropriation, the water was allocated evenly between the upper and lower basins: 75 million acre feet annually to the upper and lower basins, plus an additional 5 million acre feet annually to the lower basin. Any surplus is divided between the states in the lower basin.

- Reserved rights -- Native Americans, National Parks/Monuments, etc. For example, Indian Reservations are entitled to all the water necessary to farm the whole reservation, whether they utilize it or not. And that is an enormous amount of water -- estimated to be 5 million acre feet of the 7.5 million acre feet allocated to the lower basin! And they can lease (not sell) their water rights to cities.

As the compact was an interstate agreement, Mexico was not included initially. Later allocation was amended to supply surplus water to Mexico, and in 1944 that was quantified as 1.5 million acre feet annually.

Now 100 years later, we are finally fairly-firmly calculating the discharge¹ of the Colorado River. In other words, exactly how much water is actually available annually. It so happens, that the year that the allocations were set by agreement, was a very wet year. And as can be expected, weather is not consistent. There are periods of drought alternating with periods of plenty (See Figure 1).

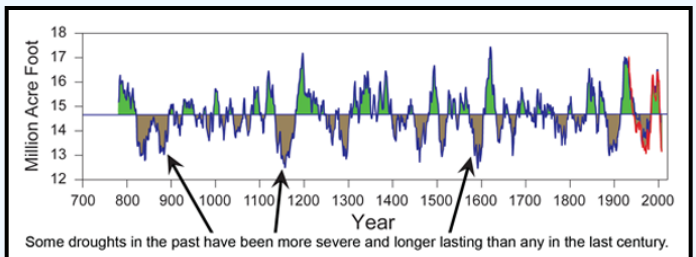


FIGURE 1 HISTORIC DISCHARGE OF THE COLORADO RIVER This graph depicts the estimated discharge of the Colorado River, based on tree ring data. As you can see, there have been some very low volume years in the last 1300 years! *Graphic from <https://nca2009.globalchange.gov/southwest-drought-timeline/index.html>*

The bottom line is that the Colorado is undoubtedly over-allocated, as the high volume levels known in 1922 cannot be counted on to persist consistently! A contingency plan has been implemented, that reduces Arizona and Nevada allocations whenever the level of Lake Mead drops to 1091' (California is excluded from cuts). Fortunately for Arizona, through conservation the state has already cut usage to a level below that of that required by the shortage.

¹Discharge is the volume of water within a stream channel, passing a given point, at a given time.

FIELD TRIP REPORT LITTLE HORN PEAK JANUARY 4, 2020

Photos by Ed Winbourne

On Saturday, January 4th, Ed Winbourne led the club field trip to the Little Horn Peak area for small geodes, and a nearby area for Apache Tears. It was a beautiful day! Attendance was great! And a wonderful time was had by all! Material can be found on the flats, or up on the somewhat rugged hillsides. This is an area enjoyed by the whole family -- I (Sue) know that on a private trip, our (the Celestians) grandkids LOVED hitting rocks with hammers and discovering the quartz crystal treasure within!



Photo by Ed Winbourne



It's beautiful country!
Photo by Ed Winbourne



In lieu of any photos from the group that attended this trip, here is a shot of the Celestian's granddaughter proudly displaying the geode she found a year ago.

Photo by Susan Celestian

...Protista continued from page 2

DIATOMS

Diatoms are single-celled algae that build a "shell", or *frustule*, out of opaline silica, that may be quite intricate and lacy. And they are very, very small (2-500 microns)², and a major component of the globe's phytoplankton.³ See Figures 1-3. Diatoms

- ◆ are solitary and colonial.
- ◆ are freshwater and marine; even occupying moist soil.
- ◆ live in warm or cold -- even hot -- water. However, historically they have been most successful in cooler water. As such, diatoms have been used to assess historical ocean temperatures.
- ◆ contain chlorophyll, and produce about 20% of the oxygen in Earth's atmosphere.
- ◆ constitute about 40-45% of oceanic organics, therefore are an important and rich food source for creatures throughout the whole food chain.
- ◆ are planktonic (free floating or attached to floating debris) and bottom-dwelling.
- ◆ have a known geologic range of early Jurassic to Recent.
- ◆ Rain down to mostly high-latitude deep ocean floor or deep lake beds, to form ooze deposits that form the sedimentary rock **diatomite (or diatomaceous earth)**, that is mined for use as an abrasive (as in toothpaste), a filter (as for water, beer and cooking oils), in cat litter, an insecticide (scratches insect cutin and the creature dries out), and as a dynamite stabilizer.

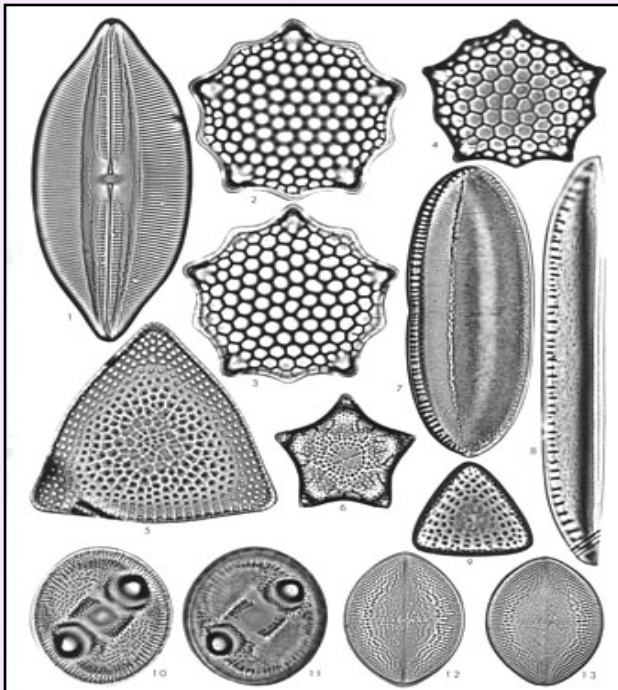


FIGURE 1 MARINE DIATOMS This plate is light microscope images of diatoms from the Bay of Campeche, Mexico. Images by Stuart R. Stidolph, from "Stuart R Stidolph Diatom Atlas", USGS

