



The Maine Geologist

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

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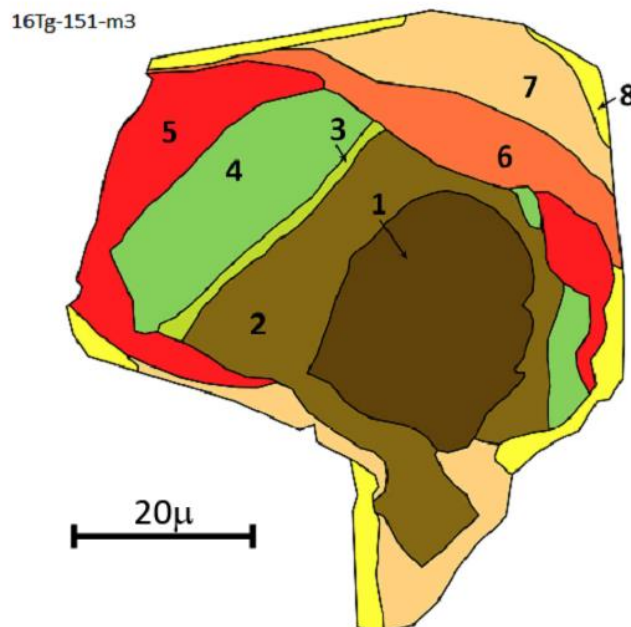
PRESIDENT'S MESSAGE

Why?

That's the key question of the upcoming GSM Annual Meeting on Friday, November 9th. If you keep asking yourself "Why?" as the afternoon goes along, you will keep hearing different answers. The theme of the meeting is Geoscience Education in Maine, and our Vice President Sarah Hall has lined up a packed program of people who are engaged in geoscience education ranging from education policy and resources, to teaching students at all levels and in many settings. But why? Why is geoscience education important? Why do people enjoy teaching it? Why are students inspired by it? The mission of geoscience education is something we all share as members of the Society. Even those of us who are not formal geoscience teachers are engaged in geoscience education in some way. We invite you to please complete the Geoscience Education in Maine survey before the meeting, and participate in the discussion workshop at the end of the afternoon. We all have different reasons as to why geoscience is important to us, and how it has influenced our thinking and our perspectives as citizens. Please join us for this most interesting exploration into our potential as a society for geoscience education. Thanks, Sarah!

Here are a few of my own answers as to why I love geoscience. I just returned from the annual NEIGC field geology conference in eastern New York. I asked one undergraduate student (who happened to be from a Vermont school) what sort of outdoor activities he liked. It turns out that this was the first time he had ever walked beside a stream in the woods and scrambled over rocks. So while I was looking at the inverted section through fossiliferous Cambrian Taconic slates, he was walking in the woods. Completely different, valuable experiences. A second reason why is a paper that was just

published in September in the Journal of Geophysical Research, by Christie Rowe and many others (including Mark Swanson and former GSM President Steve Pollock), reporting what might be described as fault networks that represent individual fossilized earthquake ruptures in Monroe, Maine. Not only is it fantastic to imagine the effects of a single earthquake being frozen in place for hundreds of millions of years, but it was deciphered mainly by students making hundreds of observations on the outcrop by deliberate, diligent, detailed work. This information was available, waiting only for someone with insight to notice. And by the way, many of us visited this outcrop on the GSM summer field trip in 2016 (Stop 8). A third reason is this map of a tiny mineral grain that was published by Mike Williams in the [NEIGC field guide](#) this month. It is a grain of monazite, a phosphate mineral about the width of a human hair. The colored map shows zones of the monazite grain that grew during metamorphism and



even at times while parts of the rock were melting. The amazing thing is that this particular mineral contains enough uranium and thorium that it can be dated by electron microprobe by measuring the amount that has decayed to lead. Williams found that zones 1 and 2 in the middle of this grain are about 1,160 million years old, but the next part of the same grain, zones 3, 4, and 5, are a hundred million years younger. This very tiny grain indicates that the rock melted twice, separated by a large gap in time, and all this history is preserved in a grain 50 microns across. Wonderful!

From practical to esoteric, fantastic to mundane, instantaneous to prolonged, continental to microscopic, geoscience runs the gamut of human imagination.

And with that final attempt at philosophy, it's time for me to wrap up my sixth and final President's Message. It has been an honor to serve the Geological Society of Maine. My greatest accomplishment as president is to leave the leadership in the hands of Sarah Hall, who is already leading us with energy and enthusiasm. I hope to see you on November 9th to find out what's next.

Henry Berry, GSM President
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Williams, Michael L., et al., 2018, Migmatites of the eastern Adirondack mountains: New constraints on the timing, petrology, and tectonic setting of partial melting: In Grover, Tim, and Mango, Helen, editors, Guidebook for fieldtrips in New York and Vermont, New England Intercollegiate Geological Conference, Castleton University, Vermont, Trip A1, p. 1-34. Figure 11a used here by permission.

