

# 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 7, ISSUE 4**

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This is a specimen of halite from the Salt Mine at Camp Verde -- a mine frequented by the Native Americans living in the region, including Baja California, Mexico, and New Mexico. Gamma radiation (such as from potassium-40) causes disruptions in the crystal structure, resulting in displaced electrons occupying what are called color centers (or F-centers). These electrons migrate to  $\text{Na}^+$  ions, turning them to Na (sodium) metal; which eventually forms minute aggregates. The inky blue color is not due to any impurity, but to the way those metallic Na aggregates interact with light entering the crystal. *Photo by Stan Celestian*



# HALITE

By Susan Celestian

Halite, or "salt", also known as rock salt forms within evaporating basins of water -- lakes or seas. It is called an **evaporite**. Many salts (ionically bonded compounds) form when basins of water evaporate, and halite forms after the brine is very concentrated. The ideal scenario for the formation of halite is a restricted basin, in a hot and arid climate, where the influx of salty water is lower than the loss to evaporation. (In a stable basin, 90% of the seawater must evaporate before halite forms. Prior to that calcite, gypsum, anhydrite will form as the brine's concentration increases.) Very often, the basin is subsiding -- whether due to tectonic warping, or due to the increasing weight of the evaporite minerals. As a result, deposits of salts several thousand feet thick are possible -- and found all around the world.

### **Chemical Formula** - NaCl

**Crystal System** - Isometric (3 axes of equal length, and at 90° to each other) Go to

<https://www.mindat.org/min-1804.html>

(Scroll down to *Crystallographic forms of Halite*. Putting your cursor on the crystal, you can turn the crystal for 3-D viewing.)

**Growth Forms/Habits** - Massive, cubic, rarely octahedral, stalactitic, hopper

**Hardness** - 2.5

**Luster** - Vitreous

**Streak** - white

**Color** - Clear, white, yellow, pink, blue

**Diaphaneity** - Transparent to translucent

**Specific Gravity** - 2.168

**Cleavage** - cubic

**Fractures** - conchoidal

**Some Highlighted Deposits** - Wieliczka Salt Mine, Poland; Boulby Mine United Kingdom; Luke Salt Body Maricopa Co, AZ.; Camp Verde Salt Mine, Yavapai Co., AZ; Carlsbad, New Mexico

### **Other - Uses of Halite (aka Rock Salt):**

- ◆ Historically Romans were paid in salt. Sal ("salt") is the root word for salary, and good workers are 'worth their salt'
    - ◆ Table salt - seasoning, preservation
      - ◆ De-icer
      - ◆ A sodium & chlorine source
      - ◆ Water softener (ion exchange)
      - ◆ Paper & leather processing
        - ◆ Textiles and dying
    - ◆ Cavities in rock salt are used to store radioactive waste, butane, propane, and other gases - due to the tendency of salt to flow when under pressure, (i.e. it generally does not crack, or cracks 'heal'), thus making it impermeable (at least in arid climates -- salt is soluble!).
      - ◆ Occurs as salt domes, that trap gas and oil
- AND MORE!!!!**

Halite or Rock Salt (NaCl) occurs in mineable quantities in many places in Arizona, the broader United States, and around the world. See Figures 1 & 2. (Some interesting information about the world's 10 largest salt mines can be had here.) Halite is concentrated in the central portions of evaporative basins -- where prolonged evaporation results in the highest salinities.

There is a Morton salt mine in the Valley, west of Phoenix, at Dysart Rd and Glendale Av. One of the thickest salt deposits in the world, the Luke Salt Body, a deposit at least 6000' thick (may exceed 10,000' thick) and covering about 40 square miles (holding a potential total of 15 mi<sup>3</sup> of salt), is mined by dissolving the salts (primarily halite with gypsum) below ground, and pumping the brine into evaporation basins at the surface. The plant produces about 7.3 million bags of salt per year. More on page 18.

One of the largest salt deposit in the world lies beneath Michigan, in what was the Michigan Basin. During the Silurian, this basin accumulated great thicknesses of gypsum, anhydrite, and halite. In total, about 1968 feet (600m) of gypsum and halite were deposited, (with one salt bed nearly 500' thick). That is equivalent to the evaporation of a column of seawater 621 miles deep. This evaporative cycle lasted between 15-20 million years. This salt is mined in conventional underground mines -- with over 100 miles of roads in the Detroit Salt Company's mine under Detroit.

Within the following halite images, we will look at halite specimens and see some other interesting localities.

Halite continued on 13...

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# Logo Competition

In anticipation of producing products such as T-shirts, caps, bumper stickers, pens, and whatever might strike the club's fancy, it has been recommended that the club logo be updated. To that end, there will be a competition -- open to any club member. The winner will get a free T-shirt, and the logo will go on the next batch of shirts to be printed this summer.

There are a number of things to keep in mind, when designing a logo.

- \* Always think "simpler is better".
- \* **COLOR:** No more than 3 colors -- NO white in the design. Typically the T-shirts will be light in color, so darker colors in the logo will be best for contrast.
- \* According to T-shirt guru Claudia, the round logo has been a favorite, and the shape is good to use various products.
- \* Create a scalable design: a design that will still look good and be printable at various sizes

[https://www.wix.com/blog/2018/07/good-logo-design-tips?](https://www.wix.com/blog/2018/07/good-logo-design-tips?utm_source=google&utm_medium=cpc&utm_campaign=9823943661^102253749073&experiment_id=^433896974311^^_DSA&gclid=Cj0KCCQjwmPSSBhCNARiSAH3cYgb8HXojBWIdaQIUJMmSo2tSCK6V05hgfwk8_nnAnBC7frlvNm67nYaAr8bEALw_wcB)

[https://www.wix.com/blog/2018/07/good-logo-design-tips?](https://www.wix.com/blog/2018/07/good-logo-design-tips?utm_source=google&utm_medium=cpc&utm_campaign=9823943661^102253749073&experiment_id=^433896974311^^_DSA&gclid=Cj0KCCQjwmPSSBhCNARiSAH3cYgb8HXojBWIdaQIUJMmSo2tSCK6V05hgfwk8_nnAnBC7frlvNm67nYaAr8bEALw_wcB)

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<https://www.feelingpeaky.com/5-principles-of-logo-design/>

<https://eternitymarketing.com/blog/what-makes-a-great-logo>

<https://www.designhill.com/design-blog/how-to-design-most-attractive-marketing-logos/>

## Submission

**FORMAT:** .jpg (preferable) or .pdf (although be sure to save the original working file, in whatever format you choose.

**TO:** azrocklady@gmail.com

**WHEN:** All submissions must be received by  
May 25, 2022



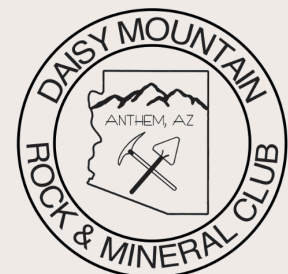
**JUST ONE  
-- MORE --  
ROCK**



\*(rock hammer included for scale)

Currently on Shirt Back

## LOGO HISTORY



Post Show Meeting Minutes  
March 30, 2022

- Open attendance – 20 participants
- Ed W. called the meeting to order
- Thank you to everyone who helped make this show our greatest success so far
  - No issues reported
  - Highest attendance (1,855 attendees)
  - Highest revenue in club history
- Ed W. heard requests for more slab sales for the show
  - Will work with Jim R. to get another slab vendor next show
- Jeannie & Bill S. – Kids Corner
  - Will be stepping down as chair next year
    - Setup is already organized for next year
    - Just need rocks labelled over the summer
      - Claudia M. has a sign-up sheet for anyone who would like to volunteer to help for a day
- Claudia M. – Co-chair
  - Dogs will have to be outside only next year
  - Would like to see the raffle prizes in the contract next year
  - Would like to see more help next year to give people relief
    - Proposed a volunteer committee to bring in more people
  - Would like quarters available as change if prices are <\$1
- Bob E. – Club Sales
  - Sold many UV lamps (with help from Bill P.)
  - Sold Tumbler
  - Was able to get rid of some of the material from the trailer!
  - Transilluminators were easy to setup
    - Wear sunscreen if you are in contact with the lights all day
- Rebecca S. – Raffle
  - Robin S. will co-chair raffle next year
  - Will need 3 volunteers each shift instead of 2
  - Thank you to Deanne G. for lending her work's sound system
    - Everyone was able to hear Rebecca throughout the show
      - Sorry to everyone that was too close to the speakers
- Deanne G. – Treasurer
  - The deposit slips worked at keeping things organized
  - Would like more volunteers to help next year in all areas
  - Will have finalized show financials soon
- Nancy G. – helped with kid's corner
  - Suggests spring break as a great time for show
    - Gives us more time to setup
  - Not coinciding with Anthem Days helped attendance
  - There are so many kids in Anthem that were able to enjoy the kid's corner
  - Liked the fact that the show was inside and outside
- Jessie C. – Admissions
  - There was no Veteran discount this year
    - Let them in for free instead
      - Should do so again next year if no discount
  - Did not have a card reader at table
    - People had to be walked down to Tiffany P.
      - There was a limit to pricing coded in that became an issue
  - Will need at least 3 more volunteers each shift
  - Explaining the show took time with guests



- Don R. – Tables
  - Seems logistically easier than reality
  - Old rental company did not have tables
    - Called 8 companies before finding one
      - Found Party People \$8.50/table
        - Cheaper than previous Royal Rentals
        - Came with carts (BE CAUTIOUS WITH THEM)
        - They were smaller and heavier though
  - We will be invoiced for damaging weather stripping on door
  - Kid's corner needed 10 tables, Display 2, Membership 1, Raffle 2-3, Admissions 2-3, Club Sales 10, Hot Dogs 3, Extras 3
  - Benches were great to have
  - Will need more than 75 chairs next year
    - Would like to see them be available at no extra charge to the vendors
- Esther – helped with security and overnight security
  - Had a great time and got a workout
  - Believes having a greeter at the front was a great idea
    - Can tell people what the show offers and pricing
- Renee I. – helped with hot dog stand
  - Will be more organized now that they know what to expect
    - Health inspector required boiling water and hand washing station
    - Would like quarters available as change if prices <\$1
- Chris F. – Hot Dog's
  - Will have food handler's certification for next year
  - Completed setup Saturday morning with health inspector
  - Would like to see relish, diet sodas, soy dogs next year
  - Thank you to Pat H. for all your help
  - Will have 2 grilles next time
  - If food coupons given out – please inform food sales next time
- Stacy N. – Vendor's
  - Inside setup went well
  - Outside had some issues but was finally resolved
  - Saturday night vendors should be given more time to leave
    - Some felt rushed out
  - Vendors who wanted our help appreciated it
  - We lost some vendors to the Albuquerque show
  - Jim R. talked to vendors after the show
    - Most were pleased
    - Some wished more high-end items were sold (\$250+)
  - Requested that vendors get more free food
- Dave H. – Electrical
  - One electrical short Saturday morning that was quickly remedied
  - The 3 panels in the gym were confusing
    - Would like to see a janitor there next time to help
      - We paid for one but did not receive one
- Linda H. – Refreshments
  - Proposed that flyer has a map on it
  - Thought sign to turn off Anthem Way could have been larger
  - Proposed getting another card reader for next year
  - Would like to buy another coffee pot next year
  - Whoever brought the candy bars & treats Friday thank you

