PITTSBURGH GEOLOGICAL SOCIETY

October 19, 2022

MEETING TIMES

Social Hour	5:30 PM
Dinner	6:30 PM
Speaker	7:30 PM

DINNER COSTS

$35.00 regular member
$15.00 student member
$40.00 non-member

RESERVATIONS

Email your name and number of attendees to: pgsreservations@gmail.com

Or reserve and use PayPal: https://www.pittsburghgeologicalsociety.org/

MEETING LOCATION

Narcisi Winery
Located in the North Hills at
4758 Gibsonia Rd
Gibsonia PA 15044

COVID19 POLICY

See page 3 for current guidance

The Terroir of Wine

Scott Burns

Professor Emeritus
Portland State University
specializing in
Geomorphology, Soils, Environmental Geology

ter·roir
/terˈwär/

noun

- the complete natural environment in which a particular wine is produced, including factors such as the soil, topography, and climate.
- the characteristic taste and flavor imparted to a wine by the environment in which it is produced.
- noun: **goût de terroir**; plural noun: **goût de terroirs**

Free Glass of Wine with Dinner

LAST REMINDER !!! REGISTER TODAY

Please RSVP by Wednesday Noon, October 12

PLEASE NOTE that our October PGS meeting will be held at the Narcisi Winery in the North Hills at 4578 Gibsonia Road, Gibsonia, PA 15044, rather than at Cefalo's in Carnegie.

Since Narcisi requires PGS to confirm the number of people who will be attending **BY OCTOBER 12**, that means if you plan on attending but haven't registered by then, you will not be able to attend. Make sure you get your RSVP's in **before Wednesday** so the treasurer can let Narcisi know. **Space is limited** (the venue can only hold 65 people) so if you plan on attending, register **ASAP** at https://pittsburghgeologicalsociety.org/index.html

Free Glass of Wine with Dinner,
thanks to Pete Hutchinson & THG Geophysics,
choice of red or white (Cabernet Sauvignon or Pinot Grigio),
other libations available at the bar

UPCOMING PGS MONTHLY MEETINGS

Meeting Date	*Scheduled Speaker*	*Presentation Topic*
November 16, 2022	Richard Smozna & Kathy Bruner, West Virginia University	Prehistoric Cave Art of Northern Spain
December 14, 2022	Craig Eckert	Geology of the Appalachian Trail

The Pittsburgh Geological Society welcomes our new members:

New Regular Members:

Don Zuch, Managing Member, Fusilier Resources, Inc.
Nathan Garlitz, Engineer, Young & Associates Consulting Engineers

New Student Members:
Shane D. Deacon, Pennwest-California
Taryn Crawford, Pennwest-California
Ryleigh C. Simala, Pennwest-California
D. Chas Schaeffer, SRU
Sara A. Trout, SRU
Anna Uschak, University of Pittsburgh

Please note that PGS is monitoring the COVID-19 situation closely and will continue to modify policy based on the recommendation of national and local experts. We ask that our members please consult and follow the US Centers for Disease Control and Prevention (CDC) recommendations for Allegheny County as shown here: https://www.cdc.gov/coronavirus/2019-ncov/your-health/covid-by-county.html

PRESIDENT'S STATEMENT

It was great reconnecting with friends again after a long and busy summer at our first meeting for the 2022-2023 program year last month. Special thanks to PGS' very own John Harper for getting our year off to a great start! I can't believe we are already into October again and as usual I'm looking forward to cooler temperatures and changing leaves. We had a number of interesting announcements at the September meeting, they are summarized below:

