TC ROCKHOUNDS

February 2024 issue

The next regular meeting will be February 21 at 6:30 p.m. at the VFW Post at 3400 Veterans Drive in Traverse City. Please see the previews of the short and main programs below.

Brody Dymond, a Pebble Pup, will present the short program on *Stylemys*: A Fossil Tortoise from the White River Badlands. Brody joined the GTARMC's Pebble Pup program last year and actively participates in all of the outreach programs. Brody is 10 years old and is in the 4th grade.

Long program title: GARDEN PARK AREA FOSSIL DISCOVERIES

Program Description: Garden Park in Colorado is famous for its fossils and is popular among scientists and enthusiasts. Part of the Cope and Marsh Bone Wars, also known as the Great Dinosaur Rush (an intense period of scientific rivalry between two prominent paleontologists, Edward Drinker Cope and Othniel Charles Marsh), were fought here. The region's geological history spans millions of years, preserving fossils from various periods, including the Jurassic and Cretaceous eras. The Garden Park fossil discoveries have played a pivotal role in expanding our understanding of dinosaur evolution, behavior, and ecosystem dynamics. Fossilized remains of some of the most iconic dinosaurs have been found here, often in exceptionally well-preserved states. These discoveries have not only contributed to scientific research but have also captivated the public, inspiring a profound appreciation for the Earth's history and the remarkable creatures that once roamed the area. Join Steven Veatch for a story so big, so bold, only the American West can hold it.

The next regular meeting of the Pebble Pups will be on February 21 at 5:30 pm at the VFW. This is what is planned for the meeting.

Planetary Geology: Is There Life on Any Other Planetary Body in Our Solar System? Icy moons in the outer solar system, such as Saturn's Enceladus, could harbor life. Mars may have had life in the past, but more robotic exploration is needed. We will take a look at this amazing question, and how disciplines such as geology and paleontology can help shed light on these mysteries.
Mineral of the month: feldspar

January Highlights

51 Members and visitors attended the meeting. During the short program, Eric Hallman showed a homemade wire gauge that helps to know what size of wire you have.

The main program was Eric telling about the Penn Dixie Paleontological and Outdoor Education Center and showing some fantastic fossils of Trilobites.

Motions were passed to provide $200.00 to purchase supplies for the Kid's Table at our annual show in September, and $250.00 for supplies needed for the Pebble Pups programs and outreach.

Food Pantry Donations

Lorna Coe and Jim and De Elder would like to thank all that have brought items for the food pantry and clothing donations. Due to the success of the program, they are going to continue this at every meeting. Non-perishable food items, personal hygiene products, new children's underwear, cold weather new, or clean, lightly-used clothing items and tote bags are welcomed. As an added incentive, every time you donate items, put your name in the hat for a drawing, which will take place at our Christmas dinner.

More Rock & Mineral Specimens Needs for the Pups

The Pebble Pups need specimens for study and for Steven Veatch to give out at the Pup's meetings and for public outreach events that are staged about 4 times a year. People can contact Steven at steven.veatch@gmail.com or bring them to the meetings for him.

Upcoming Field Trip Planning

PLEASE NOTE – WE ARE STILL IN NEED OF A NEW FIELD TRIP COORDINATOR TO TAKE OVER FOR GARY BULL. FOR MORE INFORMATION ON THE POSITION, CONTACT GARY AT 231-590-3397.

Steven Veatch is working on a possible field trip to the Cranbrook Institute of Science in Bloomfield Hills, MI.

Membership Information

From Cathy Kowaleski, Membership Chair:

You must be a paid member to continue to receive club benefits (participation in classes, outings and receiving club newsletters.)
Dues are $15 Adult or $20 for a couple, Juniors (8-17) $5, and Rockpups under 8 are free with an adult membership. Make checks out to GTARMC.

Membership dues may be mailed to:

Cathy Kowaleski, Membership Chair
801 S. Garfield Avenue #241
Traverse City, MI 49686

Name badges are an additional $8 per badge. Thank you!