- That was a great idea
  - The almond creamer was a great hit
- William (Bill) P. – helped with club sales
  - Would like to see a dedicated photographer
  - Proposed using walkie-talkies for key personnel
  - Thought Tiffany P. could have used a volunteer helper
- Tom E. – helped all throughout the show
  - Vendors seemed to appreciate our help
  - Electrical got praise from vendors
  - Proposed larger signs around town
- IF YOU HAVE RECEIPTS FROM ITEMS BOUGHT FOR THE SHOW, PLEASE BRING TO DEANNE G. FOR REIMBURSEMENT

Respectfully submitted,  
Rebecca Slosarik

### Zoom Board Meeting Minutes April 4, 2022

- In attendance: Bill F., Bob E., Bob S., Claudia M., Deanne G., Nancy G., Rebecca S., Renee I., Stan C., Sue C., and Tiffany P.
- Bill F. called the meeting to order
  - Ed W. is unavailable for board and general meeting
- March minutes approved
- Deanne G. did the financials
  - Net income for the month due to show
  - Because the claim was setup as an asset, selling it took away asset
    - We made money off the sale though
  - Asked how to expense the grill – under show or general?
  - School invoice not in yet
- Tiffany P. talked about membership
  - 28 new members at show
  - New membership total 271
  - Our meetings, field trips, and show get the most membership
  - Contact Tiffany P. if you need a nametag
- Claudia M. will talk about volunteers at general meeting
  - Nancy G. volunteered to be a greeter at the next show
- Stan C. talked about the claim's committee
  - Surface claims are cheaper and less of a liability
  - Will mark territory for mushroom rhyolite claim next week
  - Still looking for other claims to purchase
  - Will talk with Howard R. and John H. about claims
  - Would like to check active claims on BLM
    - Needs help navigating BLM claims map
  - Dave Haneline mine is sold
- Jennifer G. wire wrapping was updated
  - Jennifer will not be available for at least 6 months now
  - Will need an interim teacher to take her place
- Bill F. talked about the field trips
  - Dragon mine was very successful with 35 participants
  - Date Creek Ranch on the 16<sup>th</sup>
    - Joint trip with Verde Valley Rockhounds

- Saturday April 30<sup>th</sup> is the club picnic
  - Earlier date picked so it was cool enough outside
- Would like to schedule summer trips if people are interested
  - Colorado trip
    - Joint trip with MSA
  - New Mexico trip questionable
    - Need more details on the area to go out there
- Will have 2 trips for next 4 years to Dave Haneline mine
  - Renamed Blue Owl by new owners
  - Will have a trip in November back out there
- Please be cautious when rockhounding as there are RATTLESNAKES
- Claudia M. discussed the show
  - Post meeting went well
  - The Anthem Elementary just posted their 2023 calendar
    - Proposes we go within their spring break March 10-19
    - Will investigate dates for Anthem Days next year
    - Most people enjoyed the location
    - We should not have our show the same day as Anthem Days at the park
  - Our main issue was having enough volunteers for the show
    - Will explain the process more in depth next time
  - Proposed we rent all tables next year
  - One outside vendor did not like their location
    - Proposed changing layout outside
      - Put kids' corner and food in back area
  - Will give gas gift cards to those who drove material to and from the show
    - Approved unanimously by board
    - Claudia M. and Ed W. will give them out
- April general meeting will be a swap and share
  - Thank you to Claudia M. for getting table covers for the meeting
  - No silent auction for the month
- May meeting speaker TBD
  - Ed W. will give us update when ready
- Tiffany P. and Bill F. proposed having DMRMC gear available
  - Would like to see decals for windows, magnets, and maybe more
  - There is a company that can print our logo on anything from their website
    - Will be investigated
  - Logo will need to be redesigned and colored
    - Will propose a competition for logo at the meeting
- Lapidary property was brought up
  - We would still like to see a club owned lapidary shop
    - Financially impossible right now
      - Unless donated
      - Or possibly setup through a gofundme page
  - Bob E. proposed art center at civic building to administrators
    - This would house our lapidary shop/wire wrapping/silver smithing classes
    - Was denied due to liability and mismarketing according to civic building

Respectfully submitted,  
Rebecca Slosarik



## General Meeting Minutes

April 5, 2022

- Open attendance – about 57 participants
- We will follow city guidelines for mask wearing – currently not required
- Bill F. called the meeting to order
  - Ed W. was missed, and we hope he feels better
- This meeting has no guest speaker – it is a swap and sale special
  - Members brought material to swap or sell
- Welcome to all the new members!!!
  - They came from all over
    - Friends, the show, Facebook, and other clubs
- Bob E. discussed the claim's committee
  - Dave Haneline mine was sold
    - Due to undercutting liability
    - Was renamed Blue Owl – we will still use Dave's name
  - Looking at other claim's due to industrialization of the area
    - Will save areas for future rockhounds
  - Needs assistance with the BLM land map
- Bill F. talked about the field trips
  - The Reserve Bank mine went great
    - They had copper refining, smelting, jewelry making all on site
  - Please check emails for updates and RSVP to email
  - Club day at Anthem Park will be set
    - Will need to rent ramada first
  - Will try and do Luna, NM trip for agate again
    - Was cancelled last year due to fire
    - Requires a 4x4 vehicle
    - Will require you stay at a hotel or camp overnight
- CALLING ALL ARTISTS
  - Your skills are requested to redo the DMRMC logo
    - We want to expand our merchandise and need a colorful logo
    - Submit artwork to [DMRMCclub@gmail.com](mailto:DMRMCclub@gmail.com)
- Tiffany P. discussed the membership
  - Currently at 271 members
  - Forms are available online where you can pay for membership
- Claudia M. discussed the 2022 show
  - Most profitable show in club's history
  - Would ask if more volunteers can help out next year
  - Kid's corner needs rocks labelled over summer
    - We ran out this year at the show
  - Claudia needs the chair's paperwork from the show
- Wire wrapping was discussed
  - Jennifer will not be available for next 6 months or so
  - Will need an interim volunteer teacher
    - Contact Tiffany P. if you want to teach
- The raffle made \$106
- The meeting commenced with the swap and sale festivities

Respectfully submitted,  
Rebecca Slosarik



# FIELD TRIP TO DRAGON MINE

## Saturday, April 3, 2022

Photos & Text by Bill Freese

Holy cow Batman, we need to go the Dragon Mine for special stuff! I got a much bigger response than I was expecting. We ended up with 35 people plus me, including a bunch of newbies. We took all of these folks on a 4x4 trail and everyone made it. Once we got to the two sites, everyone managed to get some cool stuff. Luckily, I had lots of help from several folks. (Thank You) The trip was another great event in the beautiful AZ desert.

### Thundereggs



### Black Schorl Galore



### Geodes



FOR MORE PHOTOS OF THIS TRIP, CHECK OUT THE [DMRMC FACEBOOK PAGE](#)





....Minutes continued from page 11.....

# FIELD TRIP TO CHILITO MINE

## Wednesday, April 13, 2022

*Photos & Text by Bill Freese*

The DMRMC had their midweek trip to the Chilito mine today and it turned out as expected. Another beautiful day in the desert, as it just happened to be a cool day, only about 70 degrees and sunny. There were 10 of us including me, with most being first timers. All had a great time and found lots of Chrysocolla and other copper minerals. On to the next.....

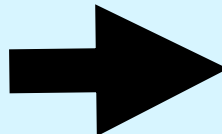


*CHRYSOCOLLA*

*Hydrous Copper Silicate*



**FLASHY  
YARD  
ROCKS**



FOR MORE PHOTOS OF THIS TRIP, CHECK OUT THE [DMRMC FACEBOOK PAGE](#)

*Field Trips continued on page 10...*



...Field Trips continued from page 12

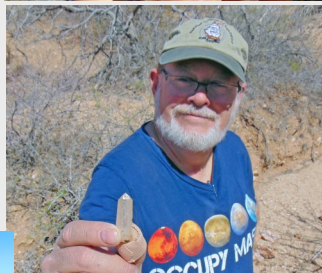
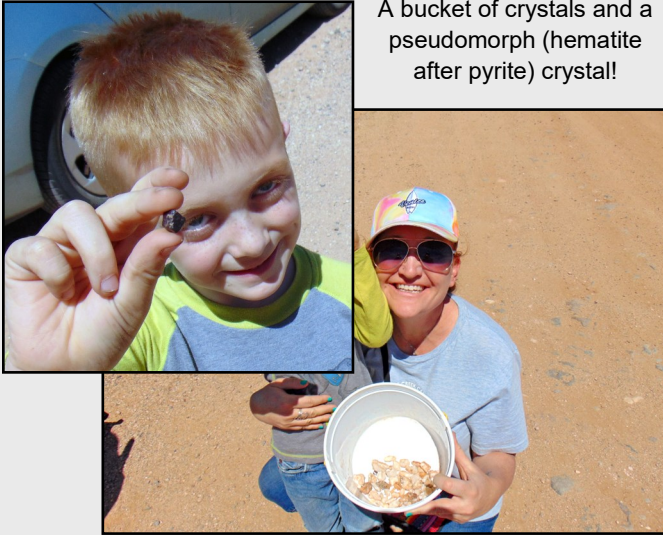
# FIELD TRIP TO DATE CREEK

## Saturday, April 16, 2022

Text and photos by Bill Freese

Another fun day in the desert with DMRMC. Today we went to Date Creek Ranch for quartz crystals. This is one of our easiest trips and it is family friendly. We ended up with 37 folks, including 11 kids. Everyone had fun and found some "treasures" to take home. JoHanna Raupe started us off with some donuts to give us a jolt of energy. There were plenty of newbies and all enjoyed their hunts.

A bucket of crystals and a pseudomorph (hematite after pyrite) crystal!



It's so great to have so many new young members



FOR MORE PHOTOS OF THIS TRIP, CHECK OUT THE [DMRMC FACEBOOK PAGE](#)

Field Trips continued on page 14....



...Field Trips continued from page 14

## FIELD TRIP TO CAMP VERDE

Wednesday, April 27, 2022

Text by and photos by Bill Freese

Today the DMRMC took a bunch of folks up I-17 to the Camp Verde area for pseudomorphs. We ended up with 15 of us on a Wednesday. That's pretty good. All had fun digging in the clay for the spiky crystal clusters. An easy trip and easy to fill your bucket or bag very quickly.