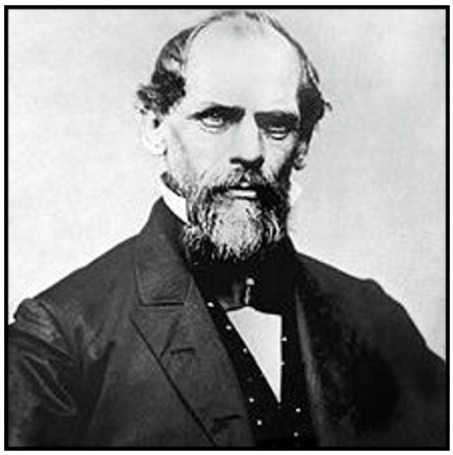
- ✓ The October meeting for PGS is scheduled to take place at The Narcisi Winery and Restaurant located at 4578 Gibsonia Road, Gibsonia, PA 15044. Please be advised that the venue has a limit of 65 attendees so if you would like to join us, be sure to **RSVP ASAP through the website**. In addition, fourteen bottles of wine have been generously donated by Pete Hutchinson and THG Resources and will be served with dinner. We hope to see you there for the talk titled: Terroir of Wine by speaker Scott Burns of Portland State!
- ✓ The 2021-2022 PGS student participation award goes to Pennsylvania Western University – California Campus (PennWest-Cal, formerly California University of PA). Congratulations students!
- ✓ The 2022 Frank Benacquista memorial scholarship has been awarded to PennWest-Cal student: Ellie Ruffing. Well done Ellie!
- ✓ Attention students: The April meeting for the PGS is scheduled as our annual student research meeting. Please keep us in mind for an opportunity to discuss your research with Pittsburgh Geologists!
- ✓ PGS is working with Mindful Brewing (several locations in the Pittsburgh region) to create a Pittsburgh geology beer! Stay tuned for more details regarding style, name, and art. The beer will be released this November!
- ✓ Butler County Community College is currently seeking an instructor for two courses (Geology and Astronomy – non-majors) at the Butler and/or Cranberry Twp. Campuses for Spring 2023. Please contact Dean Matt Kovac (mailto:mmatt.kovac@bc3.edu) for more detail
- ✓ The ESAAPG annual sectional meeting will take place in Champaign, Illinois this October 24-26. Meeting information may be found here: https://conferences.illinois.edu/ESAAPG/
- ✓ The 2023 joint Southeastern & Northeastern sectional meeting of the GSA is scheduled for March 17-19 2023 in Reston, Virginia. Meeting information may be found here: https://www.geosociety.org/GSA/Events/Section_Meetings/GSA/Sections/se/2023mtg/home.aspx
- ✓ Abstract submission deadline: December 13, 2022. Exhibit booths and academic tables are still available for reservation!

Our program year is off to a strong and productive start with a lot of unique and interesting things planned. Don't forget to renew for the 2022-2023 year (https://pittsburghgeologicalsociety.org/membership.html) and I look forward to seeing you all again soon!

Dan

LOCAL GEOLOGICAL EVENTS

THE ORIGIN OF WESTERN PENNSYLVANIA PLACE NAMES

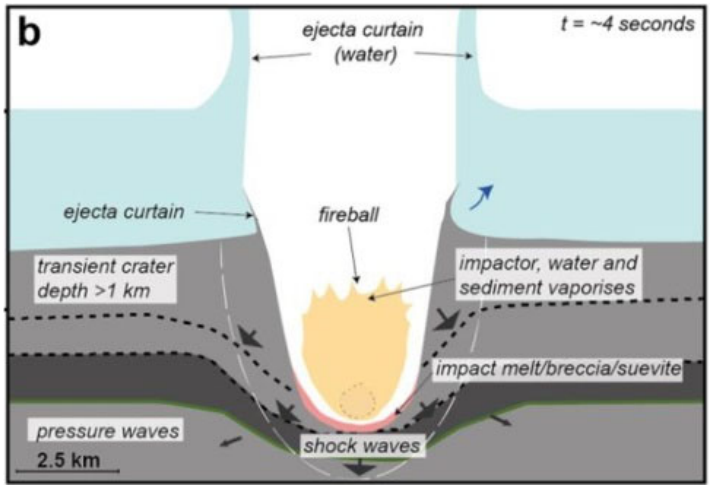


John Roebling, an engineer who developed wire rope for the Allegheny Portage Railroad and designed the Brooklyn Bridge, was one of the founders of Saxonburg, Butler Countv. PA.