Club Email Addresses

gtarmc@tcrockhounds.com (main club email address)

If you have any photos that you would like to share of club events or members, those can be sent to:

photos@tcrockhounds.com or noonanjohntc@gmail.com

To view club photos on Flicker, enter the following web address:

GT Rock & Mineral | Flickr

For scheduling requests for classes or workroom time, please send email request to:

scheduling@tcrockhounds.com

President	**Vice President**	**Secretary**	**Treasurer**
Eric Hallman	Bob White	De Elder	Sandie Bull
231-620-6567	231-676-3644	231-360-7111	231-929-3630
ehall686@gmail.com	bluerockcreative@gmail.com	jde123123@yahoo.com	sandie.bull@yahoo.com

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Gary Bull	Pierre LaFoille	Denise Groesser	Jenny Burcroff
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Newsletter & Website	**Membership**	**Refreshments**	**Club Show Chair**
Lauren Vaughn	Cathy Kowaleski	Pat Captain	Lauren Vaughn
231-276-6150 H	231-633-0700	231-946-3026 H	231-276-6150 H
231-342-3613 C	ctkowaleski@gmail.com	231-342-6674 C	231-342-3613 C
maple2b@aol.com		cappat@aol.com	maple2b@aol.com

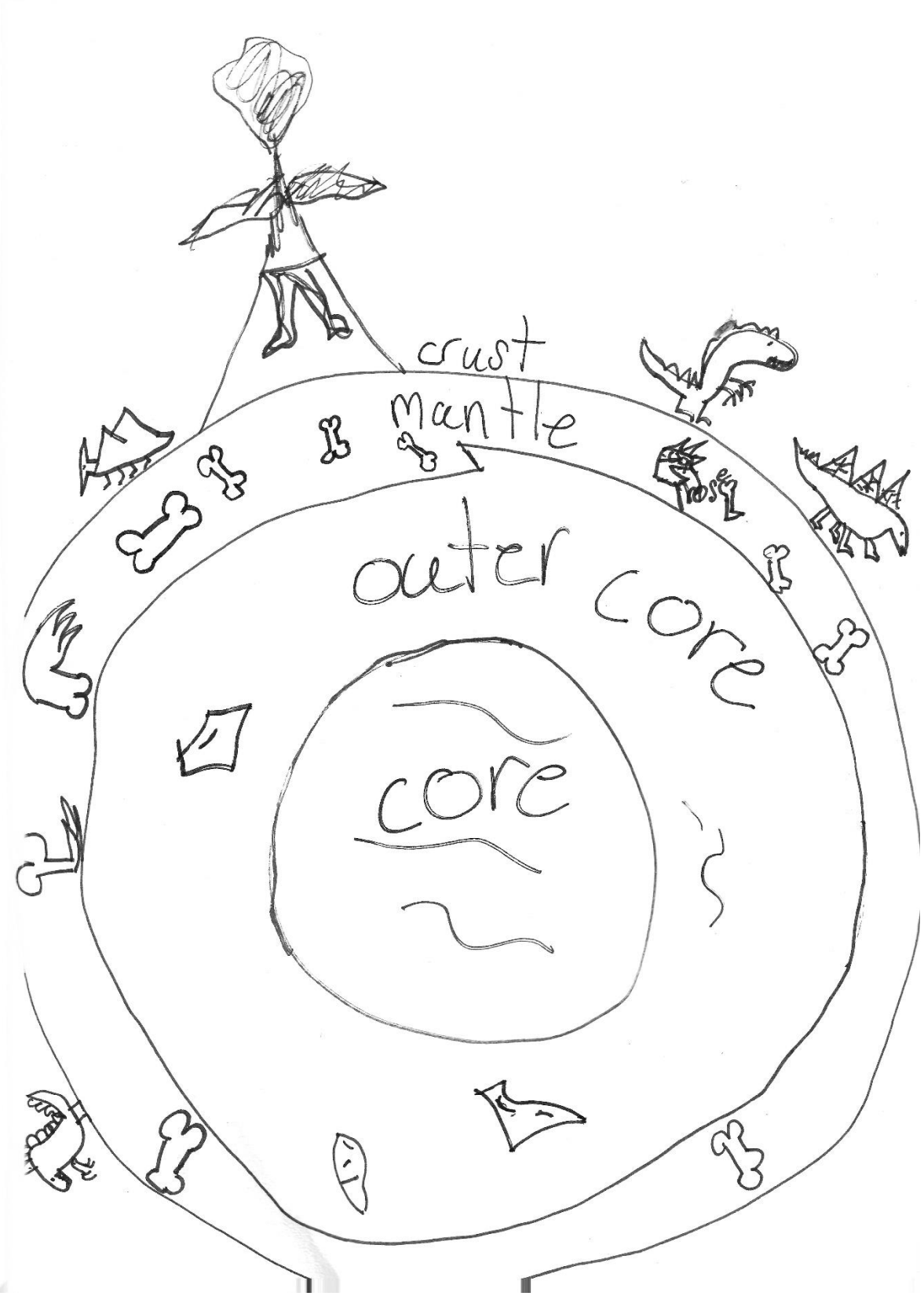
The above contact list will be included in each newsletter so that you know who to contact for various items.

