THE MAINE GEOLOGIST

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

February, 2004
Volume 30
Number 1

THE PRESIDENT'S MESSAGE

Fall Meeting 2003. Thank you again to all the speakers for their very interesting and informative presentations on the current uses of geology within the private sector. Steve Kelley (URS) spoke about his work at an out-of-state superfund site, formerly a massive mining operation. Liz Champeon (S. W. Cole) focused on ways in which wastewater can be disposed of as snow. Jim Hillier (Hillier and Assoc.) introduced a new project his company has started relating to bathymetric studies of lakes. Allen Gontz (UM) explored how geophysics can be used in marine studies, including discovering shipwrecks and other potential underwater archeology opportunities. Rudy Rawcliffe (Northeast Geophysics) presented ways in which geophysical data can be used to pinpoint water sources, and Alice Kelley (UM) delivered the keynote address on geoarcheology in Maine. Thank you as well to S.W. Cole for bringing and setting up the great display of American Society of Civil Engineers (ASCE) posters which highlight some of the more innovative uses of engineering throughout the state each year. The meeting provided a great opportunity for all of us to become better acquainted with the newest science and technologies being used in the private sector. Thanks again to the presenters for making it such an interesting meeting. I know that we are all looking forward to the next consultants' forum.

New Officers. Two new officers were unanimously elected to serve during the 2004 to 2006 interval. Rob Peale (DEP) was elected to replace Liz Champeon as GSM's current Treasurer. Sean Dougherty (DEP) was elected to replace Pat Seaward as GSM's Secretary. Pat wasn't able to completely remove herself from GSM, however, and now serves on the Nominating Committee with Marita Bryant (Bates) and Tom Weddle (MGS; GSM Vice-President). Many thanks to Liz and Pat for doing such a great job over these past years, and to Rob and Sean for agreeing to carry forward.

Revised Bylaws. The revised bylaws were presented at the Fall meeting and met with unanimous approval. They are listed within this Newsletter and may also be found on GSM's website, www.gsmmaine.org. For the most part, the revisions consisted of incorporating past approved changes into the written document.

Spring Meeting. Irwin Novak, Dept. Chair of the Geology Department at USM, has graciously offered to host the upcoming Spring Meeting. The meeting will be held April 9th (Friday). Bob Nelson (Colby College) will be delivering the keynote address based on his recent trip to Ecuador: *Ecuador and the High Andes: Analogs for the Silurian of Northern New England.* More details on the meeting will be posted on the website shortly. Hope to see you all there.

Summer Meeting. Back by popular request, GSM and GSNH are running another joint field trip this summer. The trip is scheduled for the weekend of July 24th in the Lebanon, ME and Milton, NH region. Peter Thompson has been mapping the bedrock in that area and has graciously offered to give us a preview of his NEIGC fieldtrip. More details regarding lodging and agenda will be posted in the near future on the GSM website.

Fractured Rock Conference. The EPA and National Groundwater Association are hosting an upcoming conference focused on the current state of remediation for groundwater within fractured rock settings and ways in which future remediation efforts can be improved. The conference, which is being co-sponsored by GSM, will be held September 13 –15, 2004 at the Holiday Inn by the Bay in Portland. Details on the conference can be found at www.ngwa.org, as well as at GSM's website, www.gsmmaine.org. Fred Paillet (UM) is acting as the Maine contact and may be reached at FPaillet@maine.edu.

Lisa Churchill-Dickson, President (2002-present)
paleo@gwi.net

THE EDITOR'S MESSAGE:

We give thanks for long and faithful service by Pat Seward as Secretary and Liz Champeon as Treasurer. In addition to their regular duties, they have been much help to me as Editor in keeping the membership addresses straight, dealing with inquiries, and contributing to the Newsletter. They deserve a rest.

Dan Belknap, Newsletter Editor (1998-present)
<belknap@maine.edu>

GSM WEBSITE

www.gsmmaine.org

The GSM website contains copies of present and archived Newsletters, a calendar of events, other items of interest to the Society, including a draft of our new Bylaws to be ratified at the Fall meeting. There are many important links to geology items in Maine and elsewhere.

Webmaster, UMF Senior: Katherine Wills
katherine.wills@maine.edu

(please cc: Dave Gibson - dgibson@maine.edu)

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

UPCOMING SPRING MEETING

Friday, April 9, 2004

Department of Geosciences
37 College Avenue
University of Southern Maine
Gorham, ME 04038

Host: Irwin Novak
Agenda:

1:00 – 4:30	Student talks and posters
4:30 – 5:00	Business meeting
5:00 - 6:00	Social Hour
6:00 - 7:00	Dinner
7:00 - 8:00	Keynote Address: Bob Nelson (Colby College) *Ecuador and the High Andes: Analogs for the Silurian of Northern New England.*

The Spring Meeting of the GSM will be held at the University of Southern Maine, in Gorham on Friday, April 9, 2004. Following our long-standing tradition, this meeting will involve student presentations and posters in the afternoon, and a keynote speaker in the evening. All advisors of undergraduate and graduate students should encourage their students to participate and present their work orally or by poster. There are prizes for both best poster and best oral presentation. Please submit your abstracts as soon as possible, in the format shown below, by e-mail, to:

Daniel F. Belknap
Dept. Geological Sciences
University of Maine
Orono, ME 04469-5790
<belknap@maine.edu>

Abstracts will be compiled and handed out as a Program and Abstracts supplement to the newsletter at the meeting.