Saxonburg, Pennsylvania, in southern Butler County, was founded in 1832 by two Prussian immigrants, Johann A. Röbling and his brother Carl Röbling. A group consisting of the brothers and several hundred families decided to sail to America, and Johann was their leader. But when they got to Philadelphia, they could not agree on where to settle. The Röbling brothers and three other men traveled west toward Pittsburgh where Johann purchased approximately 1,600 acres of land owned by the daughter of a land speculator, while two others purchased land elsewhere, leaving only three of the original group of immigrants to settle on the newly purchased acreage. They laid out the plans for the village of Saxonburg and Johann wrote numerous letters to his friends back in Prussia encouraging them to come to America. The community grew slowly over the next few years as new immigrants, and some families of the original group, moved to Saxonburg. In 1846, the community was incorporated as the Borough of Saxonburg. In the 1880s, Saxonburg benefitted from the oil boom that occurred a mile west of town. Like other boom towns, it appeared rapidly over the countryside and disappeared just as quickly. At some point in his life, Johann became John Roebling, and he became famous as the designer of the Brooklyn Bridge in New York City. He was also famous for developing the wire rope that the Allegheny Portage Railroad used to haul railroad cars up and over Allegheny Mountain between Hollidaysburg and Johnstown.

DID YOU KNOW . . . ?

A researcher from Scotland has discovered a previously unknown massive crater beneath 1,300 ft. of seabed sediment 248 mi. off the coast of West Africa that is raising eyebrows. The asteroid that created it slammed into the Earth's surface 66 ma ago, wreaking havoc with the planet. It happened right around the same time as the Chicxulub Crater in Yucatan, the one that purportedly wiped out the dinosaurs. Called the Nadir Crater, the new discovery could shake up what we know about that cataclysmic moment in natural history. The researcher, Uisdean Nicholson, happened on the crater by accident while he was reviewing seismic survey data of the tectonic split between South America and Africa. It will be necessary to drill into the crater and test minerals from the crater floor in order to be certain the crater was caused by an asteroid strike, but it has all the hallmarks of an impact crater. It has the right ratio of crater width to depth, the height of the rims, and the height of the central uplift, the mound in the center created by rock and sediment forced up by the shock pressure. The discovery of any impact crater is significant, inasmuch as they are very rare in the geologic record, with fewer than 200 confirmed on Earth. There are also quite a few likely candidates that have not yet been unequivocally confirmed. The most

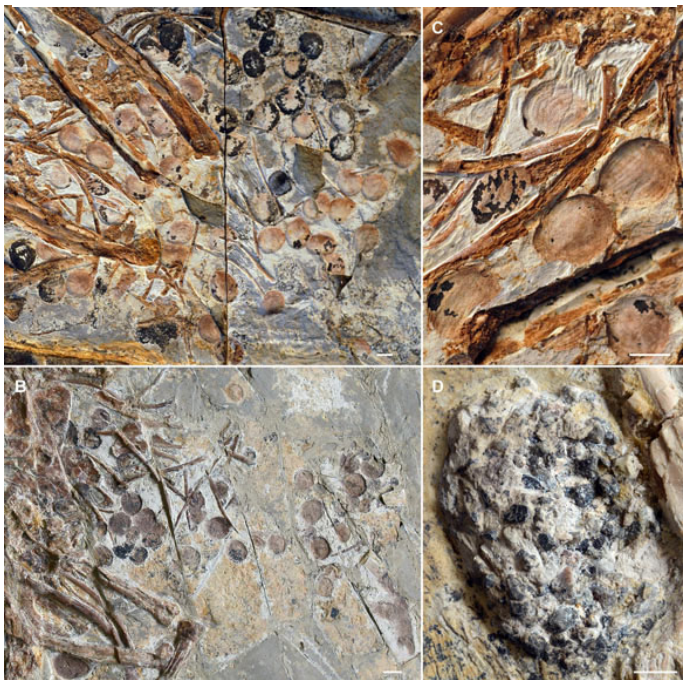


Interpretive diagram, using seismic data and computer simulations, of the formation of the Nadir Crater.