Facebook Page

Visit the club's Facebook page at this web address. There is also a link on our club website. https://www.facebook.com/TCRockhounds

Pebble Pup Artwork and Poetry

The next few pages show some of the artwork and poetry created by our Pebble Pup group.



Bo White – Second Grade

GTARMC Pebble Pup

Earth Science Poetry and Art

By Roslyn Warnes

Fossil Snail

Hard, turned to stone, fossilized
Searching, digging, finding, keeping
Fossils are rare, this one is so small, will I find more?
—Arlo Marx

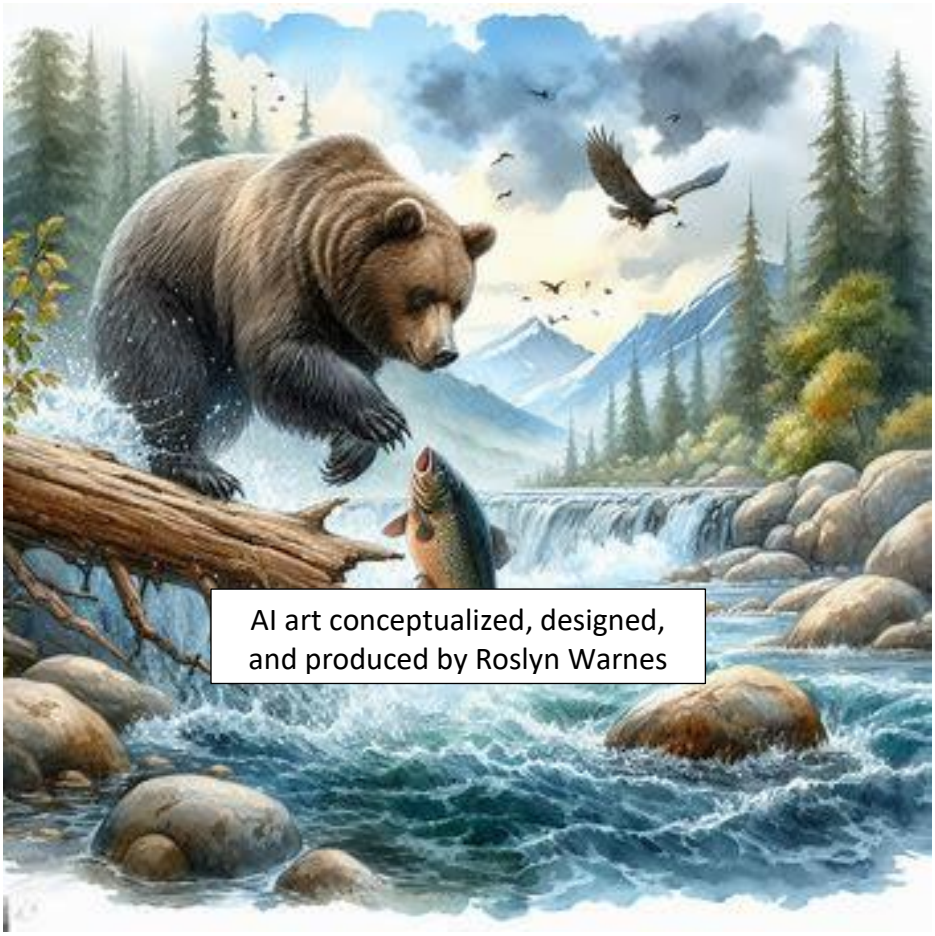
Glacier

Cold, frozen
Melting, freezing, sinking
I like glaciers. How about you?
—*Sadie Marx*

AI art conceptualized, designed, and produced by Sadie Marx.

River

Fast, long
Amazing, zooming, splashing
Fish swimming, going down the river. Will I catch one?
—Roslyn Warnes



Space

Cold, amazing, very cool
Planets are remarkable
Stars are bright and shine
—Roslyn Warnes

AI art conceptualized, designed, and produced by Roslyn Warnes

Petoskey Stone

Prepare to find them.
Expect to find them—
To locate them go to a beach.
Over there, look everywhere*!*
S*uper cool if you find them.*
K*eep trying, you will find one!*
E*verywhere, look everywhere.*
Y*ou are right there, a Petoskey stone!*

—Sadie Marx

Next is a poem by Steven Veatch followed by one of his articles.