Everyone left happy.



Between 13 and 2 mya, the Verde Valley dropped about 6100', bounded by the Mogollon Fault (to the north) and the Verde Fault (to the west). That displacement, coupled with occasional basalt dams, disrupted the flow of the Verde River, and resulted in the ponding of shallow lakes (probably 10-20' deep) and marshes, that swelled and shrank with the seasons and climate changes, over a period ranging from 9-2.5 mya.

In those lakes and streams, at least 3125' of sediments accumulated -- mudstones, limestone, sandstones, diatomites, and evaporites -- and comprise the Verde Formation.

When at last the lake(s) began to shrink, the deepest water lay in the Camp Verde area. There the salinity became extreme and evaporite minerals were deposited in the muds. The first mineral to form was glauberite, followed by aragonite, calcite, gypsum and halite.

Glauberite is quite soluble, so does not generally persist. Your editor has collected some crystals at the old salt mine. However, the sediments are locally loaded with pseudomorphs (*pseudo*-false; *morph*-form) of aragonite after glauberite, calcite after glauberite, and gypsum after glauberite. In each instance, the various minerals occupy the form of glauberite.

The pseudomorphs probably formed in two ways:

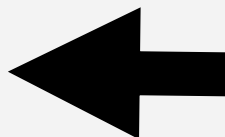
- \* Glauberite crystals and crystal clusters were replaced molecule by molecule by other minerals. This process is likely the dominant one.
- \* The glauberite dissolved leaving behind voids that filled in with other minerals.



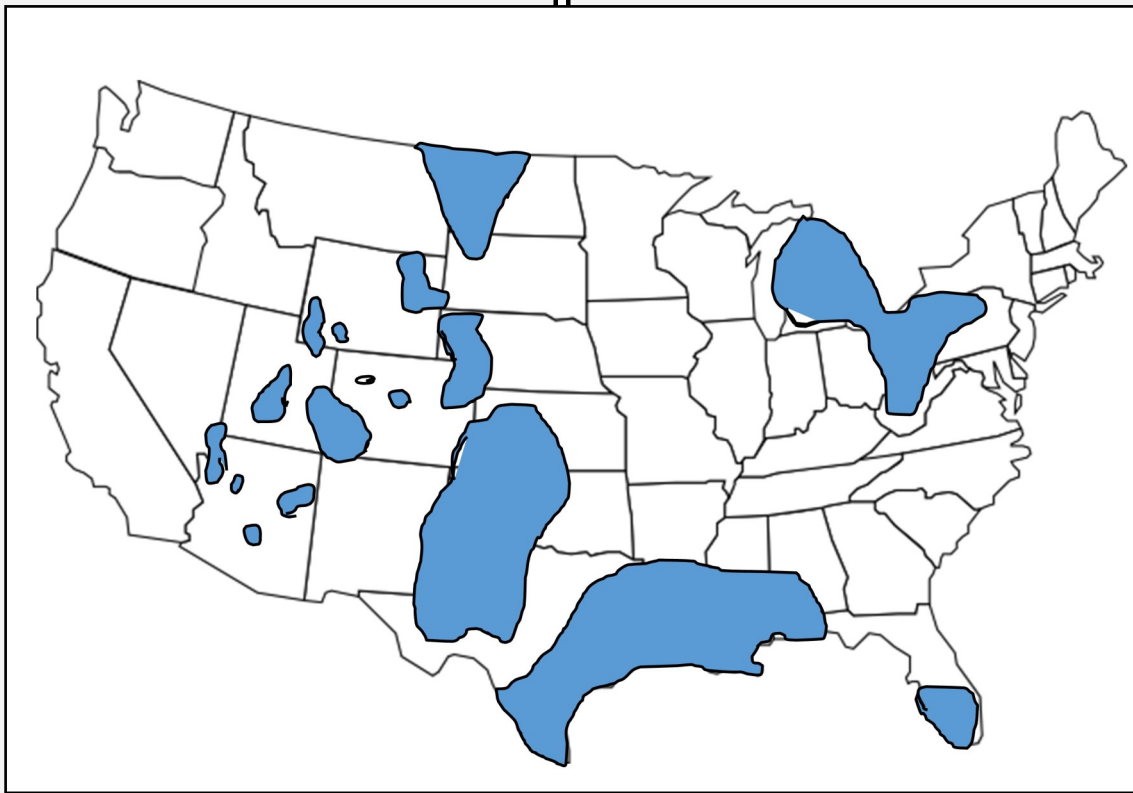
The pseudomorphs collected on this field trip are gypsum after glauberite.



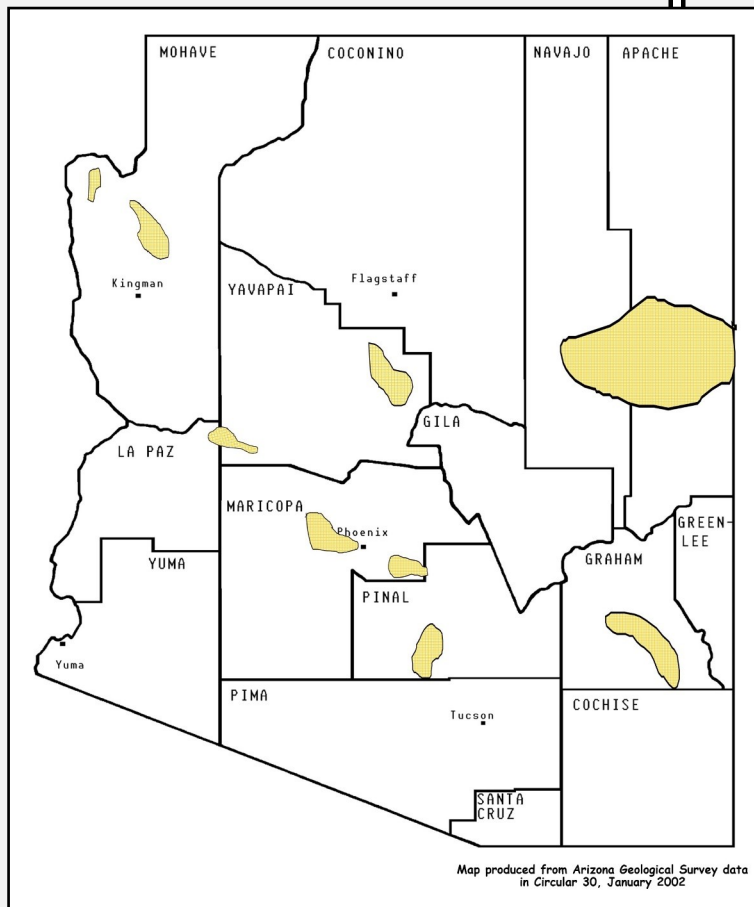
FOR MORE PHOTOS OF THIS  
TRIP, CHECK OUT THE  
[DMRMC FACEBOOK PAGE](#)



...Halite continued from page 2



**FIGURE 1 MAJOR HALITE DEPOSITS OF THE UNITED STATES** This map outlines the general areas underlain by halite in the United States. Map by Susan Celestian - based on various publications.



Map produced from Arizona Geological Survey data in Circular 30, January 2002

**FIGURE 2 HALITE DEPOSITS OF ARIZONA** This map summarizes the known main areas underlain by halite deposits, in Arizona. Map produced by Susan Celestian from Arizona Geological Survey data in Circular 30, January 2002.



...Halite continued from page 13



**FIGURE 3 CUBIC CLEAVAGE** This is a cube of clear halite. It is not a crystal, but a broken chunk, and the perfect cubic cleavage is quite obvious. *Photo by Stan Celestian*



**FIGURE 4 ORANGE HALITE** This lovely orange halite specimen is from Fort Riley, Riley, Texas. *Photo by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem & Mineral Hall.*



**FIGURE 5 BLUE HALITE** This halite is strikingly blue. Likely the source of the radiation causing this color was sylvite (a

potassium chloride), frequently associated with halite deposits (refer to caption of color photo). This specimen is from the Devonian Prairie Evaporite Formation in the Potash Saskatchewan-Lanigan Mine, Saskatchewan, Canada. *Photo by James St John and licensed under CC BY 2.0*



**FIGURE 6 THE SALT MINE AT CAMP VERDE** Between 10 and 2 million years ago, a lava dam resulted in the impoundment of water in a series of shallow lakes, within the downfaulted

Verde Valley. Evaporation cycles resulted in the deposition of evaporites, including halite. One of the oldest mines in the U.S., it was worked by Native Americans from the region (Baja California, Arizona, and New Mexico) for salt nearly 2000 years ago. In the 1800s Fort Verde exploited the mine for stock



(and human) salt. And in the 1920s-30s, it was commercially mined, and 14 horizontal tunnels were driven into the clayey sediment. Photo A's blue color is explained on the cover page. However, note the plant debris (indicated by the red arrow) entrapped in the salt -- a glimpse of the area's flora. Photo B is a view of underground timbers. These timbers are being deformed due to

the growth of salt crystals ripping the wood apart -- combined with the weight of the overburden. The white stalactitic material is thénardite (sodium sulfate).

*Photos by Stan Celestian*

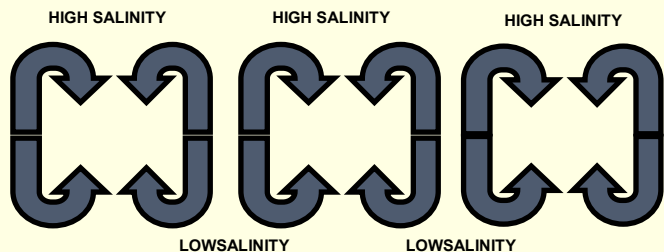


...Halite continued from page 14

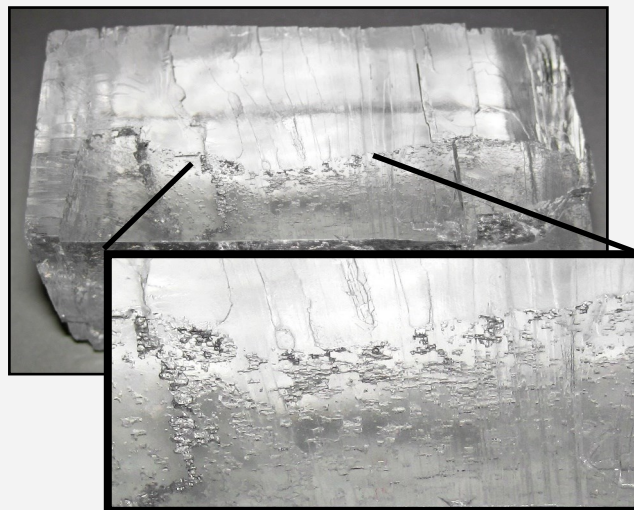


**FIGURE 7 SALT FLAT** When faulting drops blocks of earth, the drainage into those basins has no outlet. Water flows into them and creates lakes -- some small, some very, very extensive. As the water evaporates, salts build up; and with no outlet thick beds of halite (and other minerals) create salt flats, or salt pans. These 3 photos are of the salt flat at Searles Lake, in San Bernadino Co., CA. They polygonal ridges, once thought to be due to shrinkage, are now thought to be caused by closely-spaced convection cells, created by the overturning of very salty, and less salty water, within the fluid-saturated sediments below (see diagram below). The ridges that form outline the edges of the convection cells, and are created by the crystallization of salt, where the salinity is highest.<sup>1</sup>