Format:

[**Poster** or **Oral** presentation]
DETAILED AND EXPLICIT TITLE, ALL CAPS
LAST NAME, First Name, Department, College, Address, <email.address>
Text of abstract describing the work succinctly, avoiding the form: "it will be shown that" and other fluff phrases. Please limit the abstract to 300 words, using GSA style.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

2004 Friends of the Pleistocene conference, May 21-23

Duane Braun, Bloomsburg University of PA, will lead a trip to examine the late Wisconsinan glacial deposits, deglaciation events, and postglacial stream incision in northeastern Pennsylvania. On the evening of May 21 we will gather at the Colonial Brick Motel in Great Bend to enjoy good cheer, view the recently completed 1:100,000 scale glacial map of the region, and discuss the features that will be visited on the trip. On May 22, in the Great Bend - Starrucca area, we will examine evidence for a regional readvance of the glacier across Glacial Lake Great Bend, the interior of till knobs that form "beaded valleys", and postglacial "one-sided" bedrock gorges resulting from glacial deposit-induced stream derangement. On May 23 we will journey down the New Milford meltwater sluiceway to Tunkhannock Pennsylvania to view evidence for large outburst floods from proglacial lakes impounded in north-draining valleys, and evidence contradicting Shaw's proposed catastrophic floods down the Susquehanna valley.

For further information, e-mail: <dbraun@bloomu.edu>, or contact Woody Thompson (Friends Secretary) at the Maine Geological Survey <Woodrow.B.Thompson@maine.gov>.

THE STATE GEOLOGIST'S MESSAGE

Snow survey critical to flood forecasting

With snowshoes strapped to his feet and long aluminum tubes slung over his shoulder, the gelogist heads into the brush. Tramping around over an acre of land, he pushes the tube into the snow in a number of places, retrieves it, makes a few notes, and moves on. Over the course of the day, he may stop at a dozen sites and repeat the process. What's this all about? The Maine Cooperative Snow Survey. More than a dozen government agencies and private enterprises participate in the annual survey aimed at assessing the condition of the snowpack through the

winter and the critical spring run-off period. In addition to the Maine Geological Survey, the U.S. Geological Survey, the National Weather Service, Canadian and New Hampshire governmental agencies, several paper companies, and several water-power companies participate in this truly collaborative program.

The survey begins in early January with measurements to develop a baseline for the winter. We conduct the second survey of the season in early February. In late winter (that's supposed to be March) we conduct a survey each week until the snow is gone. Surveyors use special aluminum tubes that are calibrated in inches on the outside for snow depth, and have a spring-loaded mechanism on the inside that calibrates the weight of the snow column in terms if equivalent inches of water. Multiple tubes screw together for deep snow. With this mechanism surveyors can determine the depth, water content, and density of snow in very short order in an area. The density is particularly critical since forecasters use it to estimate when the snow might melt. A density over 0.33 is considered "ripe."

Information from the numerous surveyors on each survey is phoned, faxed, or e-mailed to the Maine Geological Survey where we generate maps of the state showing snow depth, water content, and density. The standard series of maps is produced using GIS programs and also includes change in water content since the previous survey, mean water content in drainage basins, and comparisons of the water content to historical values for that date. Within hours of the report from the last surveyor, a set of preliminary maps is posted at the Maine Emergency Management Agency (MEMA) website (http://www.state.me.us/mema/weather/snow.htm). The National Weather Service (NWS) uses the information to prepare flood potential statements and running flood forecast models. In the event of a significant flood, the NWS would use the data to refine its estimates of flood crests. The data are also distributed through MEMA to county emergency management officials. Reservoir managers use the information in planning capacities for spring fill-up. While not the intent of the program, winter sports fanatics also use the information to determine when and where to go in the state to enjoy their activities.

Maine's winters are close to unpredictable and none approach "average." Throughout March of 2001, for example, water content in the snowpack was increasing rather than decreasing, raising well-founded concerns for flooding. April that year had almost no rain and mild weather, producing an orderly run-off. For the 2003-2004 winter season, we probably should have started surveys in December, given its unprecedented snowfall. But in January 2004, northern Maine was not even surveyed due to lack of snow. There is still much left to the winter of 2004! Check the MEMA website frequently for updated snowpack information.

Update on "Geology at the State House"

In the Fall 2003 newsletter, I made a pitch for Geology Day to take place sometime during the Legislative session now underway. Upon further investigation, I found that all appropriate dates were booked well in advance. Therefore, Geology Day will debut in the Hall of Flags during the first regular session of the 122nd Legislature. Mark your calendars for January 18, 2005. I will pull together an organizational meeting for this event during the fall 2004. Stay tuned.

Robert G. Marvinney, Maine State Geologist:
<Robert.G.Marvinney@state.me.us>

GSM SECRETARY'S REPORT

Geological Society of Maine Annual Meeting

November 4, 2003

Elk's Lodge - Augusta, Maine

Lisa Churchill-Dickson called the Annual Meeting to order at 4:30 p.m.

OLD BUSINESS

Website: There have been changes in the Webmaster at UMF; however, all the GSM Newsletters have been scanned, and minutes of all the meetings are available on the website.

Today's program: The purpose of the afternoon program was to draw in the consulting community, as there has been much emphasis on the academic venue in the past few years. Conducting the meeting in mid-week rather than Friday was designed to accommodate the consultants. Lisa would like feedback from anyone having suggestions regarding programming and scheduling that will facilitate the goals of this organization. Summer '03 Field Trip: Lisa issued a formal thank you to Woody Thompson and Lee Wilder for organizing the joint field trip; also to all the folk who led field trips. There is some interest in having another joint meeting with GSNH this summer at a location to be decided. Peter Garrett suggested that we be the host organization this time. Lisa will pursue various suggestions and let us know the results.

