PICK&PACK
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Colorado Springs Mineralogical Society
Founded 1936
~ Lazard Cahn ~
Honorary President
"Pick & Pack"
Volume 63 No. 2
March 2023

CSMS General Assembly

Thursday, March 16, 2023 7:00 PM
Mt. Carmel Veterans Center

~ Dan Zellner ~
"Evaporite Minerals of the Searles"

A - L BRING SNACKS

Club members are encouraged to bring specimens to general assembly to share and/ or help with identification

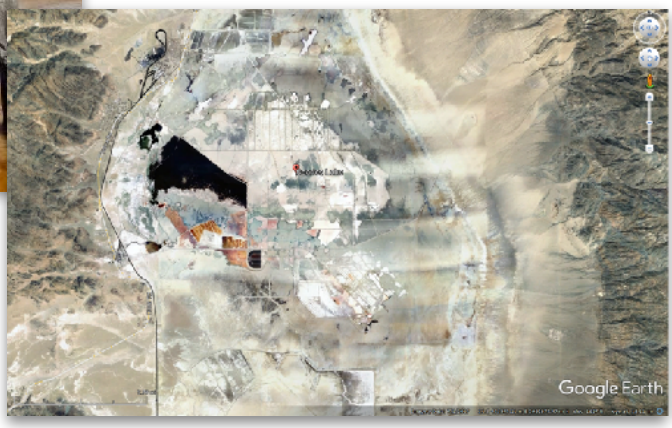
In case of inclement weather please call Mt. Carmel Veteran's Service Center 719-309-4714

In This Issue …

"Evaporite Minerals of the Searles Lake Deposit"

Searles Lake is a lacustrine evaporite deposit located in Southern California approximately 125 miles Northeast of Los Angeles. The deposit formed during alternating periods of losses and gains to the water level of the lake creating a stratified series of salt and mud beds. There have been 36 mineral species reported at Searles Lake. Of these 19 species related to the evaporite lakebed are of interest.

Daniel Zellner is a former mining engineer turned professional mineral dealer located in Denver Colorado. He has over 10 years of experience selling mineral specimens ranging from USA classics, new worldwide finds, historic mines, oddities, fluorescents, and simply aesthetic pieces.



Mr. Zellner received his undergraduate degree in Chemistry with a minor in Geology from the University of California Santa Barbara before obtaining a master's degree in Mining Engineering from the Colorado School of Mines. Before becoming a full-time mineral dealer in 2021, Mr. Zellner previously worked at a solution mining company, an underground construction and tunneling company, and as a consulting engineer on mining projects around the world.

CSMS Group Calendar

Mar '23	Apr '23						
8 Mar	12 Apr	Fossil Group	2nd Wed	6:00 PM	East Library Annex	Jerry Suchan	303-648-3410
2 Mar	6 Apr	Board Meeting	1st Thur	6:00 PM	Zoom	John Massie	719-338-4276
7 Mar	4 Apr	Pebble Pups	1st Tue	4:15 PM	East Library	David St. John	719-424-9852
16 Mar	20 Apr	General Assy	3rd Thur	7:00 PM	Mt. Carmel Center	John Massie	719-338-4276
23 Mar	27 Apr	Crystal Group	4th Thur	7:00 PM	Mt. Carmel Center	Kevin Witte	719-638-7919
By appt	By appt	Faceting Group	By appt	By appt		John Massie	719-338-4276
By appt	By appt	Lapidary Group	By appt	By appt	Sharon's House	Sharon Holte	719-217-5683

Community Events

Mar 24-26: Fort Collins Gem & Mineral Show, (Friday, 4-8 PM; Saturday, 9 AM - 6 PM; Sunday, 10 AM - 5 PM) at The Ranch/Larimer County Fairgrounds in the Thomas M. McKee Building, Loveland, Colorado. The Ranch, 5280 Arena Circle, Loveland, CO. Free parking, paid admission to show. See http://www.fortcollinsrockhounds.org/index.shtml. Please check website to confirm the exact dates.

Mar 25-26: WIPS [Western Interior Paleontological Society] Founders Symposium, "Mammals! From Mini to Megafauna," Colorado School of Mines Green Center, 924 16th St, Golden. Register at www.westernpaleo.org

Apr 7-9: Colorado Mineral and Fossil Spring Show, Crowne Plaza DIA, 15500 E. 40th Ave. See https://www.coloradomineralandfossilshows.com. No admission charge.

Apr 27: 2:00-3:00 PM, Denver Museum of Nature & Science, Earth Science Colloquium, "Paleontology in the east: New discoveries from the Upper Triassic of Virginia," by Adam Pritchard, Virginia Museum of Natural History. In the VIP Room.

May 6: Colorado Mineral Society Silent Auction, see http://www.coloradomineralsociety.org/ for upcoming details. All are welcome.

May 11: 2:00-3:00 PM, Denver Museum of Nature & Science, Earth Science Colloquium, "Does size matter? What brachiopods tell us about evolutionary rules," by Judi Sclafini (UC Santa Cruz). In the VIP Room.

May 19: 2:00-3:00 PM, Denver Museum of Nature & Science, Earth Science Colloquium, "Geology of Grand Mesa, Colorado," by Rex Cole (Colorado Mesa U). In the VIP Room.

May 20: 12 Noon – 3 PM, Friends of Mineralogy Silent Auction, Wheat Ridge United Methodist Church, All are welcome to attend, bid, and to bring specimens to sell.

Jun 5: 2:00-3:00 PM, Denver Museum of Nature & Science, Earth Science Colloquium, "The Dead Sea: Past, present and future," by Ittai Gavrieli (Israeli Geological Survey). In the VIP Room.

June 9-11: Pikes Peak Gem, Mineral and Jewelry Show, Colorado Springs. World's best gem show. Set up on the 8th.

Jun 19: 2:00-3:00 PM, Denver Museum of Nature & Science, Earth Science Colloquium, "Linked Ecologies: Connecting invisible pasts and actionable futures," by Anshuman Swain (Harvard). In the VIP Room.

Register at www.westernpaleo.org

President's Corner

John Massie
CSMS President

2023 Satellite Group Chairs

Kevin Witte/ Bob Germano, Crystals
John Massie/ Bertha Medina, Faceting
Joy Price, Fossils
Vacant, Jewelry
Sharon Holte, Lapidary
Vacant, Micro-mount
Vacant, Photography
David St. John Pebble Pups

2023 Liaisons

Florissant Fossil Beds National Monument:
S.W. Veatch
Western Museum of Mining and History:
S.W. Veatch

Presidential Matters

A message from CSMS President John Massie:

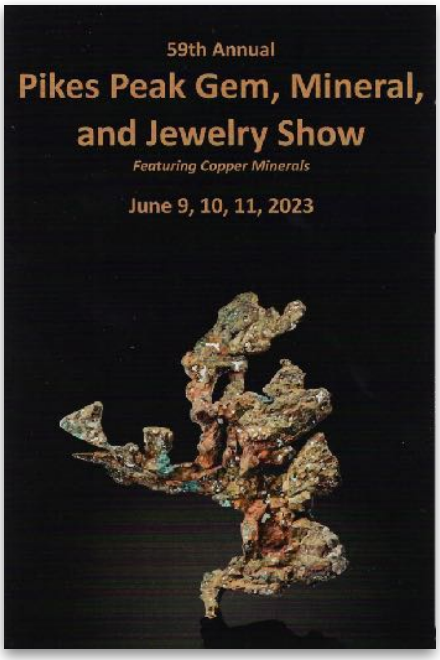
Please check the Pick & Pack to see if you are scheduled to bring snacks for the March meeting.

Please set aside June 9,10, and 11 2023 for the Pikes Peak Gem, Mineral, and Jewelry Show.

We will also need volunteers to set up the show on June 8th, I appreciate the support and the improved attendance at our meetings.

Thank You!