significant aspect of this discovery is that it is a very rare example of a submarine impact crater. Study of an underwater crater like the Nadir Crater would help our understanding of the process of ocean impacts, the most common but least well preserved or understood kind. The crater is 5 mi. wide, and was probably caused by an asteroid more than 1,300 ft. wide. Although it was much smaller than the asteroid that caused the 100-mi.-wide Chicxulub Crater, it is still a very large space rock. The impact would have had severe consequences locally and regionally across the Atlantic Ocean, with a large magnitude 6.5 – 7 earthquake that would have generated a tsunami as much as 3,200 ft. high at the crater site and around 16 ft. high when it reached South America. The air blast would have been heard across the globe and would have caused severe local damage across the region all by itself. Data from microfossils in nearby exploration wells indicate that the crater was formed around 66 ma ago with a margin of error of around 1 ma, so at the end of the Cretaceous or beginning of the Paleogene. It could have been linked to the Chicxulub impact, or it could simply be a coincidence, since an asteroid of this size is expected to hit Earth every 700,000 years. If it could be linked to the Chicxulub asteroid, the Nadir asteroid could have resulted from a break-up of a parent asteroid near the Earth with separate fragments dispersed during an earlier orbit of Earth. It is also possible that it was part of a shower of asteroids that hit the Earth over a period of a million years or so. Determining the precise age, which is only possible by drilling, is critical for testing these alternative hypotheses. Even if the two impacts could be linked, the Nadir impact would have been dwarfed by the Chicxulub impact. Still, it would have provided an additional cascading set of consequences. In addition, if it a relationship between the two impacts can be established, it would help with our understanding of what was going on in the inner solar system at that time. It would also raise some interesting new questions.

https://www.cnn.com/2022/08/17/africa/asteroid-crater-west-africa-scn/index.html

New research by paleontologists from England and China indicates that at least one genus of birds that lived in the Early Cretaceous is the earliest known group of fruit-eating birds. We know that birds and plants have had a close relationship developed over millions of years, and that birds became diverse and abundant around 135 ma ago. Shortly after that time, plants started developing new and different kinds of fruits. We also know that extant fruit-eating birds help plants to reproduce by spreading seeds in their droppings, suggesting that a bird-plant relationship, like the better-known insect-flowering plant relationship, co-evolved, changing together over time.



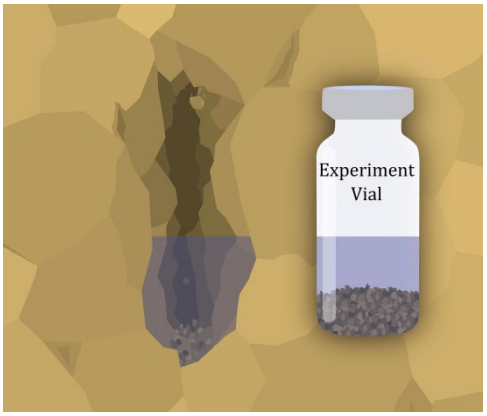
Four photos of seeds preserved as fossils in the stomach area of several specimens of the Early Cretaceous bird, *Jeholornis prima*.

It is not clear exactly how their relationship started, however. The one group of birds that could hold the answers to this co-evolutionary relation is *Jeholornis*, a genus of early birds that lived in China around 120 million years ago. The researchers discovered preserved seeds within the fossilized remains of *Jeholornis*, which raises the question of how they got there? Some modern birds eat seeds directly, cracking them open or grinding them up in the stomach to extract the nutrients inside. Other birds swallow the seeds when they eat fruit, then remove them through defecation. If, in fact, *Jeholornis* belonged to the second group, it represents one of the earliest steps in bird-plant co-evolution. When the first *Jeholornis* fossil was described in 2002, it had plant remains scattered around it, as though

they had exploded out of the stomach. Because the stomach contents were identified as seeds, paleontologists decided that the bird was eating seeds. It took 17 years for the paleontologists doing the new research to suggest that the bird was eating whole fruit but only the seeds were fossilized. Eating fruit and crushing up and digesting the seeds would not be particularly beneficial to the plants, whereas eating fruit and defecating their un-crushed seeds would help plants spread and eventually evolve. Clarifying which of the two hypotheses is correct, therefore, is important because fruit consumption probably resulted in co-evolutionary mutualism, whereas seed consumption did not.