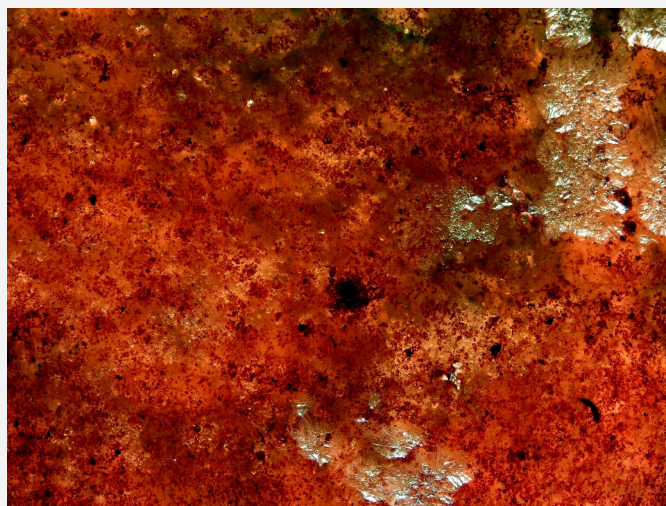
Photos by Susan & Stan Celestian



<sup>1</sup><https://www.lindau-nobel.org/blog-from-star-wars-to-geophysics/>



**FIGURE 8 INCLUSIONS IN HALITE** This is a cleavage fragment of rock salt from the Lower Permian Slavyanska Group in the Soledar Salt Mine District, Ukraine. Solid and fluid inclusions are common in halite -- it crystallizes fairly rapidly, and water, air, plant fragments, and other materials are often trapped in the growing crystals. These inclusions can provide important and interesting information to science. See Figures 6 & 7) Photo by [James St John](#) and licensed under [CC BY 2.0](#)



**FIGURE 9 SALT-LOVING BACTERIA** This is a close-up view of the water in the water on the salt flat at Trona, CA (see Figure 8). The water is blood-red, due to the presence of millions and millions and millions of halophilic archaeobacteria or halobacteria -- bacteria that thrive in water in hypersaline water or water with salinities of 15-20% (4X to 9X that of seawater). These become included in the halite growing in these pools, and the result can be seen in Figures 11-13.

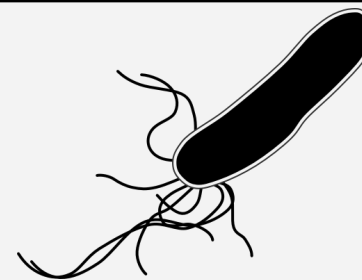
Photo by Susan Celestian



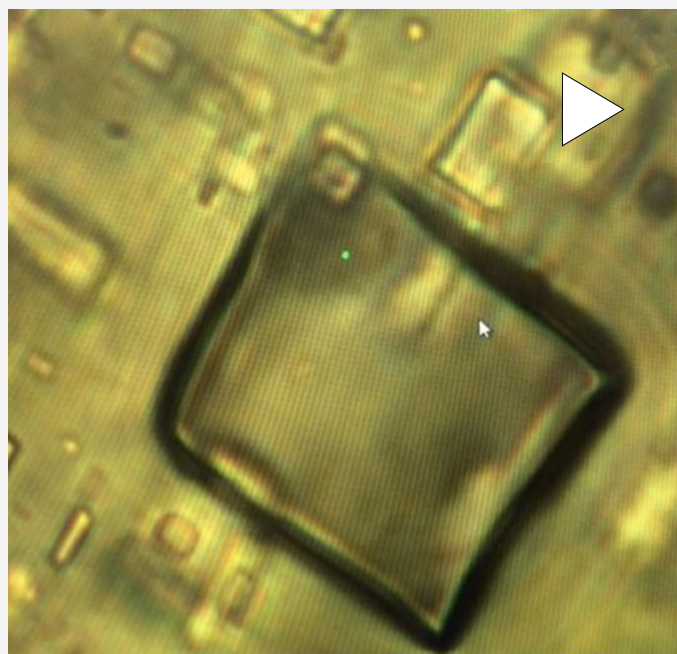
...Halite continued from page 15



**FIGURE 10 PINK HALITE** When halophilic bacteria (See Figure 10) become entrapped in fast-crystallizing halite crystals, the result is quite pretty -- dark to pale pink halite! *Photos by Stan Celestian*



**FIGURE 11 HALOPHILIC BACTERIA** This is a diagram of *Halobacterium Elazari-Volcani*, one of many rod-shaped halophilic bacteria.). *Diagram by Matt Crook and licensed under [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)*



**FIGURE 12 HALOPHILIC BACTERIA** Click on the white arrow in the diagram to view a video of moving halophilic bacteria (probably). Look closely and you can see their flagella whipping about.

Halophilic bacteria can survive for thousands, and maybe millions, of years in fluid inclusions in halite. Bacterial spores extracted from salt samples taken near Carlsbad, New Mexico, from 2000' below the surface, were grown in the lab. These salt from which they came formed about 250 million years ago! Similar scenarios have been repeated on extractions from salt beds around the world.<sup>2</sup> If those rock systems have been closed for all those years, think of the implications with respect to finding evidence of life in the salt deposits of Mars and Europa!! See this [blog](#) by Aaron Celestian. *Photo by Xander Celestian and used with permission of the Natural History Museum of Los Angeles County Gem & Mineral Hall*

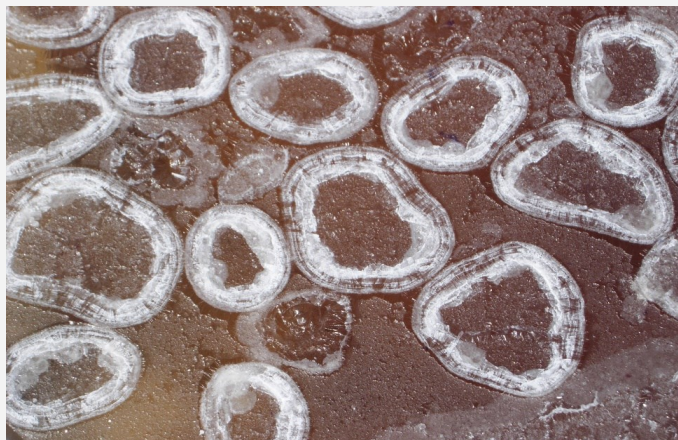
<sup>2</sup><https://www2.palomar.edu/users/warmstrong/plsept98.htm>



...Halite continued from page 16

**FIGURE 13  
CLEAR HALITE**

Here is a cluster of clear halite from Searles Lake, in Trona, San Bernadino Co., CA *Photo by Stan Celestian*



**FIGURE 14 HALITE RAFTS** On one visit, we saw these circular rafts of salt, forming on the surface of a big brine pool, at Searles Lake, in Trona, San Bernadino Co., CA These probably form from the wind eddies swirling the surface 'scum' of salt. We thought they were halite, but our mineralogist son thinks they might be mirabilite/thenardite. Still pretty awesome!

*Photo by Susan Celestian*

**FIGURE 15  
HALITE RAFTS**

Stan is calling these salt "worms". These are created by capillary action -- evaporation at the surface draws salty water up, where it leaves behind a deposit that builds up over time.



Searles Lake, Trona, San Bernadino Co, CA

*Photo by Stan Celestian*



**FIGURE 16 HALITE FORMATIONS**

Evaporation of flowing and dripping salt water creates all kinds of interesting features on the salt flat at Searles Lake, Trona, San Bernadino Co, CA *Photos by Susan & Stan Celestian*

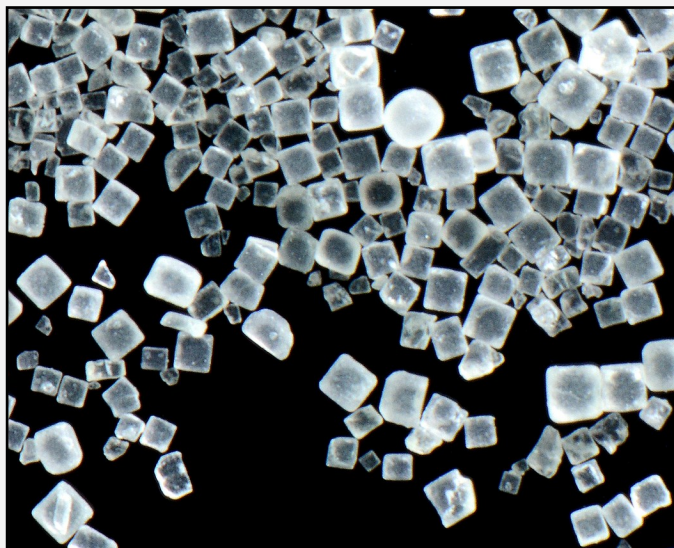


...Halite continued from page 17



**FIGURE 17 HOPPER HALITE** Halite tends to grow quite rapidly. As a result, crystal imperfections are common. We've already seen fluids and solids included in crystals. In this instance, the cavernous crystal form is called "hopper". The electrical charge, within the atomic structure, is greatest along the edges (where surface area is greatest); therefore the crystal grows fastest there, leaving the centers of the faces lagging behind. This specimen is from Searles Lake, Trona, San Bernadino Co., CA

*Photo by Stan Celestian.*



**FIGURE 18 TABLE SALT** Take a close look at that white stuff coming out of your salt shaker. See all those little cubes? Table salt, or Halite, has cubic cleavage; and when it is crushed for culinary use, one gets smaller and smaller cubes -- every time.

