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Message from the President

Greetings all. Hope you are enjoying our winter wonderland. But for those of you who like the spring and summer (that includes me) we can revel in the thought that every day the angle of the sun is changing and we are getting more and more sunlight. For this month's essay, I review the Irving Formation, the oldest and one of the most interesting rock units in the area. Also, check out the upcoming classes at the Club, and get involved with the preparations for the 2023 Gem and Mineral Show.

Board Meeting

The next Board meeting will be scheduled in March. Stay tuned.



2023 Gem and Mineral Show!

Cindy Pugsley and Adam Parker are organizing the 2023 Gem Show. Cindy held the first meeting in January and other meetings are coming soon. If you can contribute

to the process then please contact Cindy at cindypugsley@sbcglobal.net. Also, we are accepting donations for the Silent Auction.

The following dates are upcoming meetings for the Gem Show at the FCGMC Clubhouse at 6 pm.

February 15

March 15

April 19

May 17

June 21

Safety Reminders

We can no longer store plastic buckets next to the hot water heater. Jama Crawford has purchased metal buckets to use instead. Please do not place any plastic containers near the heater.

Please do not place any flammable materials within the clearance limits of the furnace (6 inches all around plus 55 above, 55 in front, and 2.5 inches for flue).

Training for the solder station will be offered by Jama Crawford on February 14 from 12:00 pm to 1:00 pm. If you want to use the torch at the solder station, you can take this in-person lesson or watch a 12-minute training video at [SolderStationTraining - YouTube](#). There is a review exam after the training that is available in the Shop.



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

Thursday, January 5, 7-9 pm: Open Shop Casting Day

Open Shop Punch Card

If you like using open shop, remember we have a punch card for multiple use. [Prepurchase](#) 10 visits

for \$45 - a \$5 savings - and don't worry about having your "shop fee" when you come in!

Upcoming Classes in February

There are a number of interesting classes being offered in February. You can check on upcoming events at the [Four Corners Gem and Mineral Club Events Calendar - Four Corners Gem & Mineral Club \(durangorocks.org\)](#)

Rock On: “Old as Dirt”

Have you ever wondered about the oldest rocks in southwestern Colorado? When we view the landscape around us, it is easy to get lost in all of the different layers of rock and their features. At the bottom of the visible pile, however, are the wonderous rocks of the Irving Formation. The name of this unit itself is unique. Most rock units are named for a type locality. For example, the lower part of the red rocks in the Animas River valley north of Durango make up the Cutler Formation, named for the exposure of similar rocks north of Ouray at Cutler Creek. But the Irving Formation is named after a person, in a round-about way.

In the late 1800's and early 1900's the United States Geological Survey conducted ground-breaking studies of the geology and topography in the rugged mountains in this region. This was no small task. Although the railroad was constructed in the late 1800's, there were not roads and only a few trails; access was on horseback or foot. One of the geologists in this research group was named J.D. Irving. John Duer Irving (1874-1918) joined the USGS in 1899. To have a rock unit named after himself took some clever maneuvering. A prominent peak on the east flank of Vallecito Creek was named Irving Peak. It is a beautiful and mystical peak that has eluded my summit for years now. Irving now had defined a location which served as the type section of the Irving Greenstone, which was later renamed to the Irving Formation. And, the rest is history. As a footnote, Irving was assigned to the 11th Engineers in the U.S. Army in World War I and died in 1918