https://www.sci.news/paleontology/fruit-eating-jeholornis-11106.html

Researchers from the United Kingdom have discovered a source of oxygen deep in the Earth's crust that may have influenced the evolution of life before the advent of photosynthesis. The research revealed a procedure that can generate hydrogen peroxide (H_2O_2) from rocks during fault movement. Although H_2O_2 in high concentrations can be harmful to life, it can also provide a useful source of O_2 to microbes, which could have influenced the early evolution, and possibly even origin, of life in hot environments on the early Earth. The researchers simulated such conditions in the laboratory by crushing granite, basalt, and peridotite that were then added to water at varying temperatures under well-controlled oxygen-free conditions. The experiments showed that significant amounts of H_2O_2 (and potentially O_2) were only generated at temperatures close to the boiling point of water. As it turns out, the temperature of H_2O_2 formation overlaps the growth ranges of hyperthermophiles, some of the most heat-loving microbes on Earth, that include aerobic microbes known to occur near the base of the "Universal Tree of Life." Previous research had suggested that small amounts of H_2O_2 and other oxidants can be formed by placing rocks under stress in an anaerobic environment, but this was the first research that showed the importance of high temperatures in maximizing H_2O_2 generation. It also showed that imperfections in crushed rock and minerals can behave differently than how you would expect "perfect" mineral surfaces to react. All such mechanochemical reactions need to generate H_2O_2 (and therefore O_2) is water, crushed rocks, and high temperatures, all of which were present on the early Earth before the evolution of photosynthesis. The whole process could have influenced the chemistry and microbiology in hot, seismically active regions where life may have first evolved.



Researchers have discovered that hydrogen peroxide, a possible source of oxygen to microbes, can be generated from rocks during fault movement. Thus, faulting could have been essential to the origin and early evolution of life in hot environments.

https://scitechdaily.com/ancient-source-of-oxygen-for-life-discovered-hidden-deep-in-the-earths-crust/

Earth is the only known planet that has continents. Trouble is, we don't have a clear understand of how they formed and evolved. One hypothesis, that the continents formed at sites of giant meteorite impacts, has been around for decades. Until now, however, there has been very little solid evidence to support it. Now, by examining zircon crystals from rocks in Western Australia's Pilbara Craton, researchers from Australia and China have found evidence of those meteorite impacts. This is important because Pilbara Craton represents Earth's best-preserved remnant of ancient crust. By studying the composition of oxygen isotopes in these zircons, the researchers found a "top-down" process that began with the melting of rocks near the surface and progressing deeper, consistent with the geological effect of giant meteorite impacts. Their research provided the first hard evidence that the processes that ultimately formed the continents began with giant

Artist's concept of meteors impacting Earth during the Early Precambrian. It is possible that impacts such as these might have been the sites where Earth's continents first formed.

meteorite impacts that occurred billions of years ago. Understanding the formation and ongoing evolution of the planet's continents is crucial inasmuch as the majority of Earth's biomass, including almost all humans, and most of the planet's important mineral deposits occur on these landmasses. The latter is especially important; critical metals such as lithium, tin, and nickel, the kinds of materials that are essential to emerging green technologies necessary to mitigate climate change, occur on the continents. Those mineral deposits result from a process called crustal differentiation, which began with the formation of the earliest landmasses. Data related to other ancient continental crust appear to show patterns similar to those recognized in Western Australia. The researchers would like to test their findings on these other ancient rocks to see if their model is more widely applicable.