John Massie
CSMS President



REPORT: CSMS Fossil Group
8 Feb 23, 6 PM

The Fossil Group met at the East Library on the 8th of Feb at 6 PM. The group members brought their fossils for show and tell or to identify. There was discussion about doing field trips - local or out of state, and finding any club members who are willing to give a 30-40 min lecture. We encourage club members to come and study fossils with us in future meetings.

Photos and writing: Richard Villarreal

Secretary's Spot

John McGrath

2023 CSMS Officers

John Massie, President
Shane Riddle, Vice-President
John McGrath, Secretary
Ann Proctor, Treasurer
Adelaide Bahr, Membership Secretary
John Emery, Editor
Chris Burris, Member-at-Large
William Meyers, Member-at-Large
Sharon Holte, Past President

2023 CSMS Chairpersons

Rick Jackson, Program Coordinator
John Massie, Show Vol Coordinator
Kyle Atkinson, Field Trip Coordinator
Vacant, Science Fair Chair
Frank and Ellie Rosenberg, Librarians
Mark Schultz, Social Committee Chair
Ann Proctor, Store Keeper
Lisa Cooper, Show Chairman
Lisa Cooper, Webmaster
Lisa Cooper, Facebook Keeper
Mike Nelson, Federation Rep
Vacant, Federation Rep

CSMS General Assembly Minutes

7 PM, Thursday 16 Feb 23, Mt Carmel Vet Center, Co Springs

Address: 530 Communications Circle, Colorado Springs CO 80905
Board Attendance: President: John Massie, Vice President: Shane Riddle, Past President: Sharon Holte, Member-at-large: Chris Burris, Membership Secretary: Adelaide Bahr, Editor: John Emery.
Agenda:

I. Meeting was called to order by our President John Massie at 7:05 PM
II. The Pledge of Allegiance was led by President John Massie
III. Introduction of Guests: One guest
IV. Introduction of New Members: Three new members
V. Program Speaker. Eric Billmeyer, Senior Instructor, Dept of Geology, UCCS, spoke about the Glen Eyrie Member of the Fountain Formation. This depositional environment dates to 316 MYA early in the Fountain Formation. The Ancestral Rocky Mountains were beginning to emerge from the shallow sea. The large island contained marine, delta and swampy environments. The Glen Eyrie Member contains fossils of trees, a finding that is rare in the US for this Pennsylvanian period. Remains of Lepidodendron trees, vascular plants, are found in the shale, these trees grew to180 ft. There were also Cordaites, pre conifer trees, and ferns. The marine limestone deposits contain bryozoans, crinoids, echinoderms, gastropods and ostracos (tiny shrimps). The speaker brought some fossil specimens of plant and animals.
VI. Meeting - There were 35 people present and 8 minerals were given out.
VII. Officer Reports
  A. President - John Massie
    1. The South Colorado Rock and Mineral Show is in Florence April 22-23. They are soliciting exhibitors.
    2. Mark Schultz is resigning from the job of Refreshment Coordinator and John asked for a new volunteer. Also, we will need to redo the alphabetical assignment for people to bring snacks because the offerings have been uneven.
    3. Volunteers needed for the Show in June, he will bring sign-up sheets next time
    4. Would like to have a meeting in June, after the show, for new and old members to meet and greet. It was so moved and approved.
  B. Vice - President: Shane Riddle – Has speakers for March, April, and June. Asked for volunteers to be presenters in May, July, Sept, Oct and Nov
  C. Treasurer Ann Proctor- Absent.
  D. Secretary John McGrath - Absent.
  E. Membership Secretary - Adelaide Bahr. Present - Brought club pins for members who qualified. The pins are for 1year, 5 year, 10 year, 15 year, 20 year and Life Member. Many people stepped up to get their pins.
  F. Editor - John Emery. Present, No Report.
  G. Members at Large: Bill Myers - Absent; Chris Burris - Present, no Report.
  H. Past President - Sharon Holte. Present Said that the Canyon City Geology Club will have two geology field trips at the end of Feb.
  I. Website and Show Coordinator - Lisa Cooper - Absent.
VIII. Satellite Groups
  A. Crystal Group - Kevin Witte, present. Next formal group meeting is Feb 23.
  B. Faceting Group - John Massie reported that he is still available for members to schedule lessons.
  C. Pebble Group -David St John. Absent. Has rescheduled the meeting to the first Tuesday of the month at the East Library, 4:30-5:30.
  D. Fossil Group - Meetings are run by Kristine Harris and Richard Villareal. Meetings are held the 2nd Wednesday of the month from 6:00 - 7:30 at the East Library Annex.
  E. Jewelry Group - Still in need of a Chair person.
  F. Lapidary Group - Sharon Holte reminded us she's available for phone calls to schedule use of rock saws Sun nights after 6:30 PM.
IX. Liaisons
  A. Claims - Frank Rosenberg. Present. No Report
  B. Field Trip Coordinator - Kyle Atkinson, Present. First field trip on April 1st, April Fools day, at April Fools Claim
  C. Social Coordinator - Mark Schutz, Present. Will be leaving and thus resigning the job. He received a grateful ovation.
  D. Store Keeper - Ann Proctor. Absent.
X. Unfinished Business
  A. John Massie has received the key to the Library display case.
  B. Pikes Peak Gem, Mineral and Jewelry show. Volunteers are needed, sign-up sheet next meeting.
XI. New Business -
  A. Ellie Rosemberg announced she has received several donations of books and has duplicates. She proposes to offer these duplicates for sale at the silent auction during the show. There was no disagreement.
  B. Bob Landgraff requests that members submit exhibits for the Show. More details will be in the Pick & Pack. He showed the form that needs to be filled.
  C. Sharon Hulte said that Mike Wheat will donate a display case to the Club for people to use who want to submit exhibits. He has 3 other big cases he would like to sell.
  D. John Massie encouraged people to take Club brochures and give them out.
XII. Meeting adjourned by President John Massie at 8:35 PM.

Respectfully Submitted by Adelaide Bahr, Membership Secretary

My Visit: The Ben E. Clement Museum

Shane Riddle
tater19@turbonet.com

In March of 2022, I traveled to St. Louis for a two-week trip. While I was making my travel arrangements, I realized I would be a four-hour drive from the Hardin County, Illinois area. This area is well known for its highly sought-after fluorite specimens. I started researching to find a place I might be able to collect fluorite. After several hours of research and multiple phone calls, the only place I could find that would allow collecting was the American Fluorite Museum in Rosiclare, Illinois. I then found out that the museum was temporarily closed after someone had broken into the museum, stole some of their specimens and set the museum on fire. I was still determined to see some fluorite and continued my research. I then learned about the Ben E. Clement Mineral Museum in Marion, Kentucky.

