The Maine Geologist

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

June 2020 Volume 46 Number 2

PRESIDENT'S MESSAGE

In March of this year, businesses and academic institutions closed their physical locations and quickly figured out virtual work-from-home solutions due to the global pandemic. As I write from my living room office, I'm reflecting on the past few months with mixed emotions: exhaustion, inspiration, fear, compassion, anger, anxiety, confusion….and many more which I'm sure some of you can relate to. Until a week ago, I was engaged in teaching 3 online college courses to students located all over the world. With college campuses closed, students and faculty engaged in online courses while dealing with different family situations, access to technology, and other challenges. While I found the technology alone to be a daily trial as it was both finicky but also critically enabling, the added amount of time and energy needed for tasks that usually can be done more efficiently (e.g. delivering a lecture, meeting with students, grocery shopping, …) left me feeling short on bandwidth daily. But one of the largest sources of anxiety for me during this time came from a feeling that I wasn't able to give my students the support they needed and the high-quality educational experience I was used to providing. I found myself regularly considering that maybe my video lessons on cloud types and relative humidity for my Climate and Weather class were not the most pressing topics for us to engage in at the time.

For decades now I've been fascinated, inspired, and also grounded and comforted by the natural world and the Earth processes shaping it – and I still am – although I am finding my training in geoscience, which taught me to consider vast time and space scales and to analyze data, (although not data from populations of living things), to be less useful for considering human interactions and human systems. Although I still feel very strongly about the need for enhanced public geoscience education, especially as we consider societally relevant topics such as impacts of climate change, access to resources, and geohazards, I am recognizing my limitations as a trained geologist. For example, I feel wholly unprepared to deal with the vast motivations and logics of my fellow citizens when it comes to discussing, planning, and taking action related to COVID-19. Further, I feel noticeably unprepared as an educator right now, especially concerning awareness of the range of student needs, access, identities, etc., and also how to use that awareness to produce effective and inclusive learning spaces for all my students. A typical doctoral program in the Earth Sciences doesn't include much in the way of training to be an educator, yet many of us end up spending at least half of our professional time working closely with undergraduate and graduate students. During the last few weeks I've begun immersing myself in resources on the topic of institutional racism within academia. Minority students are underrepresented in STEM and especially within the geosciences – both in education and professionally. In my view, as a geoscience-enthusiast and professional, I see myself as having a role and responsibility to work to be welcoming and inclusive, and to be dedicated to self-learning on topics that were not part of my formal training. I recommend checking out some of the resources on the #ShutDownSTEM website promoted by the American Association for the Advancement of Science (AAAS). There are many more resources available which can be shared among us on the GSM website.

While times are unsettling, there are many things on the horizon to be hopeful about or to find some grounding in while navigating the shifting terrain. Since both our Spring GSM Student Meeting and our Summer GSM Field Trip were cancelled (please see the section below about receiving a refund for your deposit), we are proposing some alternative

physically distant field-based social opportunities within this newsletter. Read about news from various Maine campuses and an update on recent developments by the Maine Climate Council. Included in this newsletter is a memorial piece for Hal Borns, founder of the Climate Change Institute and longtime UMaine faculty member, who passed away earlier this year. Also, see photos of IAT and GSM members celebrating Walter Anderson's 90th birthday in late February. It is likely that our Fall GSM Meeting will look different than in past years as we are mindful of the need for physical distancing. I'm encouraged by the ever-evolving technology available to help us plan an engaging, accessible, and low carbon footprint meeting featuring student presentations. Please find opportunities to stay in touch through the summer and share your geo-adventures. Stay safe and healthy!

Sarah Hall, GSM President
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THE EDITOR'S MESSAGE

The newsletter is distributed through email in pdf format. Anyone with special needs please contact the Editor. Please send items of interest and photographs of GSM activities to:

Amber Whittaker, Newsletter Editor
amber.h.whittaker@maine.gov

GSM WEBSITE: www.gsmmaine.org
FACEBOOK: facebook.com/GSMMaine

PHOTO CONTEST

Maine Geological Phenomena

Capture a photo of a favorite geological field site or geoscience phenomena and share it with the community! Please send a photo with a title (few words) and caption (no more than three sentences) that includes where the photo was taken, when, and a bit of info about the phenomena. Send to president@gsmmaine.org by August 31st with subject line: **photo contest**. The photos will be posted on a public blog (gsmfieldphotos.blogspot.com) where members can view, comment, and vote (Sept 1, 2020) for their favorite photo/caption pairs! Win **one free year of membership** to the GSM!