VICE PRESIDENT'S MESSAGE

Geoscience education in Maine survey

Survey Link:
<https://goo.gl/forms/JNwOvq2Oz89GsRA32>

As part of its core mission to promote geologic education, the Geological Society of Maine is interested in documenting components of geoscience education through a brief survey of workers

throughout the geoscience sector. By "geoscience" we mean to include broad topics in earth and environmental science. We would like to identify some of the opportunities and challenges within our present configuration of geoscience education initiatives and also to identify specific needs from the different sectors of the geoscience community. For example, what materials, infrastructure, and expertise do educators need? What skills and content knowledge do future employers need? While this is a large topic, we hope that this ~10-15 minute survey will aid us in collecting some baseline data from the diverse geoscience sector in Maine in hopes of broadening the conversation and inspiring action in the near future. These data will be used to frame future meetings and workshops. Preliminary data will be presented and discussed at the November 9 GSM meeting in Augusta.

Thank you very much for your participation!

Sarah Hall, GSM Vice 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:

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

2019 SPRING MEETING ANNOUNCEMENT

April 5, 2019
University of Maine at Presque Isle

The University of Maine at Presque Isle welcomes all the Maine geological community to

northern Maine on April 5 for the 2019 Spring Meeting of the Geological Society of Maine. We are pleased to host this important annual meeting featuring student research presentations.

Chunzeng Wang
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David Putnam
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Kevin McCartney
kevin.mccartney@maine.edu

2019 SUMMER FIELD TRIP ANNOUNCEMENT



Elbaite (variety of tourmaline), Havey Quarry, Poland, Maine. Jeff Scovil photo.

Plans are underway for the 2019 Summer Field Trip. We will be heading to the world-renowned pegmatite district of western Maine. We are planning stops at some of the most famous granitic pegmatites and mineral localities, in conjunction with the Maine Mineral & Gem Museum in Bethel. Continuing with the mineral theme, the trip will also include a visit to the museum to see their outdoor rock garden of Maine specimens, their indoor mineral exhibits and displays, as well as a tour of their analytical facilities. A photo of Maine gems from the MMGM collection is included here to whet your "apatite." We also have in mind a set of surficial, bedrock, and hydrogeologic stops highlighting recent work along the Ellis River Valley. At the Fall GSM meeting, we will discuss elements of geoscience education that we hope to

incorporate in next summer's field trip. Stay tuned to the GSM website and Facebook page for dates and details!

NEWS FROM THE STATE GEOLOGIST

Mineral exploration core rescued!



While attending a geological meeting in Presque Isle a few years ago, Fred Beck approached me brimming with excitement. "I just found something I've been seeking for the past 20 years!" he said. "What's that?" I asked. In answer, Fred reached into his bag and pulled out several short sections of drill core. What Fred had rediscovered in nearby Easton were thousands of boxes of drill core from mineral exploration drilling at Mount Chase and Ore Mountain, among the most significant ore bodies in Maine. With this rediscovery began a several-years-long effort to carefully inventory and move the core to a permanent, secure location.

In the late 1970s and early 1980s, Getty Mining Company carried out a mineral exploration program in the vicinity of Mount Chase near Patten, seeking base and precious metal deposits. In the first borehole at a depth of 134 feet, the drill intercepted over 20 feet of massive sulfide, with zinc grades to 2.90% – the initial discovery of the Mount Chase deposit (now called Pickett Mountain by the new owner, Wolfden Resources Co.). A total of about 100 holes were drilled over the next few years to

prove out the distribution and tonnage of the deposit, reported then to be 2.4 million tons grading 11.3% zinc and 4.8% lead. Nearly 100,000 feet of drill core were carefully placed in cardboard boxes, ten feet of core to each, and stored for later examination. After Getty left the project and through several changes of ownership, the cores remained in warehouses at the Huber manufacturing plant in Easton, their whereabouts long forgotten by those involved with the project. Huber, having sold the mineral rights to both the Mount Chase and the Ore Mountain properties, no longer had any interest in the cores they had been storing for 30 years.

At the time Fred rediscovered these drill cores, time, weight, and weather had taken their toll on the boxes and their contents. While cardboard core boxes stacked carefully no more than three feet high on pallets, protected from the elements, and secured in a rodent-free setting might have an indefinite lifespan, changing just one of these conditions can lead to catastrophic loss. Unfortunately, at the Huber warehouses all three of these conditions were compromised. Pallets were staked pallet upon pallet upon pallet, the boxes in the bottom layer succumbing via simple shear to the weight above, spilling their contents irretrievably. Over the decades, a few sections of roof and walls had torn away, exposing the boxes to the ravages of the elements. And a few animals had made comfortable homes among the boxes. The prospect of sorting through the mayhem to retrieve intact core was daunting, to say the least!

With funding from the National Geological and Geophysical Data Preservation Program administered by the USGS, with enormous assistance from managers at Huber, and with free space offered by the Presque Isle Industrial Council, we plunged once more into the breach! Prof. Chunzeng Wang from U Maine PI spearheaded the project to bring the cores home. With an able crew of students lead by Caleb Ward (see photo at the end of the newsletter), the cores at the Huber warehouses were systematically triaged – those intact boxes that would be moved, those that required TLC to recover, and those that were lost.