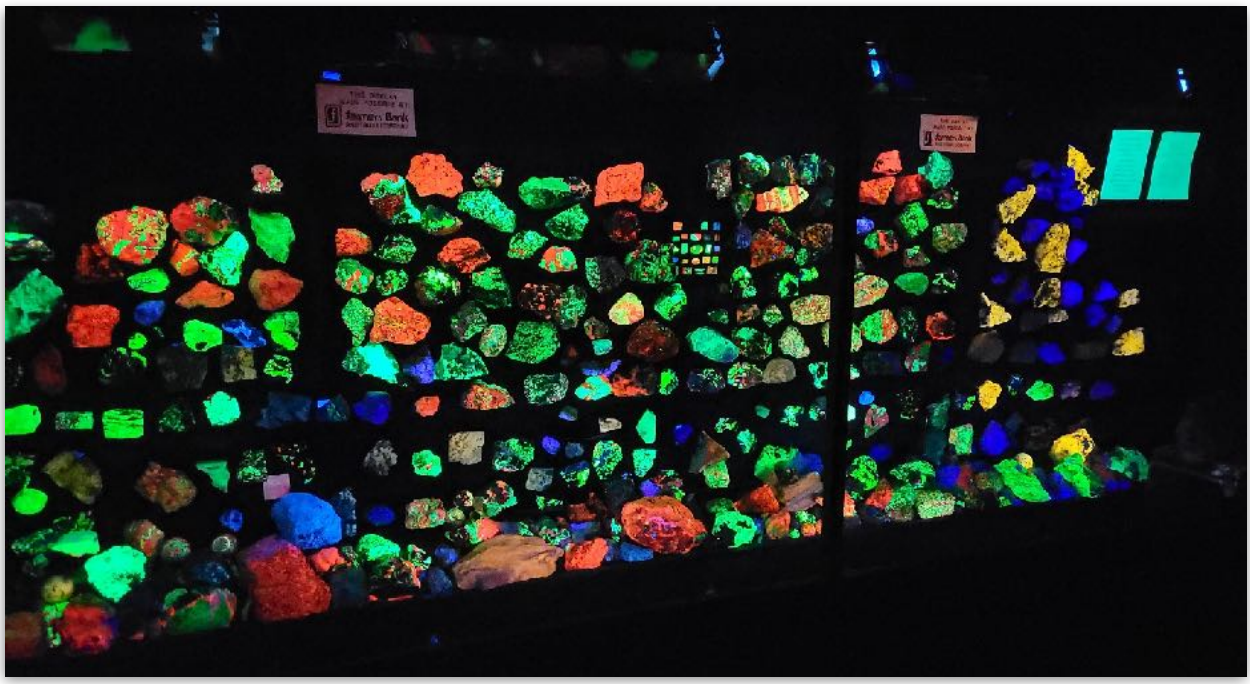
I had a weekend available on my trip and I decided to make the drive to the museum. I wanted to spend as much time as I could at the museum, so I started my drive five hours before they opened. Upon arrival to the museum, I joined a tour that took us through all the rooms that were open to the public. During our tour, we saw rooms full of fluorite specimens that the namesake, Ben E. Clement, Sr had apparently collected, octahedron fluorites that are formed by chipping away the outer surfaces of fluorite cubes and other specimens that were donated to the museum over the years. Another room showcased various minerals in their natural form. Each mineral type is displayed in its own case along with information about its growth habits, hardness, colors and even common uses you might not be aware of. In the center of this room, are some very large fluorite specimens of various colors. The next room we

Above: Octahedron fluorite display at the Ben E. Clement Mineral Museum. *Photo: Shane Riddle*

entered had the overhead lights turned off and tables of fluorite that were lit up from underneath. Some of the tables had fluorite specimens in their natural form while others contained octahedrons and slices of fluorite. The slices of fluorite being lit up from underneath allow the viewer to see the phantoms that can sometimes develop while the specimen is formed.

Right: Display of slices of fluorite showing the phantoms within at the Ben E. Clement Mineral Museum. *Photo: Shane Riddle*

Next, we toured the fluorescent mineral display. When you enter the room, you see a display case that encompasses an entire wall of various rocks and minerals under normal lighting. After a couple minutes, the guide asks you to stay put and then simultaneously switches the standard lighting off and turns on the UV lights. Instantly the colors changed from brown, black, grey and white to every color you can imagine. This was the first time I had seen a fluorescent mineral display and I could not believe my eyes. How could these rocks and minerals of such basic colors change to something so vibrant? I stood there in amazement



Above: Ben E. Clement Mineral Museum's fluorescent mineral display. *Photo: Shane Riddle*

taking in all the wonder before me. On the side of this room is a smaller display case containing a large white fluorite specimen, core samples, small pebbles and a map of the Davenport mine. There is also a copy of the book titled, “Ultraviolet Guide to Minerals” by Sterling Gleason, along with a small sign showing a request from Ben E. Clement Sr. to Ben E. Clement Jr., “Put these core drills with Davenport mine maps and Gleason’s Ultraviolet Guide to Minerals (Page 152) if you ever have a museum.” The purpose of this display case was that page 152 of Gleason’s book contains a quote by Ben about how he discovered a vein of fluorescent fluorspar during WWII.

Above: White Fluorite on display at the Ben E. Clement Mineral Museum, along with Gleason's book quoting Ben Clement. *Photo: Shane Riddle*

At the end of the tour, I was introduced to Ben E. Clement Jr. (Ed). Ed and I started talking and he offered to show me some of the areas of the museum that were not open to the public.* One room that Ed showed me is being turned into a tribute to Ben Sr. The room contained photos taken by Ben Sr. and various tools and equipment he used during his career of mining fluorspar. After Ed had spent close to three hours giving me a private tour, I asked if they had any fluorescent minerals for sale. Ed showed me an area of the gift shop that contained quality specimens for sale and loaned me a shortwave UV light to help me decide which one to buy. When I selected the one I wanted, Ed told me that this particular piece was purchased by Ben Sr. in the 1930’s from a private collector in New Jersey. This specimen came from the Sterling Hill Mine in Ogdensburg, New Jersey.

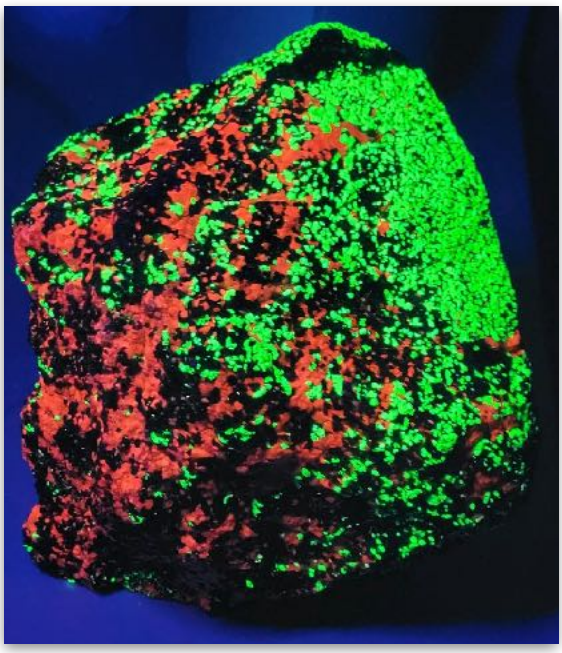
According to the Sterling Hill Museum's website, "Together with the nearby Franklin orebody, 2.5 miles to the north, more than 350 different mineral species have been found here — a world record for such a small area. About 90 of these minerals are fluorescent and more than two dozen of these have been found nowhere else on Earth.” When I learned about the fluorescent minerals at the Ben E. Clement Museum and the ones in New Jersey, I wanted to

* All information provided here about Ben Clement Sr. was provided by Ben Jr., a.k.a. Ed Clement, to the author during the author’s personal tour with Ed.

Left: Willemite and Calcite collected from the Sterling Hill Mine in the 1930's under normal lighting.

Right: Same specimen as left, under shortwave UV light.

Photos: Shane Riddle



start making my own UV display. I asked Ed where I could buy a UV light, and he told me things to consider in building my own and even offered to sell me a light that they had ordered for the museum's display.

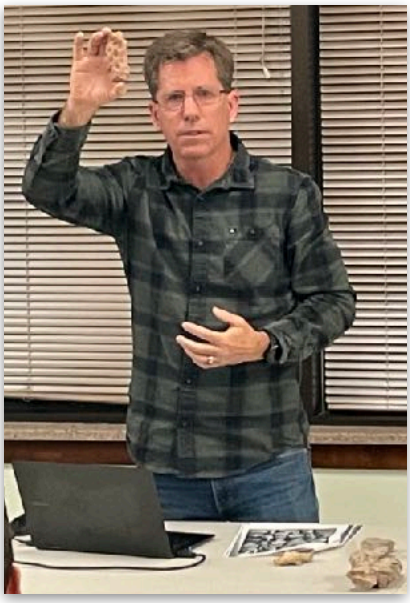
Ed and I continued talking and we went out to the main area of the museum where I met more of the employees and members of the Clement family. The short time that I spent with everyone at the museum showed me that there are still families out there that truly just want to help others. The Clements and the employees of the museum were extremely kind and genuine. I was amazed that Ed was willing to spend almost 3 hours showing me around the museum telling me all about the history of his family and the fluorspar mining in the area. I highly recommend visiting the Ben E. Clement Mineral Museum in Marion, Kentucky. They have the largest display of fluorite that I have seen as well as other specimens from around the world. They also have an extensive selection of minerals for sale in their gift shop if you are looking for something to add to your collection.