2020 SPRING MEETING
COVID-19 PANDEMIC CANCELLATION

~~**April 3, 2020**~~
University of Maine at Farmington

The spring issue of the GSM newsletter usually lists the Spring Meeting student poster and presentation abstracts. They are missing this time due to the cancellation of the GSM Spring Meeting. We hope to showcase student work at a different, possibly virtual, event in the Fall.

2020 SUMMER FIELD TRIP
COVID-19 PANDEMIC CANCELLATION

~~**July 31 – August 2, 2020**~~
Northwestern Maine

The in-person GSM Summer Field Trip in Northwestern Maine is cancelled this year due to the COVID-19 pandemic. See plans for an alternative below.

DECONSTRUCTED
2020 SUMMER FIELD TRIP

Summer 2020

OK. We can do this! The GSM will have a summer field trip — but as so many things this year, it will be unusual. We will be together while apart. We invite you to go on a field trip on your own or with family and friends with appropriate social distancing. Explore one of the MGS field localities, a land trust property, a proposed geopark site, or a favorite spot that you know. Take a selfie in the field

to record your individual experience as part of our collective field trip. Submit your field trip photo to president@gsmmaine.org with the subject line **Deconstructed Field Trip** and a few words telling us where you went and what you saw. Then, as usual following a GSM field trip, we will gather on **Saturday afternoon at 4:00 for happy hour on August 1st**. This year it will be a remote gathering on Zoom from wherever you are with a beverage of your choice (that you provide). Anyone is welcome to join the online happy hour gathering. Zoom meeting info will be sent to the GSM email list. Come tell us about your individual trip. We will present any photos that come in before the Zoom meeting.

Although this will be an unusual "deconstructed" field trip, it preserves the three essential elements of a fun GSM summer field trip experience: 1) engagement with outdoor places in Maine, 2) social interaction with colleagues, and 3) enjoyment of a cool beverage. We hope to see you there.

Avoiding Crowded Trails
https://www.maine.gov/dacf/about/news/news.shtml?id=2692426
Maine Outdoor Safety and Guidelines
https://www.maine.gov/dacf/about/news/news.shtml?id=2565815
MGS Field Localities
https://www.maine.gov/dacf/mgs/explore/explore_map.shtml
Maine Trail Finder
https://www.mainetrailfinder.com/
Proposed Coastal Maine Geopark
https://www.coastalmainegeopark.com/

Henry Berry, GSM Councilor

While you are at it, snap a photo for the photo contest!

MAINE LICENSED GEOLOGIST FUNDAMENTALS TEST NOW AVAILABLE TO RECENT COLLEGE GRADUATES

"Passing the test attractive to potential employers nationwide"

By way of background, a 1973 law initiated the licensing of what was then termed a Maine Certified Geologist. The law essentially requires that any commercial practice of geology in Maine involve a Certified Geologist, with potential financial penalties for violations. Academic geologists are generally exempted. The law was recently modified to change the name to Maine Licensed Geologist to reflect the terminology used by other professions in Maine. A second change to the law involved the tests that must be passed to become a Maine Licensed Geologist. There are three tests: 1) Fundamentals of Geology (FG), 2) Professional Geology (PG), and 3) Maine-specific geology. A geology degree or similar, 7 years of experience, and references are also required.

With respect to the tests, the FG and PG tests are created by a national organization (Association of Boards of Geologists www.asbog.org) and are the same across the US. All states that have geology licensure uses these two tests, and therefore, where these two tests are taken and where licensure is desired are not connected. Historically in Maine, none of the tests could be taken without fully applying to be a Maine Licensed Geologist. The problem with this condition is that the FG test could not be taken until at least 7 years of work history, and some of the geology fundamentals learned as a student may have been forgotten. The revised law allows anyone with a geology degree to take the FG test in Maine without having to apply for licensure. The primary benefit of taking the FG test immediately after graduation is that the fundamentals will still be fresh in ones' mind. A second benefit is that having passed the FG test will attractive to potential employers who desire Licensed Geologists on their staff.

The test is periodically offered by the Maine Department of Professional and Financial Regulation in Gardiner, Maine for $200. More information is provided on their website:

https://www.maine.gov/pfr/professionallicensing/professions/geologists/index.html

If you have any questions, feel free to contact them or Keith Taylor at keitht@stgermain.com who is on the State Licensure Board.