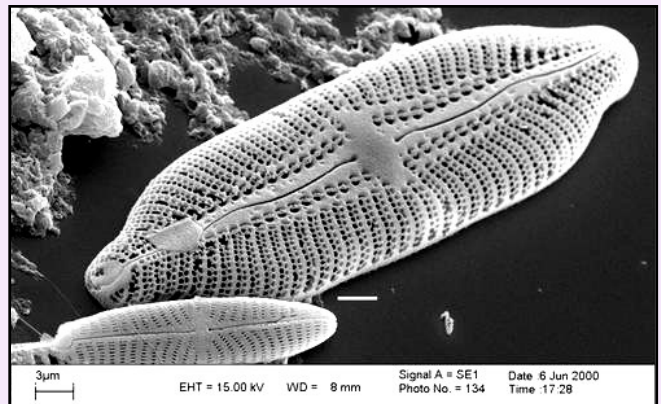


FIGURE 2 ANEUMASTUS sp. This is a scanning electron image of a freshwater diatom. Image by Sarah Spaulding, USGS, Public domain.

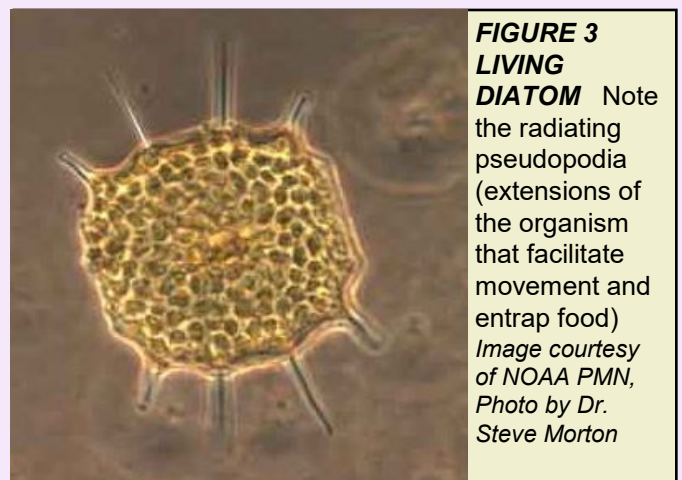


FIGURE 3 LIVING DIATOM Note the radiating pseudopodia (extensions of the organism that facilitate movement and entrap food) Image courtesy of NOAA PMN, Photo by Dr. Steve Morton

²A micron is 1,000,000th of a meter or .00004 inches. For example a human hair is about 75 microns in diameter.

³Phytoplankton are a diverse assortment of autotrophic (self-feeding) organisms within the broader plankton. Included are algae, cyanobacteria, diatoms, dinoflagellates, and coccolithophores. As a group, they comprise 1% of the Earth's total biomass.

...Protista continued from page 8

RADIOLARIA

Radiolaria are single-celled protozoa that build a “shell”, or *test*, usually out of opaline silica (although one group secretes strontium sulfate). Their tests are often very lacy and porous, and range in size from 30 microns to 2 millimeters. Rapid evolution and the creation of distinctive species make radiolarians good index fossils. See Figure 4.

Radiolaria

- ◆ are solitary and colonial
- ◆ are strictly marine
- ◆ occupy warm or cold water. There is evidence that the cold-water species, with less competition from diatoms than warm-water species, did not undergo a trend to lighter tests during the Cenozoic. In equatorial Pacific, radiolarians occur in great abundance -- 16,000 per cubic meter.
- ◆ are largely planktonic, although species occupy all depths, including deep, cold water regimes
- ◆ sometimes harbor algal symbionts, capable of photosynthesis
- ◆ have a known geologic range of Early Cambrian to Recent, although the best record begins in the Lower Ordovician.
- ◆ rain down to mostly equatorial deep ocean floor to produce **radiolarian oozes**. Radiolarians are second to diatoms in the production of these biogenic silica deposits. These deposits may be transformed into flint, chert, and Tripoli. The latter is used as a polishing abrasive, in toothpaste, as a filler in paint, plastic, and rubber.