Dreams in a River of Gold

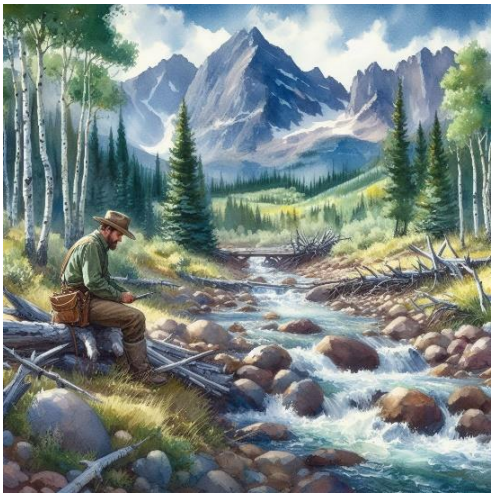
Beside the meandering stream,
a prospector worked his gold pan
while water tumbled over
smooth granite boulders.

Here the mountain stream
grew deeper in its channel
and formed pools, a likely place
for gold to settle.

The prospector tirelessly shoveled,
sifted, screened, and panned—
then picked gold nuggets
from the black sand in his pan.

Laboring by the stream, he knew why
he left home, saying goodbye—
swapping his life for one on the frontier,
a life of hardship, danger, and brutal work.

The reason was clear when he bedded down
by a crackling campfire, under a cold
sky filled with stars and a half-moon.
As he slept, next to the stream,
the aspens whispered dreams
making a strike, taming a new land,
and building the West.



By Steven Wade Veatch

Rocks in Balance:
A Closer Look at the Geological Marvels of Precariously Balanced Rocks

By Steven Wade Veatch

Balanced Rock, in Colorado Springs' Garden of the Gods Park, is an example of a type of geologic feature called "precariously balanced rocks," or PBRs. These interesting rocks are common in the American West, where dry climates preserve them. They are also found worldwide in other climates.

PBRs can vary in size from small boulders to massive stone monoliths weighing thousands of pounds—and many are precariously perched on a pedestal. They look like they could topple over in a strong wind.

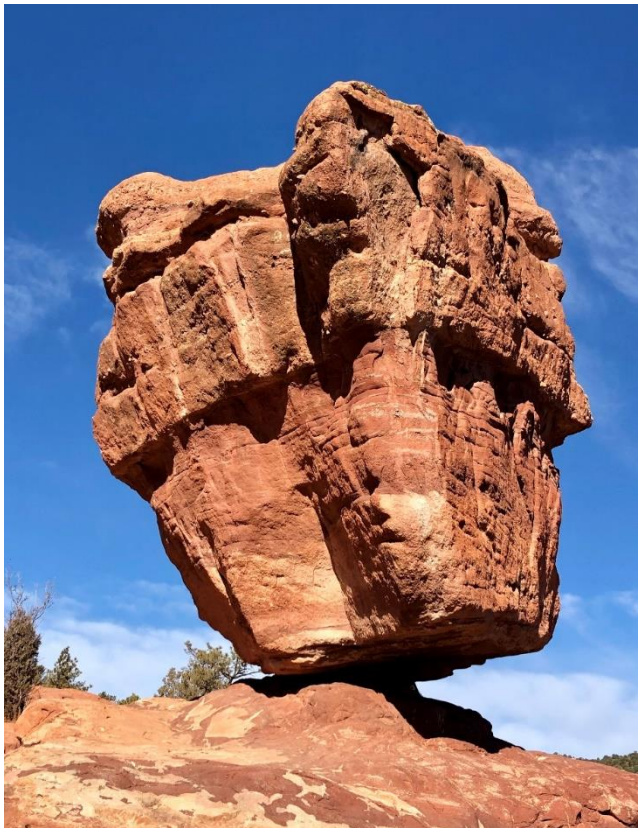


Figure 1. *Balanced Rock is a famous PBR in the Garden of the Gods Park, Colorado Springs, Colorado. The rock appears to defy gravity by balancing on a small base. This rock is an erosional remnant of the Fountain Formation. Photo date 2021 by S. W. Veatch.*

People have long been fascinated by PBRs. In the past, certain cultures linked these rocks to spiritual or supernatural realms and used them in religious rituals. Balanced rocks also held spiritual significance in Native American culture as markers for guiding mystical journeys. They were also used by early Anglo settlers as they made their way to new homes in the west. In addition to their spiritual significance, PBRs have become popular tourist attractions, and in many cases are surrounded by parks where tourists come to see these incredible geological wonders and marvel at their implausible balancing acts.