Over the course of several months this summer, the core boxes were carefully extracted from the jumbled disorder, organized by hole number, and

restacked on pallets. Once a load of pallets was ready, they were shipped via flatbed to the storage building in Presque Isle, and restacked onto new core racks by the same crew. In all, some 11,000 boxes of core were moved. At about 20 pounds per box, that's 110 tons of core that were moved and restacked. With a minimum of two lifts per box (onto pallet and off pallet) each team member moved about fifty(!) tons over the course of the summer! I advise against challenging any of them to an arm wrestling match!

While perhaps not the most convenient to access due to the goal of recovering as much valuable core as possible, the current storage is secure, out of the weather, boxes are not overloaded, and the space is rodent-free (we hope!). Very special thanks are due to Jim Reed and employees (Huber Engineered Woods, LLC) for donated forklift work that was essential to the success of the project; to Tom Powers (Presque Isle Industrial Council) for free storage space and forklift services; to Fred Beck for his determination to locate the core and guidance during the project; to Chunzeng Wang for hours of donated effort to keep the project on task and on schedule; and to the students who reported to work faithfully each day. This project has been a superb example of Maine's can-do spirit!

Robert G. Marvinney, State Geologist
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2018 SUMMER FIELD TRIP SUMMARY

Conglomerate, Jasper, and Rainbows

The 2018 Summer field trip was a wonderful experience—thirty-five people spending two days together in the North Maine woods, blissfully free of cell phones and email. We saw geology of part of the State that most of us had never even visited. We met in the Ashland District School parking lot Friday afternoon, trying to ignore the sheets of rain pelting our umbrellas and the brilliant flashes of lightning overhead as Prof. Chunzeng Wang checked off the 35 names on the soggy registration list. By the time we had climbed into the three vans and made our way

along dirt roads to Rowe Lake, about an hour from Ashland, the clouds had slowly lifted and the rain stopped just in time for us to set up tents. The accommodations were simply beautiful. We thank our host, Chuck Johnston for letting us camp on his lakeside property, and for the geology staff and students of UMPI for preparing the ground for us in advance. Bob Johnston did a masterful job preparing evening meals for us, as he has done for many GSM field trips over the years. As we mingled around the fire pit Saturday evening, it was a nice touch for Chunzeng to have scheduled a rainbow to appear over the lake.

Chunzeng, Dave Putnam, and Steve Pollock showed us an abundance of geology and geoarchaeology. A central part of the trip was recognizing the Rowe Lake Conglomerate, that many of us saw after dinner the first evening by strolling along the lake shore. It's a very thick unit of conglomerate with light colored clasts of tuff. The new mapping has shown it to be much more extensive than was known at the time of the 1985 State bedrock map, and it forms a northeast-trending belt that divides the Ordovician volcanic rocks into western and eastern parts that are different. We spent much of the trip looking at examples of the various volcanic and sedimentary rocks in the units being mapped by Chunzeng and Steve and students. Pillow basalts, cherts, tuff, phyllite, slate, melange, and various conglomerates. One particularly spectacular outcrop we saw Sunday morning is a volcanic breccia with large blocks of jasper, a red, hematitic chert commonly interpreted as an exhalative seafloor deposit associated with mineral deposits. As the new maps are completed they will be published by the Maine Geological Survey. The first one, of the Round Mountain quadrangle, is already available. It can be viewed online at:

https://digitalmaine.com/mgs_maps/2068.

Because of the abundance of chert and tuff in this area, there are many archaeological sites, some of which we visited as stops on the trip. On Saturday evening back at camp, we had a special demonstration by Dick Doyle who showed us how to flake tools from pieces of chert that he had picked up at one of the outcrops during the day. It was a remarkable connection of the geology to the archaeology happening before our eyes.

Thanks to the field trip leaders for their willingness to lead such an ambitious trip with its extra logistical planning, and to the participants who all came prepared to live comfortably with enough food, clothing, shelter, and beverages to enjoy a long weekend in the North Maine Woods.

See field trip photos taken by Chunzeng Wang at the end of the newsletter.

Henry Berry, GSM President
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OBITUARIES

Robert G. Doyle, 1926 - 2018

On August 13, 2018, the Maine geological community lost yet another large personality – Robert G. Doyle. Bob hailed from Boston where he earned a degree in geology from Harvard, and then worked as an economic geologist in South America before joining the Maine Geological Survey in the late 1950s. He first applied his expertise in economic geology to the compilation of a series of mineral resource maps in 1959. In the summer of that year, Bob assumed the role of State Geologist, a position he held into 1978.

During his tenure, the Maine Geological Survey continued programs in basic geological mapping and expanded the mineral resources program in response to the exploration frenzy that led to and followed the opening of metallic mineral mines in coastal Maine. In August of 1968, Bob attended the International Geological Congress in Prague to promote Maine's economic geology, but after a few days of meeting the conference was abruptly canceled when the Soviets invaded Czechoslovakia. In a Bangor Daily News article at the time, Bob noted that the Czechoslovaks were "very protective" of the delegates and saw to their safety.