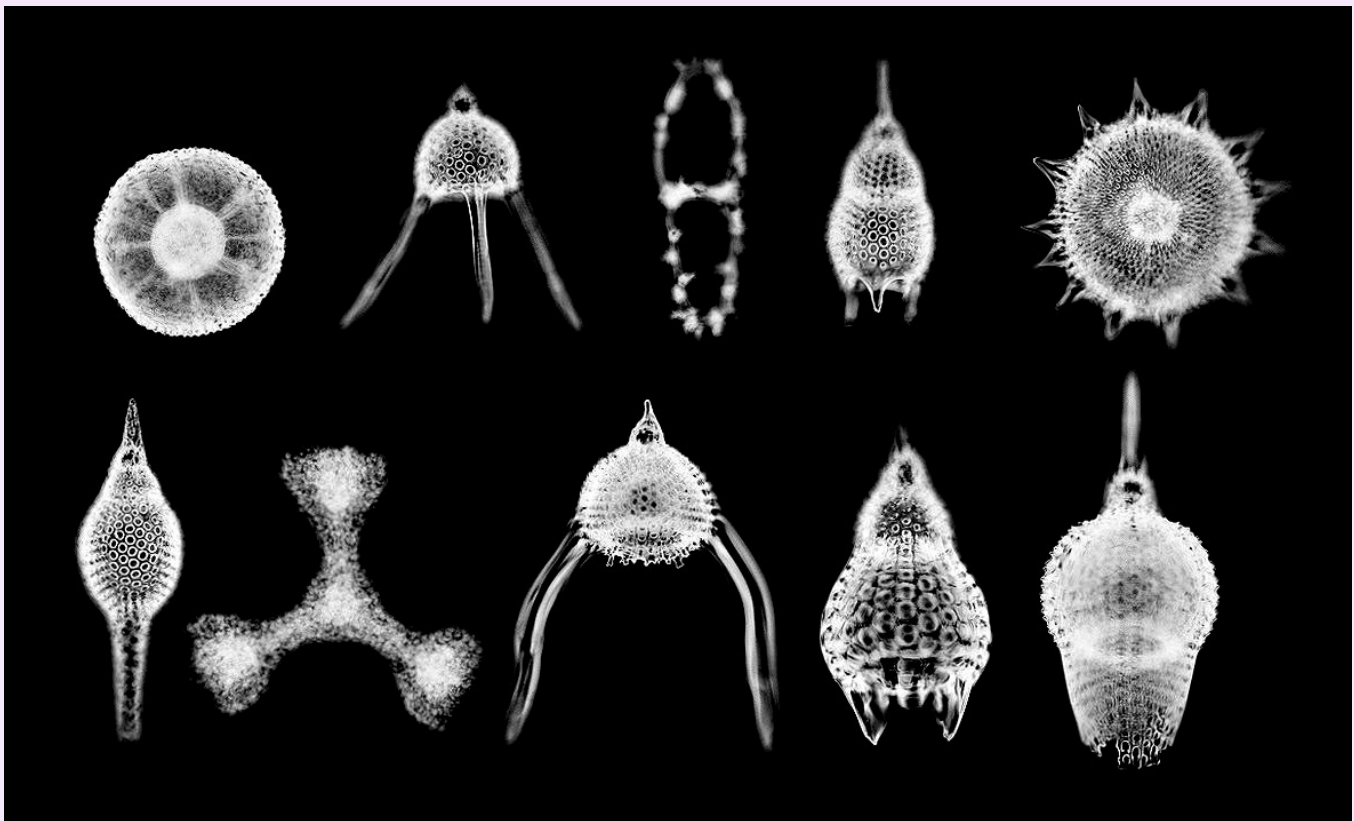


FIGURE 4 RADIOLARIANS These ten modern species of radiolarians were imaged by Randolph Femmer (USGS), using a scanning electron microscope. The tests tend to be spiky and porous, allowing pseudopodia to project through into the water for food gathering and motility. *Image by Randolph Femmer, USGS*

...Protista continued from page 9

COCCOLITHOPHORES

An important component of phytoplankton, these unicellular organisms are plants that secrete a plated "shell" or coccosphere, composed of clear calcium carbonate disks (**coccoliths**). See Figure 5. Each coccolithophore is between 5 and 100 microns in diameter -- and coccoliths are between 2 and 25 microns in diameter (2/1000th of a millimeter or .00008 inches)!

Coccolithophores

- ◆ are predominately solitary.
- ◆ are strictly marine.
- ◆ found throughout the temperate, sub-tropical, and tropical oceans; most modern coccolithophores occupy temperate sub-polar waters, and can thrive in nutrient-poor water.
- ◆ are largely planktonic.
- ◆ have a known geologic range of Cambrian to Recent; however are most important from Upper Triassic to Recent.
- ◆ are leaders in calcite production among all ocean creatures. This may mean that they will be an important CO₂ sink (recent rises in CO₂ have been associated with increased coccolithophore population).
- ◆ disintegrate into individual coccoliths, upon death. These rain down onto the ocean floor (at a rate of 60 billion per square meter annually), dumping 1.5 million tons of calcite annually. Coccoliths are the major component of **chalk** deposits. An interesting YouTube video can be found at <https://www.youtube.com/watch?v=Ep5tcBXyFoE>.

FIGURE 5 COCCOLITHOPHORE This

Coccolithophore is armor-plated by at least 40 plates or coccoliths (assuming we can see about half of the plates in this view).

Image from NOAA
<https://www.st.nmfs.noaa.gov/ecosystems/ocean-acidification/index>



FORAMINIFERA

Also known as forams, are basically single-celled amoebas in a shell. Their shell, or test, is usually composed of calcium carbonate or agglutinated particles of sand or shell (although a very few primitive species secrete chitin, one species employs silica, and naked species are known). Their tests are porous, and streams or nets of cytoplasm (as pseudopods) are extruded to catch food, provide anchor, and facilitate mobility. Most tests are under 1 millimeter, but some species reach lengths up to 30 centimeters (nearly 12 inches!). There are 50,000 species recognized, 40,000 of which are fossils.