References

Clement, Ben E., Ben E. Clement Mineral Museum, Marion KY. https://clementmineralmuseum.org/

Sterling Hill Mining Museum, Ogdensburg, NJ. https://www.sterlinghillminingmuseum.org/

About the author: Shane is an avid rockhound who lives in Colorado Springs, CO. He is currently serving a 1-yr term as the vice-president of the Colorado Springs Mineralogical Society.

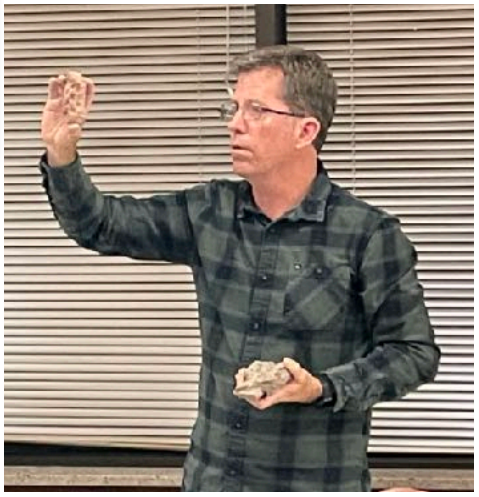


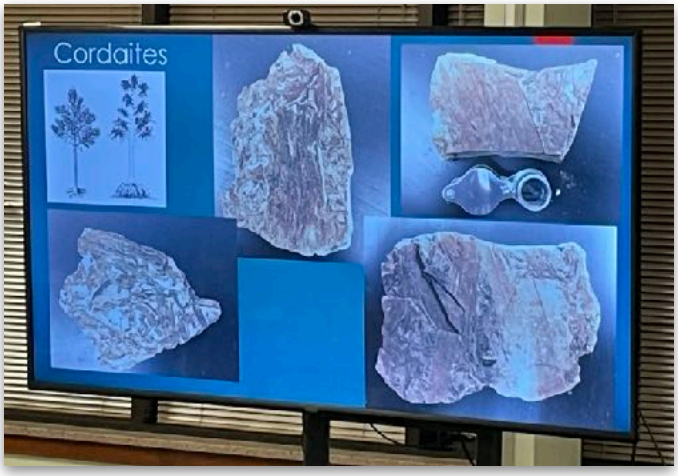
Report: General Assembly

16 Feb 23

Hardy rockhounds gathered on a cold snowy night to hear guest speaker Eric Billmeyer talk to us about the Glen Eyrie member of the Fountain formation. Eric is a Senior Instructor in the Geography and Environmental Studies Dept at UCCS. He teaches classes in Physical Geology, Environmental Geology, Geology of Colorado, and Field Studies in Geology. He owns Trail Gems Geology Tours, which he does primarily in the summertime to educate visitors and locals about the Garden of the Gods and other local geologic sites.

Photos: F. Rosenberg and J. Emery





Gowganda Tillite:
Evidence for an Early Proterozoic Continental Glaciation

By Steven Wade Veatch

Fig 1: The Gowganda tillite is composed of sediment that was deposited by a glacier and later cemented to form a rock. Its pink clasts make it distinctive. Gowganda tillite is among the oldest rocks on Earth—about 2.3 billion years old. This specimen is from the outer limits of the city of Gaylord in Otsego County, Michigan. *From the collection of S. W. Veatch. Photo by S. W. Veatch.*

Gowganda tillite (figure 1) is lithified glacial till (sediment deposited by glacial ice) from a Precambrian glaciation event that occurred over two billion years ago. Glacial till was buried, and over time, it lithified or turned into rock (tillite). Billions of years later, glaciers from the last Ice Age moved fragments of Gowganda tillite from their source location in Canada and dropped them onto the Michigan landscape as the climate warmed and the ice melted. Their pink clasts make them distinctive. This is only one of several Precambrian tillites found in the glacial drift of Michigan. The Gowganda and other tillite deposits in North America provide a rock record of the continental glaciation that occurred during the Early Proterozoic (Lindsey, 1969; Young and Nesbit, 1985, Crowell, 1999).

Geologists are now convinced that widespread glaciation occurred throughout the Early Proterozoic Era, based on at least 300 Precambrian sites, including Finland, South Africa, India, and Australia, that have tillite or deposits that resemble tillite (Wicander and Monroe, 2016). Five more major periods of widespread glaciation followed the Early Proterozoic (see table 1).

Table 1: When Glaciers Covered Parts of the Earth (Crowell, 1999)

1	Late Cenozoic glaciation: began 33.9 million yrs ago at the Eocene-Oligocene Boundary and is ongoing
2	Late Paleozoic ice ages 338 to 256 million years ago
3	Late Devonian-Early Carboniferous ice ages, two short episodes between 353 to 363 million years ago
4	Ordovician-Silurian ice ages 429 million years ago to 445 million years ago
5	Late Proterozoic ice ages ~ 520 million years ago to 950 million years ago
6	Early Proterozoic ice ages ~ 2.2 to 2.4 billion years ago
7	Archean glaciation ~ 2.91 to 2.99 billion years ago

The source of Gowganda tillite is the Gowganda Formation which forms part of the Huronian Supergroup of Precambrian sedimentary rocks exposed in central Ontario, stretching from Lake Superior to Quebec (Lindsay, 1969; Elyes and Young, 1994). Radiometric dating places the age of the Huronian Supergroup from 2.1 to 2.5 billion years old (Van Schmus, 1965, p. 769).

Geologists have interpreted rock fragments in the Gowganda tillite to be the outwash associated with the Early Proterozoic Gowganda glaciers centered southwest of Hudson Bay. Melting ice rafts (calved from ice sheets) dropped these pink granite fragments—from tiny particles to boulder-sized debris—into open water. These pink pebbles fell through the water and settled into fine-grained sediments (Kurtz, 1980). Those sediments likely originated around a glacier's margins (Kesler, 2019). Over time, these sediments were lithified or turned to rock.

After these sediments were lithified, they were carried away, at least two billion years later, by Pleistocene glaciers. After the ice of these last Ice Age glaciers melted, the ancient conglomerates were released onto the landscape, later to be found on beaches and in farmers' fields in Michigan. Scientists have also found Gowganda tillites in Wyoming and Quebec, Canada.

Gowganda tillite (figure 2) is a conglomerate composed of well-rounded to sub-angular, to angular, poorly sorted clasts (granitic and gneissic pebbles dominate) scattered in a tough, massive matrix of coarse to very fine sand and chloritic[1] material (Kurtz 1980). Rounding suggests some history of water transport prior to incorporation into the tillite.

