Granite State Geologist

~ 35 Years of GSNH! ~

The Newsletter of the Geological Society of New Hampshire,
Winter Edition – December 2025 – Issue No. 131
Newsletter Editor: jlambert@nobis-group.com **Website:** http://www.gsnh.org/

In this issue:

MESSAGE FROM THE PRESIDENT

On October 19, we gathered to celebrate many of our industry's accomplishments. Since the spring, Board members and committee leaders worked diligently to bring this event to fruition. As the day unfolded and stories of "how we got here" were shared, I was humbled by the achievements of GSNH's past and present—and even more inspired by what lies ahead.

Let us remain mindful of the colleagues whose vision launched GSNH (then NHGS) and whose dedication built its foundation. Many of them remain active members today, and 35 years later, their passion continues to strengthen our Society.

Stay grateful to those who fought tirelessly to ensure our profession received the recognition it deserves. As we were reminded in October, bringing PG licensing to New Hampshire was no easy task. A small group of geologists understood its importance and spent countless hours at the State House to make it a reality.

Finally, commend the geologists who studied New Hampshire and established the scientific framework that so many of us rely on today. Now more than ever, I am proud to be a member of our Society. Read more about the event further into this newsletter.

Abby

DATES TO REMEMBER

January 22, 2026 – **GSNH Winter Meeting** (virtual via Zoom). Will Stefanov will give a talk on the NASA Disaster Response Coordination System. See page10 for details.

March 12, 2026 – **GSNH Board of Directors Meeting**. Location TBD.

March 21-24, 2026 – **Geological Society of America Northeastern Section Meeting** – Hartford, Connecticut. https://www.geosociety.org/GSA/GSA/Sections/ne/2026mtg/home.aspx

March 26, 2026 – **2026 Maine Sustainability & Water Conference**. Augusta Civic Center in Maine; https://umaine.edu/mitchellcenter/2026-maine-sustainability-water-conference/

April 7, 2026 – **New Hampshire Geological Survey Annual Geological Mappers Workshop**. The workshop will be held on Tuesday, April 7, 2026, in the NHDES Auditorium, starting at 8 AM. CEUs for Professional Geologists will be awarded. Registration is required, and NHGS needs RSVPs by *Friday, March 13, 2026.* All are welcome. RSVP by contacting Rebecca LeCain, Rebecca.M.LeCain@des.nh.gov.

May 29-31, 2026 – **Friends of the Pleistocene 2026 Field Trip**. The field trip will visit the Albany/Conway and Gorham/Berlin area of the Eastern White Mountains. *Tills, Moraines, and Associated Fluvial/Lacustrine Glacial Deposits in New Hampshire's Eastern White Mountains* to be led by Woody Thompson, Bob Newton, and Dan Tinkham. More information available soon.

Celebrating 35 Years of GSNH: A Look Back and a Step Forward

On Sunday, October 19, members and friends of the Geological Society of New Hampshire (GSNH) gathered at The Derryfield in Manchester for our annual meeting — and what a success it was! Over 80 attendees joined us for four hours of networking, learning, and reconnecting with colleagues, some of whom hadn’t seen each other in years. The energy in the room was incredible as we reflected on the society’s roots, celebrated milestones, and looked ahead to exciting new initiatives. During the event, we revisited the origins of GSNH and the evolution of professional geology licensing in New Hampshire. The society began humbly in the early 1980s, when a group of about 12 geologists, who were colleagues and friends, recognized the need for an organization to represent their profession and bring geologists across the state together. Their first informal meeting took place at The Cat and Fiddle Restaurant in Concord, drawing more than 30 geologists from around New Hampshire. From that gathering, the first Board of Directors was formed — and today, 35 years later, GSNH continues to thrive as a unifying force for geologists throughout New England.

Another highlight of the meeting was a presentation on how Professional Geologist (PG) licensing came to be in New Hampshire. Licensing began in 2001 after a determined legislative effort by a small group of passionate geologists in the late 1990s. At that time, many state projects involving natural systems — such as environmental assessments and water supply investigations — were being led primarily by engineers. It quickly became clear that projects involving the interpretation of subsurface conditions required the expertise of trained geologists.

