The Mineralogical Cabinet

Volume 5, No. 1, May 2020

The Newsletter for the Friends of the New Mexico Bureau of Geology & Mineral Resources—Mineral Museum

From the Director's Desk

Greetings Friends,

No need for me to remind you of the highly unusual world we live in today. The museum has been closed since March 11, per New Mexico Governor Lujan Grisham's orders. Shortly after closing, we were still working in the facility until orders came down for everyone to work from home. Subsequent reviews of the policy now allow us to go into work for some tasks, like get more info for what we are working on at home or run some analyses in the x-ray diffraction lab. Silver Lining—We even started on the newsletter about a month early!

We all have plenty of work to do however, even at home. The closure allows us to pursue some projects that we often don't have time for during open hours. I have been reviewing scientific and magazine articles for journals in addition to writing some of my own. Right now I am concentrating on finishing my analytical work on manganese oxide deposits from New Mexico to use as analogs for manganese deposits recently found on Mars. My other colleagues from Los Alamos National Labs, University of New Mexico, Cal Tech, and Florida State University also have more time so we are making good progress and hope to prepare another grant proposal next spring.

I don't want to steal Kelsey's thunder, so I will let you read about our recent donations in her Curator's Corner (or is it Cornered Curator?) column. Kelsey has developed a number of new exhibits during the closure so when we open up there will be a plethora of new exhibits and specimens to check out!

"During this "downtime" I've decided to highlight in this column, my "favorite recently purchased or donated mineral" and why I am so fond of it. I'm calling this short column, "Director's Choice." Now be prepared, you know my favorite mineral on this planet and on Mars is jarosite so, anything goes!"

See "From the Director's Desk" continued on page 2.

Director's Choice

At the Tucson Show this year I ran into a barite from an unusual locality, Logan County, Kansas. This part of western Kansas is almost "table top" flat. Lisa and I drive through it often on our way back to Wisconsin and it never occurred to me there could be any collectable minerals in this area of mind-numbing flatness. Although the location information is lacking, I believe it comes from an area south of Oakley in the vicinity of the Little Jerusalem Badlands. In and around the park, Cretaceous age Niobrara Limestone (chalk) crops out and creates the badlands topography which is capped by Pierre Shale to the north. Mindat reports these barites occur in concretions and veins in the Pierre Shale, similar to the Elk Creek, South Dakota, specimens. What I like about this specimen is the small-cabinet size, brown color zonaton, and the jagged edges along the normally flat intersecton of prismatic faces that appear to be oriented (epitaxial) overgrowths. In addition, the Oakley Stone Meteorite occurrence is located nearby! As you can tell, the occurrence of a collectable specimen in an unexpected place is why this one "turns my crank." I just need to find some other specimen localities along the "Midcontinent Highpoint" trip from southern Minnesota, northeastern Iowa, and the whole state of Nebraska (Where I did purchase a quartz after gypsum from Dawes County, one of my finest online purchases ever!).

From the Director's Desk . . . *from page 1.*

Last year went great with respect to donations, both monetarily, and specimen material. I'm anticipating a significant fall-off in donations this year so if you can help, we probably could use some. With the museum closed, we are not generating any revenue from mineral sales either. Like many others we probably will be hitting the shows with empty pockets this summer and fall, if the shows go on at all.

We are still planning on hosting the 41st Annual New Mexico Symposium this fall. Already lining up speakers and hoping the COVID-19 pandemic calms down and we can get back to what we like to do best, preserve minerals and share with our friends who love them.

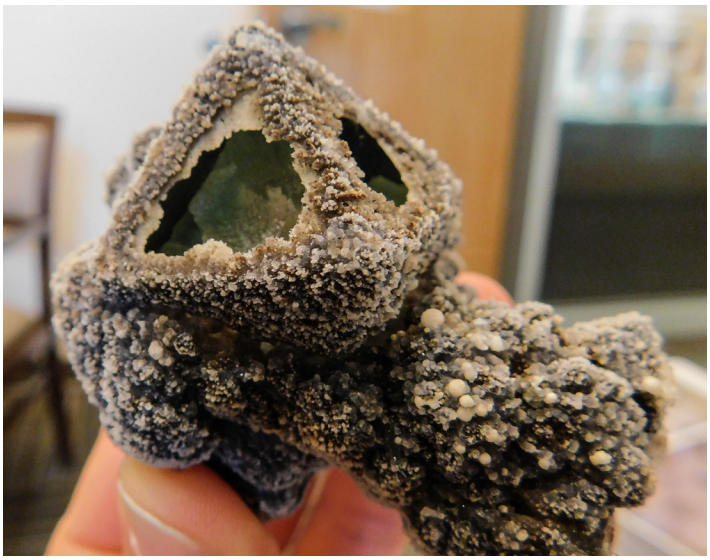
I hope this newsletter finds you and your loved ones well. We are hoping you all can come back for a visit soon.