Foraminifera

- ◆ are solitary.
- ◆ are predominately marine, although modern forams have been found to occupy brackish to fresh water, and moist soils.
- ◆ are predominately bottom-dwellers (*benthic*), in and on the seafloor sediments, although some are planktonic, floating within the water column.
- ◆ are most abundant and diverse in warm water.
- ◆ have a known geologic range of Cambrian to Recent.
- ◆ produce chambered tests.
- ◆ include a few species that carry symbiotic algae, which through photosynthesis allow those forams to occupy nutrient-poor water.
- ◆ have evolved into diverse and complex forms, and exist in abundance, making them good index fossils.
- ◆ are used extensively by oil geologists to establish the age and order of rocks in an oil field, or potential oil field. AND the color of some foram tests are indicators of temperatures to which rocks have been subjected -- and whether it is likely for petroleum to be present (i.e. have the temperatures exceeded 100°C to precipitate petroleum generation, but not so high as to cook off the volatiles).

Protista continued on page 11....

...Protista continued from page 10

- ◆ benthic forams are used to establish paleoenvironments and to track climatic changes.
 - Some forams will coil to the right or to the left, depending on water temperature.
 - For given species, shell size tends to be greater in warm water, than in cold.
 - Within specific species, shell porosity will vary with water temperature.
 - Oxygen isotopes (O^{16}/O^{18}) within the shells of forams can be used to determine water temperatures: For example, O^{16} is lighter than O^{18} , so evaporates first, and warm water has a higher level of O^{18} (and glacial ice has a higher ratio of O^{16}). As a result, when water temperatures are high, the ratio of O^{18} in foram shells, goes up, and vice versa.
 - Concentrations of trace elements in foram shells are also often temperature dependent.

PLUS foraminifera are big enough to see with the naked eye, so in ancient rock or modern beach sand, you don't have to work very hard to see them! See Figures 6-11.



FIGURE 6 NUMMULITES

The ochre-colored fossils are Eocene (56-34 mya) *Nummulites gizehensis*, weathered out of the limestones (Moqqatam Formation?) making up the

pyramids in Egypt. The largest one is a bit over 1 inch diameter. The image to the left, is *Nummulites laevigatus*, out of the Bracklesham Beds, Hampshire, England. It has been split to reveal the coiling and chambers.

Photos by Stan Celestian

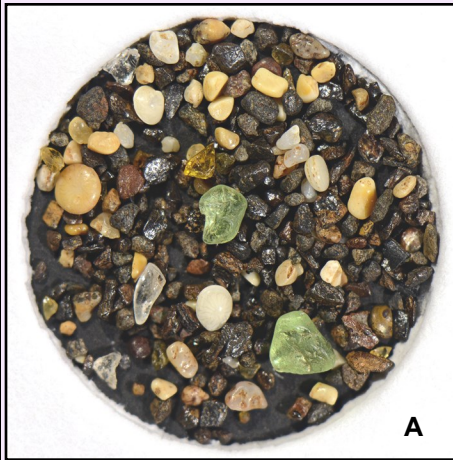


FIGURE 7 CLEOPATRA'S NEEDLE

The upper photo is Cleopatra's Needle, an ancient Egyptian granite obelisk relocated from Alexandria to New York City's Central Park (it is one of a pair, the other of which is in London). The middle image is a close view of the limestone, out of which the base is carved. The lower photo is a very close view. Prominently positioned in the center of the latter photo is a *Nummulites* fossil, about 1 inch in diameter. In the limestone photos, all the elongated clasts are *Nummulites*.

Photos by Stan Celestian

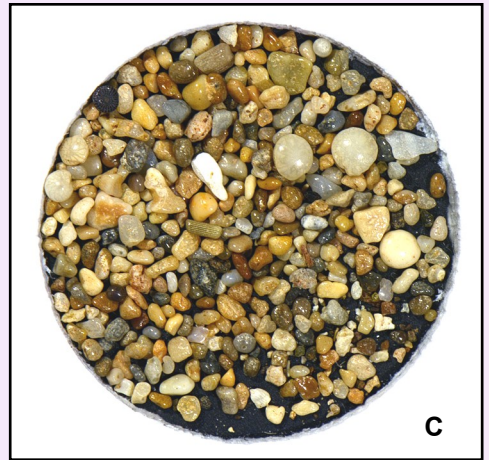
...Protista continued from page 11



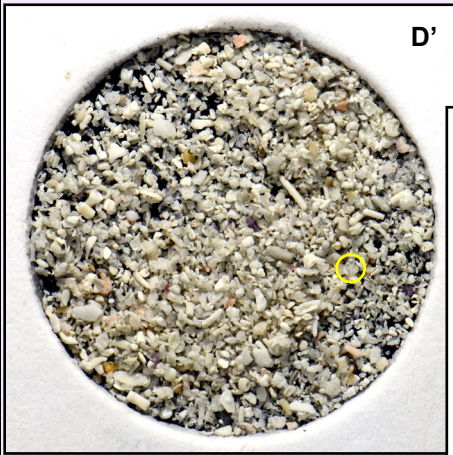
A



B

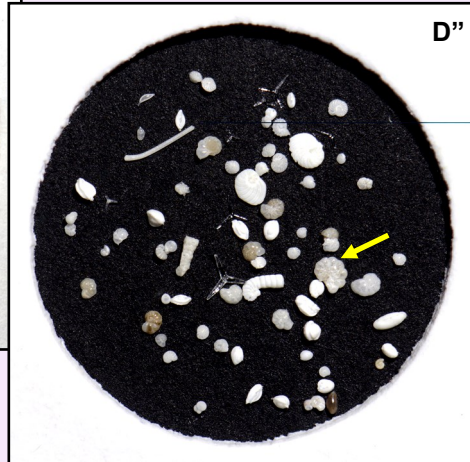


C



D'

FORAMS GALORE



D''

FIGURE 8 MODERN FORAMS

Herewith are views of five Hawai'ian beach sands: A - Glass Sand Beach, Kauai'i; B - Po'ipū Beach, Kauai'i; C - Salt Pond Beach, Kauai'i; D - Moore Point Beach, Geraldton, Western Australia. All of them contain forams. Can you spot them?