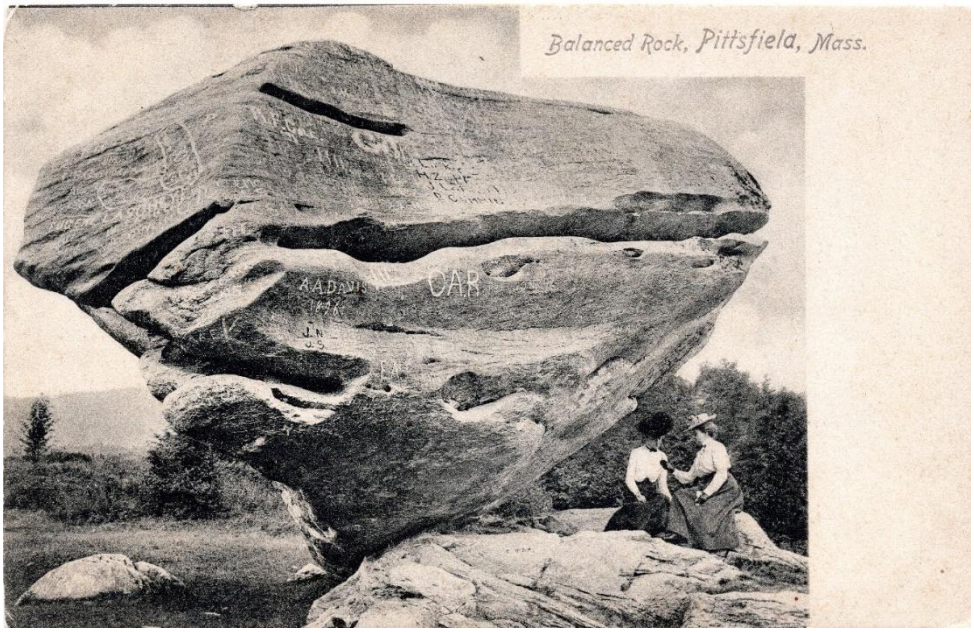


***Figure 2**. An old postcard view of graffiti-covered Balance Rock, Pittsfield, Berkshire County, Massachusetts. A creation of the last glacial era, this 25 x 15 x 10-foot boulder balances on a small rock below it. Postcard circa 1902. From the collection of S. W. Veatch*