Short Course: Held at Bates College on October 15, 2003 during Earth Science Week, the Short Course gave an overview of Maine geology in a very chronological way to an audience of 150 people. The

course was very well received with many requests to repeat on a regular basis. Approximately $4800 was added to the treasury.

Other meetings: NEIGC was held October 10-12, 2003 in Amherst, MA. National GSA is in Seattle this week, and the Stormwater Conference is also today. UNE hosted a conference on Environmental Health on October 24, 2003. Lisa attended and was very impressed with the multidisciplinary approach to human health issues, including but not limited to modeling groundwater, air, toxics to determine effects related to health.

NEW BUSINESS

Checklist of Equipment: Following up the discussion started in the President's Message, October 2003 Newsletter (Volume 29, Number 3), Lisa would like to create a database listing all the scientific equipment located throughout the state. This includes equipment housed at the academic institutions, consulting companies, and Government (State and Federal). Lisa plans to visit folk to begin collecting the information. She also invites individuals/groups to submit articles describing the equipment and how it is used (see article page 4-5 in current Newsletter).

Spring Meeting: Previously Dan Belknap had suggested that the spring and fall meetings be scheduled by regular rotation, but we don't know who is next. Lisa will find out and post the information on the website.

Summer 2004 Field Trip: See discussion under Old Business.

State Geologist's Report: Bob Marvinney followed up on his article in the Newsletter regarding "Geology Day at the State Legislature". Because of term limits, there is a lack of continuity of background knowledge about geology's role in society. The Natural Resources Committee has a good understanding of the issues, but that knowledge doesn't translate well to the legislature as a whole. Bob will find out about the availability of the Hall of Flags for an exhibit, and will be requesting volunteers to help with this endeavor.

Newsletter: Dan Belknap, speaking about format (i.e., 8 - 12 pages), continues to ask for articles from folks about research projects and results, filler pieces ('geopoetry'), and items that would be of general interest. Lisa thanked Dan for all his hard work in keeping the Newsletter viable.

By-Laws: Lisa provided us with a copy of the revised By-Laws and pointed out the areas that had been changed. There actually had been periodic changes published in the Newsletter from time to time, but Lisa felt that all the changes should be reflected in a single document. One typographical error was noted, and the By-Laws were approved as amended by unanimous vote. Dan will publish the finished document in the next Newsletter. Peter Garrett voiced approval of "nice job" for Lisa's diligence.

Nominations: Pat Seaward presented the nominees for the Secretary and Treasurer positions being vacated by Pat Seaward and Liz Champeon, respectively. Sean Dougherty was nominated for Secretary, and Rob Peale for Treasurer. Both Sean and Rob are employed by the Maine Department of Environmental Protection. No additional nominations were added from the floor and both candidates were elected by unanimous vote. Congratulations, and thank you to Sean and Rob for accepting the challenge!

The Geological Society of Maine will subsidize a portion of this evening's meal.

Social Hour 5:00 - 6:00 p.m.

Dinner 6:00 - 7:00 p.m.

Evening Speaker: Alice Kelley, Geoarchaeology
7:00 p.m.

With thanks to Liz Champeon for helping to organize today's meeting, Lisa called for a motion to adjourn at 4:40 p.m.

Respectfully submitted,
Patricia O. Seaward, Secretary (1999 – 2003)
<Patricia.O.Seaward@state.me.us>

Sean Dougherty, of the Maine DEP, is the newly elected Secretary. His term begins in 2004.

The University of Maine's Alice R. Kelley, Instructor and Ph.D. candidate, presented an expanded version of her talk on Geoarchaeology, first delivered at the GSM Short Course on October 15, 2003 at Bates College.

Geoarchaeology, represents the union of the disciplines of archaeology and geology. Archaeology is the study of human behavior through the analysis of cultural remains, and geology is the study of the earth and earth processes. Putting these two areas of study can produce a multitude of definitions, but one of the most applicable definitions of geoarchaeology is using geological methods to address archaeological questions.

Archaeologists turn to geologists to answer many types of questions relating to archaeological sites. These include the geologic setting at the site at the time(s) of occupation, the erosional and depositional history of the site, preservation of the site through time, identification and provenance of artifacts.

Many archaeological sites in Maine are associated with water: coast, lakes, and streams.

Knowing the glacial and relative sea-level history of the region helps to identify where people may have lived in the past, and where to look for potential sites.

The availability of the materials for tools was also a factor in identifying occupation sites, as well as trade and travel routes. Artifacts made of stone (Munsungan chert, Kineo felsites), bone (preserved only in the buffered soils of shell middens), ceramics (glaciomarine clays tempered with sand, shell bits, feathers), and metal (Great Lakes copper) appear at archaeological sites in Maine.

Relative dating techniques, based on stylistic changes, can help place sites in a chronological sequence. Examination of tools and other floral and faunal remains can also provide clues about the lifestyle of the inhabitants.

Native people in Maine were primarily hunters and gathers, moving from site to site as resources and conditions dictated. These sites tend to be smaller in area and artifact distribution, and may be more difficult to locate. In the case of these sites, location is a key to discovery. More recent agriculture-based sites in southern Maine are larger, and also are mentioned in historical accounts from European explorers, making these sites easier to locate.

Geologists utilize many tools to assist archaeologists in finding and studying archaeological sites. Geologic mapping identifies likely landscapes; lake and bog cores contain information as to the development of the stratigraphy, precipitation history, fire history, and pollen records indicating vegetation changes through time. Various geophysical tools offer a non-invasive way to look at the subsurface.