The circles holding the sands are 1/2 inch in diameter. Note the different sizes of the forams. In D', a yellow circle has been drawn around a foram, that matches the one indicated by the yellow arrow in D''.

Enlarge the page (ctrl & +/-) for best views. *Photos by Stan Celestian*



FIGURE 9 FUSULINIDS These are fusulinids, forams named for their fusiform shape, and important index fossils of the Paleozoic. In particular, these are from Arizona's Pennsylvanian-age Naco Formation. The lower photo is an acetate peel (a sort of thin section) view of

the interior coiling and chambers.

Photos by Stan Celestian



FIGURE 10 FORAMINIFERA

These "beaded" forams were mined by ants on a roadside east of Show Low, Arizona. The abundant forams have weathered out of the Cretaceous-age Dakota Sandstone (Twowells Tongue). They may be a species of *Ammobaculitis*, with an agglutinated test that begins out coiled, but quickly morphs into a unilinear string of spheres. *Photos by Stan Celestian*

...Protista continued from page 12



FIGURE 11 MISSISSIPPIAN LIMESTONE The Salem Limestone at Spergen Hill, Indiana contains a wealth of dwarfed marine fauna, PLUS so many forams - *Endothyra baileyi* (see inset) - that it looks oolitic. The red dots are on individual forams -- make the page larger and you will see some coiled, with inflated chambers, while cross sections just look like round objects. Photo of foram (inset) by Michael Popp <https://louisvillefossils.blogspot.com/2010/01/endothyra-baileyi-foraminifera.html> and the 2 large ones by Stan Celestian

GENERAL RESOURCES for PROTISTA:

Foraminifera

<https://ucmp.berkeley.edu/fosrec/ONeill.html>
<https://en.wikipedia.org/wiki/Foraminifera>
https://websites.pmc.ucsc.edu/~apaytan/290A_Winter2014/pdfs/2007%20Proxies%20Chapter%20six.pdf

Radiolaria

<https://en.wikipedia.org/wiki/Radiolaria>
<https://ucmp.berkeley.edu/protista/radiolaria/radfr.html>
https://en.wikipedia.org/wiki/Biogenic_silica

Diatoms

<https://sciencing.com/human-uses-diatoms-8532443.html>
<https://en.wikipedia.org/wiki/Diatom>
<https://ucmp.berkeley.edu/chromista/diatoms/diatomfr.html>
<https://diatoms.org/what-are-diatoms>

Coccolithophores

<https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/coccolithophore>
<https://en.wikipedia.org/wiki/Coccolithophore>
<https://en.wikipedia.org/wiki/Coccolith>
<http://www.scienceiq.com/Facts/WhatIsACoccolithophore.cfm>
<https://www.britannica.com/science/coccolith>
<https://www.st.nmfs.noaa.gov/ecosystems/ocean-acidification/index>

...Gypsum continued from page 1

Gypsum is a very useful mineral.

- ▶ Wallboard (gypsum is abundant, inexpensive, and contains water, thus making drywall a bit of a firewall in buildings)
- ▶ Plaster of Paris, joint compound, medical casts
- ▶ Agricultural additive - supplies calcium and plant-available sulfate sulfur, breaks up clay/hard soils when it crystallizes in the soil, encourages growth of aerobic bacteria required for optimum mushroom growth
- ▶ Retards hardening of Portland cement
- ▶ Sculpture
- ▶ Filler in foods (average human consumes 28 lbs of gypsum in their lifetime), enhances fermentation and conditions water used in beer brewing, controls tartness and clarity of wine
- ▶ Binder in medical tablets
- ▶ Crayon additive
- ▶ Mild abrasive in toothpaste
- ▶ Filler in paint, paper, cotton, PVC
- ▶ Blackboard chalk
- ▶ Flux in nickel ore smelting
- ▶ Binder for court clays designed as 'fast dry'
- ▶ Coagulant in tofu, where it also serves as a dietary source of calcium

Gypsum forms in three main varieties (See Figures A-M):

- Selenite: clear, flexible sheets & crystals
- Alabaster: massive, sugary
- Satin Spar: fibrous, splintery

Some of the largest crystals known are gypsum crystals in caves associated with the Naica Mine, in Chihuahua, Mexico. The Cave of the Crystals and the Cave of Swords house giant selenite crystals -- the largest being 39 feet long, 13 feet diameter, and weighing 55 tons!

<https://www.youtube.com/watch?v=ZslebVCr0zk>
<https://www.youtube.com/watch?v=6ohytp6jCwo>
<https://science.howstuffworks.com/environmental/earth/geology/mexico-giant-crystal-cave.htm>

Gypsum continued on page 14....