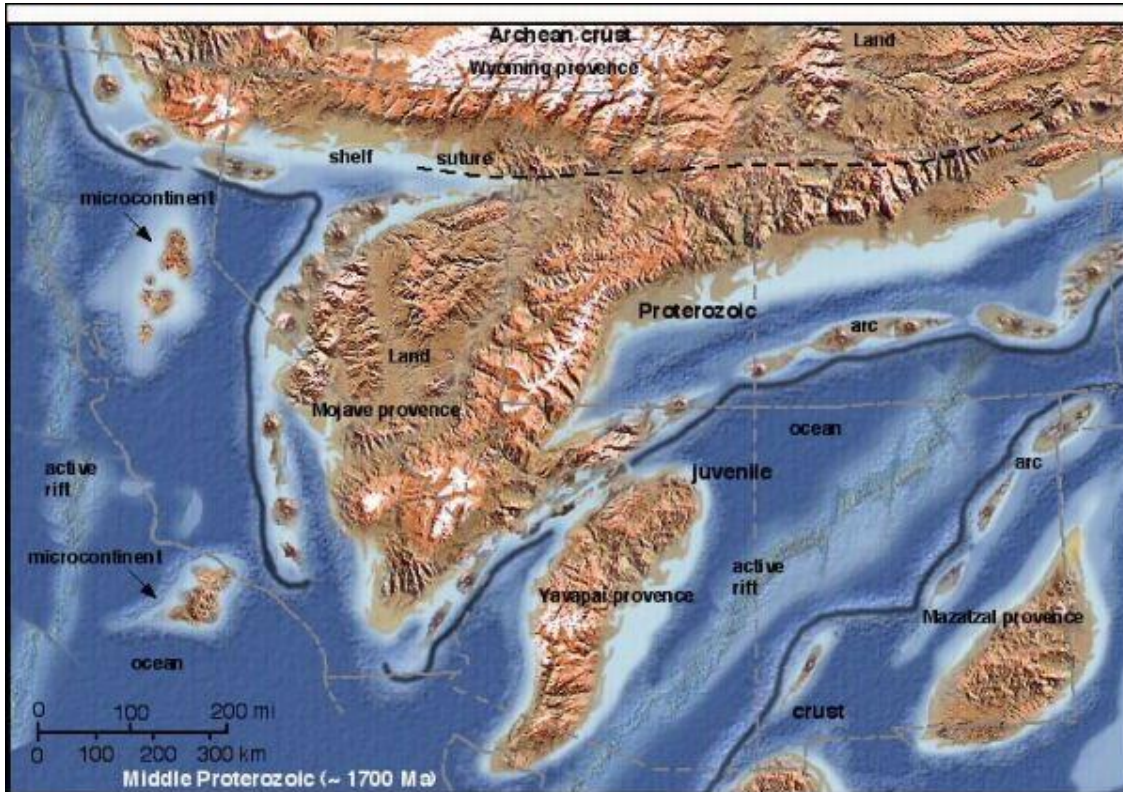
of pneumonia. His name and legend, however, has endured at Irving Peak and in the Irving Formation.

My introduction to the Irving Formation happened in 1982 when I was fortunate enough to do a senior research project with Dr. Jack Ellingson at Fort Lewis College. Although I had little to no experience with this unit, we would soon become good friends. After graduating from Fort Lewis College, I attended Northern Arizona University for a Master's degree under the supervision of Drs. Clay Conway and Richard Holm. For my research project I chose to come back to the alluring mountains in the southern Needles and work on the Proterozoic rocks, including the Irving Formation. I recall hiking into my thesis area with Dr. Conway and staring up at the steep canyons walls and jagged peaks wondering what I had gotten myself into. Dr. Conway told me something that still resonates with me today, "Son, you have bitten and now you must chew." And, yes indeed, I chewed through a number of pairs of boots in that project. And, yet, a few years later I came back for more during my doctoral research at The University of Kansas. I conducted a much larger project over the entire Needle Mountains and many a night I snuggled down with the Irving Formation at elevations over 12,000 feet. In some ways, geologists become married to their rocks, and I feel that in a certain way I have given vows to these rocks. It was in my doctoral work that we finally had an idea of the age of this unit. U-Pb analyses on zircon crystals indicated the rocks were 1800 Ma. Discovering this age was no small feat, as I had to pack several hundred pounds of the Irving on my back to obtain a handful of zircon crystals that gave up their secret. It also required several weeks of work in the Isotope Geochemistry Lab at KU.