Keith Taylor

CALL FOR VOLUNTEERS

Geoscience Experts in K-12 Classrooms

Volunteer to be a "geoscience expert" for a k-12 class or field trip! We are gathering a list of volunteers throughout the state of Maine to help facilitate geoscience educators. In particular we are looking to connect teachers with folks who have "expertise" in different realms of geoscience or career paths in the geosciences. If you would be willing to volunteer as a visiting "expert" in a geoscience class or on a field trip, please fill out this sort questionnaire:

https://forms.gle/9HBzejdV4Vevh4xm6

Your name and responses will be saved and matched to future requests from teachers. We are hoping to identify folks from different regions of the state with different expertise in order to facilitate minimal travel and help build community connections. Please send questions to: president@gsmmaine.org.

Serve the Geological Society of Maine

2020 marks the end of many terms for the officers and councilors of the Geological Society of Maine. Many of us agree to stay on term after term to serve the Society we love, but if you are interested in volunteering to serve as an officer or councilor for GSM, this year or in the future, please contact VP Kevin Spigel, the chair of the nominations committee: kspigel@unity.edu

NEWS FROM THE STATE GEOLOGIST

Critical Minerals – Part II

As a follow-up to my October 2019 column on critical minerals in the U.S., I am pleased to announce that the Maine Geological Survey has been awarded a two-year grant through the U.S. Geological Survey's Earth Mapping Resource Initiative (Earth MRI) to investigate lithium resources in western Maine. Through the effort I described in October, our project team developed several focus areas with the potential for critical commodities: lithium in the pegmatites of western Maine; nickel, cobalt, and platinum group elements in and around Moxie Pluton in central Maine; base and precious metals in the Munsungun area of northern Maine. Our Oxford County Pegmatite Field project focuses in the Rumford and Newry areas.

While our project in the fall was really an office effort – compiling available information on resources in Maine – this project will generate new data. Bedrock mapping is a key component of the project to better establish the geologic context of abundant pegmatites in the region. In addition to traditional geochemistry of rocks, our project includes a stream-sediment survey aimed at developing prospecting tools for lithium-rich pegmatites. To refine our understanding of the genesis of pegmatites, our team will collect samples for geochronological studies using several techniques: U/Pb analysis of igneous zircons; detrital zircon analysis of metasedimentary rock samples; and U/Pb dating of cassiterite.

For a project focused on lithium resources, we have assembled the dream team: Dwight Bradley (USGS, emeritus) – guidance on geochronological studies, particularly on cassiterite; Myles Felch (Maine Mineral and Gem Museum) – geologic mapping and handheld XRF analyses of pegmatites; Chris Koteas (Norwich University) – geologic mapping and sampling for geochem and geochron; Dyk Eusden (Bates College) – geologic mapping and sampling for geochem and geochron; Steve Smith (USGS) – guidance on stream-sediment sampling; Dan Locke (MGS Hydrogeologist) – lead on stream-sediment sampling; Amber Whittaker (MGS Senior Geologist) – GIS analysis and geologic

interpretation; Chris Halsted (MGS Director of Earth Resource Information) – GIS and database functions; and field interns to assist with mapping. And, oh yes – I get to push around all the paper for this project.

We're glad that Governor Mills' COVID-19 protocols allows this interstate team to convene (within no less than six feet) on western Maine this summer. We are looking forward to great results!

Robert G. Marvinney, State Geologist
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MAINE CLIMATE COUNCIL UPDATE

Maine Climate Council receives draft recommendations at June quarterly meeting

Maine's Climate Council, which has been charged by the Governor and Legislature to develop a four-year plan to put Maine on a trajectory to reduce greenhouse gas emissions by 45% by 2030 and at least 80% by 2050 and become more resilient to the impacts of climate change, received an initial set of recommended strategies from its six working groups at its 2-part quarterly meeting on June 17th and 18th. The working groups, joined by a Scientific and Technical Subcommittee, have worked since last fall to research and recommend strategies to both reduce greenhouse gas emissions from Maine as well as help communities and ecosystems adapt to the effects of climate change. The Maine Climate Council is now responsible to consider and select strategies to include in the final action plan, informed by further cost-benefit analyses and vulnerability assessments that are ongoing.

We were lucky to have Dr. Nirav Shah, director of the Maine Center for Disease Control and Maine Climate Council member, give remarks to open the 2-day meeting. You can watch his remarks on the Maine Climate Council's YouTube channel at https://www.youtube.com/watch?v=DfWX3HwLMZs.

The draft strategies can be viewed on the Climate Council website. Beginning in early July, the Governor's Office of Policy Innovation and the Future will be seeking public comment and feedback on the strategies. Please sign up for the Council newsletter at the link below to hear about the public engagement and outreach efforts that will take place throughout the summer and fall.