https://www.sci.news/othersciences/geoscience/earths-continents-11083.html

It seems that Ceres, the largest former asteroid (now considered to be a dwarf planet) in the asteroid belt between the orbits of Mars and Jupiter, recently was found to show "unexpected geological activity," according to researchers from Virginia Tech. The new findings could change the way that we think about dwarf planets. Scientists have known of Ceres' existence since the Sicilian astronomer Giuseppe Piazzi discovered it in 1801, but it wasn't until 2015 that researchers got a closer look at the rocky body thanks to NASA's Dawn probe. Scientists were surprised to discovered Ceres had interesting geological features such as plateaus, mineral deposits, and surface fractures, all of which signaled that Ceres could have supported seismic activity and even an ocean. In order to confirm that hypothesis scientists needed to determine if it had a way to generate heat at some time in its history. This was something scientists were convinced smaller planetary bodies were not capable of doing. Larger planets like Earth that formed violently start out as hot bodies that activate geological activity and cool down over time. Ceres was never large enough to be a true planet, so it supposedly couldn't have generated heat during formation. According to computer modeling of Ceres' distant past, however, the dwarf planet did not have to begin hot in order to generate heat. They suggest instead that the dwarf, which they think contains uranium and thorium, actually became heated due to interior radioactive decay that took the body from cold, to hot, to cold again. This is quite different from the hot-to-cold pattern traditionally seen in larger planets. What the researchers have shown is that radiogenic heating all on its own is enough to create interesting geology. They hope this model will be able to provide some insight into how dwarf planets and some moons came to be. Regardless, it provides a captivating reminder of how little we really know about how the cosmos formed and how much is still out there to be discovered.

https://futurism.com/the-byte/why-dwarf-planet-ceres-unexpected-geologic-activity

Hopefully, humanity will not self-destruct in a global war, or due to anthropogenic climate change. Even if we manage to avoid these immanent dangers, however, there remain other threats to our existence, and we must be ready for them. Earth has faced plenty of dangers since millions of years before humans evolved, such as fireballs from space, asteroids like the one that supposedly wiped out the dinosaurs. We know asteroids are a threat, and various governments and global agencies are spending hundreds of millions of dollars annually on planetary defense. For example, the U.S. is experimenting with a system to fend off space rocks – NASA's Double Asteroid Redirection Test (DART) mis sion will soon test the possibility of deflecting an asteroid by trying to move it off course. DART will cost about $330 million. A pair of researchers from the

Volcanic eruptions, especially those by super-volcanoes, pose an existential threat to human survival. Humanity needs to do more to plan for the survival of the human race in the event of such a super-eruption.

UK recently wrote a commentary in Nature, however, that basically said we shouldn't let our anxiety about asteroids dominate our concern when there is another colossal danger right under our noses – volcanoes. As they point out, large-scale volcanic eruptions are hundreds of times more likely to occur over the next 100 years than asteroid and comet impacts combined. Yes, preparing for asteroids is wise, but we're doing far too little about the likelier event of a volcanic super-eruption, for which there are no equivalent investments in preparation (a super-eruption has a magnitude of 8, the highest rating on the Volcanic Explosivity Index, or VEI). Fireballs from space might be more exotic, but volcanoes, but that's no reason to ignore them. Volcanoes are scattered all over Earth, and they often offer picturesque scenery that hides their destructive potential. We have seen lots of horrifying eruptions in modern times, like Mt. St. Helens in Washington State in 1981 and Mt. Pinatubo in the Philippines in 1991. Yet these pale by comparison to super-volcanoes, the giant eruptions that occur about every 15 ka. The last super-eruption of a super-volcano happened about 22 ka ago. The most recent magnitude-7 eruption occurred when Mt. Tambora in Indonesia erupted in 1815 and killed ~ 100,000 people. The ash and smoke from that eruption reduced spread worldwide, lowering global temperatures by an average of about 34oF for a year (the Year Without a Summer – 1816). This resulted in widespread crop failures, responsible for famine, disease outbreaks, and violence. Although volcano monitoring has improved since 1815, it is not enough to offset the risks we face. Earth's human population has grown 8-fold since the early 1800s, and some large urban areas are situated near dangerous volcanoes. Since humanity has become more reliant on global trade, turmoil in one place can cause food shortages and other crises elsewhere. And volcanic peril might be greater than we think. A 2021 study based on data from ancient ice cores found the intervals between catastrophic eruptions actually are 100s or even 1000s of years shorter than previously thought. The history of many volcanoes remains murky. We need more research on ice cores, marine and lakes cores, and historical and geological records, particularly in data-poor high-risk areas like Southeast Asia. Interdisciplinary research could help predict how a super-eruption might cripple civilization by identifying risks to trade, agriculture, energy, and infrastructure. In addition, research needs to be done to identify where volcanic risks overlap with critical trade networks. We also need more comprehensive volcano monitoring, including ground-based monitoring as well as aerial and satellite observation. Volcanologists have long wanted a specialized volcano-observing satellite that could boost preparedness beyond the current system of sharing existing satellites with other scientists. Plus, people need to know if they live in volcanic danger zones, how to prepare for an eruption, and what to do when it happens. In addition, governments need ways to broadcast public alerts when volcanoes erupt, complete with details about evacuations, tips for surviving an eruption, and directions to shelters and health-care facilities.

