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Message from the President

Spring has arrived, finally. The rocks are calling! We have a great deal of interest in field trips, but we need leaders to offer them. If you are willing, please let me know what type of trip and where. Remember, trips do not have be focused only on rocks and minerals. It could be trip to explore history, landscapes, or any other topic that has a link to Earth Sciences. Please consider helping out.

If you enjoy some of the geologic topics in this newsletter or have others you are interested in, please let me know at gonzales_d@fortlewis.edu.

Gem Show News

I am helping Cindy find items for the Silent Auction at the Gem Show. If you have items such as minerals or jewelry that you are willing to donate, please let Cindy know. We can also accept donations from local business who might offer an item.

If you can help, please contact Cindy Pugsley at cindypugsley@sbcglobal.net

The next Gem Show meeting will be Wednesday, May 25th at 5:30 pm at the Clubhouse.

Gem Show Classes - Filling Up Fast!

Wow! Classes have just now been posted (as of Tuesday night) and already some have filled! There are 13 classes with a wonderful variety of art and skills to learn and try. Check them out and sign up here.


Four Corners
Gem Club
75TH ANNIVERSARY PARTY!!
At the club
Wed May 18
6-8
Cake
Camaraderie
Refreshments
Snacks
(Members Only Please)
Bring an old photo or memory of a Club event, activity, or member with you to share!

Upcoming Classes in May

We have a new polishing machine – a Genie Grinder from Diamond Pacific! This is for fine polishing and will really make your cabs shine!

Good thing it arrived in time for . . . .

Cutting and Polishing Cabochons

- **May 8 from 10:00 am to 2:00 pm**
- Contact Instructor Joel Arnold for more info or to get registered at 970-247-5140 or joelrecuerdo55@gmail.com

Introduction and practicing the Lost Wax Casting Process via Metalsmithing

- This is a 2-day class, **May 14 and 15 from 5:00 pm to 8:00 pm**
- Contact Instructor Charlotte Lensson for more info or to get registered at 970-799-8950 or charlotte_lenssen@yahoo.com

If you want to know more about these classes or get a jump on June classes, visit the Club's calendar at www.durangorocks.org/events.html

Upcoming Field Trips

June 11, Mancos Ammonite Fossils with Ammolite, offered by Jama Crawford. For more details and to register for the trip use the link: http://www.durangorocks.org/fieldtrips.html

What would you like to see? What can you share with other members? Let us know!

Open Shop Hours

Tuesday 1-4 pm
Tuesday 6:30-9 pm
Wednesday 9am-noon
Wednesday 1-4 pm
Thursday 1-4 pm
Thursday 6:30-9 pm
First & Third Saturdays 10am-2pm

A new way to enjoy open shop!!!

Tired of always looking for a crumpled $5 at the bottom of your bag to pay the Open Shop fee? Now, you don't have to: Punch Cards are here! You can prepay your open shop fees on one convenient card that also gives you one shop visit FREE! The card only costs $45, but you can use it for Open Shop 10 times!

How to get it?

Pay online and bring your receipt to a steward at Open Shop. Or bring a check or cash to an open shop and purchase a pre-paid card from the steward. Easy Peasy!

Rock On: A Tale of Two Mountain Ranges

"Civilization exists by geological consent, subject to change without notice."
Attributed to Will Durant (U.S. Historian 1885-1981)

Mountains, mountains everywhere. Mountains are iconic features of Colorado, and other places on Earth. But, did you know that the mountains in our part of the world have different geologic histories and origins? This article is focused on the story of the La Plata Mountains and the Needle Mountains, both of which are visible from most places in Durango.

In order to tell the story of these two mountain ranges, it is important to consider what was happening across the region that influenced their formation. In the Cretaceous period from about 140 to 80 million years ago the area we know as Durango was covered by vast epicontinental seaway

encroaching from the north which left a thick succession of rocks dominated by rock units such as the Mancos Shale. This Western Interior seaway expanded to one of the greatest interior continental seas of all time. Around 80 million years ago the seaway was retreating leaving swamps (to become coal beds), lakes, and rivers in its wake. Why did it retreat?

Around 80 million years ago, the west coast of North America underwent a new phase in the collision history that had previously marked the coastal region for many millions of years. The west coast was the site of a series of subduction zones as the oceans basins to the west were pushed down beneath the edge of the continent. This process created volcanic systems before 80 million, but starting about this time it is hypothesized the rate of subduction increased. It is thought that this higher rate allowed the subducted slab to adjust to a shallower angle beneath western North America. As the plate was pushed into the earth, it caused compressive deformation across the region that in part gave birth to the uplifted area of the Colorado Plateau and the Rocky Mountains. Keep in mind that my description is simplistic and that this hypothesis is complicated, and not fully accepted by some members of the geologic community. As the subduction process continued there was also a wave of magmatic activity that moved across the region from west to east. In many places in Arizona, Utah, and New Mexico the plutons created in this period are associated with copper mineralization.

Now, we can get to the topic. The magmatic activity related to the Farallon subduction would arrive in southwestern Colorado around 75 million years ago and continue until around 60 million years ago. Melted earth generated highly viscous magmas that rose into the stratified layers of sedimentary rock that lay above. As the magma rose to higher levels, they were able to push into the layers and also undergo some decompressive gas expansion (similar to opening a bag of compressed marshmallows). This lifted the overlying

sedimentary layers into mushroom-shaped bulges, called laccoliths, that today define the northern extent of the Carrizo Mountains, Sleeping Ute, the La Plata and Rico Mountains, and the “Blowout” stock of Ouray. All of these mountain ranges were produced by this process of magma rise and inflation.