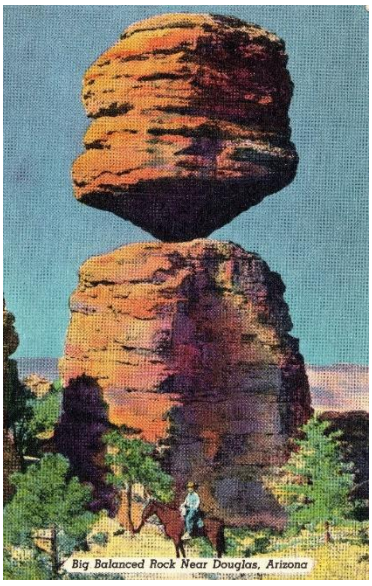


***Figure 3**. Big Balanced Rock Near Douglas, Arizona. Postcard circa 1948. From the collection of S. W. Veatch.*

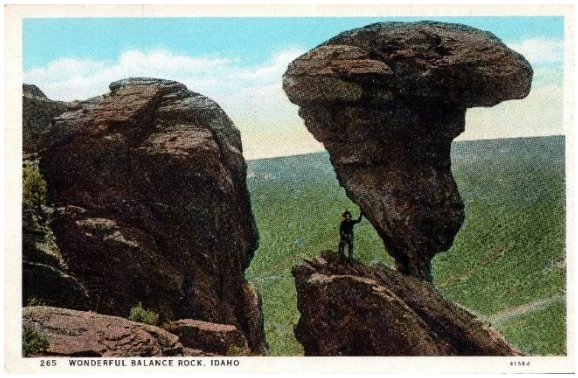


***Figure 4.** Balance Rock, Idaho. Postcard circa 1940s. From the collection of S. W. Veatch.*

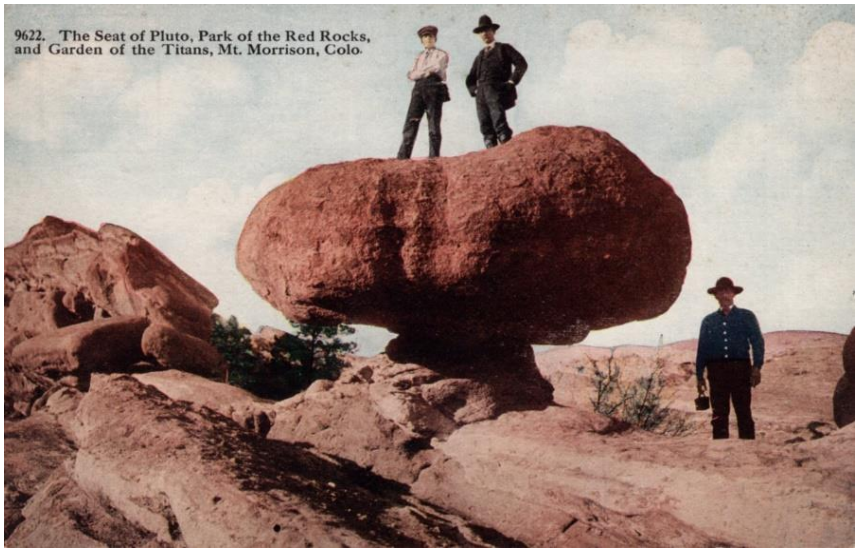


Figure 5. *An old postcard view of the mushroom-shaped "Seat of Pluto" rock formation in the Red Rocks Park, Morrison, Colorado. Postcard circa 1912. From the collection of S. W. Veatch.*

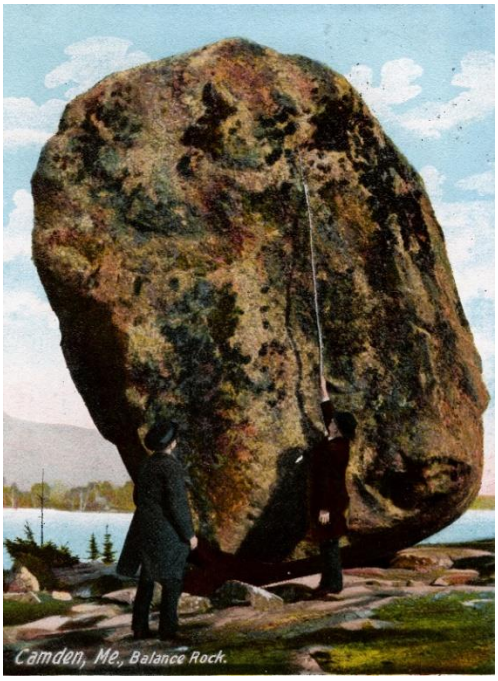


Figure 6. *An old postcard view of Balance Rock, Camden, Maine. This glacial erratic is located on Fernald's Neck peninsula near Lake Megunticook. Postcard circa 1910s. From the collection of S. W. Veatch.*

PBRs are formed in several ways. Some PBRs result from weathering and erosion. When water percolates through fractures in rock, those fractures can grow and ultimately break the larger rocks into several smaller pieces. Over thousands of years, as erosion lowers the ground level, the rocks are exposed at the surface, and are frequently stacked on top of one another. Weathering and erosion of the exposed rock by wind, rain, and relentless cycles of freezing and thawing removes rock material around the balanced rock, leaving the harder rock behind. Over time, a rock pedestal is formed as the softer material erodes away, leaving only a small base of support protected by the more resistant rock.