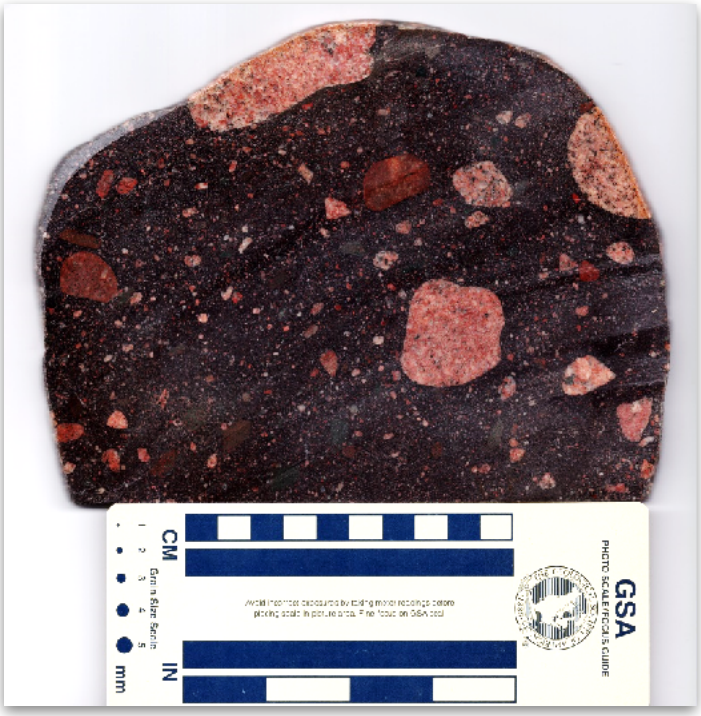


Fig 2: A sawed section of Gowganda tillite shows dropstones of various sizes. Sorting is completely lacking in most Gowganda tillite. *From the collection of S. W. Veatch. Photo by S. W. Veatch.*

The Gowganda tillite is one of the most well-known ancient glaciogenic deposits in the world because of its characteristic pink, granite clasts (pebbles) held in a fine-grained gray matrix (Kesler, 2019). Today, the Gowganda tillite—among some of the oldest rocks on Earth—continues to be studied by geoscientists. Samples are also sought after by rock and mineral collectors for their unique combination of unsorted pink pebbles, age, and interesting formation.

[1] Chlorite is a group of silicate clay minerals occurring in both macroscopic and clay particle sizes; they are hydrous aluminum silicates, usually of magnesium and iron. Chlorites have a silicate layer structure similar to that in micas. *Source: Britannica.*

References and further reading:

Crowell, J. C., 1999, *Pre-Mesozoic ice ages: their bearing on understanding the climate system* (Memoir 192). Geological Society of America.

Eyles, N. and G. M. Young, 1994, Geodynamic controls on glaciation in Earth history, in, *The Earth's Glacial Record*, eds. M. Deynoux, et al, eds: Cambridge, Cambridge University Press, p. 1-28.

Kesler, S. E., 2019, *Great Lakes Rocks: 4 Billion Years of Geologic History in the Great lakes Region*: Ann Arbor, University of Michigan Press.

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Lindsey, D. A., 1969, Glacial sedimentology of the Precambrian Gowganda Formation, Ontario, Canada: Geol. Soc. America Bull., v. 80, p. 1685-1702.

Young, G. M., and H. W. Nesbitt, 1985, The Gowganda Formation in the southern part of the Huronian outcrop belt, Ontario, Canada: Stratigraphy, depositional environments and regional tectonic significance: Precambrian Research, v. 29, p. 265-301.

Van Schmus, R., 1965, The geochronology of the Blind River-Bruce Mines area, Ontario, Canada: Jour. Geology, v. 73, no. 5, p. 755-780.

Wicander, R. and J S. Monroe, 2016, *Historical Geology: Evolution of Earth and Life Through Time*: Boston, Cengage Learning.

About the author: Steven is a geologist who joined the CSMS when he was 10, in 1965. The club met at that time at the old IBEW hall near the west side of the city. His complete profile is available at:

https://www.blogger.com/profile/06566101278318062273

A Tale of Tracking Down Cordierite Var. Iolite from South Dakota and Colorado

Mike Nelson
csrockguy@yahoo.com

In the end, it's not the years in your life that count. It's the life in your years.

- A. Lincoln

I really was not very knowledgeable about the mineral cordierite until I looked at some gemstones labeled water sapphire and listened intently to the jeweler's long-winded description of these blue-violet stones. That little experience caused me to start reading about these colored stones and trying to better understand them. Soon I discovered that water sapphire, also known as iolite, was not an "official" mineral but was the gemmy variety of cordierite. However, the only time I remember seeing cordierite was in my optical petrology course as we studied metamorphic rocks. I really don't remember observing the mineral in hand sample but only in petrographic slides.

Later in life, after my move to Colorado, I was reading Dan Hausel's book (2009) on Wyoming minerals and was fascinated by his descriptions of cordierite and gemmy iolite from the Laramie Range west of Wheatland. Hausel noted large deposits of cordierite gneiss that produced such gems as the Palmer Canyon Blue Star (1,750 Carats) and the 24,150 carat Grizzley Creek Blue Giant, the latter a specimen he believed was the largest iolite gemstone in the world. Hausel also located other iolite deposits in the Laramie Anorthosite cropping out near Sherman Mountain. Additionally, he noted that perhaps millions of gemmy iolites remained in these Precambrian rocks but lamented the fact that these gemstones were mostly untouched and off the market.

Since reading Hausel's descriptions I have looked in many rock/mineral shows, and on the internet, trying to locate specimens of the Wyoming iolite. But Hausel also stated that most/all gemstone localities were off limits to "average" collectors and rockhounds. I even tried examining a few roadcuts of the Laramie Anorthosite, but no luck for any gemmy material. I have seen a few cabs of Wyoming iolite (at least noted as such) for sale on internet sites but could not locate jewels at shows or stores. It is my understanding that imported iolite is of better quality and less expensive than the Wyoming variety; however, it would be nice to have some local material!

Above: Pendants faceted from Palmer Canyon, Wyoming, cordierite/iolite. *Offered by Etsy seller Jane Reneau. Now they are "Out of stock."*

After my failed search for Wyoming iolite, I decided to try Colorado localities and was somewhat more successful. Successful indicating that cordierite occurs in tens of localities across Colorado in metamorphic rocks, commonly in some relationship with sillimanite and/or staurolite and is often altered (ugly?). The less successful part of

the equation is that few cordierite exposures seem to exhibit the nice blue to violet variety, iolite (Eckel and others, 1997). One somewhat major exception is the Grape Creek locality in Fremont County where glassy, clear, blue corundum (sapphire?) was noted by Finlay over a century ago (1907). Mark Jacobson (1988) later described the blue masses as cordierite, "essentially unaltered, usually less than 1.5 cm in diameter." Unfortunately, I could not locate photos on MinDat and did not have access to some older publications that could contain photographs. Never-the-less the hunt was on for Grape Creek iolite.

Since the collecting locality was only relocated in 1987 "with some difficulty" (Eckle and others, 1997), and by that time in my life bone joint replacements prevented serious hiking, I started looking at shows and asking dealers for information. Not much luck until about four years ago when I discovered a specimen at the Denver fall show. I consider myself lucky as I have not observed another "for sale" specimen.

Above and all right: Cordierite from Grape Creek locality, Fremont County, Colorado, Width FOV ~7 mm. *Photos: M. Nelson*

My next attempt at locating cordierite var. iolite was to explore the Precambrian rocks of the Black Hills of South Dakota, one of my favorite places to wander. I remembered: 1) that Roberts and Rapp (1965) had stated that “cordierite occurs chiefly as a microscopic constituent of highly aluminous metamorphic rocks.” They also noted a couple of localities west of Custer; and 2) several years ago I was “exploring” the metamorphic rocks west of Custer trying to figure out what sort of a rock was described as amphibolite. Although at that time in my life I was hot into sedimentary rocks and vertebrate fossils, my curiosity had popped up while reading USGS papers describing the geology of the Four Mile and Berne Quadrangles immediately west of Custer and noting the large number of times “amphibolite” was mentioned. So off I went to explore, and to try and understand.

Life seems a quick succession of busy nothings.
- J. Austen

If I remember correctly, I located the amphibolite unit as it is exposed over several square miles. There were also “lots of” other rock units that I noted were really “gneiss” (pun intended). I collected a few hand samples (why?) because I was practicing being a geologist. Most were later discarded in one of my many rock gardens although a few were retained including one that I thought might be amethyst. But before you giggle, remember I have never claimed to be a mineralogist or petrologist!