Among Bob's many achievements in his 20 years at MGS were the more than thirty reports and maps that he authored or co-authored, many focusing on the detailed geological context of Maine's mineral resources. Perhaps his crowning achievement was his oversight of the project to compile the

Geologist Safe, Well

(Continued from Page 1)

at some Russian tanks, and fires had broken out in Prague. Doyle, who is director of the Division of Science and Technology of the Maine Department of Economic Development, said Russian delegates at the International Geological Congress moved Thursday for adjournment, and he presumed the congress had been cancelled. The conference originally scheduled to last two weeks, opened earlier this week attended by 1,000 delegates from 90 countries.

Doyle said the Czechoslovaks had been "very protective" of the delegates and had seen to their safety.

Dr. Russell said his son had telephoned him from West Germany to say that he would try to return to his embassy post in Prague Saturday.

Theodore Russell and his wife, Sarah, had left Prague earlier in the week to take their eldest son, who is 4, to a hospital in the Bavarian city of Nuernberg. The younger boy had stayed behind.

A Columbia University specialist on Communist affairs said at his summer home at Northeast Harbor Thursday that the United States should retaliate against Russia for invading Czechoslovakia. He called the invasion an act of "international gangsterism."

Prof. Zbigniew Brzezinski said in a telephone interview that Americans could invoke econo-



ROBERT G. DOYLE
(1958 photo)

mic measures against the Soviets as well as cancel the new U. S.- Soviet air agreement.

Yet he warned that Americans cannot be "fanatically anti-Communist."

"We must try to build bridges to Russia and the Iron Curtain countries," he said. "This is the only way we can eventually bring them back to civilization."

NEED SIDING?

Call Or Write
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Tel. 942-7151 — 942-3886

throughout the region. Bob remained a frequent visitor to the MGS offices up until shortly before his death, always managing to ferret out the time and location of the annual Christmas party!

Robert G. Marvinney

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Thomas Eastler, 1944 - 2018

Dr. Tom Eastler, recently retired Professor of Geology at the University of Maine Farmington, passed away at the end of August. Tom was a longtime faithful and enthusiastic supporter of the Geological Society of Maine, and of so many other things having to do with geology, society, and Maine. A heartfelt reminiscence by his daughter is posted online at:

<http://www.dailybulldog.com/db/obituaries/thomas-eastler-august-30-2018/>

The following tribute was contributed by Bill Berry for the GSM newsletter.

A Tribute to Tom Eastler

In the Spring of 1974, the University of Maine at Farmington announced the creation of a new faculty position in geology. A person with strengths in Structural Geology, Sedimentation, and Paleontology. Most of the numerous applicants emphasized their past and proposed future research.

One applicant, an Air Force Reservist just completing his active duty, emphasized his desire to teach undergraduate students in a small New England college. The fit seemed perfect and Tom Eastler was hired. UMF did not at first realize the gem that they had hired. His mentor in graduate school was Marshall Kay, he had working relationships with Tuzo Wilson and Niles Eldredge, and was a research expert in ground penetrating munitions in the Air Force. What an outstanding background to teach undergraduate students. In addition, Tom had the personality to inspire and motivate students.

At the time, UMF was only known as a stepping stone to graduate studies in Education. Tom helped change that to include geology and the other

Preliminary Geologic Map of Maine published in 1967. This was the first truly modern map that presented Maine's bedrock in a consistent and integrated manner statewide at a scale of 1:500,000. To accomplish this enormous task, Bob strengthened and expanded collaborations with academic and federal geologists, dozens of whom contributed to the map.

As large bureaucracies are wont to do, during the Doyle years the Maine Geological Survey was shuffled from one institutional setting to another no fewer than four times as each administration sought "organizational efficiencies." Bob did well to preserve the Survey's programs and in 1973 guided the Survey's inclusion into the newly formed Department of Conservation.

After leaving MGS, Bob introduced dozens of students to Maine geology through courses he taught at the University of Maine at Augusta. He was a frequent participant in GSM and NEIGC fieldtrips, last leading a trip for the latter in 2000. He also indulged his archaeological interests, identifying the source materials for and distribution of stone tools

sciences. His former students with advanced degrees are currently working in industry, business, educational, and government positions (local, state, and federal). He introduced cutting edge computer technology into his classes. He strongly believed that geology was to be seen. This led to local and regional field trips, course trips across the country and Newfoundland, and many photos in the classroom. His course in Terrain Analysis became a must for related fields such as Geography, Biology and the Ski Industry Program.

Tom and I worked together for 22 years. It was pure joy. He was the most knowledgeable person I have ever had the privilege to work with. We never had a disagreement and always supported one another's ideas. Our students seemed to appreciate that we were on the same page. He has been a true friend for the past 44 years.

In addition to his academic duties at UMF, Tom created an Ice Hockey Club which he also coached. He also reintroduced race walking to the regional and State High School track and field events. His coaching in race walking resulted in Olympic Games participation.