https://www.sciencealert.com/the-world-is-not-ready-for-the-next-super-eruption-scientists-warn

Paleontologists have identified the oldest-known mammal using fossil dental records. This 225 ma old fossil predates the previously confirmed oldest-known mammal, *Morganucodon*, by about 20 ma. Called *Brasilodon quadrangularis*, the new discovery was a small shrew-like creature about 8 inches long and existed at the same time as some of the oldest dinosaurs. The team of Brazilian and British researchers who discovered the fossils suggest it sheds light on the evolution of modern mammals. Inasmuch as mammalian glands that produce milk have not been preserved in any fossils found to date, the team had to rely on information gathered from the bones and teeth

of the animal. It is interesting to note that the fossils previously were thought to be part of "advanced reptile," but examination of its teeth show definitively that it was a mammal. Reptiles have many different replacement teeth throughout their lives, but mammals have only two, the milk teeth and the second, more permanent set. *Brasilodon* is the oldest extinct vertebrate with two successive sets of teeth. Examination of three lower jaws of the species, which lived in what is now southernmost Brazil, indicated the type of replacement teeth present only in mammals. *Brasilodon* was a very small burrowing animal mammal that probably lived in the shadows of the oldest dinosaurs that known from that time. Describing their discovery as "very significant," the researchers said their findings contributed to an understanding of both the evolution of modern mammals and the ecological landscape of Late

Artist's rendition of the Late Triassic *Brasilodon*, currently considered by paleontologists to be the oldest-known mammal.

Triassic. This discovery raises the level of debate about what defines a mammal and shows that it was a much earlier time of origin in the fossil record than previously known.

https://www.cnn.com/2022/09/06/world/earliest-mammal-teeth-scn-scli-intl/index.html

WEBSITE OF THE MONTH

https://www.nasa.gov/planetarydefense/dart/dart-news

Fun Fact Having Nothing to Do with Geology

Eight percent of humans have an extra rib, whereas 12 percent are left-handed.

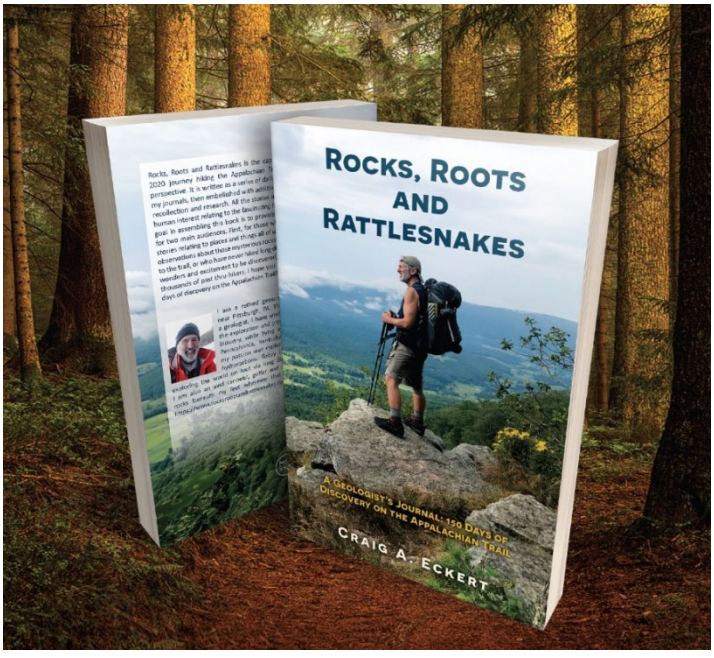
YOU CAN STILL ORDER YOUR OWN PGS SWAG!