If you have any questions or questions about the Maine Climate Council, please get in touch at the website https://climatecouncil.maine.gov/ or by contacting Cassaundra Rose, the Maine Climate Council coordinator (and GSM webmaster), at Cassaundra.Rose@maine.gov.

NEWS FROM THE CAMPUSES

Bates College

Name Change at Bates:

The Department of Geology at Bates College has officially changed its name! As of July, we will be known as the Department of Earth and Climate Sciences (EACS). This change has been under discussion and in the works for a couple of years now and we are excited to finally have it in place. EACS more accurately reflects what we do, who we are, and the true breadth of our field.

The name change goes into effect in the fall (and for majors beginning with the class of 2024). The classes of 2021-2023 will be majoring in Geology. So for the next couple of years, we will be known as GEO and EACS and transitioning ultimately to EACS. We are in the process of figuring out how to say EACS---- Shall it be eeks? e-acks? or simply e-a-c-s? Time will tell.

COVID-19 at Bates:

COVID-19 shut down our normal operations on Friday the 13th (March 13th, that is). Students packed up, said their goodbyes, and left campus over a period of days. And staff/faculty pivoted to teaching remotely for the rest of the semester. These sudden and unexpected changes were brutal, especially for our seniors. In person spring meetings, usually a highlight for showcasing senior work, and graduation, were cancelled. Upon hearing of a semester cut short, our alums volunteered to provide remote workshops on life post-Bates, and to honor our seniors. We had 16 alums (from the class of

2002-2018) and GEO majors from the current junior and sophomore classes, gather on ZOOM to celebrate our seniors' accomplishments. It was truly amazing and humbling to see the generosity and kindness of our GEO community in a time of need.

And now our focus shifts to "normalizing" the experience of our returning students in a time that is far from normal. We are launching summer projects with rising seniors (either remotely or socially distanced), to the best of our abilities, and are busy revising our courses to work in the 7.5-week modules planned for next year. We see lots of potential for the 7.5-week course format and are testing our various ideas with each other. Stay tuned for more on this...

Faculty news at Bates:

Geneviève Robert is now an Associate Professor, having received tenure in January 2020! Congratulations, Geneviève! For those of you who don't know her, you will find Geneviève anchoring the Earth Science/Materials side of our program. Geneviève does research on melt viscosity and has welcomed over 20 students to work in her lava lab.

Beverly Johnson
bjohnso3@bates.edu

College of the Atlantic

Diving into online courses for the spring term, students living all around the world engaged in the geosciences through self-guided weather observations which were shared through photographs, drawings, and videos featuring weather data from nearby stations. Students in Climate and Weather class created a photo journal of their observations with their favorite photos posted on a blog for a community-wide photo contest. Check out the photos here:

https://cawphotocontest2020.blogspot.com/

Senior Sahra Gibson developed a proposal for a Coastal Maine Geopark and worked alongside students in a Geoheritage Tutorial and Museum Practicum class to design prototypes of potential sites of interest along the coast. With the idea gaining traction, we will continue working on the project through the summer and into the fall in hopes of installing a few "Geosites" soon! Read more about the Geopark and how to get involved here:

https://www.coastalmainegeopark.com/

Sarah Hall
shall@coa.edu

Unity College

Wow, what a semester it has been! Of course, it was filled with the usual including helping with student research projects, thesis proposals, and internship/graduate school/job applications. Then, in mid-March, we were presented with an unprecedented situation. As a result, we shifted to online delivery along with the rest of academia. We survived, after making delivery modifications for our lectures and labs, finding alternative student projects, and modifying timelines for other assignments. But, the silver lining, despite all of this, our Earth and Environmental Science graduates either found full-time employment with the USGS or accepted graduate school research assistantships, while other EES students secured summer internships (USGS, DEP, Environmental Consulting, and GSA) and are making final plans for beginning the data collection phase of their senior thesis projects (radon analysis of soils, landslides in southern Maine, paleohydrology of Sandy Stream, and streamflow modeling of several local streams). At this time, we are also eagerly awaiting word on some pending grant funding.

Kevin Spigel
kspigel@unity.edu
Jim Killarney

University of Maine at Farmington

The American Institute of Professional Geologists has awarded a scholarship to Chelsey Drake, whose essay will be published in an upcoming issue of The Professional Geologist. She is currently participating in an REU program through the University of Colorado. Robbie Knowles shared results of his senior research on the Perkins Point field site north of Castine on UMF's Meeting of the Minds, the on-line substitute for our annual

Symposium Day. He was selected for an internship with Maine DEP through the Margaret Chase Smith Policy Center. Recent alumni Bryce Neal and Dan Mason will commence, respectively, graduate studies in geoscience at Montana State University and the University of New Mexico; Michael Paradis recently began full-time employment with the USGS in New Hampshire. Our faculty managed to survive the final six weeks of the spring semester teaching on-line. Dr. Daly's May term trip to Iceland is postponed one year. A revised field guide to Farmington geology by Dr. Reusch is available upon request.