The difficulty in studying archaeological sites is that they are destroyed in the process of excavation. Therefore, meticulous record keeping is paramount as the site is dismantled. The site is first surveyed, then each horizon is photographed and the description recorded. As the excavation proceeds, the sediments are analyzed for color, texture, and chemistry to determine the conditions of deposition. The artifacts are identified with respect to lithology to determine their provenance, production technology, and evidence of wear or use. Once excavated, the sites are gone. All that remains are the artifacts and the records.

It is important to remember when working at these sites, we are uncovering the history of the native people who still live in this region. All work needs to be done with appropriate professionalism and sensitivity to cultural differences. This is particularly true if a burial site is encountered. Be sure to stop all work if human bones are found, to comply with regulations, but also in deference to the native communities who view these sites as the burial sites of their ancestors.

There is a growing field for the consulting community in 'cultural resource management' (CRM). Geologists can provide archaeological consultants with cost effective ways to focus their investigations and limit the amount of fieldwork required to locate and excavate a site.

GSM TREASURER'S REPORT

After extensive weeding of the list of members with unpaid dues, the Society currently has 321 members: They are distributed as follows:

Associates:	24
Institutions:	12
Regular:	238
Students:	47
TOTAL:	321

Prev. Balance on Hand 09/30/03	**$ 11,534.75**
Anderson Fund (Total) includes CD	$ 5,288.59
Education Fund (Total)	$ 872.70
Checking Account (other)	$ 5567.26
Receipts	
Other, dues, interest, etc.	$ 681.00
Interest on CD	$ 187.80
Anderson fund	$ 6.00
Short Course Registration	$ 1,985.00
Refunds	$ 363.00
Receipts Subtotal	$ 3,222.80
Expenses	
Campground expenses	$ 104.00
Bates College refreshments	$ 590.20
Fall meeting – dinner	$ 792.96
Sales tax on publications	$ 1.00
USM Professional Development Center	$ 60.00
Staples – name badges, photocopies	$ 228.83
Printing, mailing, stamps	$ 476.48
Bank charges	$ 0.48
Expenses Subtotal	$ 2,203.65
Balance on Hand 01/30/04	**$ 12,553.90**

Respectfully submitted,
Elizabeth A. Champeon, C.G., Treasurer (1998-2003)
< Lchampeon@aol.com>

Rob Peale, of the Maine DEP, is the newly elected Treasurer. His term begins in 2004.

GSM MEMBER NEWS

Lora and **Riley Flanagan-Brown** are the proud parents of William Edwin Flanagan-Brown, born October 24, 2003 at 3:10 pm. He was 5 pounds, 8 ounces, and 19 inches long at birth. Lora and the baby are both well and they are all having a

wonderful time together. Riely is a Ph.D. candidate in the Department of Geology and Geophysics, University of Connecticut. <riley.flanagan-brown@uconn.edu>

Martha Mixon is now a Senior Geologist at Acadia Environmental Technology in Portland, working with Tom Schwarm, Alison Jones, Jace Pearson, and Joe Renda.

Todd Coffin is now the men's track coach at Colby College while continuing to work part time at Jacques Whitford. Nick Sabatine is now running the Jacques Whitford office in Portland.

Steve Kahl is the president-elect of the National Institutes for Water Resources, an organization made up of 54 research institutes nationwide.

Please send member news to:

Carolyn Lepage, Member News Correspondent (1996-present) <clepagegeo@aol.com> or PO Box 1195, Auburn, ME 04211-1195 or Fax: (207)-777-1370 ; Phone: (207)-777-1049

GEOLOGY DEPARTMENTS' NEWS

Connecticut Geology in Jeopardy

The Department of Geology & Geophysics at the University of Connecticut is currently threatened with dissolution. The geology program is slated for elimination, not a simple name change. This action by the University of Connecticut administration is a short-sighted and weak decision. Instead of moving to dissolve it, the University of Connecticut administration should work toward assisting and improving the geology program.

A movement set to oppose the impending dissolution is underway, led by students concerned for the future of their education and the reputation of their geology program. In addition to a letter-writing campaign and efforts to raise the support of the entire University of Connecticut student body, students in the targeted Department of Geology & Geophysics have created an online petition:

Opposition to the Dissolution of the University of Connecticut's Department of Geology & Geophysics
hosted by PetitionOnline.com, at:
http://www.PetitionOnline.com/102777/

Many of you received an email from me regarding this petition. To those who have signed the petition, thank you for your support. To those learning of this for the first time, please visit the link to our online petition and leave your signature in support of geology. The Board of Trustees has not approved the dissolution, so please help us convince them to reverse this action.

Geology is a fundamental field of science relevant to our world now. Earth materials help provide the roads and cars we drive on, the houses and buildings we live and work in, and many of the objects that add convenience to our daily lives. Most of the fuel we use for transportation, food preparation, and warmth is geologic. Geology reveals the history of our planet and the continued study of Earth's systems will reveal paths to a safe and prosperous future for humanity. As fellow members of the Geological Society of Maine, you know these elementary supportive arguments in favor of geology. Yet these simple truths are being ignored by a University of Connecticut administration that has consistently failed to support its geology program.

The Department of Geology & Geophysics at the University of Connecticut is a small, successful unit with a diverse student population (50% female). Its faculty members have written textbooks (Philpotts), a hydrological procedures CD-ROM (Robbins), award-winning books about stone walls in New England (Thorson), and edited special volumes (McHone, Byrne). Departmental alumni now have rewarding careers in the environmental industry (numerous) and in academia (Karabinos, Asher, Buursink). The Geology & Geophysics Field School broke ground by teaching modern surveying techniques (Total Station, GPS, AutoCAD). The department provides high-quality general education courses to undergraduates,

including a regularly scheduled, field-oriented course each spring.