A dedicated group of about eight geologists led the charge to advocate for professional recognition within the state's legislative framework. Their hard work paid off: by 2001, New Hampshire officially established PG licensing, ensuring that geologists could contribute their specialized knowledge to critical environmental and infrastructure projects. This year marks 25 years of professional licensing in New Hampshire — a milestone that underscores the importance of geologists' work in understanding and managing the natural world.

We also celebrated the remarkable career of John Cotton, whose contributions to the field of geology and to GSNH have been immense. In his honor, GSNH proudly announced the creation of the John Cotton Scholarship Fund — an initiative that has raised over $20,000 as of December 12, 2025. This scholarship will help support geology students in their field mapping studies, ensuring that the next generation of geoscientists has the tools and experience needed to continue advancing our science. The 2025 annual meeting was more than just a gathering — it was a celebration of where we've been, what we've accomplished, and the bright future of geology in New Hampshire. From its small beginnings in a Concord restaurant to a thriving statewide organization representing hundreds of professionals, GSNH continues to grow, educate, and advocate for the geological sciences. We're grateful to everyone who attended and contributed to this year's success — and we can't wait to see where the next 35 years take us!

It was a lovely fall day for the lunch meeting. Photo by Sharon Lewandowski.

Dick Lane gave a presentation on the history of GSNH. Photo by Sharon Lewandowski.

Panel discussion with John Regan, Dorothy Richter, and Tim Stone

Current and former NHDES employees at the lunch meeting. Photo courtesy of Lea Anne Atwell.

Thanks to Abby Fopiano for pulling this event together! Photo by Sharon Lewandowski.

The October 19 meeting also had time for networking for the 85 attendees and the mineral raffle. The raffle raises money for the GSNH scholarship fund. The winners were:

- James Degnan won a rock of dolomite and quartz with sphalerite and euhedral galena, which is potentially a Mississippi-Valley-Type lead zinc ore sample.
- Bettina Eames won an altered volcanic rock containing euhedral azurite crystals from Arizona.
- Rich Mechaber won a rock containing orthoclase and euhedral smokey quartz crystals from Conway, NH.

John Cotton Scholarship fund updates

Many people have volunteered their time, efforts, and money to make the John Cotton Scholarship fund a reality. The fundraising subcommittee successfully persuaded many individuals and companies to make donations and the fund's total currently sits at $19,700. It would be great if we could get up to $20,000. It's not too late to make a tax-deductible donation! Send a check to GSNH with John Cotton Scholarship in the memo line.

The scholarship award subcommittee is in the process of drafting an application form and guidelines for award decisions. Based on the donations received to date, the intent is to award multiple scholarships per year for several years. Applications will be available by Feb. 1, 2026 with a due date of March 15, 2026. Grant awards will be announced by April 15, 2026. Look for more information from GSNH once the application form and process are finalized and help us publicize the opportunity for students.

Thank you again to everyone who has contributed to the John Cotton Scholarship fund. Some kind words from donors are below.

"John was my "go to" man at DES regarding any geological questions. He was a great resource."

"Thank you to the society for sponsoring this scholarship fund for a great geologist, John Cotton. We were honored to have worked with John and feel enriched by his knowledge and presence."

"In fond memory of John Cotton."

"Glad to be able to provide this donation to such a good cause and life lived."

"John was a friend and colleague, a brilliant geologist who practiced his profession with humor and humility. I'm sure John would be both humbled and gratified to have his name associated with educating future geologists."

"Many of us in the Waste Management Division at DES were fortunate to have John as a colleague and a friend. John's presence, knowledge and dry wit is missed. However, his spirit may live on thru this scholarship."

"Thanks so much for heading up the effort to ramp up and fund the John Cotton Scholarship Fund."