— Dr. V

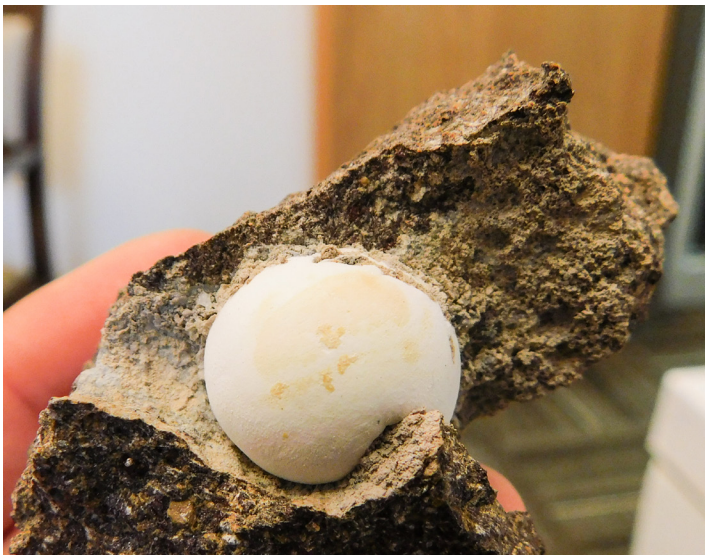
Curator's Corner

Greetings friends,

I hope this article finds you all doing well amidst the uncertainty of the pandemic. Hopefully, you decide not to use this newsletter as toilet paper, but if the going gets rough, it will work! With closure of the Mineral Museum, we have still been busy behind closed doors with collection organization, research, and XRD work.



Quartz epimorph after fluorite, Cookes Peak District, Luna Co., NM. Gift of Rex Nelson.



Gonnardite, Grapevine Camground, Grant Co., NM. Gift of Rex Nelson.

We have added four new displays (Trinity Site, Pseudomorphs (educational), Mt Saint-Hilaire pseudomorphs, and the Rex Nelson NM Collection) to the empty Waddell cases. In addition, the New Acquisitions display has many freshly-cataloged, showy pieces on the shelves; and the tabletop display of NM Ricolite has been replaced with NM turquoise from the Rex Nelson Collection. Come Symposium-time, there will be many new items for each of you to feast your eyes upon!

New Acquisitions Photo Gallery

We had a boom in mineral donations at the end of 2019. Big thanks to our generous donors! Since the last newsletter, I've catalogued over 350 minerals into the database. Please enjoy this photo gallery of a small portion of the many new pieces, from New Mexico and beyond.

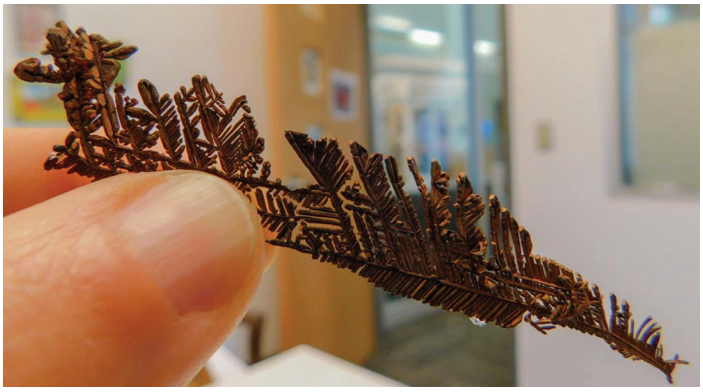
Some of the pieces we received were extra-large in size and required some heavy lifting! Four Brazilian amethyst geodes were donated by Cortney Stewart and Anne Brenner of Taos Rockers. The largest piece (the "igloo") is now on display in the Bureau atrium. The smaller, cylindrical pieces will be converted to end tables by Jay Rosenbauer. We would also like to thank Brian Wheeler, Frankie Lopez, and David Griego for the moving logistics; and Albert Baca for his carpentry skills.