Doug Reusch
reusch@maine.edu

University of Maine at Presque Isle

Kevin McCartney has been awarded a Fulbright Fellowship (his second) and will be in Lucknow India from January through June 2021. He will continue his work on a paper on the Cenozoic Evolution of Silicoflagellates and a study from the recently drilled International Ocean Discovery Program (IODP) Expedition 378 to the Southwest Pacific Ocean.

Kevin McCartney
kevin.mccartney@maine.edu

Read more about UMPI's Chunzeng Wang and his recent field work under MEMBER NEWS.

WALTER AT 90 – AN APPRECIATION

Many of us attended Walter's 90th birthday party at the Harraseeket Inn in Freeport at the end of February. Head on over to the Maine IAT website for some photos that Bill Duffy shared: https://maineiat.org/2020/02/29/lord-almighty-look-whos-90/

Check out the Story Map about Walter developed by Sarah Hall.

Donate to the "Ninety for Ninety" drive for the Walter Anderson Fund via GoFundMe

ITEMS OF INTEREST

Aspiring Coastal Maine Geopark: visit a potential Geosite!

Explore geological sites along coastal Maine that will help promote the development of the Aspiring Coastal Maine Geopark. A small working group comprised of Sarah Hall (College of the Atlantic), Joseph Kelley (UMaine), Don Hudson (IAT Maine Chapter), and Sahra Gibson (College of the Atlantic '20) is prototyping a Geopark for coastal Downeast Maine. Geoparks are single, unified geographical areas that promotes that area's unique geological heritage in connection with all other aspects of the area's natural and cultural heritage. By raising awareness of the importance of the area's geology in history and society today, Geoparks give local people a sense of pride in their region and strengthen their identification with the area. Geoparks differ from U.S National or State Parks because they are not managed by the government. Instead, they operate as a partnership with local communities and land managers through a bottom-up approach. Over the past six months, students from College of the Atlantic have been compiling information to propose potential "Geosites" along the coast. Geosites are designated sites for visitors to learn about the geoheritage of coastal Maine that displays outstanding geological features that connects to the local cultural heritage. Read more about the Geopark and how to get involved here:

https://www.coastalmainegeopark.com/

If you would like to be further involved or learn more about the development of the Coastal Maine Geopark, please contact Sarah Hall (shall@coa.edu).

Sahra Gibson

NEIGC Schedule

The New England Intercollegiate Geological Conference event this fall in western Connecticut and adjacent New York will be postponed until 2021. NEIGC 2022 will be focused on areas around Central Massachusetts and hosted by Mt. Holyoke College.

NEIGC 2023 with be co-hosted by UMaine Presque Isle and focus on areas in Aroostook County.

Chris Koteas, NEIGC Secretary

MEMBER NEWS

A giant post-Acadian redbeds rift system discovered in northern Maine

Going to the woods is more than just social distancing to help fight the coronavirus. My bedrock mapping in northern Maine in the early spring days of this field season has been very fruitful so far. The most important and surprising discovery so far is a huge post-Acadian redbeds rift system that occurs along the geographically and recreationally well-known Fish River chain of lakes. This discovery was made in the third week of May when I had no choice but to figure out the "Fish River Lake Formation" that extends into the northern part of the Big Machias Lake quadrangle which is my 2020 STATEMAP mapping project. STATEMAP is a cooperative program of the state geological surveys and U.S. Geological Survey, the goal of which is to improve geologic mapping in our nation. Based on my work so far, the Fish River Lake Formation in the Fish River Lake area includes the lower part (basal conglomerate, fossil-rich limestone and calcareous sandstone, and maroon slate) of the Lower Devonian Seboomook Group and some volcanics of the Ordovician Winterville Formation. From Red River valley northeast toward Square Lake, however, there exists a perfect half-graben style redbeds basin that contains predominantly red sandstone, siltstone, mudstone and conglomerate. The redbeds are rich in fossils of Devonian-style plants that are dominated by *Psilophyton* and several other genera. The lithology and the fossils correlate to the Middle Devonian Mapleton Formation in Mapleton in The County and the Trout Valley Formation in Baxter State Park. Both Mapleton and Trout Valley are the only two known locations with these plant genera of the Middle Devonian in the United States. Currently, I call the newly discovered redbeds the Red River redbeds basin. The area of the basin is estimated at least 130 km^2 (current surface exposure), 4.6 times larger than the Trout Valley Formation and 6.7 times larger than the Mapleton Formation.