During his tenure at UMF, he continued an active research role with the Air Force and Defense Department. Thus, he was continually traveling to Washington, DC, and research labs throughout the country. Tom, from day one, was very active on the environmental scene from general conservation, composting, and recycling to harassing McDonald's about plastic use. Tom has worked with Boy Scouts, was for many years on the Town Planning Board, and participated on a number of State Boards.

His passing will create a major void in the lives of the many people that Tom touched. His outgoing personality, knowledge, and sincerity was appreciated by all. We will miss him.

Archie W. "Bill" Berry, Jr., Professor Emeritus
University of Maine at Farmington

NEWS FROM THE CAMPUSES

Unity College

Hi Folks,

The Earth and Environmental Science Program at Unity welcomed another large cohort of majors to campus in late August – bringing the number of majors and minors to almost 40, the most we've ever had! Needless to say, us faculty are rather busy getting students adjusted to life in the major, assigned to research projects, trained for field and lab work, and more. Examples of ongoing student research projects include water quality in lakes and streams, infiltration/inflow of sewer lines and dye tracing, soil testing, microplastics in waterways, hydrologic modeling, and more. Our graduates from last year have gone on to secure jobs at the USGS and in private consulting. Several current students spent last summer working at the Maine Forest Service, US Forest Service, and the USGS. On another note - thanks to everyone who traveled to Unity in April for the GSM Meeting – even with a little late snowfall all went well!

Kevin Spigel
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College of the Atlantic

The Acadia National Park Science Symposium will be hosted at COA on Oct 20, 2018. The symposium will provide a forum to hear about science taking place in the region and to interact and build collaborations with scientists, students, park staff, and others working in a range of fields.

Sarah Hall
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MEMBER NEWS

Charlotte Lehmann

(M.S. UMAINE 1991) has been serving the Unitarian Universalist Church of Tallahassee (FL)

for the past two years as their interim minister. During this time she has been exploring Florida's coastal environs and karst topography, because she is not just a life-long UU, but also a life-long geologist. In October 2017, Charlotte was ordained as a minister by the First Universalist Church in Auburn, Maine, and in June 2018 she was called by the Bull Run UU Congregation in Manassas, VA to serve as their next settled minister. She moves to Manassas in August to begin her ministry there. Rev. Charlotte is looking forward to exploring the geology of the Piedmont and the Blue Ridge Mountains in her free time.

Charlotte Lehmann
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A Beach Too Far



Mr. Gerber introducing the field trip to the East Side Paleo-beach "beach too far."

In July 2015, the Geological Society of Maine conducted a three-day field trip on Isle au Haut, located in easternmost Penobscot Bay, the Gulf of Maine. During the field trip one of the presenters, Robert Gerber, took the group on a hike to the location of an ancient beach far above current sea level on the east side of the "mountain range" spine of Isle au Haut.

This East Side Paleo-beach is defined by large rounded boulders up to 16 inches in diameter that reveal the beach to have been a high-energy wave beach. It covers nearly a half-acre in the middle of

the woods. Yet this beach is 231 feet above current sea level. All the boulders are of the same granite.

Mr. Gerber explained that when he first saw the boulders he thought for a moment that a farmer had piled them up after having cleared a field, but quickly realized that was not a realistic conclusion. It was a beach, a relic of the Pleistocene epoch, that lasted from about 2,588,000 to 11,700 years ago, spanning the Earth's most recent and repeated glaciations. More than a dozen major continental ice sheet events occurring during the Pleistocene epoch have been identified, as well as many minor occurrences. The boulders had to have been rounded and deposited sometime during the retreat of the Pleistocene epoch's last continental Ice Sheet.

Mr. Gerber mentioned having found an old geological survey of Maine that had been conducted by George H. Stone. In 1899 the United States Geological Survey (USGS) published Mr. Stone's survey, which included his identification of the East Side Paleo-beach.

The East Side Paleo-beach is in the Acadia National Park section of Isle au Haut and can be reached by the Park's Long Pond Trail. The trail crosses the East Side Paleo-beach a half mile from the Isle au Haut road.

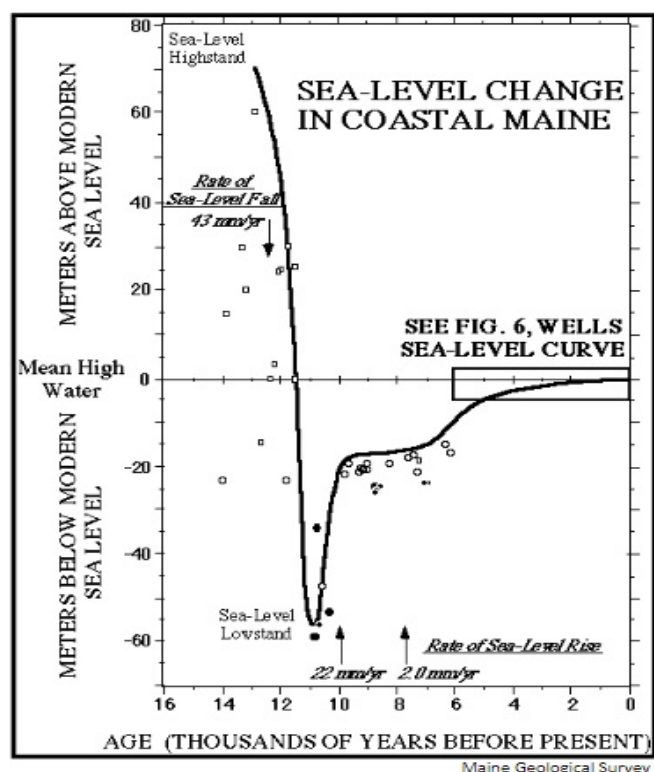
The boulders are 8 inches to 20 inches in diameter, tightly packed in a long wide layer forming a level shelf oriented along a north-south axis. They are rounded, having once been subjected to powerful water action. The beach is 175 feet long, up to seventy feet wide, and has a north/south axis.