Hemimorphite, Stephenson-Bennett Mine, Organ District, Doña Ana County, New Mexico. Gift of Rex Nelson.

Pyrolusite from the Little Florida Mountains District, Luna Co., NM. Gift of Rex Nelson.

Amethyst scepter, Desert Jewel Claim, Grant Co., NM. Gift of Rex Nelson.

Proustite with an irridescent coating, Bad Schlema, Erzgebirgskreis, Saxony, Germany. Gift of Joan Massagué.

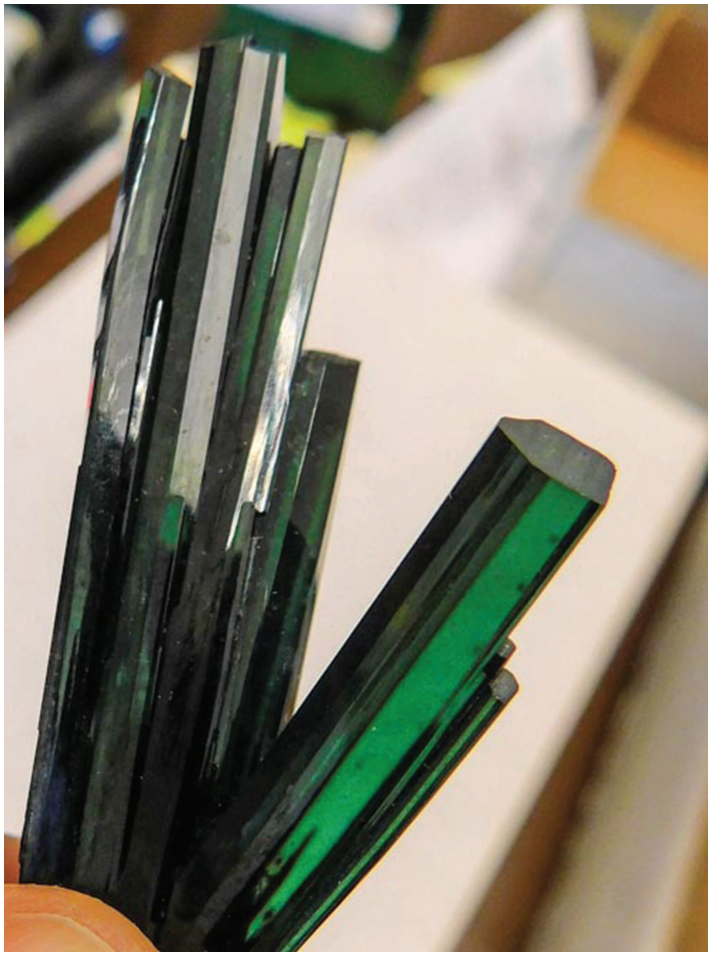


Copper, Itauz Mine, Karaganda Region, Kazakhstan. Gift of Joan Massagué.

Calcite, Bou Azzer Mining District, Morocco. Gift of Joan Massagué.

Barite with realgar inclusions!! Baia Sprie Mine, Maramureș, Romania. Gift of Joan Massagué.

Brookite & Quartz, Kharan District, Balochistan, Pakistan. Gift of Joan Massagué.



Vivianite, Huanuni Mine, Oruro Dept., Bolivia. Gift of Joan Massagué.

Gem & Mineral Show Gallery

"We drove through a blizzard (!) and brought our best to the Tucson Show this year, as the theme was "World Class." We had a nice time at the show seeing friends and colleagues."

Our "world class" display at the Tucson Show.

Unfortunately, the Albuquerque "Treasures of the Earth" Show has been cancelled. We planned to take two displays—one with new acquisitions, and another featuring mining artifacts (courtesy of Bob Eveleth). Even though the show will not go on, many of the new pieces we planned to take are featured in the photo gallery on the previous pages..

Geology of the Amethyst Geodes

These sizeable crystal cavities are mined from several lava flows in the ~130 million year old Paraná flood basalts of Brazil. Large void spaces, from coalescing volcanic gas bubbles and the development of lava tubes, were formed during cooling of the lava flows. Fluid inclusion studies and radiometric dating suggest quartz and celadonite (with lesser calcite and gypsum) formed in these bulbous to elongate cavities approx. 70 million years ago.