So today I have a “hunk” (~4 x 5 cm) of metamorphic rock that appears to be part gneiss and part schist with layers of glassy blue or blue-violet cordierite var. iolite collected, as my label states, “west of Custer.” By-the-way, I never really completely understood amphibolite. As defined by Wikipedia (retrieved 3 January 2023):

All above: Cordierite from "west of Custer County, South Dakota, near the amphibolite unit." Width FOV ~7 mm. *Photos: M. Nelson*

“Amphibolite is a metamorphic rock that contains amphibole, especially hornblende and actinolite, as well as plagioclase feldspar, but with little or no quartz. It is typically dark-colored and dense, with a weakly foliated or schistose (flaky) structure.

Amphibolite frequently forms by metamorphism of mafic igneous rocks, such as basalt. However, because metamorphism creates minerals entirely based upon the chemistry of the protolith, certain 'dirty marls' and volcanic sediments may also metamorphose to an amphibolite assemblage. Deposits containing dolomite and siderite also readily yield amphibolite (tremolite-schist, grunerite-schist, and others) especially where there has been a certain amount of contact metamorphism by adjacent granitic masses.”

Cordierite [$(Mg,Fe)_2Al_3(AlSi_5O_{18})$] occurs in a variety of colors: gray, yellow-brown, greenish, colorless, blue, and bluish violet. It has a hardness of ~7.0+ and a vitreous luster while thinner crystals are translucent to transparent while the massive material seems rather opaque. Cordierite belongs to the Orthorhombic Crystal System although some twins resemble pseudo-hexagonal prismatic crystals; other material appears as massive to embedded grains. It has a white streak and a subconchoidal fracture.

Cordierite/iolite is also quite pleochroic, that is there are changes in color depending on the angle at which you view the specimen. Gemmy iolite may have pale blue color or a violet color or even a pale-yellow color. This pleochroism is quite easy to observe in my specimens as the mineral is rotated. In some case the blue color almost disappears into a gray-blue color.

Cordierite collected in "Madagascar" **(top and middle figures)** purchased 2022 from Geofossiles in Colorado Springs. **Bottom figure:** Purchased but collected Emininiminy (Anbinany), Androy Madagascar. Width FOV ~8 mm. *Photos: M. Nelson*

The variety iolite/water sapphire is a blue to blue-violet to a blue-gray color and can be quite gemmy. I assume that lapidaries are experts in cutting the gems correctly so that the stones bring out the brightest blue color. It is softer than natural sapphire and has a lower refractive index (less brilliance). However, the cost of using iolite in jewelry is substantially less than mounting sapphire and most casual observers of a well-cut stone (cabs or faceted) would likely not notice the difference.

Above: Thin, glassy, translucent blue-violet fragment of cordierite without matrix, etching is natural. Maximum width ~1.0 cm. Purchased but collected by Luiz Menezes, 2001, Coroaci, Minis Gerias, Brazil. *Photo: M. Nelson*

So, that is my tale of tracking down a mineral that has been of interest to me for many years, but one that I also neglected until recent acquisitions brought it to the forefront of my mind. It just took a little sleuthing while remembering the words of Dr. Suess: *You have brains in your head. You have feet in your shoes. You can steer yourself in any direction you choose.*

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Mike is a former University professor and administrator who enjoys outdoor activities, and writing articles for the Pick & Pack, other rock and mineral clubs, and the Newsletter of the Rocky Mountain Federation of Mineralogical Societies (www.rmfms.org). He also writes, and occasionally speaks, about members of the Colorado Cavalry/ Infantry who participated in the march to Glorieta Pass (1862), helped settle central Kansas (1865), and later fought at Beecher Island (1868). In CSMS he heads up the Undergraduate Research Committee as introducing students to geology research is a long-time passion. But mostly he just tries to enjoy life with frosty IPAs, travel, and collecting mundane facts and pretty rocks/ minerals.

Classifieds and Announcements

John Emery
Editor

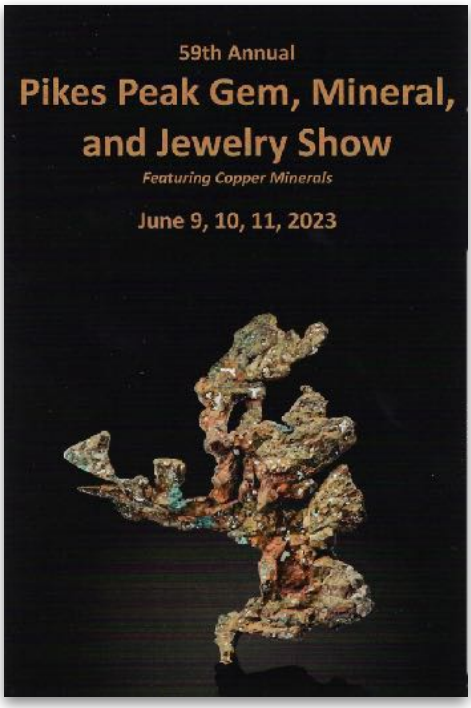
Thanks to our contributors. We encourage everyone to submit articles, photos, illustrations or observations.

To submit an item:
For hardcopy photos or articles, mail to the address below or bring them to the General Meeting. All hardcopy photos remain the property of the submitter and will be returned. Electronic photos can be submitted at resolutions above 200 dpi in ANY format.

Feature articles can be in MS Word or Mac Pages, preferably NOT pdf.

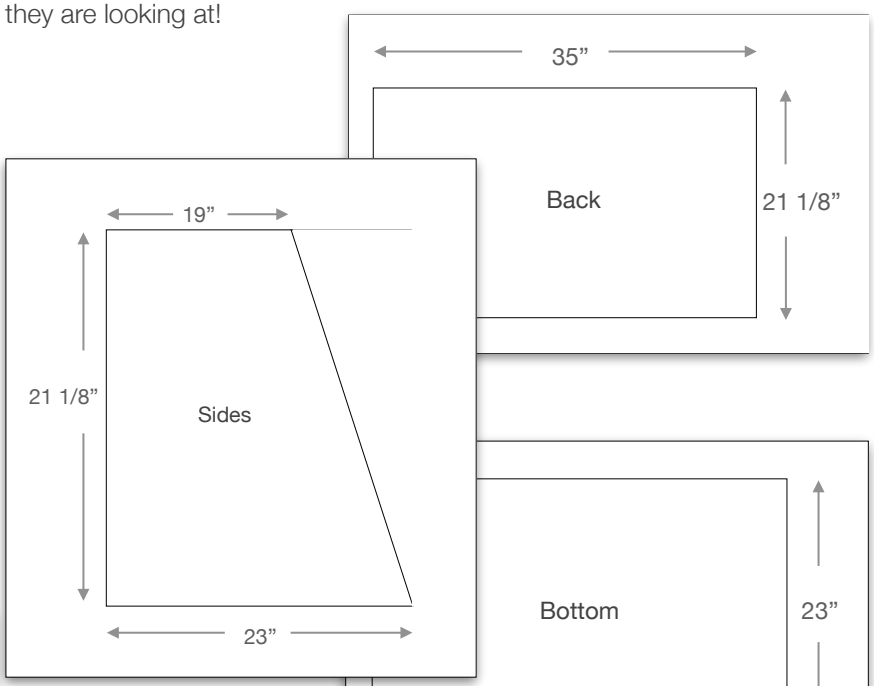
e-mail to the editor:
csmseditor@hotmail.com