...Gypsum continued from page 13



FIGURE A - GYPSUM This ball of selenite crystals is interesting, as selected crystals have grown larger, forming fish-tail twins. Locality: Red River Floodway, Winnipeg, Manitoba, Canada
Photo by Stan Celestian



FIGURE B - GYPSUM var SELENITE on DOLOMITE This clear selenite looks sheeted, because gypsum has excellent cleavage along one plane. You could peel this specimen along the cleavage planes, by hand. It is so clear you can see the dolomite crystals behind it. Locality: Lockport Quarry, Lockport, New York
Photo by Stan Celestian



FIGURE C - GYPSUM with SAND INCLUSIONS Here is another example of sand included selenite rosettes. Locality: Chihuahua, Mexico
Photo by Stan Celestian



FIGURE D - GYPSUM on GYPSUM Orange blades of selenite gypsum have been overgrown by a second generation of selenite crystals -- this time slender, clear crystals. Locality: Pernatty Lagoon, Mount Gunson, South Australia, Australia. *Photo by Stan Celestian*



FIGURE E - GYPSUM variety SATIN SPAR This gypsum exhibits the fibrous texture of the variety *satin spar*. Note the clay layers, common to evaporite deposits, where mineral deposition is sporadic. Locality: Camp Verde, Yavapai County, Arizona.
Photo by Stan Celestian

...Gypsum continued from page 14



FIGURE F - GYPSUM variety ALABASTER

These two photos are of alabaster, a massive crystalline form of gypsum. The orange color is due to some impurity -- probably iron oxide. Localities:

Unknown

Photos by Stan Celestian



FIGURE G - CASTILE FORMATION, NEW MEXICO These thin laminae are from the famous Permian Castile Formation aka State Line Outcrop. The white layers are gypsum/anhydrite, and the dark layers are silty calcite. Some have suggested they are varve-like -- chemistry and organic content varies with the seasons (winter locks up water so there is reduced runoff, and consequent reduced organic material -- light gypsum/anhydrite layers. With runoff comes increased organic content and saturation -- dark, calcite layers). In addition, the flexibility of gypsum allows very tight folding, when the rock is stressed. The hammer helps give you perspective on the scale of the folding. Photos by Stan Celestian

...Gypsum continued from page 15



FIGURE H - GYPSUM after GLAUBERITE This is an alabaster variety of gypsum that has replaced a glauberite crystal. It is a pseudomorph (false - form) -- the crystal form of glauberite is occupied by the mineral gypsum. Locality: Camp Verde, Arizona. Photo by Stan Celestian



FIGURE I - GLASS MOUNTAIN, CAPITOL REEF NP This 'mountain' of gypsum is only about 15 feet high. It is composed of very large crystals of selenite. The gypsum originally formed as an evaporite about 165 mya. As it was buried and subjected to pressure of burial and orogeny, the plastic mineral migrated upward along faults to form this dome, probably recrystallizing along the way.

Photo by Stan Celestian



FIGURE J - WHITE SAND NM These white dunes in New Mexico are composed of gypsum sand, which is a very unusual sand clast. Being so soft, gypsum does not survive long in the weathering environment. This huge pile of gypsum sand is possible because of a nearby source. In the close-up, notice that the sand grains are blocky, due to them being crystals. <https://www.nps.gov/whsa/learn/geology-of-white-sands.htm>

Photos by Stan Celestian



GENERAL RESOURCES for GYPSUM:

<https://en.wikipedia.org/wiki/Gypsum>

<https://geology.com/minerals/gypsum.shtml>

<https://www.mindat.org/min-1784.html>

<http://webmineral.com/data/Gypsum.shtml#.Xiev28hKg2w>

<https://www.flickr.com/photos/usageology/albums/72157679486294071>

<https://www.britannica.com/science/gypsum>

<https://www.minerals.net/mineral/gypsum.aspx>

Gypsum continued on page 17....

UPCOMING FIELD TRIPS & MEETINGS

WHEN: Sunday, February 2, 2020
WHERE: Burro Creek
WHAT: Jaspers & Agates
MEET: TBA
LEADER: Stan Celestian

WHEN: Saturday, February 15, 2020
WHERE: Contact Mine
WHAT: Amethyst
MEET: TBA
LEADER: Ed Winbourne

WHEN: Saturday, February 22, 2020
WHERE: Dobell Ranch & Grand Falls
WHAT: Petrified & waterfall
MEET: TBA
LEADER: Verde Valley Rock Club/Bill Freese

WHEN: Saturday, March 7, 2020
WHERE: Bullard Mine
WHAT: Copper Minerals
MEET: TBA
LEADER: Ed Winbourne

WHEN: Saturday, March 28, 2020
WHERE: Prism & Blue Cube Mines
WHAT: Fluorite
MEET: TBA
LEADER: Dave Haneline?

WHEN: Saturday, April 4?, 2020
WHERE: Planet Mine
WHAT: Specular Hematite, Copper Minerals
MEET: TBA
LEADER: Stan Celestian

WHEN: Saturday-Sunday, April 18-19, 2020
WHERE: Nuevo Corrales/Devil's Gate & Ruby
WHAT: Geodes & Ghost Town
MEET: TBA
LEADER: TBA
OTHER: Possible overnight trip

WHEN: Friday-Saturday-Sunday, May 1-3, 2020
WHERE: Topaz Mountain, Utah
WHAT: Topaz
MEET: TBA
LEADER: Stan Celestian

DATES SUBJECT TO CHANGE

...Gypsum continued from page 16



FIGURE K -- HOURLASS GYPSUM These clear crystal of selenite gypsum have inclusions of silt, trapped along planes within the atomic structure, so that they appear as an hourglass within the crystals. Locality: Salt Plains National Wildlife Refuge, Jet, Oklahoma. Plan a trip to here. Collecting is free, and gypsum is everywhere! *Photo by Stan Celestian*