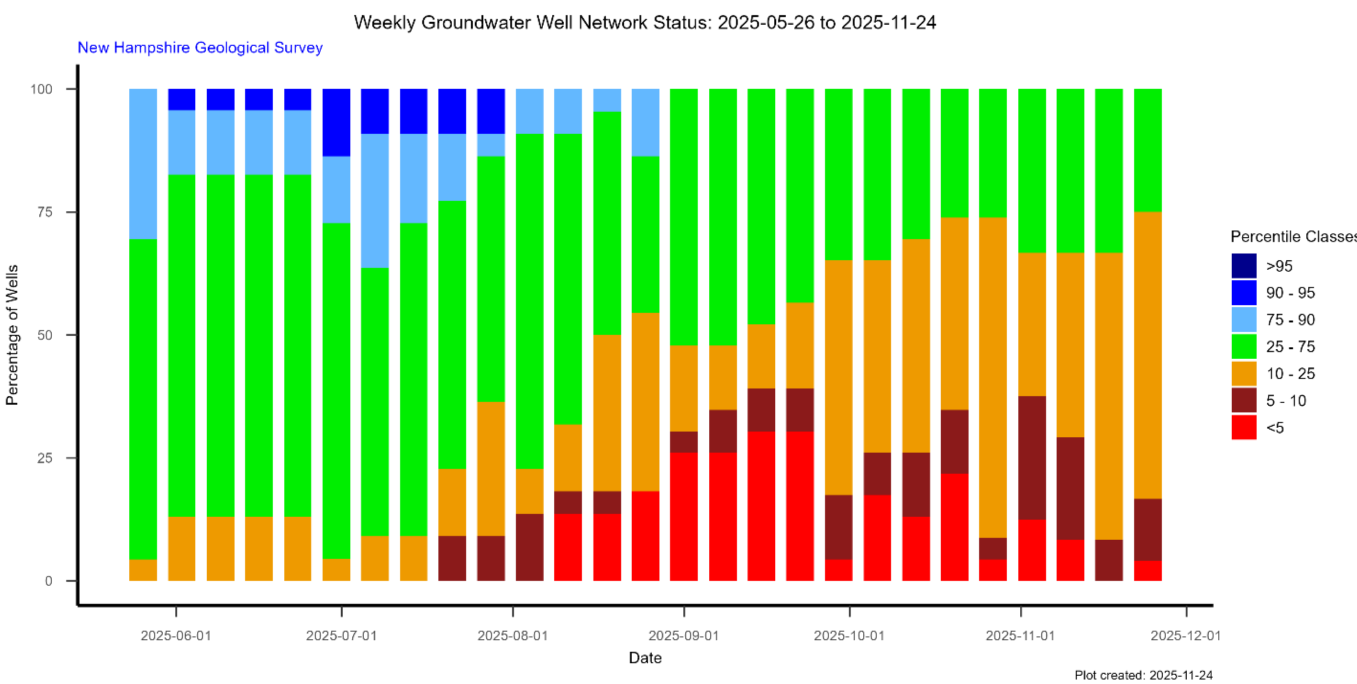
GSNH Gear!

Does your field hat need an upgrade? Did you miss the October meeting or do you just want a full set of GSNH pint glasses? We also have a range of adult t-shirt sizes available. Order form is located on page 16.

New Hampshire Geological Survey Update

By Shane Csiki, State Geologist and Director, and Michael Howley, P.G., Senior Scientist
December 2025

Season's Greetings! Hard to believe that the holiday season is once again upon us, and it seems only yesterday that it was this time last year. But a look out the window with the bare trees indicates that it once again is late fall in New Hampshire. Again, this has been a busy year for NHGS, and it has also been a dry year in New Hampshire. After receiving above normal precipitation in May and early June, precipitation rapidly decreased to much below normal for the remainder of the summer months and into the fall. The precipitation deficit, coupled with above normal temperatures, resulted in drought conditions that became rapidly noticeable starting about mid-July and worsened as the summer progressed. If you have been following NHGS' Groundwater Level Monitoring Network data, this deteriorating trend could also be seen in the 12-month hydrographs for many of the network's wells across the state, with trends particularly acute at monitoring wells in northern New Hampshire. The figure below shows the weekly status of network wells over the past 6 months for wells with more than 10 years of monthly measurements.