Looking at the beach for the first time one can't help wonder:

- When was it formed?
- Why here?
- How long did it take to form?
- What was the source of the boulders?
- Why has no vegetation grown on the boulders?

The following is an attempt to answer some of these questions.

The dating of the East Side Paleo-beach's formation is developed from two sources. The first source is a graph of Maine's coastal sea level from 16,000 years ago to the present. The graph is result of the research by Professors Joseph T. Kelley, Daniel F. Belknap, and Stefan Claesson, Department of Earth Sciences, University of Maine.



The second source is a deglaciation map of the State of Maine by John Barker and Dr. James Aber with time contour lines showing the leading-edge positions of the retreating ice sheet.

At the height of the last Ice Age the continental Laurentide Ice Sheet covered the State of Maine and reached out 150 miles across the Gulf of Maine onto the continental shelf. At Isle au Haut the ice reached a thickness of approximately 1.3 miles. On the Maine coast the tremendous weight of the vast ice sheet depressed the crust of the earth as much as 500 feet. At the end of the last Ice Age the Laurentide Ice Sheet retreated northwest from the continental shelf back over Maine. The ice sheet had locked up a great quantity of water, which lowered sea levels worldwide. Its eventual melting back released large amounts of water, which raised sea level.

Rebound of the earth's crust began at Isle au Haut when the front of the ice sheet had melted back to the island. Rebound would not be near completion until the ice sheet had melted back approximately 110 miles from Isle au Haut. The rate of rebound starts very slowly, then increases sharply, and slows again toward the end. After the ice sheet retreated past Isle au Haut, rebound took place gradually over two thousand years. The melting ice sheet raised sea

level much faster than rebound occurred. As a result, the Maine coast flooded inland beyond the city of Bangor. Today the rebound in Maine is over 99% completed.

The formation of the East Side Paleo-beach took place immediately after the ice sheet melted back from Isle au Haut. Using the State of Maine deglaciation map, we can estimate that the ice sheet had retreated to just northwest of Isle au Haut 14,000 years before present; this date coincides with the Maine Relative Sea Level graph that shows sea level at 230 feet above current sea level 14,000 years ago.

So how long did it take for the East Side Paleo-beach to form? A clue is found on a visit to Hurricane Island just ten miles west of Isle au Haut. Hurricane Island had been quarried for granite from 1870 to 1914, and the south shore is littered with granite blocks and piles of angular granite cobblestones. On Hurricane Island's southeast side beach there are rounded granite cobbles six inches diameter. If cobbles could be rounded on the Hurricane Island beach in less than 120 years, then perhaps the boulders of Isle au Haut's high-energy East Side Paleo-beach might have been similarly rounded during the same time period.

Where did the East Side Paleo-beach boulders come from? Geologists think the ice sheet moved across Isle au Haut from the northwest to the southeast. Isle au Haut has a granite mountain spine with a north/south orientation directly above East Side Paleo-beach. As the ice sheet grew over the mountain's spine, it may have ripped granite blocks from the top and dropped them at the East Side Paleo-beach location. The large blocks initially would have been angular with sharp edges, but strong wave action would be sufficient to work the large boulders into rounded shapes.

Why did the East Side Paleo-beach form at this particular location along Isle au Haut's 231-foot-high Pleistocene shore line? Mr. Stone, in his 1899 Geological Survey of Maine report, answered this question: The east side of Isle au Haut is fully exposed to the open ocean and winter storms. The deep gully topography at the East Side Paleo-beach location would have concentrated high-energy wave action into the head of the gully. This action worked to round the boulders, thereby creating the formation of the East Side Paleo-beach we see today.

On Isle au Haut the shoreline area known locally as Boom Beach is also located on the east shore. It is directly southeast of our East Side Paleo-beach. Boom Beach is 600 feet long and 200 feet wide. It consists exclusively of eight- to sixteen-inch rounded boulders; it is clearly a high-energy beach. Isle au Haut's mountain spine may be the source of boulders on Boom Beach as well.