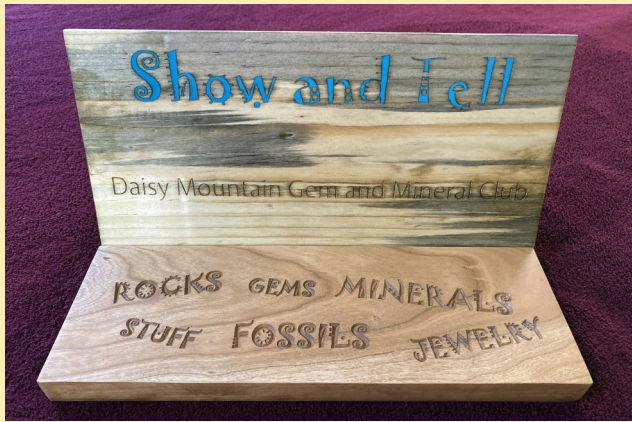


FIGURE L -- GREAT SALT LAKE EVAPORITES This single crystal of gypsum variety selenite was collected not far from the Spiral Jetty. Notice that in this case, included mud/clay was trapped along different planes than that in Figure I. According to Aaron Celestian (minerals curator of Natural History Museum of LA County), bacteria can be found populating the interfaces along the mud inclusions. *Photo by Stan Celestian*



FIGURE M - GYPSUM with INCLUSIONS of SAND This rosette of selenite crystals is gray, due to the inclusion of gray sand. Locality: Ica Department, Peru. *Photo by Stan Celestian*

Peru. *Photo by Stan Celestian*



Share!

Part of the fun of being in a rock club is sharing with members. Have you found a cool rock -- recently or in the past? Have you made something out of a rock or mineral?

Bring an item in to the monthly and tell its story.

Everyone who brings in something for Show & Tell will get an extra ticket for the attendance/nametag raffle.

ROCKY MOUNTAIN FEDERATION SUMMER MULTI-FEDERATION FIELD TRIPS JUNE 13-16, 2020

The RMF Show & Convention is being held in Big Piney, Wyoming June 19-21. Prior to the event, there will be collecting trips available. Planned already is Blue Forest for petrified wood (<http://blueforestpetrifiedwood.com/about-us/>) and Green River Formation for fish fossils (\$fee). Others are in the works.

Interested in the field trips? Contact Doug True dtruefossils12@yahoo.com

Interested in the Show? Contact Jim Gray jimgray@wyoming.com

I'm sure more information will be forthcoming. But if you think you'd like to attend, you might want to start making campground or motel reservations.

The closest facilities will fill up fast -- there probably aren't any motels closer than 20-25 miles away, and you'll want to get a spot as close as you can.

NEEDED: QUALITY MINERAL (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

WIRE-WRAPPING CLASS

4:30-6:30 pm

Prior to the meeting

Bring: cab or stone, about quarter-sized or larger; 26 and 18 or 20 gauge copper-based wire; round nose pliers and flush wire cutter, beads (optional), little clamps, masking tape, E6000 jewelry glue.

Free, but donations are appreciated.

Questions? Contact Jennifer at Jennifer@eliteshuttersandblinds.com

**FOR FEBRUARY
ZIG ZAG WEAVE w/5 wires
Most difficult project yet!**



BRING PAPER & A PEN TOO!



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.

UPCOMING AZ MINERAL SHOWS

January-February - Quartzsite, AZ For a complete list of shows, go to <https://www.desertusa.com/cities/az/quartzsite.html#anchor832166>

Desert Garden January 1-February 28
 Pow Wow January 15-17
 Tyson Wells January 3-12

January 20-February 17 Go to <http://www.tucsongemshows.net/coming.html> for a complete list of Tucson gem, mineral & fossils shows.

January 29-February 16 - Marana, AZ Smokey's Miner's Co-op Rock Show, Mike Jacobs Sports Park, 6901 N Casa Grande Hwy; 9-sunset daily.

February 13-16 - Tucson, AZ Tucson Gem & Mineral Society; Tucson Convention Center, 26 S Church Av; Thurs-Sat 10-6, Sun 10-5; Admission: Adult \$13, 14 and under free w/paying adult. See poster on page 20 -- discount coupon.

March 21-22 - Anthem, AZ Daisy Mountain Rock & Mineral Club; Anthem School, 40100 N Freedom Way; Sat 9-5, Sun 9:30-4; Admission: adults \$3, seniors & youths \$2, children under 12 free. See poster on page 21

May 2-3 - Kingman, AZ Mohave County Gemstoners; Kingman Academy of Learning HS, 3420 N Burbank; Sat 9-5; Admission: free.

July 11-12 - Lakeside, AZ White Mountain Gem & Mineral Club; NEW VENUE Country Court Event Hall, 3369 W White Mountain Blvd.; Sat 9-6, Sun 10-4;

July 31-August 2 - Prescott Valley, AZ Prescott Gem & Mineral Club; Findley Toyota Center, 3201 N Main St; Fri-Sat 9-5, Sun 9-4; Admission: adults \$5, seniors, vets, students \$4, children under 12 free.

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> For out-of-the-country shows: <http://www.mindat.org/shows.php?current=1>

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.

AWARD-WINNING WEBSITE

<http://www.dmrmc.com/>

If you have comments, contact Nancy Gallagher.

GROUPWORKS

As a DMRMC club member, your name should be available at <https://app.groupworks.com/#/login>, and you should receive an email linking you to registration. Create an account and receive reminders about club events, meetings, and important club information. You may post pictures and information -- all seen only by club members.