Outreach News

The 2020 NM Science Olympiad tournament was held on the NMT campus Saturday, February 22nd. Each year, the top 25 middle and high schools send their brightest scientists to battle it out for a spot in the national tournament. A wide range of scientific events were held across campus, including Heredity,

Three cylindrical amethyst geodes that will be converted into end tables for the atrium.

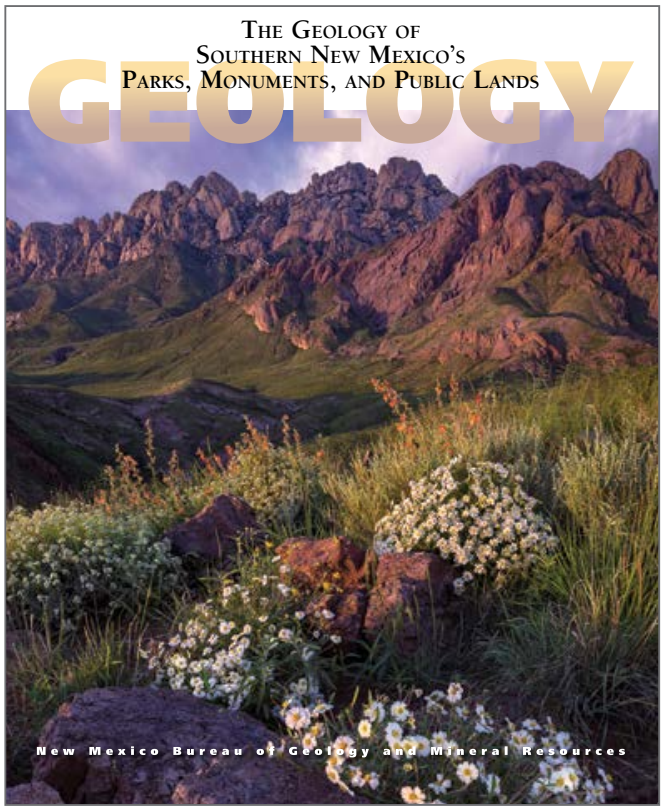
Virgil and Frankie admire the igloo, with M Mountain in the background.

Virgil hiding from the scary world around him.

Ornithology, Geologic Mapping, and even Ping-pong Parachute! This year I (along with our outreach manager, Cynthia Connolly) conducted a comprehensive test on fossils. We supervised the test for ~45 teams. For this particular exam, Albuquerque Academy scored highest for the middle school ranks, while Lovington High School took home first place in the high school division.

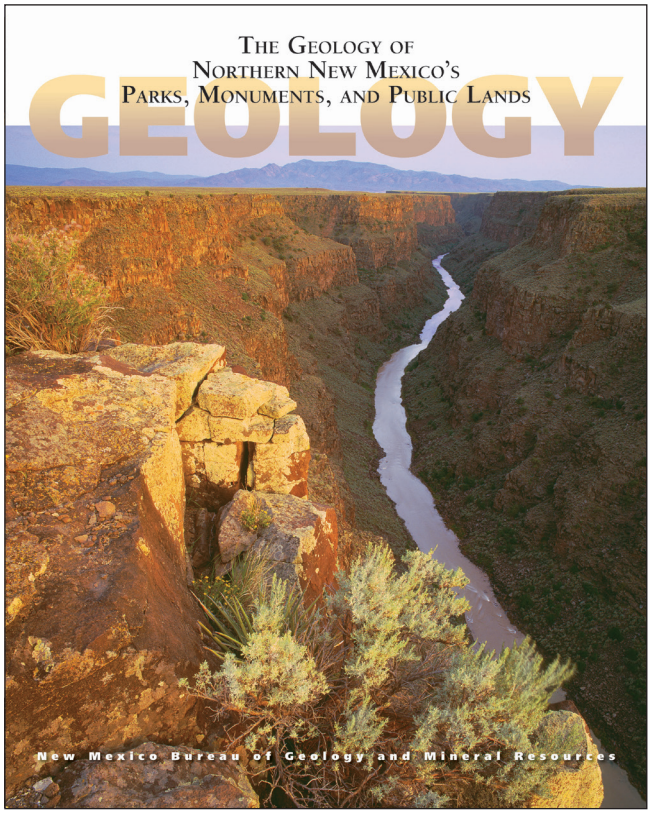
Publications Store News

The Geology of Southern New Mexico's Parks, Monuments, and Public Lands is hot off the press and will be available in May. This book is a companion publication to the award-winning northern park version, which has been revised and is also on schedule to make its third debut for New Mexico geology enthusiasts.