Time series of weekly Groundwater Level Monitoring Network status relative to monthly statistics. The rapid onset of hydrologic drought is evident by the growing percentage of network wells in the <10th Percentile Classes (dark brown and red bars).

During the past 2 years, NHGS has been upgrading the New Hampshire Groundwater Level Monitoring Network by not only outfitting each well with real-time telemetry equipment, but also by increasing the density of bedrock monitoring wells in the state. Both of these actions are the result of feedback received from stakeholders during the droughts of 2020 and 2021. The network has been expanded to include 48 wells, with remaining capital budget funds that will support final expansion to 58 wells and deploy real-time telemetry equipment across the entire network. The final phase of network expansion will occur during the next year. This expansion project will build upon the original network of 23 wells from the late 1990's, and includes many wells with greater than 30 years of monthly measurements.

NHGS' groundwater level monitoring network data is available to all via the New Hampshire Groundwater Level Monitoring Dashboard, and is actively consumed each week by the regional authors of the northeast United States portion of the U.S. Drought Monitor (USDM) map. Groundwater data is also utilized extensively by programs throughout NHDES, the National Weather Service Weather Forecast Office in Gray, Maine, and the state's Drought Management Team. This summer, each of the above entities approached NHGS with questions about the network and its data. NHGS also actively participates in meetings in order to support drought decision-making.

With decreasing groundwater levels this summer and fall, a number of residents in New Hampshire experienced water supply wells going dry. Capturing this information is important to understand the geographic extent of the attendant water resources impacts. To this end, this summer and fall NHGS, in collaboration with the NHDES Water Division, released a public Dry Well Report Form for New Hampshire residents to easily report dry wells to NHDES. Once sufficient data was collected, NHGS published a Dry Well Reports Dashboard displaying summary information of the reported dry wells. As of this writing, the dashboard shows 201 reports of dry wells have been received by NHDES from across the state since July 1. The majority of reported dry wells are shallow dug wells (68%), followed by drilled bedrock wells (24%), and well type unknown (8%). The rate of dry wells (per 10K county population) shows that the largest proportion of residents in Coos County were most impacted by the 2025 drought, followed by Grafton and Carroll Counties.

The upper layers of soil in the state have already begun to freeze, or will do so soon, which will prevent the ability of water to infiltrate into the subsurface. Thus, groundwater impacts are likely to continue into this winter and possibly into spring, when the melting snowpack can infiltrate and provide recharge. Throughout, stay tuned to the Groundwater Level Monitoring Network tool at the links above to keep track of groundwater levels in the state. NHGS will continue to ensure wise stewardship of these real-time monitoring and public reporting tools to support citizens, decisionmakers and stakeholders now and into the future. If you have questions about these tools or their data, please reach out to Mike Howley in NHGS at michael.w.howley@des.nh.gov, or (603) 271-2876.

What's Your Board Been Doing?

By Julie Spencer

The GSNH Board of Directors met on Thursday, December 11th via Zoom. Not all board members could attend so we could not vote on matters, but we were able to brainstorm ideas for future speakers and field trip ideas. If you have any suggestions for a speaker or a field trip leader, please contact any of the board members or send your suggestions to GSNHinfo@gmail.com. Include the name and affiliation of the person and why you think he or she would be a good speaker or trip leader. We'll take care of contacting your suggestion! Remember, out of state speakers work really well for our January meeting which is held via Zoom, so we are not restricted by geography. We also discussed setting up an online payment option for meetings and dues. More details to come when that is operational. Submittal of the necessary reports and forms to maintain our nonprofit and 501(c)3 status are in the works. Details for the January 22, 2026 meeting were also ironed out, look for the announcement in this newsletter. We hope to "see" everyone in January!