Please help support the Department of Geology & Geophysics at the University of Connecticut by signing our online petition, writing to the University Board of Trustees, or contacting the Connecticut Board of Higher Education. Please stand with us as we oppose the dissolution of our department and support the preservation and improvement of geological studies at the University of Connecticut. **Please Support New England Geology!**

Riley Flanagan-Brown, Ph.D. Candidate
Department of Geology and Geophysics
University of Connecticut
Storrs, CT 06269
riley.flanagan-brown@uconn.edu

BOWDOIN COLLEGE – Electron Backscatter Diffraction facility

Bowdoin College has purchased an Electron Backscatter Diffraction (EBSD) system with funds awarded through the NSF Major Research Instrumentation program (proposal 0320871 funded 9/03). In geology, EBSD is a powerful tool for the observation and analysis of microstructures and for phase identification. The EBSD system uses back-scattered electrons (BSE) emitted from a specimen in a SEM to form a diffraction pattern that is imaged on a phosphor screen. Analysis of the diffraction pat-tern allows identification of the phase and its crystal lattice orientation. The scanning and mapping capabilities of the system permit rapid acquisition of data, from polished rock thin sections, at sub-micron resolutions. Among other uses, these data may be applied to evaluate crystallographic preferred orientations (CPO) of mineral fabrics, and to examine misorientation axes and angles that may signify processes such as subgrain development and dislocation creep.

Bowdoin College's EBSD system, by HKL Technology Inc. (hkltechnology.com), includes a Nordlys II EBSD Detector, forescatter detectors and software for orientation mapping (stage and beam control), texture determination, and phase identification (using the American Mineralogist Geological Phase database). The system is attached to a LEO 1450VP SEM (variable pressure scanning electron microscope) with an EDAX energy dispersive spectrometer (EDS) for mineral chemistry. The SEM and EDS were purchased previously with funds awarded through the NSF Course Curriculum and Laboratory Improvement program (proposal 9951390) and through matching funds from Bowdoin College.

Dr. Beane, in collaboration with students and faculty colleagues, is starting several projects examining microstructure development in minerals and rocks using EBSD methods. For example:

1) Interpretation of Garnet Microstructures in Amphibolite- and Eclogite-facies Metamorphic Rocks: Garnet is used, routinely, to interpret the pressure-temperature-time paths of amphibolite, eclogite and other metamorphic rocks. The assumption generally applied in these interpretations is that garnet grains grow from core to rim, and a core-to-rim traverse of a garnet grain and its inclusions will represent successive time slices in its growth history. Recent studies seem to bring this assumption into question for some metamorphic rocks, and integrated EBSD/EDS research may provide needed insight into mineral nucleation, growth, recrystallization, and diffusion mechanisms that affect garnets. The EBSD system allows crystallographic observations, through collection and analysis of orientation maps, such as the development of subgrain boundaries, dispersion of lattice orientations around specific axes, boundary and interface misorientations, and any preferential orientation of garnet within a sample; and, the EDS system allows observations regarding chemical zoning or other variations in crystal chemistry. These combined observations are used to model grain-scale processes for the garnets such as dislocation creep, coalescence of multiple-nucleation centers, recrystallization, and rotation.

2) Microstructural evidence for strain development across the Norumbega Fault Zone, Maine: Significant strain gradients are observed across the Norumbega Fault Zone. Samples, collected from transects across the fault zone, are analyzed with the EBSD system to provide quantitative crystallographic preferred orientation

(CPO) data, and to provide insight into how deformational mechanisms vary as a function of the strain gradient. Questions to be addressed include: Is there evidence for dislocation creep? Do misorientation angles suggest the development of subgrains? And, is there evidence for unstrained mineral lattices that might indicate that strain in the rock was accommodated by recrystallization?

The application of EBSD methods to geological problems is relatively new, and Bowdoin College is one of the few institutions in the United States to have such a facility. Researchers interested in applying EBSD methods to textural problems in rocks are encouraged to contact Professor Rachel Beane for possible collaborations.

Rachel Beane <rbeane@bowdoin.edu>
Department of Geology, Bowdoin College
6800 College Station, Brunswick, ME 04011

RAMBLINGS FROM THE HISTORIAN

EARLY YEARS OF THE GEOLOGICAL SOCIETY OF MAINE.

With its establishment in 1974, almost 30 years ago, the Geological Society of Maine was off to a successful start. Jack Rand, as editor, wrote in the second newsletter (now up from one to three pages!): "So far, we have a going organization and a little money to publish with, and we must now develop the Society to be of interest and benefit to all Maine geologists, representing a wide variety of professional associations and interest, -- Academic, Highway, Maine Survey, USGS, Industrial, Mining, Engineering, Environmental, soils, surficial, bedrock, groundwater, uplands, lowlands, shorelines, and oceans."