Another surprise was made soon after the first – the second post-Acadian half-graben style redbeds basin was discovered between Pennington Mountain and Portage Lake. It was June 2 when my field assistant Eric Bagley started his first day out with me – we saw the first outcrop of the sandstone with plant fossils on Rte-11 and could not believe it was really a bedrock outcrop. The rocks are mainly pale green sandstone, siltstone, and mudstone. Therefore it is more like a "greenbeds" basin. It is also rich in fossil fragments of the same plants as the ones in the Red River redbeds basin. Currently I call it Portage Lake greenbeds basin. It seems this basin has been much displaced by large-scale post-redbeds faults. In fact, in addition to the normal faults that produced the half-grabens, several pre-Acadian, syn-Acadian, and post-Acadian tens kilometers-long reverse and thrust faults have been identified and mapped in the region. The greenbeds occurring between Square Lake and Cross Lake may be one of the displaced pieces of the Portage Lake greenbeds basin. If this is confirmed, the total area of this greenbeds basin is estimated at least 100 km^2.

Both the Red River and Portage Lake redbeds and greenbeds basins seem to be products of a post-Acadian rifting system developed in the basement of Middle Ordovician Winterville Formation volcanics and Lower Devonian Seboomook Group foliated sedimentary rocks. Based on the fossils and their correlation to Mapleton and Trout Valley formations, both basins were formed in Middle Devonian. I plan to do more mapping and work to fully understand this rifting system and its tectonic setting (in addition to mapping the Big Machias Lake quadrangle).

The early spring days are the golden field days because there are no mosquitos and flies and the visibility in the woods is great. However, the roads can be very soft and there is still snow here and there. My CRV was stuck in the snow on the third day I was out, which was easy to deal with this time. However, when my CRV was stuck in the mud on the fourth day, I failed to get it out after two hours of effort. I gave it up and walked one mile out to a main road hoping somebody would drive by and take me out of the woods. Fortunately, two Irving foresters

Ed and Steve were on their way home (it was in the afternoon) and helped pull the CRV out of the mud. Nevertheless, this field season is so far, so good. I thank State Geologist Dr. Bob Marvinney and Dr. Gary Boone for support and guidance and Professor Dave Putnam for going to the field to confirm the redbeds and greenbeds are real, and they do exist in the beautiful Fish River chain of lakes region! You never know what else would surprise you in north Maine woods next time you go there.

David Putnam stands on top of the Red River redbeds in Red River and faces northeast. The redbeds form a NW-dipping homocline in the NE-striking half-graben.

Plant fossils in the Red River redbeds sandstone. Most of them belong to *Psilophyton*.

Chunzeng Wang, UMPI

[After Wang submitted the report, on June 24, he found the third rift basin of greenbeds rich in plant fossils. It is similar to the Portage Lake greenbeds. It is located in the Burpee Brook valley southeast of the NE-trending ridges at Portage. More work is underway.]

OBITUARY

Hal Borns
1927-2020

Hal Borns passed away earlier this year. Read the tribute on the UMaine website:

https://umaine.edu/news/blog/2020/03/26/colleagues-celebrate-hal-borns-legacy-of-friendship-vision-scientific-discovery/

His obituary may be found in the Bangor Daily News:

https://obituaries.bangordailynews.com/obituary/harold-borns-jr-1078952156

A tribute from Bob Nelson:

Hal was not just an incredible scientist, but a warm and loving human being whose graciousness was without equal.

My favorite Hal tale is of a field trip (NEIGC?) to western Maine, on which we had stopped at a section on which he'd published a pretty stellar stratigraphy and interpretation back in the 1980s, or perhaps earlier. Of course, the entire slope was overgrown with alder and willow thickets. Someone asked about how they got such a precise stratigraphy. Hal smiled and chuckled, then admitted they'd gone into town (in Rangeley) and rented a high-pressure water pump at the local equipment rental place, and using the water in the stream, had hydraulicked the entire slope to remove the loose materials!

Couldn't get away with his hydraulic "mining" today, of course, though I remember doing - physically, with U. S. Army entrenching tools - comparable slope-cleaning in Alaska in the 1970s. It was often the only way you could get a complete view of the stratigraphy.

Hal Borns was a gracious gentleman scientist, whose warm and sharing temperament was rarely matched by his contemporaries, and which will never be seen again in the increasingly competitive world of "modern science."