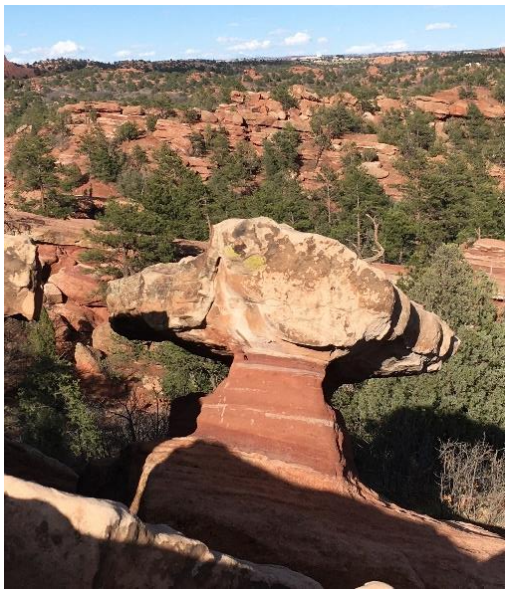


***Figure 7**. A sandstone PBR at Garden of the Gods, Colorado Springs, Colorado. Photo date 2020 by L. Canini.*

***Figure 8.** A sandstone PBR at Red Rocks Open Space, Colorado Springs, Colorado. Photo date 2020 by L. Canini.*

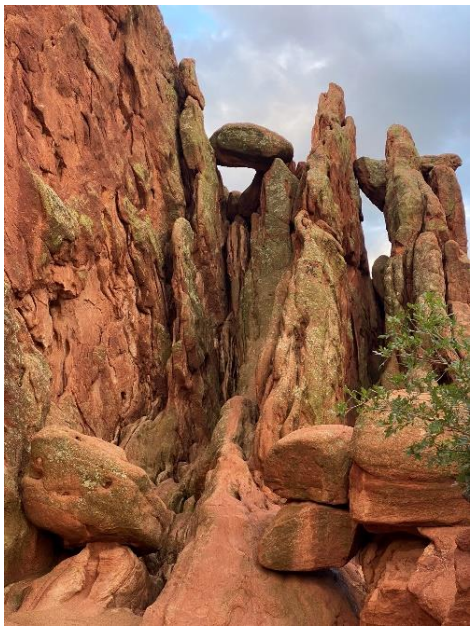


***Figure 9.** A sandstone PBR at Garden of the Gods, Colorado Springs, Colorado. Photo date 2020 by L. Canini.*

***Figure 10.** A sandstone PBR at Palmer Park, Colorado Springs, Colorado. Photo date 2020 by L. Canini.*

A glacier can create a PBR when it snatches up a boulder and carries it away in the moving ice. When the glacier melts, it drops the entrained boulder onto its new location (see fig. 2, 6, and 15). Glacial meltwater then removes the softer till and outwash, leaving larger rocks (erratics) perched on smaller rocks. Gravity is another way of creating a PBR when it pulls a larger rock down a slope that comes to rest precariously on another rock or rocks (figure 11).

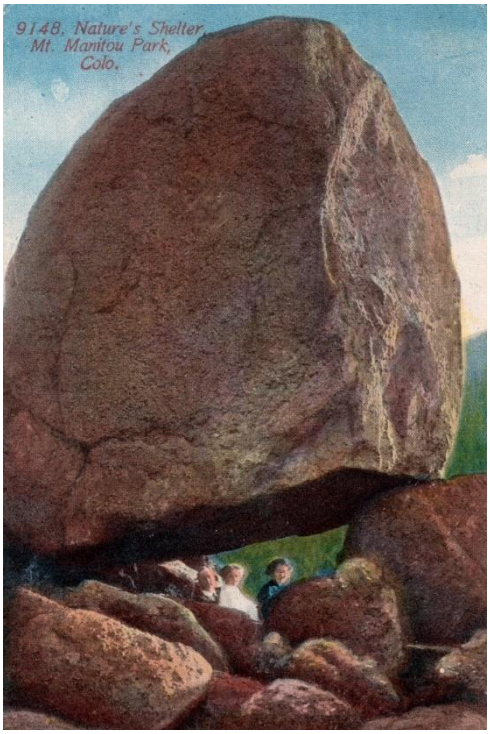


Figure 11*. A PBR in Mount Manitou Park, Colorado. A large boulder of Pikes Peak Granite has moved downhill and rests on a smaller boulder. Postcard circa 1912 from the collection of S. W. Veatch.*

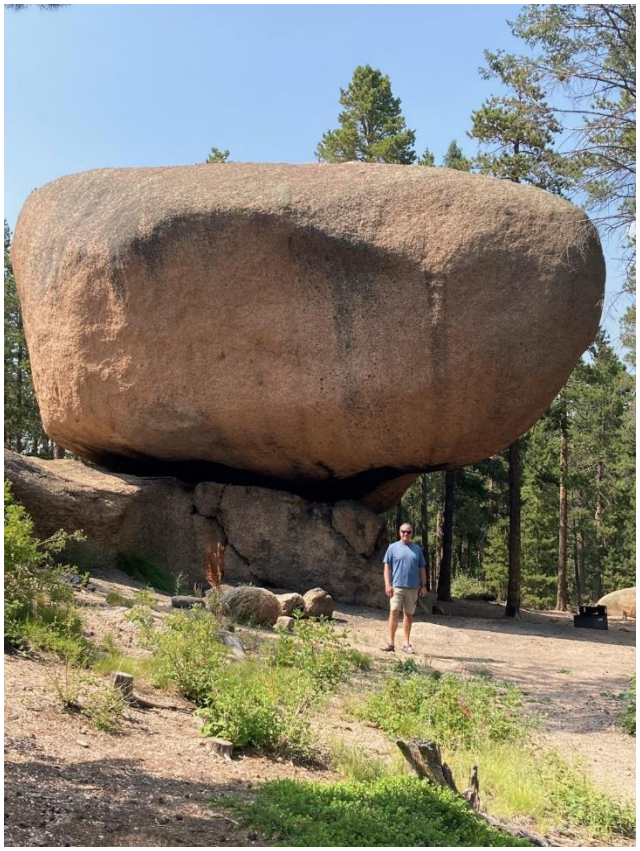


***Figure 12**. A granite PBR. Devils Head area, part of the Rampart Range of the Rocky Mountains of Colorado. Photo date 2020 by L. Canini.*