The first regular meeting was held at Colby College on November 6 for an evening dinner, a business meeting, and a talk by Don Hoxie, Director of Health Engineering of the State Department of Health and Welfare. Don talked to us about evaluation procedures under the new State of Maine Private Sewage Disposal Code. In the second Newsletter, during the business session, it was decided that we would hold 3 meetings per year, November, February, and mid-summer. The need to establish By-Laws for the society were discussed and referred to executive officers and councilors, to be presented to the Society in the third newsletter. These were then voted in at the first annual meeting of the society at Don Koons' farm in Sidney on August 1, 1975. In my recollection, no field trip was held the first year, but at the summer meeting the subject came up. From Vol. 2, no. 1 of the newsletter you will find the following statement: "*It was brought up … that the society ought to think about organizing a field trip of several days' duration in which a number of areas, mapping projects, or features of geological significance may be examined and discussed. The program might involve some kind o a unified 'package,' wherein all ride together in a chartered bus, wired for sound; travel light, with notebook, sleeping bag, and toothbrush; stay overnight at pre-set shelters; carry on running commentary or technical presentations on the bus between stops."* (The Maine Geologist, v. 2, no. 1). WOW! We had some lofty ideas, and although such a fancy trip never materialized, field trips of a more reasonable scope did come of this, starting in July 1977. Bill Rideout, president, and Brad Hall, along with Ollie Gates, Al Ludman, and Dave Westerman, gathered the faithful at the UM – Machias campus. A business meeting convened Friday evening after dinner. Saturday, Ollie Gates initiated the field trip tradition by showing the latest of his work and interpretation of the rocks of the Machias-Eastport area. Sunday, Al Ludman and Dave Westerman conducted a trip to display significant features of the inland rocks in the Calais-Wesley area, and the contact between their rocks and Ollie's coastal suite (The Maine Geologist, v. 3, no. 1, p. 1, and v. 4, no. 1, p. 2). Another first for the society with these field trips was the preparation and distribution to all attendees of a field guide, a tradition that has carried on since. (Does anyone know if we skipped any years?)

Other significant actions taken during the Annual Meeting of 1977 included:

1. A vote to incorporate the Society as an educational non-profit organization.

2. Authorize the publication of "Occasional Papers" on Maine geology with Art Hussey, Dave Westerman, and Brad Hall as editors. The first one appeared as Bulletin No. 1 at the March 16, 1978 meeting of the Society.

The spring meeting of the Society on March 16 1979 (the fifth annual Spring meeting), at Bates College, initiated another of our traditions, that of student presentations, along with publication of their abstracts in The Maine Geologist Newsletter. Ten Maine college students (3 from Bates, 3 from UMO, 2 from UMPI, and 1 each from USM and Colby) presented papers, following a GSA format, covering a variety of topics on bedrock geology, experimental studies, glacial geology, and paleontology (TMG, v. 5, n. 3, p. 2-3). The success of this program insured its inclusion as the focus of all the subsequent Spring meetings of the Society.

By the end of 1979, 5 years after its initial founding meeting, the Society had initiated most of the programs that have sustained it to this day. The Newsletters were superbly prepared by its Editor, Jack Rand, who included much information about geological developments in the State – Maine Geological Survey, Academic institutions, private economic and regulatory sectors, and USGS, and they serve as valuable historical, often witty, reminders of geologic accomplishments in the State of Maine. So much for now, stay tuned for further installments.

Arthur Hussey, Society Historian,
<hussgeo@gwi.net>

THE RANGELEY LAKES TROUGH

I am writing this note not to report on research, but to ask a question to which I do not know the answer.

On a satellite image, or the Lewiston 2° map (Figure 1), it can be seen that Rangeley Lake, Mooselookmeguntic Lake, the Richardson Lakes and Umbagog Lake (but not Aziscohos Lake) lie in a relatively low area which extends to the southwest into New Hampshire north of the Presidential Range. The trough also extends to the northeast, but is less well defined. This elongate lowland area is interrupted by the Pliny Range, the hook-shaped mountains on the map north of the Presidentials, but the Pliny Range and nearby mountains are Mesozoic intrusives, which normally form resistant mountains. The presence of the trough is emphasized by the southeast boundary, which includes the highest mountains in New Hampshire and western Maine.

Certainly, this southeast boundary is geologically significant. It is about the same location as a tectonic hinge, southeast of which Silurian sediments are much thicker than to the northwest (Boone, 1973; Moench and Pankiwskyj, 1988). On Williams' 1978 map of the Appalachian orogen, the trough lies in the southeastern half of unit 12, ensimatic (west) and ensialic (east) island arc volcanic rocks and associated marine sediments. Perhaps the trough lies over the ensialic rocks and the mountains to the northwest lie over the ensimatic rocks. The high mountains to the southeast are in Williams' unit 17c, marine to terrestrial sedimentary and volcanic rocks deposited across the deformed continental margins of Iapetus. The trough also corresponds to the southern part of the Lobster Mountain-Moose River Lowlands of Hanson and Caldwell (1989) as shown on their map on page 150, not that on page 155.

THE QUESTION IS, why should this geologic boundary be expressed as a topographic boundary between high mountains on the southeast and relative lowlands on the northwest? This could happen if there were periodic movement along a fault at the boundary, but such recurring movement would probably leave faults that would be obvious. Some faults are shown along the boundary, but they are cut by Devonian granites. I look forward to the discussion

Michael T. Field
PO Box 322
Gambier, OH 43022
<fieldm@kenyon.edu>

References Cited:

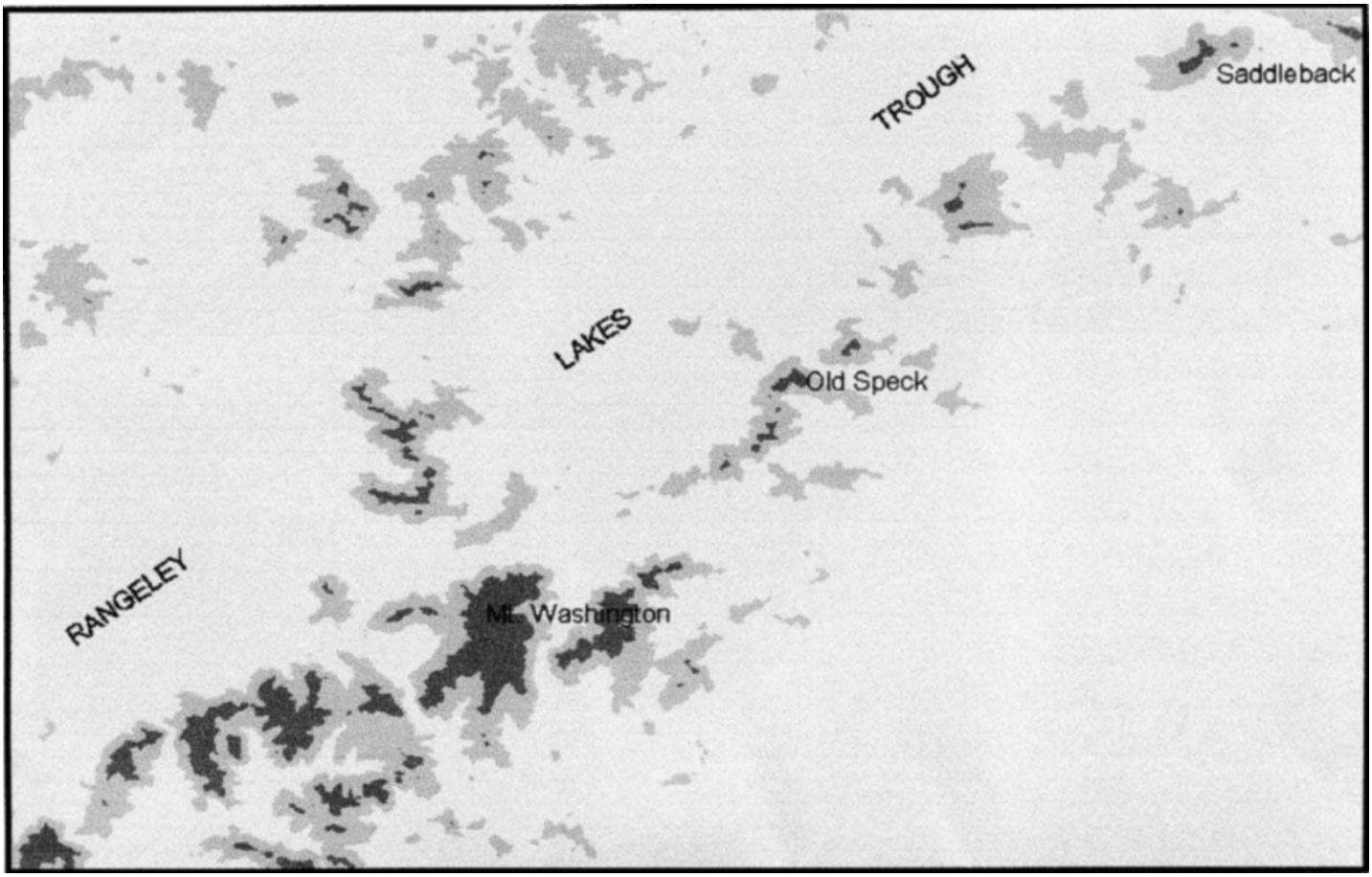
Boone, Gary M., 1973, Metamorphic stratigraphy, petrology, and structural geology of the Little Bigelow Mountain map area, western Maine: Department of Conservation, Augusta, Maine, 136p.

Hanson, Lindley S., and Dabney W. Caldwell, 1989, The lithologic and structural controls on the geomorphology of the mountainous areas in north-central Maine: Studies in Maine Geology, Volume 5, p. 147-167, Maine Geological Survey.

Moench, Robert H. and Kost A. Pankiwskyj, 1988, Geologic map of western interior Maine: U.S. Geological Survey, Miscellaneous Investigations Series, I-1692, map and 21p. text.

Williams, Harold, compiler, 1978, Tectonic lithofacies map of the Appalachian orogen: Memorial University of Newfoundland, St. John's, Newfoundland, 2 sheets, scale l: 1,000,000.

Figure 1 - Lewiston 2° sheet. Contour divisions at 700 and 1000 meters. Mt. Washingon, NH, Old Speck and Saddleback Mtns, ME



BYLAWS
(Adopted August 1, 1976, Revised November 4, 2003)

THE GEOLOGICAL SOCIETY OF MAINE

ARTICLE I - Name

Section 1. The name of the association shall be "The Geological Society of Maine" (GSM).

Section 2. The name of the society may not be used, nor any reference to it made in any advertising, promotion, solicitation, or the like, without prior written permission of the Society.

ARTICLE II - Purpose

Section 1. To further the public awareness and understanding of the geology of the State of Maine, and of the modern geologic processes which affect the Maine landscape and the human environment;

Section 2. To develop and encourage continuing social contact and dialogue among geologists working in Maine;

Section 3. To advance the professional improvement of its members;

Section 4. To inform members and other interested persons of current and planned geologic programs in Maine.

Section 5. To provide a financial base to publish and distribute a periodic Newsletter, to cover matters of technical and general interest, and to announce future society meetings.

Section 6. To receive and administer gifts, bequests, and devises from persons, firms, or corporations to the GSM.

Section 7. To perform acts instrumental in the furtherance of the foregoing purposes, including the owning, leasing, or otherwise dealing in real estate in order to further said purposes.

ARTICLE III - Non-Profit

Section 1. This society shall be non-profit. All assets shall belong to the GSM and shall not inure to the benefit of any member or group of members of the society.

ARTICLE IV- Membership

Section 1. A member shall be defined as any person who is interested in furthering the goals of the society and who fulfills the requirements of section 1a, 1b, or 1c.

1.a. Those persons who hold a Bachelors degree in geology and engaged in the practice of geology for at least one year, or who have a Masters degree in geology, in lieu of the one year requirement, or who have demonstrated by trade a degree of geological professionalism, regardless of the academic training, shall be designed as "Regular Members".