A tribute from James Hillier:

As one of Hal's students in the 1970s I'd like to send a note of thanks to whoever is receiving comments for his family or for the U of Maine. Hal's kindness and audacious enthusiasm for earth sciences inspired to me and so many others. In his graduate class "Glacial Geology" he told us "If you want to understand glaciers go look at them!" I'm so glad I did. While working in Colorado and Alaska, I found that experts who were already familiar with the work of the Institute for Quaternary Studies welcomed this kid from Maine, largely because of Hal's genius for understanding and describing the broad nature of earth sciences.

I'm glad to have thanked him personally for his impact on my career in 2010 when we both served as consultants advocating for land uses protective of a mapped esker similar to one he had described to us in the field back in 1977.

Memories of Hal Borns from Chris Dorion:

I had completed my undergraduate degree in Spanish with a minor in Business and had the very unrealistic goal of a fabulous and glamorous job in "international business". I had read about this in miscellaneous publications and I thought of world travels and a great salary. It was not to be. I had always loved the natural world from third grade when I learned to read, especially biology, geography, and geology.

So after not finding my ideal "international business" job, I applied to graduate programs in geology, and UMaine invited me to matriculate into their program, with the caveat that I complete the deficient undergraduate courses.

As a first-year graduate student in September of 1988, I went on my first NEIGC field trip out of UMF, and went on Woody Thompson's glacial trip. I vividly recall, to this day, Woody, Jon Boothroyd, Byron Stone, and other famous glacial geologists having "lively discussions" at the various stops. I loved every minute of the trip, and, more importantly, I realized this was what I wanted to do for a career. One thing led to another, and in the winter of 1989 I called Hal Borns, who was working for NSF Polar Programs in Washington, D.C. He was returning to UMaine in the summer, and invited me to work with him on the glacial history of Maine.

Around 1990, the Quaternary Institute and Department of Geological Sciences had just received its first EPSCoR grant. Hal had a thesis project for me Downeast, developing a high-resolution chronology of ice sheet recession. Also at this time, the first accelerator mass spectrometers were coming online, so very small sample volumes could now be radiocarbon dated. So, in July of 1990 Hal drove me out to Machias and arranged housing at UMM and access to the Cutler Navy base where eroding bluffs displayed 10- to 12-meter-high sections of glacial marine deposits.

The following year Hal asked me if I wanted to spend a summer in Sweden with Stockholm University. I was so honored because only one graduate student is invited to go to Sweden each year. The summer began with a 7-day field trip with the greatest glacial geologists in Scandinavia. I had read their papers, and it was humbling for me to listen to their discussions at outcrops and in the evenings.

I worked with Hal organizing several field trips: NEIGC, Friends of the Pleistocene, the annual Quaternary Institute field trip, and graduate class field trips. I recall being immediately overwhelmed by the potential logistics of organizing a field trip. Hal calmly told me to first just figure out a date, the geologic area to visit, and where we the participants would stay and eat. The rest would easily follow. I have used this methodology for the past 30 years so successfully.

In the spring of 1993 Hal invited me to join the archaeological team on the re-excavation of the Scarborough mammoth site. I spent several weeks camped out at the former farm pond excavation. It was a fascinating project with a large excavator and operator at my disposal to determine when, how, and why the partial skeleton came to rest in its unusual stratigraphic position. It was an honor to work with Hal, the Maine State Museum staff, Maine Geological Survey staff, and visiting geologists.

To cap off my graduate time at UMaine, Hal invited me to go to Antarctica in 1994 on a research project on the West Antarctic Ice Sheet. There are many stories to tell of that expedition, including what is now the legend of the lost snowmobile...

There were so many other times when Hal's generosity, kindness, and desire to see me, and many others, succeed that I could fill this newsletter. I miss you Hal.

TREASURER'S REPORT

Fund Balances
June 23, 2020

Below are the balances of the GSM funds as of June 23, 2020:

General Fund	$ 5,918.09
Walter Anderson Fund	$30,038.23
Kevin McCartney Fund	$10,747.51

The Walter Anderson Fund is in an endowment account at Bath Savings Trust. Sixty percent (60%) of this fund is in equities so it fluctuates daily. Thirty-six percent (36%) is in fixed income and the remaining four percent (4%) is in cash and cash equivalents.

The Kevin McCartney Fund is in a savings account at Maine State Credit Union. Ninety-eight percent (98%) is in a Certificate of Deposit. New contributions go into the Savings account as cash.