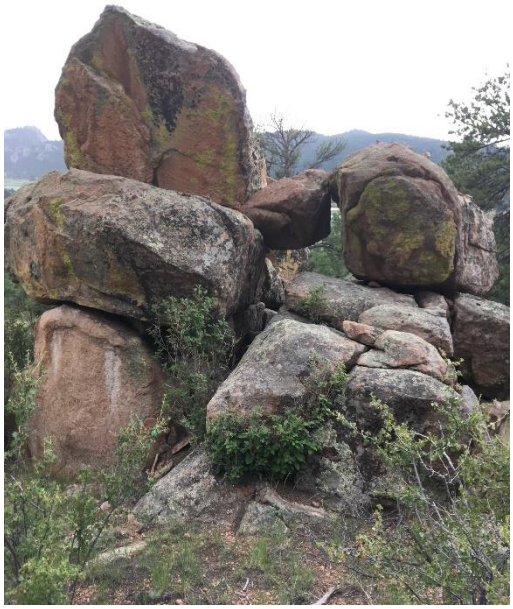


***Figure 13**. A PBR perched on granite at the Lake George Community Park, Lake George, Colorado. Photo date 2020 by L. Canini.*

Figure 14. *This PBR is made of an egg-shaped piece of Pikes Peak Granite and is located on Ute Lakes Fishing Club property, about 6 miles north of Divide, Colorado. The 1.08-billion-year-old Pikes Peak Granite often forms rounded and even dome-shaped structures as it erodes. This is due to three main factors: ice, water, and the release of pressure from the overburden. Photo date 2020 by S. W. Veatch.*

PBRs are not only fascinating sights, but by remaining balanced, reveal a lack of regional seismic activity from the past (Rood, et al., 2020).

These balanced rocks also indicate the maximum intensity of past earthquakes (Brune, 1996; Imbler, 2020). By collecting data on PBRs, seismologists examine uniquely valuable data on the rates of rare, large-magnitude earthquakes.

Over time, erosion, weight changes, or earthquakes will cause PBRs to topple. Tragically, acts of vandalism can destroy PBRs, as seen in 2012 when a scout leader and a friend pushed over a small PBR in Goblin Valley State Park in Utah (Botelho and Watkins, 2014).

Figure 15. *A balanced rock on Azure Mountain in the Adirondacks. This glacial erratic was set in this precarious position by a continental ice sheet about 19,000 to 14,000 years ago as the ice gradually melted. Photo USGS, Public Domain.*

Figure 16. *A PBR stands as a lonely sentinel in Arches National Park, Utah. Photo date 2013 by S. W. Veatch.*

PBRs show the power of nature and add to the incredible beauty that is found in the natural world. These rocks are a reminder that the forces of nature can transform even the most stable objects. Whether seen as cultural artifacts, geological curiosities, or sources of seismic information, precariously balanced rocks never fail to fascinate and inspire awe.

Acknowledgments

The author greatly appreciates the help of Laura Canini of the Colorado Springs Mineralogical

Society, who provided interesting discussions and photos of Colorado PBRs.

References and Further Reading

Botelho, G. and Watkins,T., 2014, Ex-Boy Scout leaders involved in pushing over ancient Utah boulder charged. Retrieved from CNN https://www.cnn.com/2014/01/31/us/utah-boulder-boy-scouts/index.html on January 29, 2023.

Brune, J. N. 1996, Precariously balanced rocks and ground-motion maps for Southern California. *Bulletin of the Seismological Society of America*, 86 (1A): 43–54.

Imbler, S, 2020, Why Scientists Fall for Precariously Balanced Rocks, Atlas Obscura, January 9, 2020, Retrieved from https://www.atlasobscura.com/articles/precariously-balanced-rocks?fbclid=IwAR2DS3LCMGd0xYlw9OXG3lgCDeLtgWNgpTA2Er7tnNzEompibGCbnXNlHN0 on October 1, 2022.

Rood, A.H., Rood, D.H., Stirling, M.W., Madugo, C.M., Abrahamson, N.A., Wilcken, K.M., Gonzalez, T., Kottke, A., Whittaker, A.C., Page, W.D. and Stafford, P.J., 2020, Earthquake Hazard Uncertainties Improved Using Precariously Balanced Rocks. American Geophysical Union Advances, 1: e2020AV000182. Retrieved from: https://doi.org/10.1029/2020AV000182 on 10/01/2022.