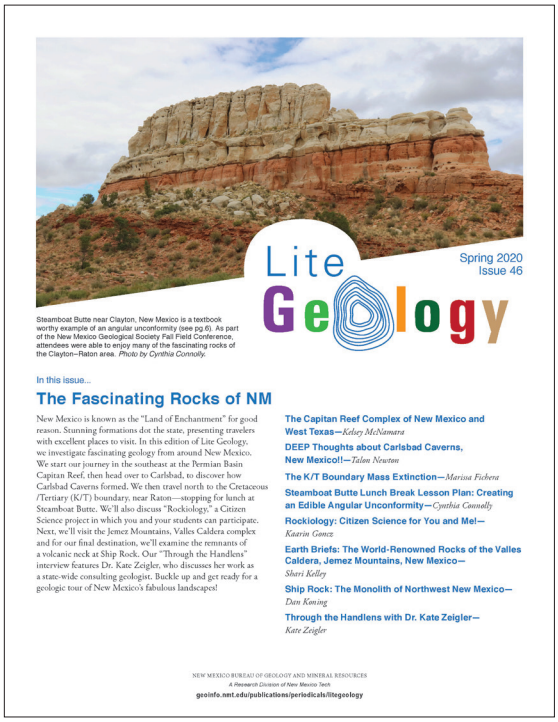
This project wouldn't have happened without the muscles and good humor of Brian and Frankie.

Virgil, Anne, & Cortney are all-smiles after loading the pieces on the flatbed trailer.



A new issue of *Lite Geology*, a publication light on the argon for the layman and K–12 educators, is now available. This particular issue includes the most fascinating rocks of New Mexico, including (but not limited to) the Capitan Reef Complex (written by yours truly), Shiprock, and Valles Caldera.

Interested? A free download can be found at this site: https://geoinfo.nmt.edu/ publications/ periodicals/litegeology/46/lg_v46.pdf



Lite Geology

Spring 2020
Issue 46

Steamboat Butte near Clayton, New Mexico is a textbook worthy example of an angular unconformity (see pg.6). As part of the New Mexico Geological Society Fall Field Conference, attendees were able to enjoy many of the fascinating rocks of the Clayton–Raton area. *Photo by Cynthia Connolly.*

In this issue...

The Fascinating Rocks of NM

New Mexico is known as the "Land of Enchantment" for good reason. Stunning formations dot the state, presenting travelers with excellent places to visit. In this edition of Lite Geology, we investigate fascinating geology from around New Mexico. We start our journey in the southeast at the Permian Basin Capitan Reef, then head over to Carlsbad, to discover how Carlsbad Caverns formed. We then travel north to the Cretaceous /Tertiary (K/T) boundary, near Raton—stopping for lunch at Steamboat Butte. We'll also discuss "Rockiology," a Citizen Science project in which you and your students can participate. Next, we'll visit the Jemez Mountains, Valles Caldera complex and for our final destination, we'll examine the remnants of a volcanic neck at Ship Rock. Our "Through the Handlens" interview features Dr. Kate Zeigler, who discusses her work as a state-wide consulting geologist. Buckle up and get ready for a geologic tour of New Mexico's fabulous landscapes!

NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES
A Research Division of New Mexico Tech
geoinfo.nmt.edu/publications/periodicals/litegeology

New Mexico EARTH MATTERS

WINTER 2020

Dangers of Steep Slopes: Landslides, Rockfalls, and Debris Flows in New Mexico

Slope is an important feature of Earth's surface. It is fundamental to the hilly to mountainous terrain of much of New Mexico, and is a defining feature of many of our notable landmarks, such as Shiprock, the Sandia Mountains, and Sierra Blanca. Slope is an essential consideration in most engineering projects, including construction of roads and buildings.

People have an inherent sense that steeper slopes are more dangerous. This intuition is well founded, as many geologic hazards are associated with steep slopes—including landslides, rockfalls, and debris flows. There are enormous benefits to society from identifying areas susceptible to slope-related hazards, so that houses and roads are not built in these areas, or so that appropriate protective measures are taken.