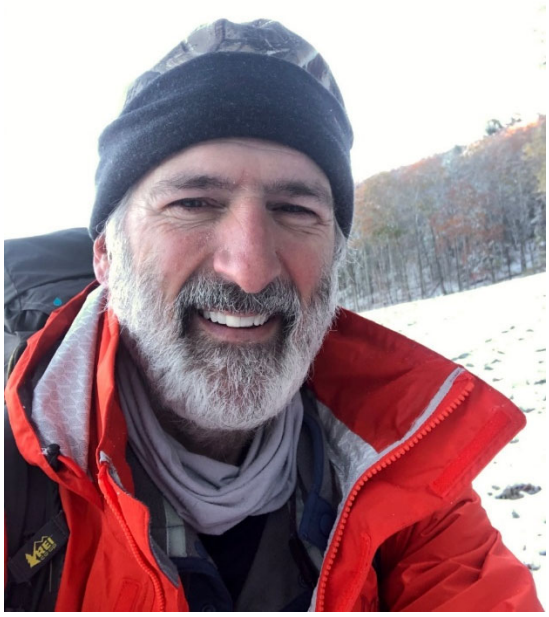
Show off your PGS Membership by purchasing a hoodie, t-shirt, or bumper sticker at the new PGS merchandise store. All proceeds support geology student participation in PGS society meetings!

https://apparelnow.com/pittsburgh-geological-society-apparel

READ A BOOK WITH A LOCAL GEOLOGY CONNECTION!

In June of 2020, Pittsburgh-based geologist and former PGS President Craig Eckart set off on a thru-hike of the Appalachian Trail, a journey which took him past numerous rocks and scenic landscapes. He decided to keep a daily log about the geologic observations he made along the way. In *Rocks, Roots, and Rattlesnakes*, Craig reflects on the sedimentary, igneous, metamorphic and tectonic history of our favorite local mountain chain, weaving an assortment of published data with his own geologic observations. His book makes a great gift for a geologist or a future trail hiker. You can purchase it now at Craig's website: https://www.rocksrootsandrattlesnakes.com/.





PGS 2022-2023 Officers and Board of Directors

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Officer Contacts: If you wish to contact a PGS Officer, you can email Dan Harris, President at harris_d@pennwest.edu; Pete Hutchinson, Vice-President at pjh@thggeophysics.com; Kyle Fredrick, Treasurer, at fredrick@pennwest.edu; or Diane Miller, Secretary, at dianemiller123@msn.com.

Memberships: If you have not yet renewed your membership, be aware that PGS is making the entire process digital. You will no longer be receiving a membership form as in the past. Now you will only need to go to the PGS website's Membership page at https://pittsburghgeologicalsociety.org/existing-member-renewal-instructions.html and fill in the boxes with a red asterisk (*). And, as usual, you can pay your dues through the website www.pittsburghgeologicalsociety.org

If you know of anyone who is not a member who would like to become one, let them know that they just need to go to https://pittsburghgeologicalsociety.org/new-membership-instructions.html and fill in the boxes marked with that ubiquitous red asterisk. And again, they can pay through the website.

If you have any issues with the forms, you should contact Webmaster Dan Harris, at harris_d@pennwest.edu. If you have any questions about PGS membership, contact Membership Chair John Harper at jharper.pgs@gmail.com.

For more info on **PGS**, please visit our website: www.pittsburghgeologicalsociety.org.

Programs: If you would like to make a presentation at a PGS meeting or have a suggestion for a future speaker, contact Pete Hutchinson, Program Chair at pjh@thggeophysics.com.

Newsletter: To contact the Newsletter Editor, Robin Anthony, with questions or suggestions for articles, job postings or geological events, please email robanthony@pa.gov or Karen Rose Cercone at kcercone@gmail.com

Facebook: Follow the PGS at https://www.facebook.com/PittsburghGeologicalSociety

Twitter: PGS can be followed on Twitter by searching out the username @PghGeoSociety

LinkedIn: To join the PGS Group, click https://www.linkedin.com/groups/12018505

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