*Photo by Stan Celestian*



**FIGURE 19 FLUORESCENT HALITE** The image on the left is of large (over 1") halite crystals growing on a plant stem, from the Salton Sea of southern California. Halite from the Salton Sea will often display brilliant fluorescence, as seen in the image on the right. This bright orangey-red fluorescence is due to the co-activation of manganese and lead. *Photos by Stan Celestian*



...Halite continued from page 18



**FIGURE 20 DEVIL'S GOLF COURSE** This area of Death Valley NP is a thick salt pan deposit. Erosion by occasional rain, and a spiky surface due to capillary movement of salty water toward the surface, have created a surface on which only the Devil could play golf. *Photo by Stan Celestian*

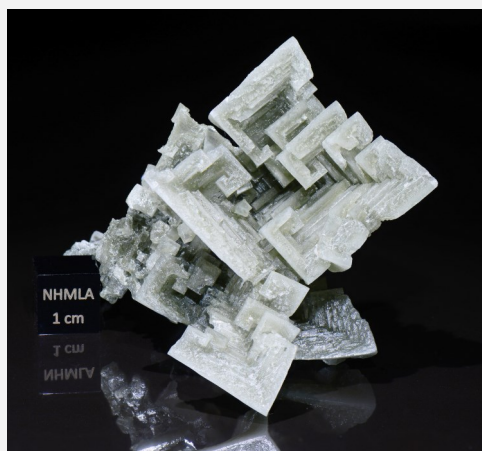
**FIGURE 21 HALITE**

This stack of en echelon halite cubes is a sort of hopper growth. The specimen is under 3" tall, and is out of the Stassfurt, Potash deposit, Stassfurt, Saxony-Anhalt, Germany.

*Photo by Rob Lavinsky, [iRocks.com](http://iRocks.com) and licensed under [CC-BY-SA-3.0](https://creativecommons.org/licenses/by-sa/3.0/)*



**FIGURE 22 HALITE SCULPTURE** Out of the collection of the Natural History Museum of Los Angeles County, this is a sculpture from the Wieliczka Salt Mine, Krakow Poland. *Photo by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem & Mineral Hall*

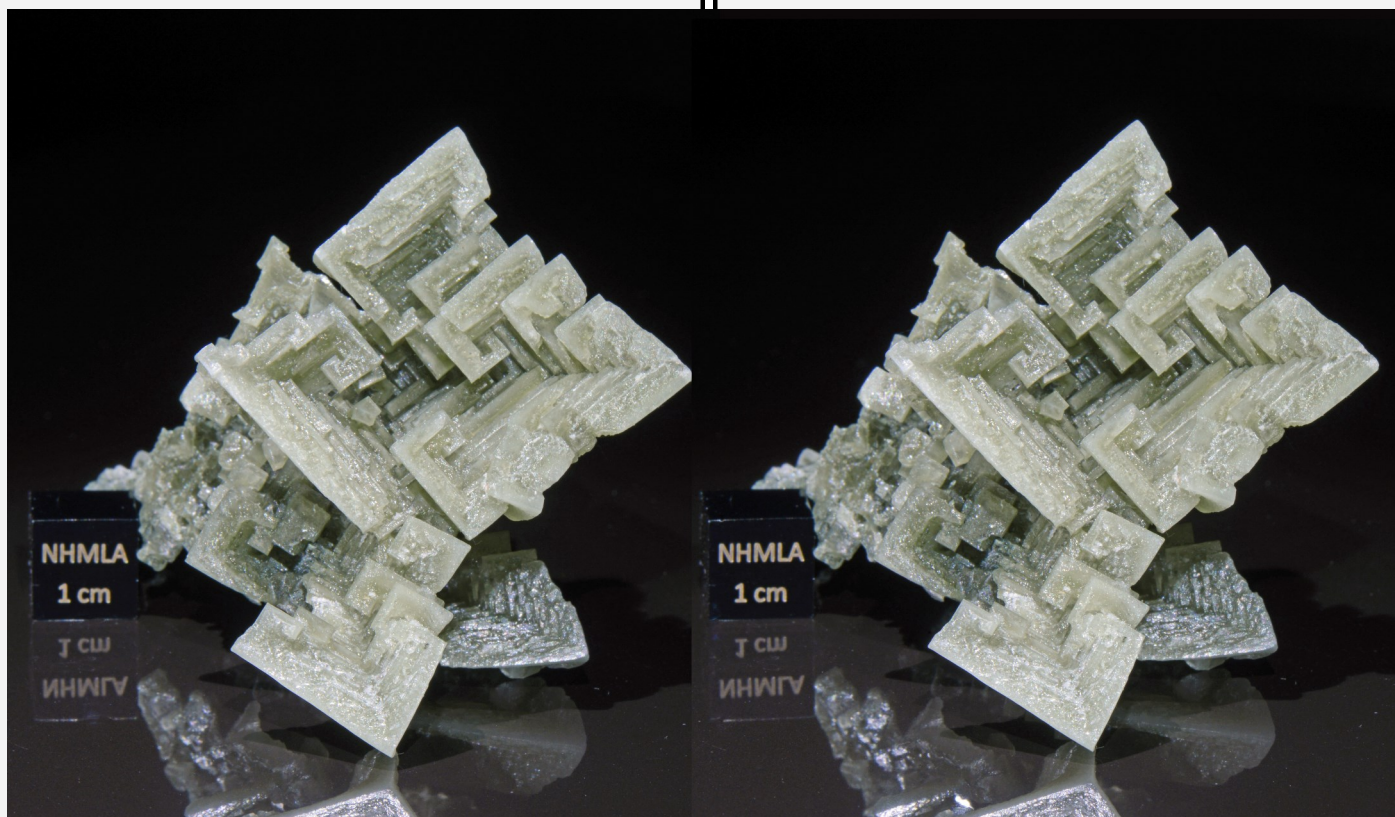


**FIGURE 23 HOPPER HALITE**

Remember the pink hopper crystals in Figure 18? Here are some fabulous hopper halite crystals from the Sieroszowice Mine, Lubin-Glogów Copper District, Poland. The green color is probably due to inclusions of various amounts of tolbachite (a copper chloride). *Photos by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem & Mineral Hall*



...Halite continued from page 19



**FIGURE 24 STEREO PAIR - HOPPER HALITE** You know what to do :-)  
 This stereo pair of hopper halite from the Sieroszowice Mine, Lubin-Głogów Copper District, Poland, SO cool! Photos by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem & Mineral Hall

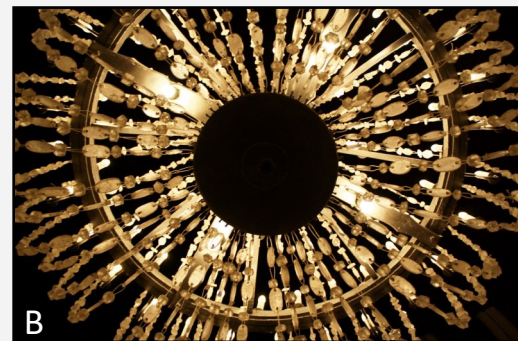


**FIGURE 25 STEREO PAIR - HOPPER HALITE, SORT OF** This stereo pair is of hopper halite replaced by gypsum, from Point Sal, Santa Barbara, Santa Barbara Co., CA. Photos by Stan Celestian



...Halite continued from page 20

In addition to mining, storage and specimen collection, some salt deposits have been carved into magnificent cathedrals, chapels, and reception rooms. See Figures 27 & 28.



**FIGURE 26** [WIELICZKA SALT MINE CATHEDRAL](#)

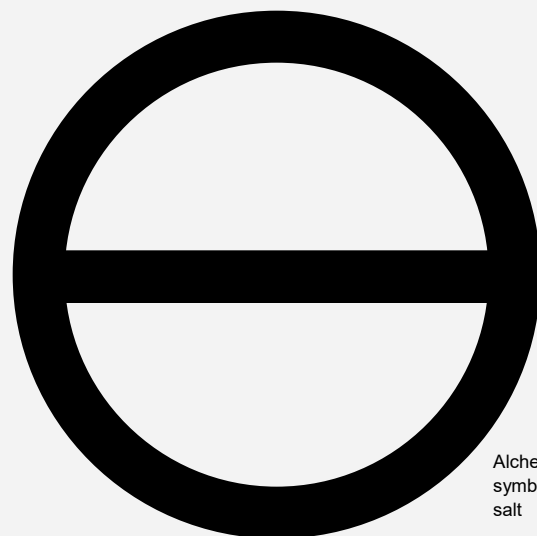
As mining occurred, miners also took the time to carve out a cathedral, 20 chapels, reception rooms, sculptures, bas reliefs, and ornate wall and floor designs. Even the chandeliers (Photo B) are created out of salt (dissolved and reconstituted to look like glass). Photo A by [Nikonmania](#) and licensed under [CC BY-NC-SA 2.0](#). Photo B by [Dimitry B](#) is licensed under [CC BY 2.0](#).



**FIGURE 27** [ZIPAQUIRÁ SALT MINE CATHEDRAL](#)

Another mine, in which miners carved chapels and cathedrals, is in Zipaquirá, Colombia. The current chapel, is actually the 3rd one built, as the first two were closed as unsafe. It is adorned by many ornate [statues](#) carved out of salt. According to American Mine Services, the room is over 80' high and nearly 250' long, and at capacity, can accommodate 10,000 people. A typical Sunday finds 3,000 in attendance.

Photo by [jikatv](#) is marked with [CC BY-SA 2.0](#).



Alchemical symbol for salt

Halite continued on page 22..



...Halite continued from page 21

## AN ADDENDUM - ROCK SALT IN THE VALLEY



Did you know that there is a salt mine in our own backyard? Right in Glendale, Arizona?

Underlying an area east of Luke AFB, there is a salt deposit, from a Tertiary (Miocene-Pliocene) inland lake.

- ◆ The top of the salt is 880'->2600' below the surface
- ◆ The body is 8 miles x 5 miles x >1 mile thick (and may be over 10,000' thick)

The salt is mined by solution mining and is used for industrial salt, such as in water softening.

- ◆ Fresh water is pumped into wells drilled to 3500', to dissolve the salt
- ◆ Brine is pumped up into evaporating ponds (see Photo A)
- ◆ Over 120,000 TONS of salt produced per year

Tear drop-shaped caverns are dissolved out in the process, and are used to store LPS (butane, propane).