At around 75 million years ago, the compressive stresses in the earth also caused a piston-like uplift in the area we now call the Needle Mountains. It is not entirely understood why this well-defined block of earth was driven up, but likely was controlled in part by older faults and weak zones in the earth. When these mountains rose, they were accompanied by a downward warping of the earth to the south creating the San Juan Basin.

The construction of the La Plata Mountains and Needle Mountains in the late Mesozoic to early Cenozoic would change the history and landscape of our stomping grounds forever. The mountains created water sheds from which streams and rivers flowed over millions of years. And, in the last several hundred thousand years, these mountains were the site of great tongues of ice that carved deep valleys and sharp peaks, exposing the rocks of earlier mountains and providing us with a playground of wonder and awe. So, next time you view the La Plata Mountains and Needle Mountains consider them “time twins” with very different origins and personalities.

A view of Centennial Peak and Hesperus Peak viewed to the west. The banded appearance in the landscape is due are sills that intruded into the layered sedimentary rocks (photograph by D. Gonzales).

A closer view of Hesperus Peak viewed to the west. Again, note the banded appearance in the mountain formed by sills that intruded into the Mancos Shale (photograph by D. Gonzales).

The Guardian viewed to the west from Rock Creek Trail. This is just on or the may peaks composed of 1800 to 1400 million year old rocks that are exposed in the tectonic block called the Needle Mountains (photograph by D. Gonzales).

Chicago Basin on a cold morning in the middle of June. The 14,000-foot peaks of Mt. Eolus and Sunshine Peak loom over the basin. These peaks are composed of 1400 million year old granite (Eolus Granite) and are the heart of the Needle Mountains. (photograph by D. Gonzales).

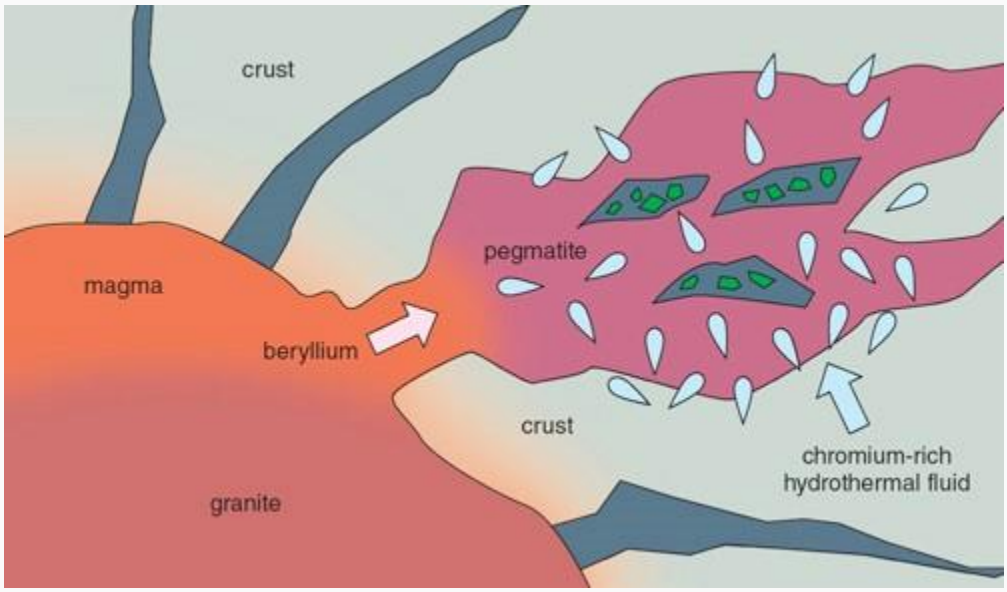
May Birthstone (Taurus, April 20-May 20; Gemini, May 21-June 21)

Emerald is the official birthstone for May. This mineral a variety of beryl that owes it distinctive hardness of ~8 and hexagonal prisms to the Si_6O_{18} rings that are the atomic building blocks of beryl. The group of silicate minerals composed of ring structures are quite varied and many of them can be gemstone quality: beryl, tourmaline, cordierite, and dioptase. Beryl is a family of minerals that have the same atomic structure but vary in color and include emerald (green), aquamarine (light blue, and the Colorado state gemstone), morganite (pink), red beryl, heliodor (greenish yellow), goshenite (colorless), and golden beryl.

Of course, one of the striking features of emerald is its mesmerizing green color (imparted by trace amounts of chromium) that is uncommon in the mineral word. According to GIA, the word emerald “comes from *smaragdos*, ancient Greek for a green gem. In the past,

this green birthstone was thought to have magical powers that could make a wearer more intelligent and could cure some diseases. “By placing it under the tongue, one could see into the future” (https://www.gia.edu/birthstones/may-birthstones)

Colombia has been the source of the finest emeralds for more than 500 years. It commonly forms in granite pegmatite or related hydrothermal systems. In the United States, emeralds have been mined in the Carolinas.



A simple illustration showing how emeralds can form in an igneous-hydrothermal system. (online site no longer active)

Examples of cut and faceted emeralds (Emerald | AGTA).

“The Crown of the Andes boasts an impressive 24 ct emerald center stone and 442 additional emeralds set in the intricately crafted golden headpiece. Photo: the Metropolitan Museum of Art.”