January Meeting Announcement – NASA Earth Science Disasters Program

Our next meeting will be on-line via Zoom on Thursday, January 22, 2026. The meeting will start at 6:30 PM with networking/GSNH business and the presentation will start at 7:00 PM. Please email Sharon Lewandowski (Sharon.A.Lewandowski@des.nh.gov) to register.

Presentation: The NASA Earth Science Disasters Program – the View from Space

Talk Summary: The Disaster Response Coordination System, or DRCS, is a core component of the NASA Earth Science Division Disasters Program. Launched by NASA on June 13, 2024 the mission of the DRCS is to support disaster pre-planning, event response, and post-event recovery efforts of the federal, state, and local government emergency management community. The program uses NASA remotely sensed data from orbital and airborne sensors, including the International Space

Station. Since its inception, the DRCS has supported numerous data and data product requests for events in the continental USA and other countries. This talk will provide an overview of the DRCS, with examples of data and data products developed in aid of response to a variety of recent events including wildfires, flooding, and tropical storms.

Speaker: "William Stefanov is the Senior Earth System Scientist within the Astromaterials Research and Exploration Science (ARES) Division. In this role he provides subject matter expertise in remote sensing and earth, climate, and environmental science to the Division, Center, and Agency. He directly supports the NASA Disaster Response Coordination System as Center Response Coordinator for Johnson Space Center working with Federal, State, and local emergency management groups to provide data and data products from the International Space Station following a disaster event. This aligns with his role as the International Space Station (ISS) Program Scientist for Earth Observations facilitating continued development and use of the ISS as a remote sensing platform for basic and applied science. He is directly involved in astronaut training for scientific observation and data collection in support of future human space exploration missions. While academically and professionally trained as a geologist, Dr. Stefanov is an interdisciplinary scientist with numerous published research articles and chapters in peer-reviewed journals, books, and proceedings volumes on diverse applications of remote sensing ranging from mineral and rock identification to assessment of spider diversity in urban environments." (from NASA)

Call for Articles

Have a geological story you want to share with your fellow geologists? Did you go on a field trip or just see a cool geological feature in your travels? Submit to the GSNH newsletter! The submission deadlines are March 1, June 1, September 1, and December 1 for each quarterly issue, but content can be submitted any time for inclusion in the next newsletter article. Send to jlambert@nobis-group.com. For more details, see the submission guidelines at the GSNH website: http://www.gsnh.org/submission-guidelines.html.