- ◆ Caverns 1550' deep, 60' average diameter (up to 175' diameter), extend to 1550'-3000' below the surface
- ◆ Total volume stored is 156 million gallons



Halite continued on page 23



...Halite continued from page 22

### GENERAL RESOURCES FOR HALITE

<https://www.mindat.org/min-1804.html>  
[https://www.instagram.com/p/BTFyHt9ICgm/?utm\\_medium=share\\_sheet](https://www.instagram.com/p/BTFyHt9ICgm/?utm_medium=share_sheet)  
<https://azgs.arizona.edu/photo/arizona-has-salt#:~:text=Arizona%20has%20substantial%20salt%20resources,occurs%20in%20the%20Phoenix%20basin.>  
<http://archive.azcentral.com/community/glendale/articles/20130712morton-turns-glendale-into-valleys-saltiest-city-prog.html>  
<https://www.phoenixmag.com/2021/07/14/the-luke-salt-body-stimulated-the-west-valleys-postwar-economy/>  
<https://project.geo.msu.edu/geogmich/saltminingg.html>  
<https://www.buzznicked.com/detroit-salt-mine-michigan-basin/#.VJOsIF3i9WY.facebook>  
<https://www.detroitnews.com/picture-gallery/news/local/michigan-history/2020/01/26/detroit-salt-mine-city-beneath-city/4523991002/>  
<https://www.sott.net/article/292524-The-giant-salt-mine-1200-feet-beneath-Detroit-Michigan>  
<http://detroitssalt.com/>  
<https://lisbdnet.com/where-is-the-largest-salt-mine-in-the-us/#:~:text=The%20rock%20salt%20is%20produced,in%20the%20Sevier%20Valley%2C%20Utah.>  
<https://americanmineservices.com/top-10-largest-salt-mines-in-the-world/>  
<https://www.mindat.org/loc-45093.html>  
<https://en.wikipedia.org/wiki/Halite>  
[https://www.google.com/search?q=uses+of+halite&rlz=1C1CHMO\\_enUS586US586&oq=uses+of+halite&aqs=chrome..69i57j0i512j0i22i30i2j0i390.6334j0j1&sourceid=chrome&ie=UTF-8](https://www.google.com/search?q=uses+of+halite&rlz=1C1CHMO_enUS586US586&oq=uses+of+halite&aqs=chrome..69i57j0i512j0i22i30i2j0i390.6334j0j1&sourceid=chrome&ie=UTF-8)  
[http://minerals.gps.caltech.edu/color\\_causes/radiate/index.html](http://minerals.gps.caltech.edu/color_causes/radiate/index.html)  
<https://www.lindau-nobel.org/blog-from-star-wars-to-geophysics/>  
[https://www.researchgate.net/publication/331034186\\_Salt\\_Polygons\\_are\\_Caused\\_by\\_Convection/link/5cc0718fa6fdcc1d49acb1ec/download](https://www.researchgate.net/publication/331034186_Salt_Polygons_are_Caused_by_Convection/link/5cc0718fa6fdcc1d49acb1ec/download)  
<https://www2.palomar.edu/users/warmstrong/plsept98.htm>  
[http://www.minsocam.org/msa/collectors\\_corner/arc/fluorhal.htm](http://www.minsocam.org/msa/collectors_corner/arc/fluorhal.htm)  
<https://www.spiriferminerals.com/177,Skeletal-halites-from-Poland.html>  
<https://aaron-celestial.medium.com/crystal-aquariums-60b3eb65de4f>  
[https://www.google.com/search?q=how+many+chapels+in+salt+mines+in+the+world&rlz=1C1CHMO\\_enUS586US586&oq=how+many+chapels+in+salt+mines+in+the+world&aqs=chrome..69i57j33i160i3j33i299.9383j0j1&sourceid=chrome&ie=UTF-8](https://www.google.com/search?q=how+many+chapels+in+salt+mines+in+the+world&rlz=1C1CHMO_enUS586US586&oq=how+many+chapels+in+salt+mines+in+the+world&aqs=chrome..69i57j33i160i3j33i299.9383j0j1&sourceid=chrome&ie=UTF-8)  
<https://americanmineservices.com/top-10-largest-salt-mines-in-the-world/>

### GENERAL RESOURCES FOR SALT DOMES (GEO MINI 1)

<https://geology.com/stories/13/salt-domes/>  
[https://www.researchgate.net/figure/Map-showing-rock-salt-deposits-in-the-United-States\\_fig1\\_236357266](https://www.researchgate.net/figure/Map-showing-rock-salt-deposits-in-the-United-States_fig1_236357266)  
<https://www.dnr.wa.gov/programs-and-services/geology/energy-mining-and-minerals/oil-and-gas-resources>  
<https://pubs.usgs.gov/of/1988/0450k/report.pdf>  
[https://en.wikipedia.org/wiki/Salt\\_dome](https://en.wikipedia.org/wiki/Salt_dome)  
<https://pubs.usgs.gov/pp/0175d/report.pdf>  
<https://www.britannica.com/science/salt-dome#ref181653>  
<https://pubs.usgs.gov/sir/2012/5159/SIR12-5159.pdf>  
<https://www.osti.gov/servlets/purl/1244477>  
<https://repositories.lib.utexas.edu/bitstream/handle/2152/77893/txu-oclc-33204.pdf?sequence=1>

# GEO MINI 1

## Salt Domes

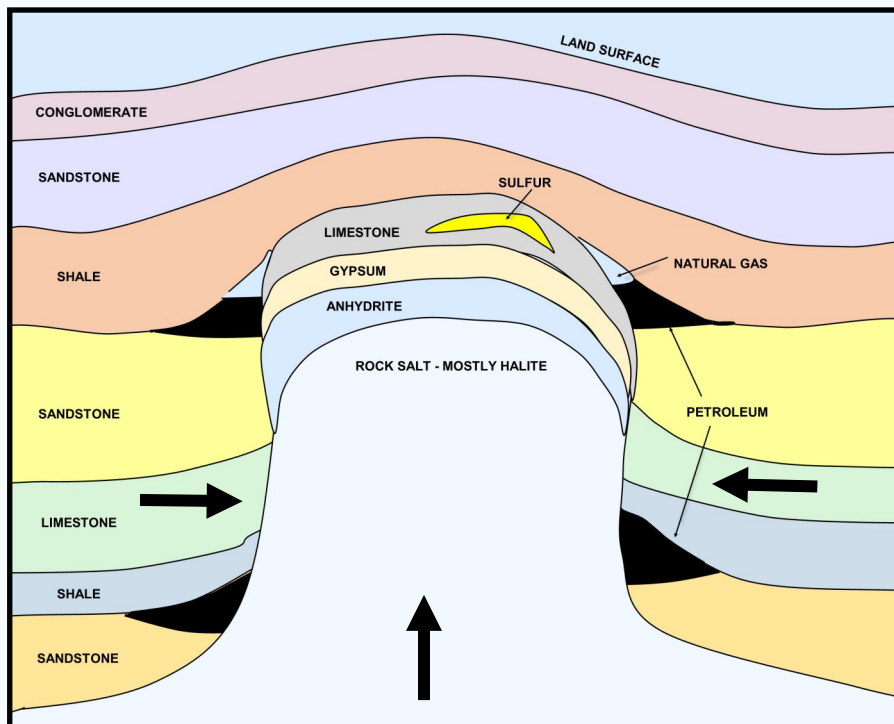
By Susan Celestian

Salt domes are columnar features unique to bedded rock salt (mostly halite, with associated gypsum, anhydrite, and other evaporites). Because of their unique structure and geologic setting, they make great traps for petroleum. See Figure A.

- \* It begins with the accumulation of very thick beds of salt, which requires the repeated flooding and evaporation of seawater in a restricted basin (one in which there is significant inflow, but little to no outflow).
- \* The salt is then buried by thousands of feet of sediment layers (sand, mud, lime..), that form sandstone, shale, and limestone.
- \* Under extreme pressure, salt deforms and flows. Under differential pressure, and finding weakness in the rock above, the salt will flow upwards (in a way is squeezed to flow upward), intruding and piercing the rocks, and causing them to dome and fracture (normal or tensional faults), further facilitating upward movement. As long as the pressure on the salt overrides the resisting forces (weight of overburden, strength of the rocks above, friction, gravity), the salt will flow upward -- a process called *diapirism*. When the forces are in equilibrium, upward flow will cease.

Typically salt domes are around 1/2 mile in diameter, but may exceed 6 miles. And they are between 1 and 6 miles tall.

- \* **CAP ROCK:** At shallow-ish depths, solution of the main salt body will produce a layer of insoluble anhydrite (calcium sulfate), that will later alter to gypsum (hydrous calcium sulfate), calcite (calcium carbonate) and sulfur. This cap is typically about 300' thick, but may be as thick as 1000'.
- \* Salt domes are a source of halite, sulfur and petroleum/natural gas. Often voids left after mining are used to store oil, natural gas and hydrogen. In the United States, the over 500 salt domes in the Gulf of Mexico are extremely important to the petroleum industry. See Figures B & C.



**FIGURE A IDEALIZED SALT DOME** In this diagram, a column of salt has flowed upward, and has pierced and domed up hundreds to thousands of feet of the overburden of weak relatively unconsolidated sediment layers.

Due to its lighter density, oil and gas in rocks pierced by the salt, migrate up along bedding through porous sediments, until it encounters impermeable material, such as shale and salt. It then accumulates in "pools" adjacent to the salt dome.

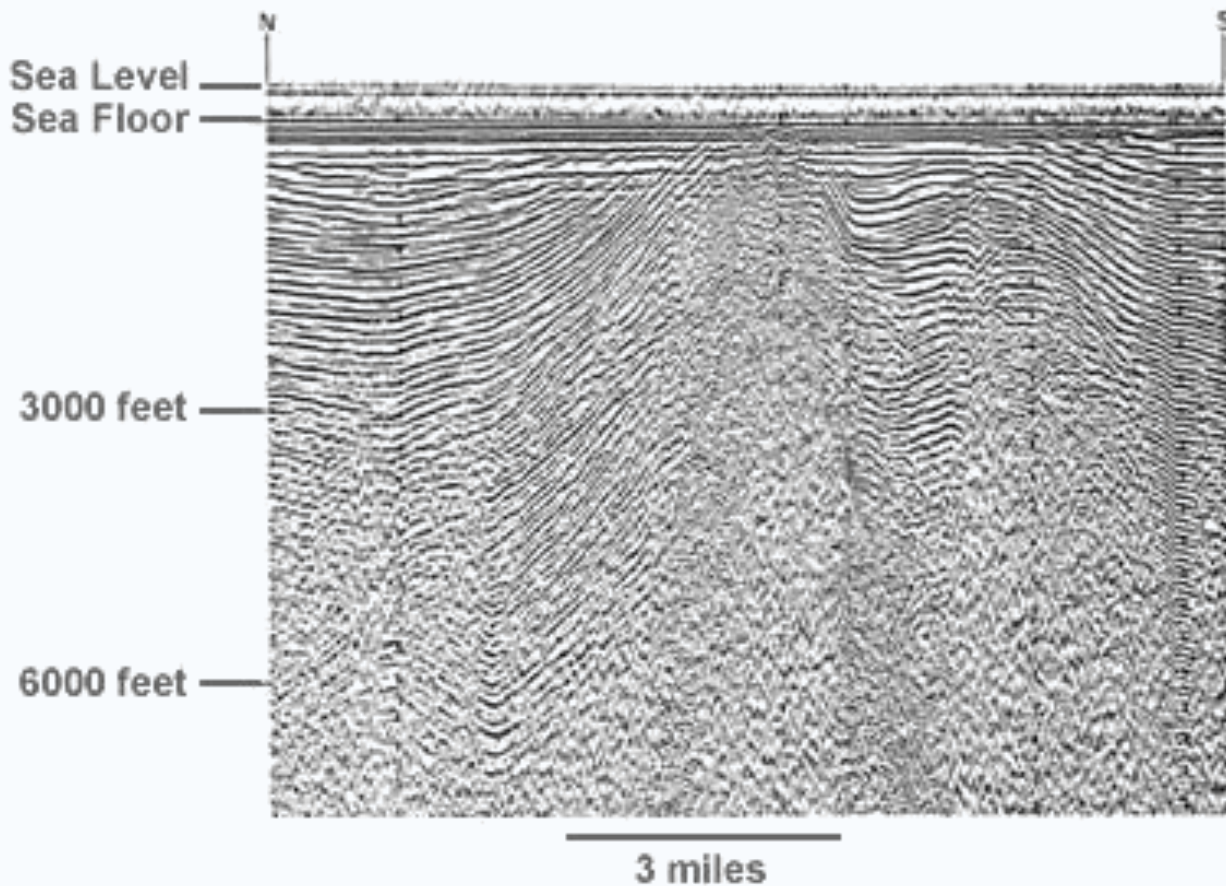
Solution of the salt column at shallow depths, leaves behind an impermeable cap rock of anhydrite, gypsum, sulfur, and limestone.