Now, what about the history of this rock unit? In a time, long ago, in the place we now call home, there was no land. About 1800 million years ago, southwestern Colorado was at the edge of North America. The landscape was similar to that of modern Indonesia. Large pieces of earth were subducted beneath the edge of a juvenile land mass that made up Colorado. This subduction zone stretched hundreds of kilometers in a roughly northeast to southwest orientation. Geologic evidence from the rocks reveals that this was a place of volcanoes, earth collisions, and rising mountains. If you had stood in Durango at this time, chances are you would have witnessed massive volcanic eruptions and a few earthquakes.

The beginning of the Irving Formation took millions of years and created a thick sequence of volcanic and minor sedimentary rocks in a volcanic arc system. The arc was then sutured to the southern margin of North America (Laurentia) accompanied by deformation and metamorphism. Today, the rocks present themselves as gneiss and schist, but in some locations the original features are still visible where the deformation did not overprint the features. The Irving Formation and a similar suite of rocks in northern Colorado are the oldest rocks in the State, even older than the rocks exposed in the gorge of the Grand

Canyon. If you want to stand on the oldest earth in this area, you can drive to Haviland Lake where the Irving Formation is exposed on the east side of the reservoir. Have fun exploring!



Reconstruction of southwestern Colorado at ~1700 Ma. Note that the area is interpreted as different pieces or terrains of volcanic arcs that would eventually collide to make the foundation of Colorado. Figure from Dr. Ron Blakey (<https://jan.ucc.nau.edu/~rcb7/index.html>).

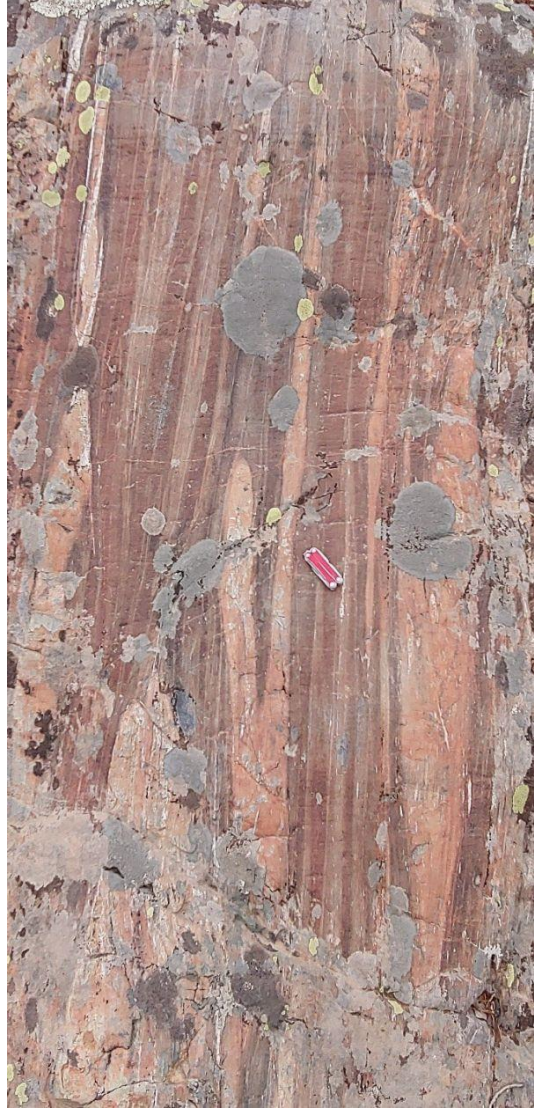
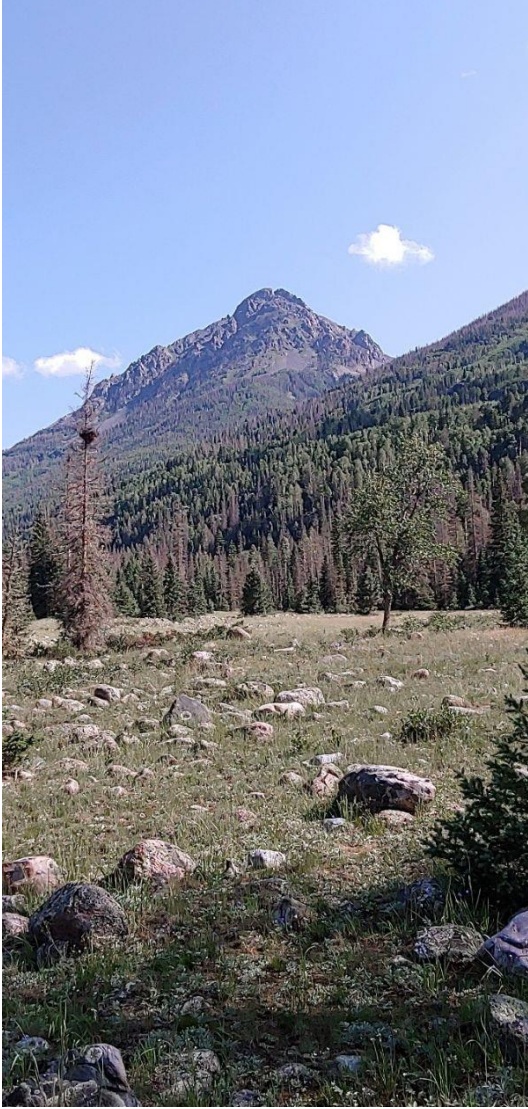