Quasi Crystals and the Atomic Bomb

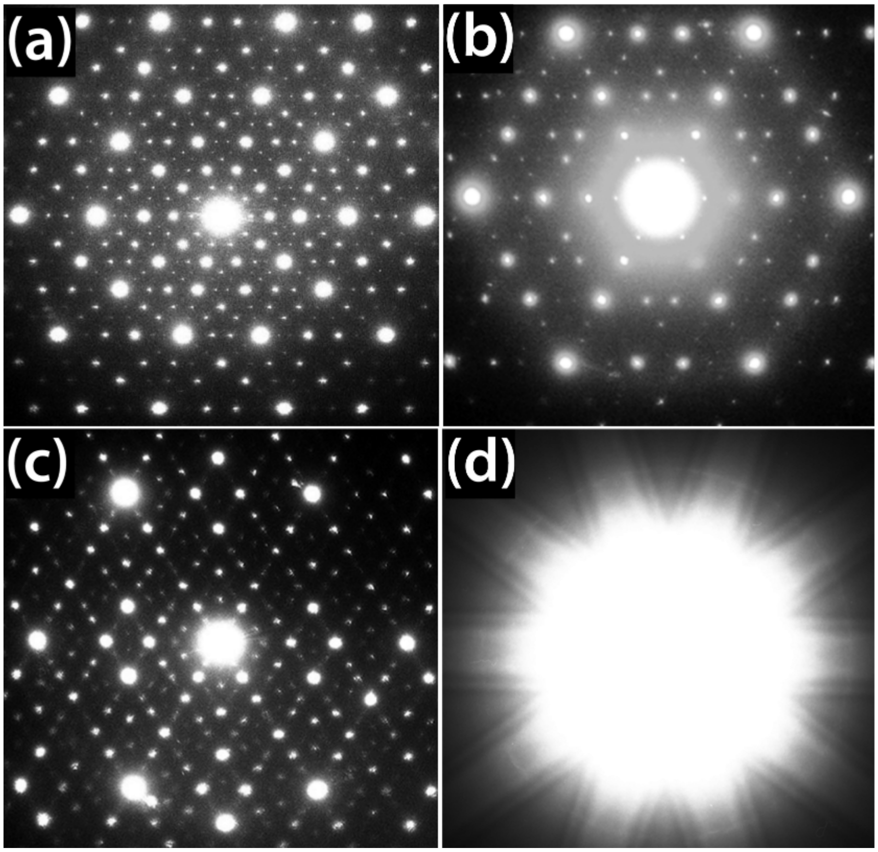
By Nelson Eby

Patterns are everywhere - flooring, wallpaper, artwork, crystalline solids, etc. In the case of minerals, the repetition of these patterns in three dimensions produces crystalline solids. Symmetry elements in crystals are mirror planes, rotation axes, centers of symmetry, and rotoinversion axes (point groups, 32 possible combinations). Rotation axes are 1-, 2-, 3-, 4-, and 6-fold. Note the absence of a 5-fold rotation axis. If we add translational elements – Bravais lattices, screw axes, and glide planes we get the 230 space groups that provide a complete description of the symmetry of a crystalline material. While 5-fold symmetry occurs in biological systems (e.g., starfish), it was thought that 5-fold symmetry was impossible in crystalline materials.

In 1982 Dan Shechtman (Israel Institute of Technology) discovered the first quasi crystal in a rapidly cooled Al-Mn alloy. X-ray patterns of this material showed sharp Bragg peaks (indicating order) that were incompatible with periodicity. He had found a crystalline solid that shouldn't exist. In 2011 he was awarded the Nobel Prize in Chemistry for this discovery.

Since 1982 a number of quasi crystals have been found in laboratory-produced solids, but do they exist in nature? In 2009 Luca Bindi (University of Florence) discovered the first naturally occurring quasicrystal [Icosahedrite ($Al_{63}Cu_{24}Fe_{13}$)] embedded in the mineral Khatyrkite from the Khatyrka meteorite.

Luca Bindi and his team then turned their attention to the glasses (Trinitite) formed during the first atomic bomb test. The arkosic sand at the test site was fused during the blast and formed a layer of green glass with radiating spikes around ground zero. Within this glass blanket is an area of red glass that corresponds to the location of copper wires that ran to the test tower. Bindi and his team hypothesized that the high temperatures reached in the blast cloud might facilitate the formation of quasicrystals. They focused their attention on the red trinitite because of the presence of metals (particularly Cu) in the glass. Their effort was rewarded with the discovery of a new icosahedral quasicrystal ($Si_{61}Cu_{30}Ca_7Fe_2$).



The 5-fold (a), 3-fold (b), and 2-fold (c) electron diffraction patterns for icosahedrite collected by TEM. The patterns correspond perfectly, up to experimental resolution, with the 5-fold, 3-fold, and 2-fold patterns predicted for a face-centered icosahedral quasicrystal. From Bindi et al (2011).

Trinity Test

Green Trinitite

Red Trinitite

The unusual symmetry and electronic structure of quasicrystals makes them of interest for materials physics and nanotechnology. They have been investigated for possible uses as surface coatings, reinforcement in metal-matrix composites, hydrogen storage materials, and photonic materials.

If you want to know more:

An eleven minute YouTube video is available which talks about quasicrystals and the discovery of the quasicrystal in the Trinity glasses at https://youtu.be/AkuLjTIUO7A

Bindi, L., Steihardt, P., Yao, N., Lu, P.J. (2011) Icosahedrite, $Al_{63}Cu_{24}Fe_{13}$, the first natural quasicrystal. American Mineralogist 96, 928-931. https://doi.org/10.2138/am.2011.3758.