Graphic by Susan Celestian

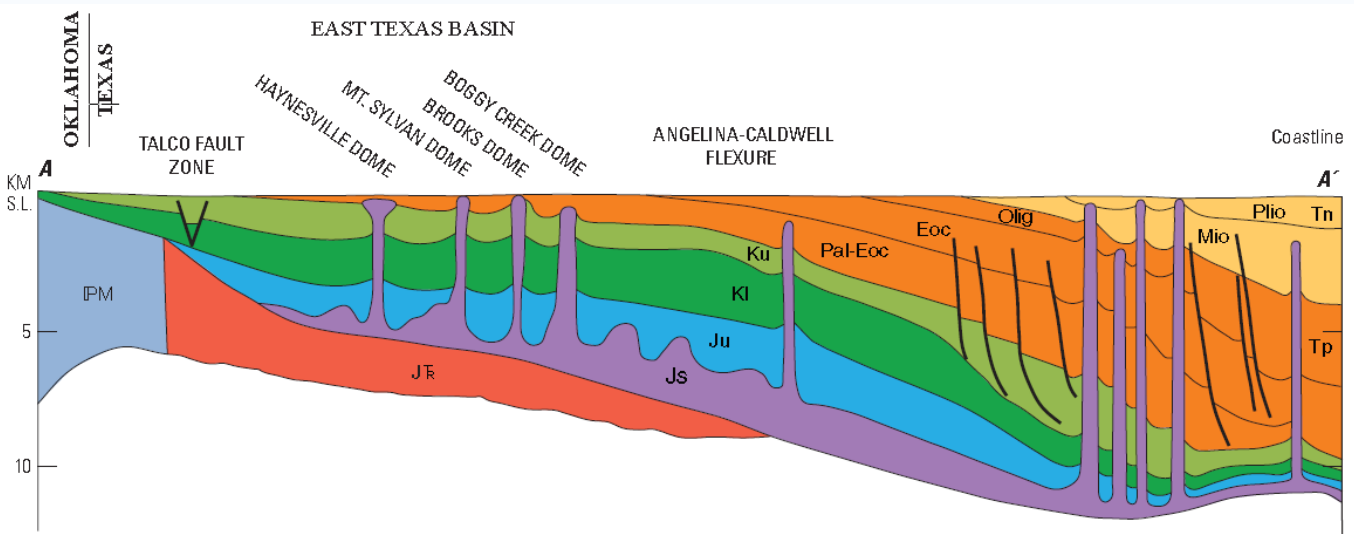
Salt domes continued on page 25...



...Salt domes continued from page 24



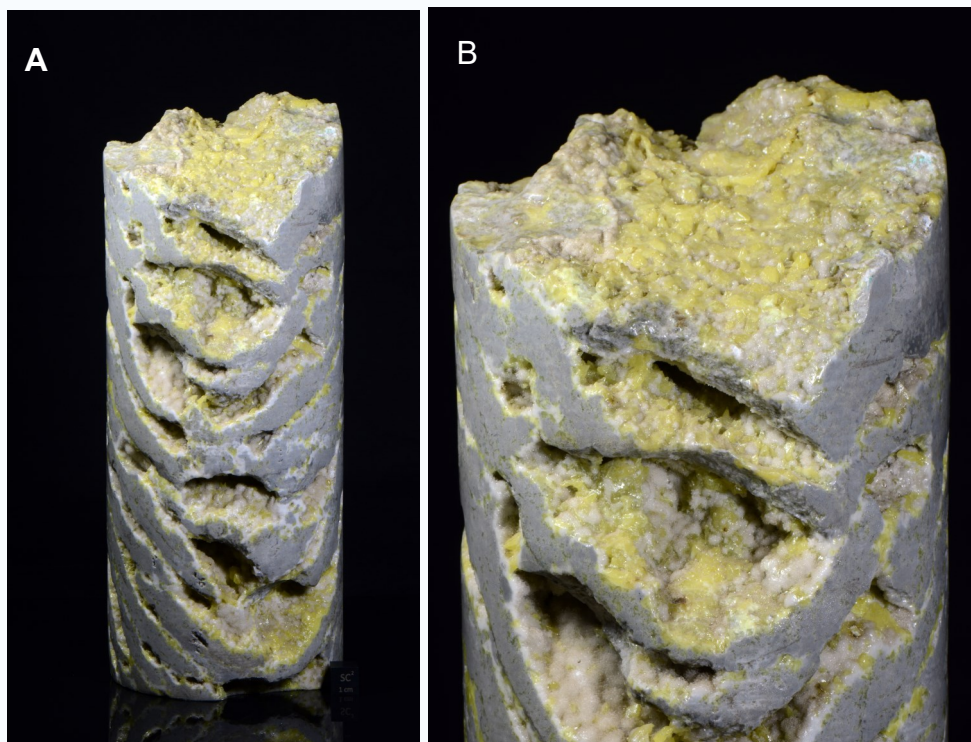
**FIGURE B SEISMIC PROFILE OF SALT DOME** In this early seismic profile, you can see a 1.5-mile-wide salt dome in the center, flanked by rocks tilted up from being dragged by the upwardly rising salt column. Click [HERE](#) to go to a page of seismic images by Hill Geophysical Consulting. Click the arrows to the right and left to scroll through a series of very interesting images. *Image modified after Parke D Snavely, USGS (Public Domain).*



**FIGURE C SALT DOMES BETWEEN OKLAHOMA/TEXAS BORDER AND GULF OF MEXICO** This diagram illustrates the deformation of a Middle Jurassic salt bed (purple). The depth of the image is about 6 miles, and you can see that some of the salt columns are about that high. Note the faulting (heavy vertical-ish black lines) that has offset rocks during the displacement caused by the upward flow of salt. *Image courtesy of the USGS (Public Domain)\_https://pubs.usgs.gov/sir/2012/5159/SIR12-5159.pdf*



...Salt domes continued from page 25



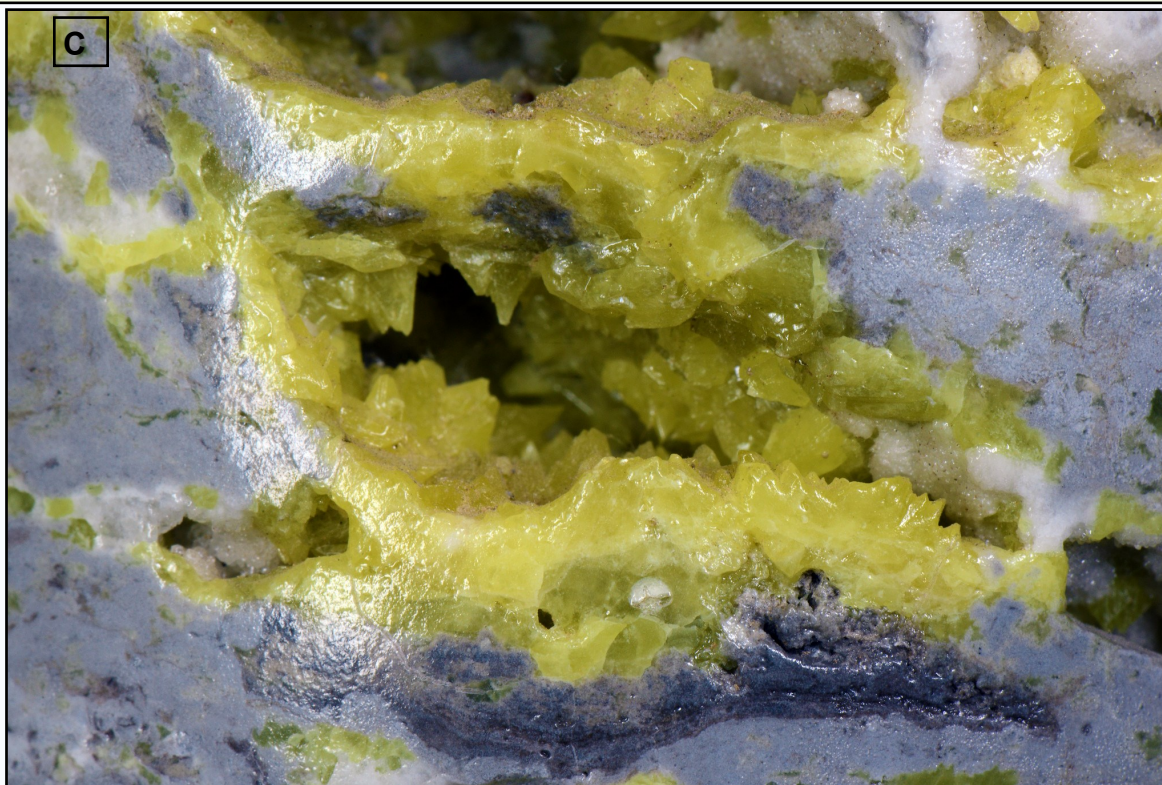
**FIGURE E SULFUR FROM CAP ROCK OF SALT DOME**  
 Bright yellow crystals of sulfur, formed when anhydrite and gypsum (both sulfides) dissolve in the subsurface, Comanche Creek Mine, Pecos Co., TX Photo by Rob Lavinsky, [iRocks](#) and licensed under [CC-BY-SA-3.0](#)

**FIGURE D VIEWS OF CORE INTO CAP ROCK OF SALT DOME** Back in the 1950's and 1960's drill cores, like this one, were given away as gifts to oil executives, making them some of the most expensive gifts around (think of the cost of drilling a core. I looked up drilling and this deposit -- It looks like in today's dollar, it costs upwards of \$9 per INCH, and the sulfur at this mine is encountered at between 300-500 FEET below the surface.)

This core segment (Views A, B, & C) is about 8.5" tall and 3.5" diameter. The gray rock is limestone, and the pockets are lines with white calcite and yellow sulfur crystals. It is a beautiful glimpse of the undersurface above a salt dome.