Nature of Slope Hazards

It is helpful to consider "driving forces" and "resisting forces" when discussing slope hazards. Driving forces initiate or cause an action. Resisting forces counteract an action. Earth's gravity is the main driving force acting on any moving mass of soil or rock, causing the mass to accelerate to destructive velocities. Because the gravity force is constant, slope hazards commonly have a triggering event. Common triggers are events that "loosen up" or initiate erosion on a hillslope, such as an earthquake or a heavy rainstorm, although, many landslides and rockfalls have occurred in the absence of any obvious trigger.

A **landslide** can be defined as the movement of cohesive rock and/or sediment down a hillslope due to the influence of gravity over a "basal shear plane" (a surface along which the mass slides). In a "deep-seated landslide" the shear plane is more than 10 feet deep, and the landslide may mobilize bedrock as well as overlying sediment. In a "shallow landslide" the shear plane is less than 10 feet deep, and typically involves only soil or sediment. Landslides can move slowly to rapidly.

A **rockfall** consists of free-falling rocks, sourced from a cliff or steep slope, which can be as small as a pebble or as large as a house. The downward movement may be straight down initially, but the end stage typically involves bouncing along a lower slope. Factors that promote rockfalls can be divided into: 1) processes that cause bedrock to fracture, such as ice freeze-thaw, uneven solar heating of rock, swelling of clays, or prying by tree roots; 2) ground shaking from an earthquake; and 3) heavy rains. Rockfalls typically stop when encountering some combination of shallow slopes and rough surfaces, such as trees and boulders.

Debris flows are gravity-driven mixtures of mud, water, and other debris (such as sand, rocks, and wood) in drainages that have steep upper slopes. The water and sediment are commonly about equal volumes and are thoroughly mixed. Debris flows are most often triggered by high-intensity or prolonged rainstorms. The sudden addition of large amounts of sediment into running water creates the debris flow. The momentum of debris flows can cause them to flow far out onto alluvial fans or valley floors. In New Mexico, destructive debris flows commonly occur after wildfires have burned off hillslope vegetation. Healthy vegetation acts as a protective cover by intercepting rainfall, slowing down the velocity of sheet flow, and increasing water infiltration. Where vegetation is thin or absent, more water hits the ground and flows more quickly downslope, resulting in greater erosion.

Risks to Society

What parts of the state are threatened by landslides, rockfalls, and debris flows—and which of the three are the most hazardous? Debris flows pose the greater risk to many New Mexico residences because of their

View of a debris flow lobe extending into the Rio Grande in the Rio Grande Gorge near Pilar. Erosion of the toe of the debris flow by the river left large boulders in the river at Sleeping Beauty Rapid, much to the delight of the whitewater boaters. The debris flow occurred on July 25, 1991, after an intense rainfall event. The debris flow temporarily dammed the Rio Grande, and had an estimated volume of 4,700 cubic yards.

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Interested in learning about New Mexico rockfalls, debris flows, and landslides? Bureau mappers Dan Koning and Colin Cikowski highlight deposits from mass-wasting events, discuss societal risk, and highlight the importance of mapping these features. For a free download, please visit this link: https://geoinfo.nmt.edu/publications/periodicals/earthmatters/20/n1/em_v20_n1.pdf

For updates and photos on what's happening at the museum, I try to post weekly on our Facebook page: www.facebook.com/NMBGmineralmuseum

The New Mexico Bureau of Geology & Mineral Resources ALSO has a Facebook page! Please check it out at this address: www.facebook.com/NMBGMR

—Kelsey McNamara

2020 Museum Show Calendar

Sept. 18–20 ♦ Denver Gem & Mineral Show
Nov. 13–15 ♦ 41st Annual NM Mineral Symposium

"Friendly Reminder"

Annual dues for the Friends of the Museum expire on the weekend of the Mineral Symposium.

You can pay dues on site or remit payment to:
NMT—Mineral Museum Gift Fund
Send it to:
NMBGMR Mineral Museum
Friends of the Mineral Museum
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Socorro, NM 87801

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Publications Sales
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Contact Us:
Director: Virgil W. Lueth:
Virgil.Lueth@nmt.edu
575-835-5140
Curator: Kelsey McNamara
Kelsey.Mcnamara@nmt.edu
575-835-5418

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