Bindi, L., Kolb, W., Eby, N., Asimow, P., Wallace, T., Steinhardt, P. (2021) Accidental synthesis of a previously unknown quasicrystal in the first atomic bomb test. Proceedings of the National Academy of Sciences 118, 1-5. https://doi.org/10.1073/pnas.2101350118.

Other Geology News:

See below for a roundup of recent geology articles that caught the interest of GSNH members:

Kamchatka Megathrust Earthquake: What lies in the Pacific Ring of Fire
By Kleoniki Lydia Theodoridou. Geodynamics Blog, European Geoscience Union. October 1, 2025.
https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2025EA004433

The Kamchatka Penninsula is located right at the subduction zone where the Pacific Plate is colliding beneath the Okhotsk microplate, and the Kuril Kamchatka Arc is one of the most seismically active areas on earth. On July 29, 2025, a massive magnitude 8.8 earthquake struck this area, followed by a magnitude 7.8 aftershock two months later (September 18). Tsunami waves up to 4 m were recorded in Russia and Alaska. Early warning systems allowed for evacuation alerts across the Pacific Ocean, in stark contrast to the 2004 Indian Ocean earthquake and tsunami, which resulted in major loss of life.

The World's First Rock Star: Celebrating the Tercentenary of James Hutton (1726-1797), the Founder of Modern Geology
From Speaking of Science, blog of the Geological Society of America, October 19, 2025.
Contributed by Nowell Donovan (Provost Emeritus, Texas Christian University), Robert Gatliff (Edinburgh Geological Society) and Colin Cambell (CEO, The James Hutton Institute).
https://speakingofgeoscience.org/2025/10/19/the-worlds-first-rock-star-celebrating-the-tercentenary-of-james-hutton-1726-1797-the-founder-of-modern-geology/

Happy 300th birthday to James Hutton, the Scottish scientist who wrote the first two volumes "A Theory of the Earth", which refuted the prevailing idea at the time that granite was a primeval rock underlying everything else that had precipitated from the original ocean. To celebrate James Hutton, the Edinburgh Geological Society is coordinating a "Deep Time Trail" with waypoints and eventually a new staircase to Siccar Point, which is a classic unconformity that he used to help develop his theories of igneous intrusive rocks.

Sotheby's Brings Heavyweight Gems to Abu Dhabi in $1B Luxury Push
By Annie Davidson Watson. From JCK Online, November 24, 2025.
https://www.jckonline.com/editorial-article/sothebys-abu-dhabi/

Sotheby's will be running a jewelry live auction on December 5 that will include the Desert Rose, a 31.68 carat pear-shaped pink diamond in a rare orange hue, estimated at $5 million to $7 million. The single-owner sale will also include diamond rings with a 5.61 carat Kashmir sapphire and a nearly 8 carat Colombian emerald.

New Lessons from Old Ice: How We Understand Past (and Future) Heating
By Mariana Mastache-Maldonado, Eos, November 24, 2025.
https://eos.org/articles/new-lessons-from-old-ice-how-we-understand-past-and-future-heating

Blue ice formations in Antarctica are rare (about 1% of the continent) and form where strong winds strip away the snow, allowing access for researchers. The Allan Hills region at the edge of the East Antarctic Ice Sheet is one such area where researchers have discovered the oldest ice on Earth so far – up to 6 million years old. The ice is not continuous back that far, but researchers can look at the snapshots available to reconstruct past climates from the ice's age and water isotopes.

This Site in Bolivia Boasts 16,600 Exposed Dinosaur Footprints—The Most Ever Found in One Location
By Marta Hill, Smithsonian Magazine, December 11, 2025.
https://www.smithsonianmag.com/smart-news/this-site-in-bolivia-boasts-16600-exposed-dinosaur-footprints-the-most-ever-found-in-one-location-180987830/

Paleontologists have documented 16,600 three-toed dinosaur footprints and 1,378 swim tracks in Torotoro National Park in Bolivia. The footprints ranged in size from 4 inches to 12 inches and may represent juveniles and adults, or smaller species. The tracks allow researchers to understand how dinosaurs moved and behaved.