The locality is probably the Comanche Creek Mine, Pecos Co., Texas

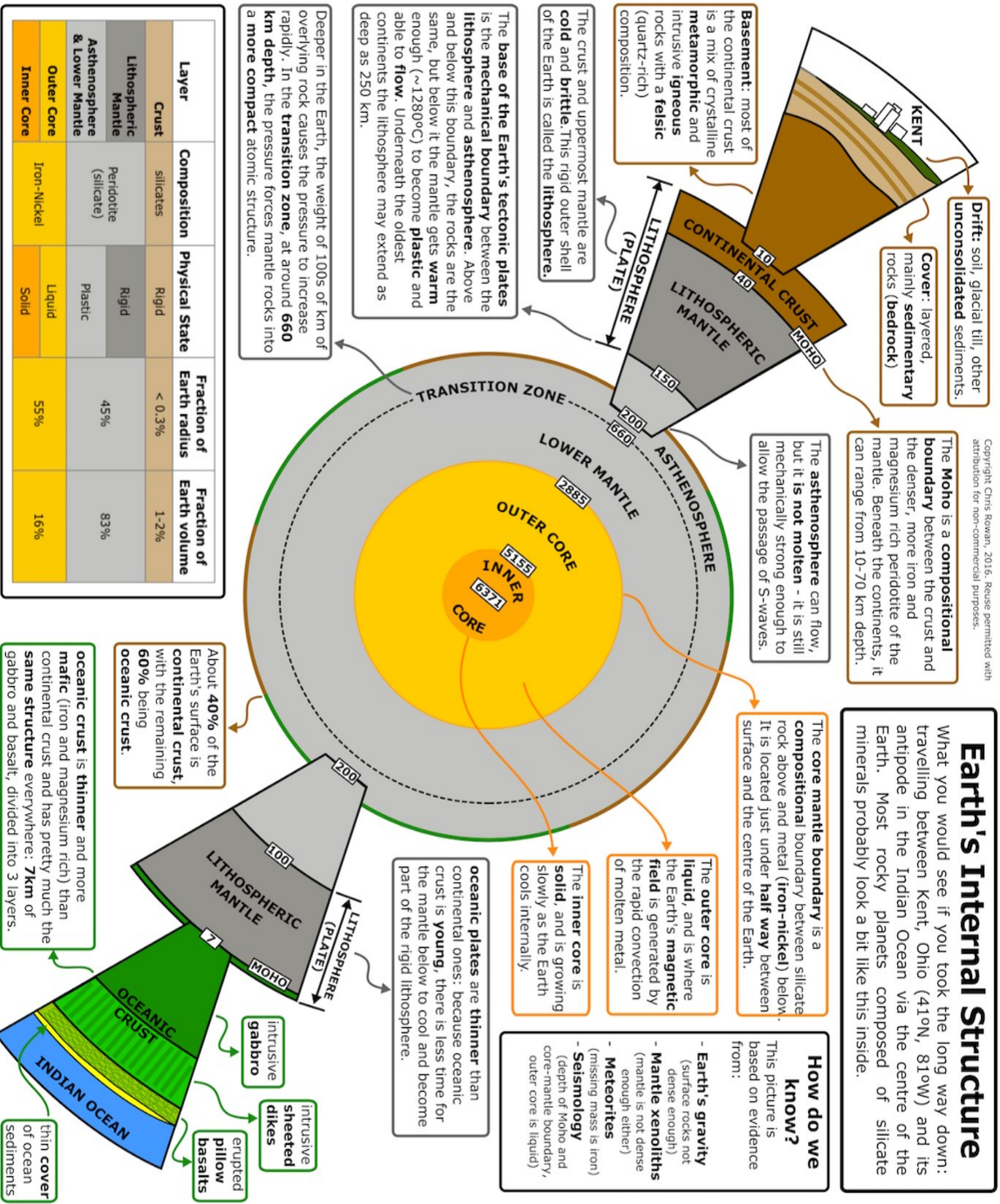
Photos by Stan Celestian





# GEO MINI 2

Here is a great diagram of the [Earth's Interior Structure](#) by Dr. Chris Rowan & Dr. Anne Jefferson of Kent State University in Kent, Ohio. (Feel free to print this out and keep it for reference.)



Copyright Chris Rowan, 2016. Reuse permitted with attribution for non-commercial purposes.

## Earth's Internal Structure

What you would see if you took the long way down: travelling between Kent, Ohio (41°N, 81°W) and its antipode in the Indian Ocean via the centre of the Earth. Most rocky planets composed of silicate minerals probably look a bit like this inside.

**UPCOMING FIELD TRIPS**

Here is a general list of upcoming trips, for the next 3 months. Details will be emailed to the general membership.

**April**

DMRMC Picnic at Anthem Park - 30th Sat

**May**

Sycamore Creek (Jasper) - 7th Sat

Agate Mt. - 11th Wed

Luna Agate (long weekend) - 20th-23rd

Globe 'onyx' - 25th Wed

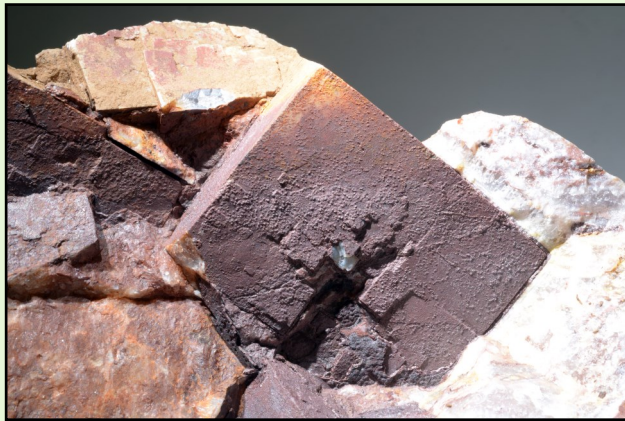
Payson (fossils) & Christopher Creek (zebra jasper) - 28th Sat

**June**

Lynx Creek (gold) - 4th Sat

Lava Tube/Parks - 11th Sat

Colorado, multi-night trip TBA



**Quartz after Fluorite - a pseudomorph - from Agate Mountain, Yavapai Co., AZ The large cube is 2-2.5" across.**

*DATES AND DESTINATIONS 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*

***FUTURE SPEAKERS***

***No information at time of publication***



Is on hiatus. Watch your email for potential zoom or video lessons.

**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](https://www.facebook.com/daisyMountainRockandMineralClub). 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!

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- Field Trip:** Bill Freese ... bfreese77@cox.net
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	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 2022**

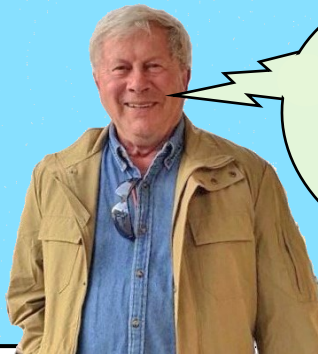
Jan 4, Feb 1, Mar 1, Apr 5, May 3, June 7, Sept 6,  
 Oct 4, Nov 1, Dec 6



## Words of Wisdom

passed along by our own

**Bob Evans**



One minute you're young and fun. And the next you're turning down the stereo in your car to see better.

### UPCOMING AZ MINERAL SHOWS

**May 7-8 - Kingman, AZ** Mohave County Gemstoners; Kingman Academy of Learning, 3420 N Burbank St; Sat 9-5, Sun 9-4; Admission: Free.

**June 17-19 - Las Vegas, NV** Southern Nevada Gem & Mineral Society (in conjunction with Rocky Mt. Federation & Mineral Society Conference; Orleans Hotel & Casino; Fri-Sat 9-4, Sun 9-2; Admission: Adults \$5. See [flyer](#) on page 32.

**July 9-10 - Show Low, AZ** Whit Mountain Gem & Mineral Club; Elks Lodge, 805 E Whipple St; Sat 9-5, Sun 10-4; Admission: Adults \$2, 18 & under free with school ID.

**October 7-9 - Buckeye, AZ** West Valley Rock & Mineral Club; Buckeye Arena, 802 N 1st St; Fri-Sat 9-5; Admission: Adults \$3, under 13 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> OR <https://www.rockandmineralshows.com/Location/?displayShows=true>

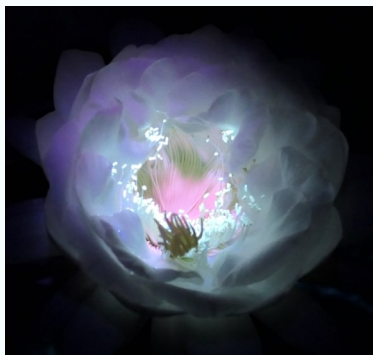


Photo by Susan Celestian

White, in daylight, this is a large blossom of *Trichocereus spachianus* under UVA (long wave ultraviolet light), at night. I can imagine that bees see something like this and are drawn to the pollen-laden stamens.

**NEEDED: QUALITY MINERALS (or OTHER) DONATIONS WITH LABELS** -- for monthly raffle and silent auction; 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 EDITOR

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 - MAY

**You are invited to NMVC Open Studio. Lapidary & Silversmithing on Thursdays and the first, third and fifth Saturdays in a month, from 9:00 to noon with cleanup starting at 11:50.**

**Face masks are now optional.**

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. Usage fee is \$8/hour.

**Notice: Please bring your own towels, polishing compounds and buffing wheels as they will no longer be provided. Mandatory: wear a mask.**

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](mailto:crystalc17@gmail.com)

**May - Thursday's dates are 5, 12, 19, 26**  
**There is a planned Silversmith Class on Saturdays, if Doug does not fill the class there will be Open Studio on Saturday, May 14, and 28. Will keep you informed.** 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 - 9am-12pm.** Email Shirley at [crystalc17@gmail.com](mailto:crystalc17@gmail.com) Usage fee is \$8/hour.

**May - Monday's dates are 2, 9, 16, 23, 30**

# VIVA LAS VEGAS ROCKS

## June 17 - 19, 2022 at the Orleans Hotel



### Rocks, Gems & Jewelry Show

Presented By

Southern Nevada Gem & Mineral Society



Hosting The Rocky Mountain Federation & Mineralogical Society Conference

**Daily**

Admission 5.00

Children Under 12 Free

Tickets Entered in Drawing

**Orleans Hotel & Casino**

Reservations

800 675-3267

ID: ASN2C06

**Exhibition Hours:**  
Friday 9am to 4pm  
Saturday 9am to 4pm  
Sunday 9am to 2pm

50 + Vendors

Displays

Speakers

Raffles

Kids Activities

Door Prizes



**SNGMS Contacts:**

sngmspresident@gmail.com

sngmsshowchair@gmail.com

www.snvms.org