Finally, why has no vegetation grown on the boulders and covered them? As the ice sheet moved over Isle au Haut, it initially scraped away the topsoil down to the bedrock and then polished the bedrock. The subsequent Pleistocene beach, formed after the ice sheet retreated, is a collection of boulders piled up to a large depth. Over the past 14,000 years, soil has not been able to accumulate enough to reach down to bedrock to enable vegetation to take root.

The coast of Maine endured an ice sheet 1.3 miles thick, had its topsoil removed and its bedrock polished, and has been flooded by the ocean, finally emerging to what we see today. Standing on the East Side Paleo-beach, you can imagine before you the amazing story of the natural events that unfolded 14,000 years ago.

Paddy Trainor, Vinalhaven Geological Society
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SECRETARY'S REPORT

GSM held no formal business meeting since the latest Secretary's Report (provided in June 2018). There are no minutes to report at this time.

The Executive Council (EC) met on July 27, 2018. Agenda items included approving the new dues rate schedule as discussed during the 2018 spring meeting, establishing a formal endowment fund for the Anderson Fund, updating the GSM website, identifying candidates for EC positions, and planning for the 2018 fall meeting. The EC took the following actions (moved, seconded, and approved):

1. Following the presentation at the 2018 spring meeting and the article in the June newsletter, the following annual dues rates are approved, to be effective September 1, 2018: Regular member \$30, Associate member \$15, Student member \$5.

2. GSM will establish an endowment account with Bath Savings Trust Company for the Walter Anderson Geoscience Education Fund (the Anderson Fund) using existing funds, and addition additional funds as they are raised through the endowment campaign.

Respectfully submitted,

Lisa Jacob, GSM Secretary
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TREASURER'S REPORT

Fiscal Year August 1, 2017, to July 31, 2018

	Actual
Income	
Dues Paid	\$3190.00
Donations to Anderson Fund	\$910.00
<i>Other Income</i>	
Field Trip 2018 registrations	\$290.00
Book sales, Hussey, Geology of SW Maine	\$30.00
Subtotal	\$4,420.00
Expenses	
Postage Stamps	\$20.00
Printing and Mailing of Annual Dues letter	\$173.07
Annual Corporate Report (years 2017 & 2018)	\$70.00
<i>Meeting Expenses</i>	
Fall Meeting 2017	\$1,513.00
Spring Meeting 2018	\$1,008.02
Name Tags	\$6.85
Cost of engraving plaques for Spring Meeting	\$40.68
Summer Field Trip 2018	\$408.84
<i>Anderson Fund Awards</i>	
Research Grant Gemma Venuti College of the Atlantic	\$750.00
Research Grant: Damien LeFavor – Wichita State U.	\$500.00
UMO Geology Club field trip – Iceland	\$750.00
Web site expenses	\$80.20
Subtotal	\$5,320.66
Net Decrease	-\$900.66

End of Year Asset Summary July 31, 2018

Account	Sub-Account	July 31, 2018
General Fund		
	Business Savings	\$26.84
	Checking	\$4,272.57
	Total	\$4,299.41
Anderson Fund		
	Business Savings	\$10,755.62
	2 Certificates of Deposit	\$11,061.78
	Total	\$21,817.40
Total Assets	All Funds	\$26,116.81
Liabilities¹		\$0.00

¹ As yet uncleared checks.

Respectfully submitted,

Bruce E. Hunter, GSM Treasurer (2018)
bruce.e.hunter@gmail.com

UPCOMING EVENTS

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Organizer</u>
November 4-6	Exploration, Mining and Petroleum Conference	Fredericton, New Brunswick, Canada	New Brunswick Department of Energy and Resource Development
November 9	2018 GSM Fall Meeting	Augusta Civic Center	Sarah Hall
December 10-14	American Geophysical Union Fall Meeting	Washington, D.C.	AGU
2019			
March 1	Anderson Fund grant proposal deadline		
March 17-19, 2019	2019 Geological Society of America Northeastern Section 53 rd Annual Meeting	Portland, Maine	Steve Pollock
March 28	2019 Maine Sustainability & Water Conference	Augusta Civic Center	Senator George J. Mitchell Center for Sustainability Solutions
April 5	2019 GSM Spring Meeting	UMaine Presque Isle	Chunzeng Wang David Putnam Kevin McCartney
May 10-12	7 th Annual New England Mineral Conference	Sunday River, Newry	New England Mineral Association
May 12-15	GAC-MAC Annual Meeting 2019	Québec City Convention Center	Geological Association of Canada – Mineralogical Association of Canada

PHOTOS



Adam Weyeneth, Sarah Swain, Dylan Damboise, and Caleb Ward with the first rack of cores at the Presque Isle airport.