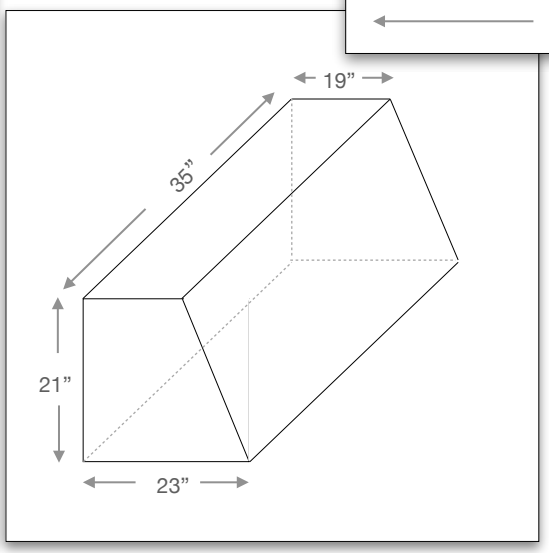
Mail to:
Pick & Pack Editor PO Box 2
Colorado Springs, CO 80901



The CSMS Gem and Mineral Show Case

The theme for the 2023 CSMS Show is copper minerals. Of course, we are happy to have any earth science related exhibit that you would be enthusiastic about putting together. Look at this as a chance to reacquaint yourself with specimens in your collection along with memories for that dig or that purchase at a mineral show. You also may want to use exhibiting as an excuse to organize your collection. Consider making a printed list of numbers on your computer to be glued to the bottom of your specimen. Then develop a catalog list in your computer containing each specimen for future reference and posterity. Remember, listing locality is as important as specimen identification. The most important note here is, show the public what our club members collect or fabricate and then tell them what they are looking at!





All measurements are inside measurements. However, since all cases are handmade there may be some slight variations in the cases. Be sure to bring any necessary tools required to make adjustments to your liners. Also remember to allow for thicknesses of your liners to make the final fit.

Pike's Peak Gem & Mineral Show

Presented by the Colorado Springs Mineralogical Society
June 9 - 11 2023, Norris Penrose Event Center, 1045 Lower Gold Camp Rd, Colorado Springs
Fri 12 PM - 7 PM, Sat 10 AM - 5 PM, Sun 10 AM - 4 PM

Request for NON-COMPETITIVE Display Space

Name:	Society:

Address:

Phone:	Email:

City:	State:	Zip:

Describe display or cases:

	I will bring my own display	Your case length:	# of cases:
	I will need a case*	Case size desired:	# of cases:

* CSMS cases are approximately 36" by 24" outside measurements. A few 4-foot cases are generally available. There is a hasp on the case that accepts an exhibitor-supplied padlock.

Exhibitors are urged to bring their own cases. A limited number of club cases are available upon request. Exhibitors using club cases will need to furnish any risers, linings, padlock or accessories as needed. EACH CASE WILL BE LIMITED TO 150 WATTS.

Setup is from 1 PM to 7 PM on Thursday or 8 AM to 12 PM on Friday before the show opens. Note new show hours for Friday. Tear down is 4 PM to 8 PM on Sunday.

Return by mail or email by June 1st to reserve a case and exhibit space. After June 1st, exhibitors are still welcome based upon availability of cases and space. Return to: Bob Landgraf, 304 Palmer Trail, Manitou Springs, CO 80829 719-658-1364 rmlwp74@aol.com

Presently we are only looking at People's Choice award for best case for judging.

Signature of Non-Competitive Exhibitor: _____

With the signing of this request, email submission of this document or showing up with an exhibit, it is mutually agreed that the Colorado Springs Mineralogical Society and the Norris Penrose Event Center shall not be liable to any exhibitor for damage, loss or destruction of any exhibit or injury to his person for any cause and all claims for injury are expressly waived by the exhibitor.

How to do a Case for the Show

Bob Landgraf - recipient, DGMG People's Choice Award
Adapted from Denver Gem and Mineral Guild

THE BASICS

- You only have to fill a space that is about 35" x 23" with specimens. That means you will probably need about 15 to 25 specimens.
- Don't be concerned that your specimens "are not worthy" – the presentation is the thing.
- Here are the major tasks you have to accomplish – in sequential order:
  1. Build a set of "liners" for each case you want to exhibit. A set of liners consists of:
     — A "Back Panel"
     — A "Floor Panel"
     — Two "Side Panels"
     — Each of the panels needs to be covered with cloth.
  2. If you wish, you can add risers, steps, "floating" platforms, or other items to help display your specimens.
  3. Choose the specimens you want to display.
  4. Create labels for each specimen and for the case.
  5. Create the desired layout at home.
  6. At the show, add the liners to the case and adjust the liners if necessary. Clean the liners before adding the specimens.
  7. Carefully add your specimens to the case.
  8. Clean the glass front panel and secure it to the case.

THE ROCKS

- One really good rule is to avoid putting too many specimens in the case!
- If you have more specimens than will fit in a case, make another case!
- Most people have a tendency to try to put too many in, even when they think about it.
- Taking two or three specimens out and spreading the remaining specimens will often make a dramatic improvement in a case's appearance.
- Having several steps or separate risers in a case will allow you to put in more rocks without things looking as crowded.
- Though it is always best to lay out the case ahead of time at home, take an extra specimen or two to "fine tune" the arrangement with different specimens while setting up the case.
- After you make the arrangement at home be sure to number the bottom or back of the labels so that you can remember the order you planned.
- After you have finished and are absolutely sure it is right, try taking a specimen or two out of the case to see if that improves the look.
- Without trying to be slavishly tied to a symmetry a generally balanced appearance (color, brightness and especially size) helps. A trick to check this is to step back and squint, such that details aren't noticeable, but just the general form and colors.
- It is best that the case contains specimens that are approximately the same size. An alternative that may work is to have one or more large specimens surrounded by smaller ones.

Tips about specimens

1. If you plan to wash specimens before setting up your display, allow a few days for them to dry thoroughly. Otherwise, heat from the lights can cause moisture to form inside the case.
2. Wear thin white gloves when setting up your display to avoid getting fingerprints on crystal faces and other shiny surfaces.
3. Bring paper towels and glass cleaner, tape for removing lint, a ruler to check your spacing and alignment, and extra mounting materials.

LINERS

OVERVIEW

- Liners are required for any cases you do for the CSMS show.
- The best way to carry the liners is probably one or more large black plastic garbage bags.
- Make sure the liner pieces all fit snugly together so you can't see gaps or the wood of the case between the panels.

Tips about liners

1. To make the liners fit tightly, you can make the liners a little smaller – maybe 1/4 inch or so. Then, you can stuff extra cardboard or wrinkled up newspaper as spacer material behind the back and on the outside of the sides such that the spacer material doesn't show.
2. If the liners are too wide on the sides with a relatively soft spacer behind the back, tightening up the front of the case forces the side liners back and makes everything more secure.
3. If you make the back liner deliberately a little too tall and bend it forward, it will act as a reflector and will hold the side panels in place.
4. If you make the liners the proper size so that the back rests on the bottom piece and the sides push against the back piece, the joints/seams are less apparent and any imperfections in the edges are less noticeable.

[Warning:] Don't make the mistake of using backing material that is too heavy. One of our more illustrious members once used dry wall and the back fell over and virtually destroyed some expensive and cherished specimens.

STIFF BACKING MATERIAL

- Cardboard
- Coroplast
  - — Corrugated plastic
  - — Less likely to bend and break than cardboard
  - — Makes it easy to post photos and letters
- Use rubber cement, Weldwood cement, hot melt glue, "tacky glue," or duct tape to attach the cloth to the backing.