Photo Descriptions:

The photograph on the left is a view of Irving Peak looking north from the trail on Vallecito Creek. This peak is the type locality for the unit. The photograph on the right is an outcrop of Irving Formation exposed about 2 miles south of Silverton. Note the folds defined by the layers in the rock indicating that they were deformed. Photographs taken by D. Gonzales.



Deposit of basaltic pillow lavas in the Irving Formation at Highland Mary's Lake, Needle Mountains. Photograph by D. Gonzales

Sources of information:

Howe, E, 1904, An occurrence of Greenstone schists in the San Juan Mountains, Colorado: *The Journal of Geology*, v. 12, no. 6, p. 501-509, [doi:10.1086/621173](https://doi.org/10.1086/621173)

John Duer Irving biography, [John Irving \(August 18, 1874 — July 20, 1918\)](#), [American geologist | World Biographical Encyclopedia \(prabook.com\)](#)

Mineral Highlight

Some names of mineral are just fun such as the mineral Skutterudite (formerly known as smaltite), pronounced **skuht-uh-ruhd-ahyt**. This relatively rare mineral is cobalt-arsenide CoAs_3 , also reported as $(\text{Co}, \text{Fe}, \text{Ni})\text{As}_2$.

3. Skutterudite was named in 1845 after its discovery locality, Skutterud, Modum, Norway. It forms from hydrothermal alteration of mafic and ultramafic

rocks (serpentinites, basalts, peridotites) and is found in veins in sulfide deposits that contain arsenide and arsenate minerals. It is isometric with forms of cubes, octahedrons and pyritohedrons, and it has a striking white to silver-gray color and brilliant metallic luster. Skutterudite is mined for cobalt and nickel used in the production of magnets, batteries, and high-strength steel. The mining and production of nickel is critically important in the movement to produce electrical vehicles and other rechargeable, battery-operated devices.

Sources of Information

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

<https://www.mindat.org/min-3682.html>

<https://webmineral.com/data/Skutterudite.shtml>



Skutterudite crystals from the Ouarzazate Province in Morocco. Photograph taken from [Skutterudite: The mineral skutterudite information and pictures.](#)



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