Bruce Hunter, GSM Treasurer

UPCOMING EVENTS

Date	Event	Location	Organizer
~~June 5-7~~ Postponed until 2021	83rd Annual Reunion and Field Conference, Friends of the Pleistocene, Northeastern Cell	Lakes Region, Central New Hampshire	GZA, NHGS, Smith College
June 21-26	Goldschmidt 2020 Conference	Virtual	Geochemical Society and the European Association of Geochemistry
~~July 31 – August 2~~ Postponed until 2021	**2020 GSM Summer Field Trip**	**Northwestern Maine**	**Kevin Spigel**
August 1	**GSM Zoom Happy Hour**	**Virtual (link will be sent via email)**	**Henry Berry**
August 31	**Field Photo Contest Deadline**		**Sarah Hall**
September 1	**Vote for Field Photos**	**gsmfieldphotos.blogspot.com**	**Sarah Hall**
October 1	**Anderson Fund grant proposal deadline**		**GSM**
~~October 3-6~~ Postponed until October 2021	AIPG Annual Conference	Sacramento, California	American Institute of Professional Geologists
~~October 9-11~~ Postponed until 2021	112th New England Intercollegiate Geological Conference	Western Connecticut and lower Hudson Valley, New York	Chris Koteas and Bob Wintsch
October 25-30	2020 Geological Society of America Annual Meeting	Virtual	Geological Society of America www.geosociety.org
Fall 2020	**2020 GSM Fall Meeting**	**Virtual**	**TBD**
December 7-11	2020 American Geophysical Union Fall Meeting	Virtual	www.agu.org

Please submit events to include on the calendar to the Newsletter Editor: amber.h.whittaker@maine.gov

MEMBERSHIP DUES STATEMENT

The GEOLOGICAL SOCIETY OF MAINE, INC. (often referred to as **GSM**) is a non-profit corporation established as an educational Society to advance the professional improvement of its members; to inform its members and others of current and planned geological programs in Maine; to encourage continuing social contact and dialog among geologists working in Maine; and to further public awareness and understanding of the geology of the State of Maine; and of the modern geological processes which affect the Maine landscape and the human environment.

The Society holds three meetings each year, in the late fall (Annual Meeting), early spring, and mid-summer (usually a field trip). A newsletter, ***The Maine Geologist***, is published for all members three times a year. The Society year runs from Aug. 1 to Jul. 31. Annual dues and gift or fund contributions to the Society are tax deductible. There are four classes of membership:

2020 FEE SCHEDULE

$ 30.00	REGULAR MEMBER	Graduate geologists, or equivalent, with one year of practice in geology, or with an advanced degree.
$ 30.00	INSTITUTIONAL MEMBER	Libraries, societies, agencies, businesses with interests in or practicing geology and related disciplines.
$ 15.00	ASSOCIATE MEMBER	Any person or organization desirous of association with the Society.
$ 5.00	STUDENT MEMBER	Persons currently enrolled as college or university students.

THE GEOLOGICAL SOCIETY OF MAINE ANNUAL RENEWAL / APPLICATION FOR MEMBERSHIP

Regular Member	$ 30.00	$_____
Institutional Members	$ 30.00	$_____
Associate Member	$ 15.00	$_____
Student Member	$ 5.00	$_____
Contributions to GSM		$_____
(please write gift or fund on check)		
TOTAL ENCLOSED		$_____

Name _____

Address _____

_____

_____

Email Address _____

(GSM funds include the Walter Anderson Fund _____ , and discretionary gifts as noted by contributor)

Make checks payable to:
Geological Society of Maine
Bruce Hunter, GSM Treasurer
44 Old Fairgrounds Rd
Readfield, ME 04355

THE MAINE GEOLOGIST is the Newsletter of the Geological Society of Maine, published three times a year, in mid-winter, summer, and early fall, for members and associates.
Items for inclusion in the **Newsletter** may be directed to:

Amber Whittaker, Newsletter Editor
amber.h.whittaker@maine.gov
207-287-2803

2019/2020 SOCIETY YEAR BEGAN August 1
PLEASE SEND DUES TO TREASURER.

THE GEOLOGICAL SOCIETY OF MAINE
c/o Bruce Hunter, GSM Treasurer
44 Old Fairgrounds Rd
Readfield, ME 04355

PLEASE PAY YOUR DUES!

THE GEOLOGICAL SOCIETY OF MAINE EXECUTIVE COUNCIL

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Vice President	Kevin Spigel	(2020)	Unity College, kspigel@unity.edu
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Historian	Daniel Belknap	(2020)	University of Maine (retired), belknap@maine.edu