COVERINGS USED ON THE BACKING MATERIALS

- Carpet
  - — Advantages: easy to clean, lasts forever
  - — Cut to fit case
  - — Short nap, conservative color
  - — Can be glued to liner backing with Super Glue or carpet cement
- Felt
  - — Advantages: no wrinkles, lots of stretch
  - — Glue to liner backing with spray rubber glue
- Patterned paneling – stones, wood, etc

COLORS FOR THE LINER FABRIC

- Be careful – Garish colors can be an absolute turn-off or "show-stopper".
- Consider the colors of the specimens you are displaying when deciding what color background to use. You need to have good contrast between the specimens and the background color. For example, don't use a bright red background if you are going to display bright red minerals. The minerals will fade into the background.
- Light colors
  - — Don't show the lint
  - — Do make the cracks/seams between liner components more obvious than dark colors
  - — Are harder to keep clean
- Dark colors
  - — easier to keep clean
  - — do a good job of hiding the cracks/seams between liner components
  - — require a lint-picker roller to clean off anything white or light
- Mottled or Tweedy

[Note:] If you only want to make one set of liners, pick neutral colors that will be OK no matter what color specimens you put on them.

TYPE OF FABRICS USED FOR LINERS
Make it easy to clean – and easy to remove from the backing - if you are going to use it a lot.

SMOOTH OR GLOSSY CLOTH
- If you have glossy specimens such as quartz, a rough-textured cloth such as burlap will work.
- With rough rocks such as ore minerals or fossils, a smooth cloth might look better.

RISERS, FLOATERS AND SHAPES

OVERVIEW
· Use all of the case, not just the lower 12 inches.
· Take advantage of all the space.
· Don't put signs or labels on the sides of the case liners.

RISERS
· A 2-tier set of risers is the most common.
· 4 – 6 inches in height seems to be normal.
· You can vary the heights of risers within a case.

FLOATERS
· Use a dark cloth/covering.
· Cover the supports with dark material so they can't be seen.
· Keep the support materials back from the front of the floating shape so they won't be seen. .
· Make the support material for a floating shape big enough so the shape/board won't tip.

> **Tip about "floaters"** - Look around at work or home for riser materials to create new affects. Some large plastic disks at work gave Bob the idea for his and Janie's case with the "floating" round risers.

FREEFORM SHAPES DRAPED WITH CLOTH
- Shapes to consider
  - — Bricks
  - — Logs
  - — Wood blocks
  - — Plastic holders
  - — Glass jars
  - — VCR boxes
  - — Rock tumblers
- Possibilities for arrangement of shapes
  - — Up & down
  - — Ascending size
  - — Each specimen sits on top of its own shape
  - — Draw the viewers into the center of the case – where the specimens are.
- Avoid wrinkles, pleats and folds if at all possible.

> **[Note:]** It is possible that that irregular, free form riser shapes can work better than shapes that are too geometrically regular. Use your imagination.

LIGHTING

- Make sure the whole case well lit
- Watch out for shadows - especially under any risers
- You might want to consider adding more lights. You can do this without drawing any more current than the standard pair of 75-watt bulbs. Use a Y-type adapter and two bulbs – a 50-watt clear incandescent bulb and a 25-watt fluorescent bulb in each light socket. This combination produces about twice the light of the standard 75-watt incandescent bulbs. The clear bulbs seem to give more "sparkle" to the specimen whether or not you use the fluorescent bulbs.

  [Note:] In competition, we are often restricted as to the type of bulb we can use. Check the rules.

  [Warning:] If you want to use bulbs other than what is provided, make sure their heat won't damage your specimens.

- Even when using dark risers, you can use white back and side liners to reflect more light on the specimens.

LABELS

OVERVIEW

- Always label your specimens. Viewers learn nothing from specimens that have no labels.
- Make labels the least inconspicuous thing in the case – but not invisible!
- The label should not dominate the case.
- When you look at the display, ask yourself: What is the first thing I see – labels or specimens?
- Case Title label
  - — 36 point type or larger
  - — Usually centered within the case

  [Note:] If the Case Label is on the back panel of the case, make sure it is low enough to be easily read when the glass front is placed on the case.
- After you make the arrangement at home be sure to number the bottom of the labels so that you can remember the order in which you plan to display the specimens.
- Don't put signs or labels on the glass or on the side case liners.

INFORMATION ON LABELS

- Include a location as complete as possible – unless the rocks are all from the same location.
- Often descriptions (crystal class, twinning, type location, or any other information that might be of interest) can be added.
- All labels should be consistent in their layout, typeface, and information contained.
- For more formal/serious shows, check to see if there are specific labeling requirements.

PHYSICAL CONSIDERATIONS FOR LABELS

- Match/blend colors with the case liner.
- Off-white is better than pure white.
- Make the labels uniform in size.
- Legibility – two different points of view:
  - — Make the labels legible from 4 feet away
  - — Viewers should be able to read the labels when standing in front of the case.
- For computer-generated labels, a 14-point sans serif typeface works best. A sample of this size font is shown below.

  This is a 14-point sans serif typeface
- Propping labels up for readability
  - — Just fold down the back of a card-stock label.
  - — Use folded card stock glued to back of label.
  - — Put one or two ." nuts in back of the label.
  - — Use a grooved piece of wood or Plexiglas.
  - — Allow space on the bottom of the holder label if you use a grooved wood or plastic holder.

  [Note:] It is OK to lay labels flat if they can be easily read.

TYPE OF MATERIAL USED FOR LABELS

- Many labels used today are either computer-generated or made on a label maker. If you have a PC and access to Microsoft Word, almost any "computer person" can help you create a template you can use for just about any size label.
- Card Stock with back folded up.
- Laminated.
- Transparent labels on glass slide mounts.

PARTING THOUGHTS

- The best thing to remember is to use your own imagination for your particular display. Often very striking effects can be achieved by using mirrors, back (or underneath) lighting, including artifacts, descriptive text, or whatever.
- One year Francis did a very whimsical (if unscientific) case with rocks and stuffed animals. While this type of thing may offend some sensibilities, it is the sort of thing that is attractive to the average, non-initiated viewer.
- Glen's stamp and mineral case is another example of a different approach that catches the eye.
- Don't be intimidated by what others do or by anything in this handout either. Let your imagination run wild. It will make it more fun for you and the viewer.
- Don't worry about whether your specimens are rare and valuable – the presentation is the thing!

Established 1936
MINERALOGICAL SOCIETY

Pick & Pack
P.O. Box 2
Colorado Springs, CO 80901-0002

CSMS is an incorporated nonprofit organization with the following goals:

- To promote and disseminate knowledge of the earth sciences, especially as they relate to mineralogy, lapidary, and fossils.
- To encourage study, collection, and fashioning of minerals.
- To accomplish the same through social meetings, lectures, programs, displays, shows, and field trips.
- The Pick & Pack newsletter is published 10 times each year to assist and promote the above.

Joining the Colorado Springs Mineralogical Society (CSMS):

- Meetings are held the third (3rd) Thursday of each month, except January & August.
- 7:00 PM at Mt. Carmel Veterans Service Center; 530 Communication Circle, Colorado Springs, CO 80905
- Visitors are always welcome.
- Individuals—$30, Family—$40, Juniors—$15, Corporate—$100.
- Find the application at the web site: www.csms1936.com**.** If you are interested in joining CSMS or would like more information, we encourage you to attend our next General Meeting or visit our web site.

Meetings: CSMS also offers Satellite Group meetings that allow more focused attention in specific areas of our members' interests. Our current Satellite Groups consist of the following: Crystal Study Group, Faceting Group, Fossil Group, Lapidary Group, and Pebble Pups/ Juniors. For details on Satellite Group meetings, check out the calendars on page 2 and the web site.

Membership Benefits: Yearly dues include 10 issues of the *PICK & PACK*, all field trips (additional fees may be required on some field trips, and members are responsible for all transportation to and from), participation in all Satellite Groups (some groups may request additional fees to help cover resource costs), free admission to the *Western Museum of Mining & Industry* (carry your card), a year of learning and enjoyment, plus a lifetime of memories.

Colorado Springs Mineralogical Society is a Member of the following organizations:

- American Federation of Mineralogical Societies (AFMS) www.amfed.org
- Rocky Mountain Federation of Mineralogical Societies (RMFMS) www.rmfms.org