2018 GSM Summer Field Trip: Part of the lakefront tent settlement at Rowe Lake. Photo Chunzeng Wang.



2018 GSM Summer Field Trip: Rainbow over Rowe Lake at Saturday dinnertime. Photo Chunzeng Wang.



2018 GSM Summer Field Trip: Sunday lunch on Amanda's Ledge, bedded tuff. Photo Chunzeng Wang.



2018 GSM Summer Field Trip: Field trip participants at Rowe Lake. Photo Chunzeng Wang.

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:

2018 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	\$ _____	Name _____	Make checks payable to: Geological Society of Maine Bruce Hunter, GSM Treasurer 44 Old Fairgrounds Rd Readfield, ME 04355
Institutional Members	\$ 30.00	\$ _____		
Associate Member	\$ 15.00	\$ _____	Address _____	
Student Member	\$ 5.00	\$ _____		
Contributions to GSM		\$ _____		
(please write gift or fund on check)				
TOTAL ENCLOSED		\$ _____		

Email Address _____

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

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:

THE GEOLOGICAL SOCIETY OF MAINE
c/o Amber Whittaker, Newsletter Editor
Maine Geological Survey
93 State House Station
Augusta, ME 04333-0093
amber.h.whittaker@maine.gov

2018/2019 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

President	Henry Berry	(2018)	Maine Geological Survey, henry.n.berry@maine.edu
Vice President	Sarah Hall	(2018)	College of the Atlantic, shall@coa.edu
Secretary	Lisa Jacob	(2018)	Sevee & Maher Engineers Inc., lj@smemaine.com
Treasurer	Bruce Hunter	(2018)	Maine DEP, bruce.e.hunter@gmail.com
Newsletter Editor	Amber Whittaker	(2018)	Maine Geological Survey, amber.h.whittaker@maine.gov
Directors	Steve Kelley	(2018)	Haley & Aldrich, skelley@haleyaldrich.com
	Martin Yates	(2019)	University of Maine, yates@maine.edu
	Mike Deyling	(2020)	CES, Inc., mdeyling@ces-maine.com
Historian	Fred Beck	(2018)	F.M. Beck, Inc., fmbeck@fmbeck.net



Geological Society of Maine Fall Meeting – Nov 9, 2018 Augusta Civic Center

*Before the meeting, please take the Geoscience Education in Maine survey for our discussion at the end of the afternoon: <https://goo.gl/forms/auIdqWCZoSBfCpzu2> Thank you!

11:00-12:00: GSM Executive Council Meeting

Geoscience Education in Maine

12:30-12:45: Registration

1:00-1:20: GSM Annual Business Meeting. Election of officers, Treasurer's Report, other business

1:20-1:40: Welcome and Opening Remarks

1:40-2:30: Existing resources for educators. These talks highlight some ways independent organizations and government agencies are involved in education of Maine students through providing workshops, teacher trainings, educational resources, and funding opportunities as well as new plans, data, or policy on the horizon.

- 1:40-1:55 – Deborah Shulman and Marina Van der Eb, RiSE Center, UMaine.
Research-supported Earth Science instructional resources, content support, and professional learning through the Maine STEM Partnership at the RiSE Center (UMaine)
- 1:55-2:10 - Shari Templeton, Maine Department of Education. *Geoscience in Maine Science Standards*
- 2:10-2:25 - Cassaundra Rose, American Geosciences Institute. *AGI: a platform for education and information resources from across the geosciences*
- 2:25-2:27 – Keith Taylor, C.G., St. Germain Collins. Announcement about National Association of State Boards of Geology (ASBOG)

2:30-2:50: Higher Education. This talk will highlight how faculty in higher education are engaging undergrads and grads in Maine-focused research in and outside of the classroom.

- 2:30-2:45 - Chris Gerbi, University of Maine. *A university perspective on geoscience learning*

2:50 -3:10: Break/Refreshments

3:10-3:40: K-12 Education. These talks will highlight some examples of how faculty in K-12 institutions are engaging students in research projects and geoscience content outside the classroom and beyond traditional teaching methods.

- 3:10-3:25 - Ed Lindsey - Old Town High School. *Getting numbers from a landscape*
- 3:25-3:40 - Patti Millette, Blue Hill High School. *Can Students Believe That They Are Actual Research Scientists?*

3:40-4:15: Community engagement. These talks will highlight some ways Maine geoscientists are engaging with students, teachers, or the wider public as well as introduce a few local groups currently providing infrastructure and expertise to support educators and facilitate continued learning beyond the classroom.

3:40-3:55 - Jeff Morrison, Havey Mine, New England Mineral Conference (NEMC).
The Havey Mine

3:55-4:15 - Roland Charles, Myles Felch, Jim Chandler, Maine Mineralogical and Geological Society (MMGS). *High School and Middle School Resources*

4:15-5:00: Participant Workshop. GSM members will be encouraged to share their experience and needs with respect to geoscience education in a facilitated discussion/brainstorming session.

4:15-4:20: - Geoscience Education in Maine Survey results*: preview and discussion prompt * <https://goo.gl/forms/auldqWCZoSBfCpzu2>

4:20-4:40: Small group discussion

4:40-5:00: Groups report out to full group

5:00-6:00: Closing and Social hour

Goals:

- 1) Identify and connect people interested in collectively working on geoscience education initiatives (collaboratively with other Maine-based groups: MMGS, MMGM, NEMA, RiSE Center, etc.)
- 2) Plan for an education or educator training component to the GSM summer 2019 field trip to western Maine.