Upcoming Meeting Programs

Thanks to Ed Winbourne for scheduling the following speakers:

- February - Stan Celestian (Volcanoes)
- March - Patti Polk (Agate)
- April - Wayne Helfand AT the Rare Earth Gallery in Cave Creek

Officers, Chairpersons, & Trustees

- President:** Ed Winbourne.....ewinbourne@gmail.com
- Vice President:** Bill Freese..... bfreese77@cox.net
- Secretary:** Rebecca Slosarik .. rslosarik1@gmail.com
- Treasurer:** Cynthia Buckner....Cbuckrun1@q.com
- Publicity:** Jessie Redmond...
- Membership:** Tiffany Poetsch tnpoetsch@gmail.com
- Editors:** Susan & Stan Celestian.....azrocklady@gmail.com
- Field Trip:** Bill Freese ... bfreese77@cox.net
- Show Chair:** Ed Winbourne
- Trustees:**

- | | |
|-------------|-----------|
| Cynthia V | Claudia M |
| Susan C | Tiffany P |
| Bob E | Jim R |
| Jennifer G | Witt R |
| Don R | Howard R |
| Jessica C. | Rebecca S |
| Johnaton M. | |

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

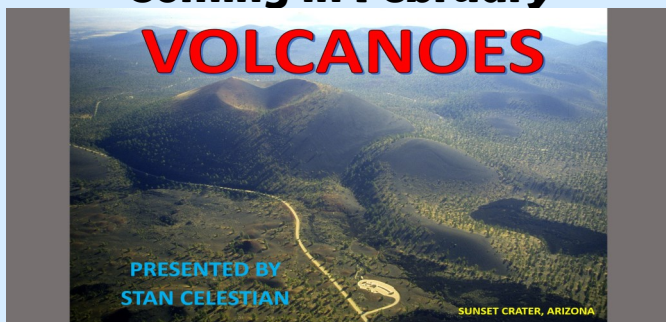
Membership Dues:
 First year \$30, then \$20.00 Adults per Person
 First year \$45, then \$25.00 Family (2 people)

Meeting Dates for 2020

Jan 7, Feb 4, Mar 3, Apr 7, May 5, June 2, Sept 1,
 Oct 6, Nov 3, Dec 1

Coming in February

VOLCANOES



PRESENTED BY
 STAN CELESTIAN

THE 66TH ANNUAL TUCSON GEM AND MINERAL SHOW[®]

FEBRUARY 13-16, 2020

Tucson Convention Center
260 South Church Avenue • Tucson, Arizona 85701

Thursday: 10:00 a.m. - 6:00 p.m.

Friday: 10:00 a.m. - 6:00 p.m.

Saturday: 10:00 a.m. - 6:00 p.m.

Sunday: 10:00 a.m. - 5:00 p.m.

Tickets go on sale Thursday, January 17, 2020 at all TCC Ticket outlets or call the TCC Box Office at 520-791-4101, option 1 for more information.

Don't forget, you can buy your ticket at the door!

Admission is \$13.00
(\$12.00 plus \$1.00 facility tax) per adult.
Children 14 and under FREE with a paying adult

Friday, February 14, 2020 is Military (active & retired) and Senior Citizens Day (62 and older), receive \$2.00 off the regularly priced ticket (cannot be used with any other discount).

2-day tickets will be available for a cost of \$22.00 (cannot be used with any other discount).

Clip the coupon for \$2.00 OFF on one adult General Admission ticket (cannot be used with any other discount).

FEATURING:

- Honoring 50 years of Mineralogical Record
- Retail Dealers | Exhibits
- Junior Education Area
- FREE Lectures | Symposiums
- "Micro- Mineral" Room
- Hourly Drawings at the Giveaway Booth
- Saturday Night Banquet & Awards
- Silent/Live Auctions

For more information: visit www.tgms.org



**TUCSON
GEM & MINERAL
SOCIETY**



Scan code for information on our Tucson Gem and Mineral Show[®]



TUCSON GEM AND MINERAL SHOW[®]
Tucson Convention Center
February 13 - 16, 2020

\$200 OFF
ONE ADULT GENERAL ADMISSION

www.tgms.org
CHILDREN 14 AND UNDER FREE WITH A PAYING ADULT
This coupon cannot be used with any other discount

© 2016 MG&H, Harvard University - Gold Ramblers - Grand Hog Mine, CO

2020 ANTHEM GEM AND MINERAL SHOW

SATURDAY MARCH 21 9 AM - 5 pm
SUNDAY MARCH 22 10 AM - 4 PM

ANTHEM SCHOOL
41020 N. FREEDOM WAY, ANTHEM

BRING THE KIDS !

KIDS CORNER: LOTS TO DO
EGG CARTONS, GAMES, PRIZES, HANDS-ON

VENDORS

JEWELRY, GEMS, MINERALS, FOSSILS, BEADS, WIRE WRAPPING, GEODES AND MORE

RAFFLES & DOOR PRIZES

SPECIAL ULTRA VIOLET DISPLAY

EXPERTS WILL IDENTIFY YOUR ROCKS

ADULTS \$3, SENIORS AND STUDENTS \$2

KIDS 12 AND UNDER ARE FREE

SPONSORED BY

DAISY MOUNTAIN GEM AND MINERAL CLUB

FOR MORE INFORMATION CONTACT:

ED WINBOURNE (978-460-1528)

EMAIL: ewinbourne@gmail.com