Time to Renew your Membership!

Time to renew your membership for 2026! With your membership, you get a discount on dinner meetings (which will happen at some point!) and field trips, information of upcoming events of interest to the geological community, voting privileges at Society business meetings, and automatic subscription to this newsletter! Membership dues also help to support outreach for the greater community. See the second-to-last page of this newsletter for a membership renewal application.

GSNH Order Form

	Number of Items	Price per Item	Shipping (1 item)*	Shipping (2 items)*	Total
GSNH T-Shirt**		$18.00	$7.00	$10.00	
GSNH Field Hat		$20.00	$10.00	$15.00	
35th Anniversary Pint Glass		$10.00	$7.00	$10.00	
				Total	

*Email gsnhinfo@gmail.com for shipping estimate for mixture of above items.
**Specify Unisex or Women's style. Available in Small, Medium, Large and Extra Large sizes.

Ship to:

Name	
Street Address	
City, State, Zip Code	
Phone # (in case of questions about your order)	

Please make checks payable to "GSNH" and mail with this completed order form to:

GSNH
P.O. Box 401
Concord, NH 03302

MEMBERSHIP & RENEWAL APPLICATION

Geological Society of New Hampshire

PO Box 401, Concord, NH 03302

Name: ____ *(Please print clearly)*

E-mail: _______________________________________

Renewing Members*: Only update this section if you have changes to your contact information (*<u>*including email*</u>*) or educational history.*
New applicants: *please complete this section.*

Preferred address/email to receive GSNH Communication: ___Home or ___Business

Home Address:

____

____

____

Business Address:

(Employer): ___________________________

____

____

Home Telephone: __________________

Office Telephone: _______________

New Hampshire PG # (if applicable) _______

Education: Degrees received or in progress:

<u>Year</u> <u>Degree</u> <u>Major</u> <u>College or University</u>

____

____

____

I volunteer to help with one of the following committees or tasks:

__ Membership Committee
__ Legislative Committee
__ Giving a talk at a meeting
__ *Regulations Committee*
__ *Education Committee*
__ Events Committee
__Communications Committee (Newsletter or Website, circle preference)
__ Other:

Membership Category:

______ Regular Member (Annual Dues $20.00)

______ Student Member (Annual Dues $10.00). Please <u>complete **Education** section above</u>.

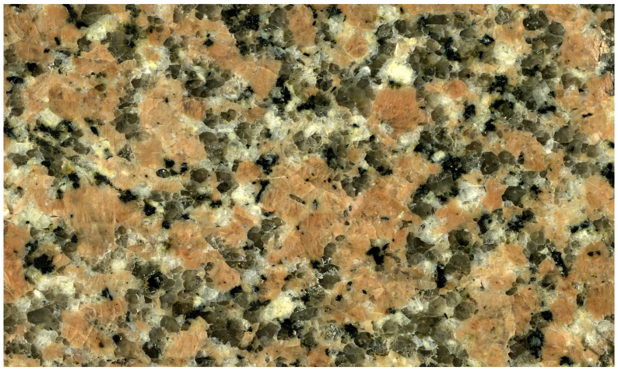
Make checks payable to **"Geological Society of New Hampshire."** Note that GSNH dues are not deductible as a charitable contribution, but may be deductible as a business expense. Please return this completed application form with any necessary corrections and a check for the appropriate dues to the GSNH at the address above. The Society's membership year runs from January 1 to December 31.

Signature: ___________________________________ Date: ____________________

Inspire the Next Generation of Geologists!!!

Are you interested in sharing your love of Geology with others?

- GSNH is often asked to provide speakers to school classes, Scouting troops, and other groups looking to learn about Geology.
- We are looking for Volunteers to help fulfill these requests. GSNH will provide materials, including rock and mineral boxes, as well as sample activities.
- If interested please email gsnhinfo@gmail.com to learn more.



GSNH PROMOTING GEOLOGICAL SCIENCE & EDUCATION

GSNH.ORG