1.b. Those persons who demonstrate an interest in the geological sciences and who are desirous of association with the society, but do not meet the requirements of sections 1a or 1c, shall be designated as "Associate Members".

1.c. Those persons currently enrolled as a student in any college or school of higher learning who are interested in the field of geology and are desirous of association with the Society, shall be designated as "Student Member".

Section 2. There will be no Maine residency requirement for any of the three categories of membership.

ARTICLE V- Dues and Fees

Section 1. Dues and fees will be established by the Executive Council to provide for funding functions of the Society in keeping with its not-for-profit status. These dues and fees will be reexamined periodically. See Article VIII, Section II, part 2 – Duties of the Executive Council *[1].

ARTICLE VI - Annual Meeting

Section 1. An annual meeting of the members of the Society shall be held during the Fall Meeting of each year *[2] for the purpose of electing councilors, receiving financial reports, and for the conduct of such old business as may come before the meeting. The date and time of the meeting shall be determined by the Executive Council. The Secretary of the Society shall be responsible for providing sufficient notification of the meeting to all members.

Section 2. Other meetings may be called by the President or Executive Council when deemed necessary.

2.a. Several periodic meetings will be scheduled each year; time and place of said meetings to be designated by the President of Executive Council.

Section 3. At each annual meeting the membership shall elect six officers to two-year terms, and one council to a three-year term of office (Article VII, Officers, and Article VIII). A slate of officers and councilors shall be recommended to the membership by the Nominating Committee prior to the Annual Meeting.

ARTICLE VII- Officers

Section 1. The officers of the Association shall be as follows:

a. President
b. Vice-President
c. Secretary
d. Treasurer
e. Newsletter Editor *[3]
f. Historian *[4]

Section 2. The officers shall be elected by the membership at the Annual Meeting to serve a two-year *[5] term of office.

Section 3. President – The President shall be responsible for conducting the affairs of the Society and for executing the policies established by the Executive Council. The President shall appoint the chairman of the committees as provided in Article VIII and shall serve ex officio as a member of each committee.

Section 4. Vice-President – In the event of the absence or disability of the President, the Vice-President shall perform the duties of the President, and when so acting, shall have all the powers of that office. The Vice-President shall also be a permanent member of the Nominating Committee *[6] and perform such other duties as assigned by the Executive Council or by the President.

Section 5. Secretary – The Secretary shall be responsible for recording the activities of the Society; recording names of officers, councilors, and committee members; giving notice of all meetings of the Society, the executive council, and committees; keeping the minutes of the meetings of the members and the Executive Council, and cause them to be recorded in a book kept for that purpose; and conducting such correspondence as may be required.

Section 6. Treasurer – The Treasurer shall have custody of the Society funds, shall keep full and accurate accounts of receipts and disbursements and shall deposit all funds and other valuable effects in the name and to the credit of the Society in such depositories as may be designated by the Executive Council. Under the direction of the President, the Treasurer shall prepare the annual report accounting for all transactions and describing the financial condition of the Society. The Treasurer shall prepare an annual budget for submission to the Executive Council and to the Society at the Annual Meeting. On disburse-ments of funds over three hundred dollars ($300.00) the President shall countersign the checks. The President also has the right to disburse funds, but must have the Treasurer's joint signature on checks in excess of $1000.00 *[7].

Section 7. Newletter Editor – The Newsletter Editor shall prepare a newsletter from reports by the other Officers, from member submissions, and other sources, three times per year, generally in October (before the Annual Fall Meeting), February (before the Spring Meeting) and June (before the Summer Meeting). The Newsletter Editor will see that the newsletter is distributed in an efficient manner through mail and/or electronic means. The Newsletter Editor will also serve as a coordinator of communications among the Executive Council and the membership.

Section 8. Historian – The Historian will, from time to time, supply items for publication in the newsletter, and in general maintain a history of the GSM for use of the membership and the Executive Council.

ARTICLE VIII - Executive Council

Section 1. The Executive Council shall be composed of the six elected officers plus three additional councilors elected from the membership of the Society. At the first annual meeting one councilor will be elected to serve until the second annual meeting, one shall be elected to serve until the third annual meeting, and one shall be elected to serve until the fourth annual meeting. At each annual meeting after the first, one councilor shall be elected by the membership to a three-year term of office.

Section 2. The Executive Council shall provide the general direction for and control of the affairs of the association. In addition to the duties customarily performed by the Council it shall:

1. Transact all business necessary and proper for the efficient management of the Society.
2. Establish dues and fees, payment schedules, and any reimbursements deemed appropriate.
3. Confirm membership and terminate members who resign from the Society or who, given good cause, are voted out of the society by a two-thirds vote of the Executive Council.
4. Fill vacancies on the Executive Council.
5. Appoint a By-Laws committee from the Executive Council and membership at large to make recommendations for changes to these By-Laws for consideration of the members at the annual meeting or a special meeting for said purpose.
6. Appoint a Nominating Committee from the Executive Council and membership at large to make recommendations for officers and councilor to be nominated at the annual meeting.
7. Appoint committees from the Executive Council and/or membership at large to address specific areas of concern to the society, including but not limited to the following:

   a. Program Committee
   b. Public Relations Committee
   c. Fund Raising Committee
   d. Publications Committee

The Executive Council may from time establish other permanent or temporary committees to carry out particular activities that they deem necessary.

ARTICLE IX - By-Laws

Section 1. The By-Laws of the Society may be altered or repealed by affirmative vote of two-thirds of the Society membership present at any scheduled meeting of the Society. Any question as to the proper interpretation of the provisions of these By-Laws shall be resolved by majority vote of the Executive Council.

ARTICLE X - Liability and Grievances

Section 1. No officer, council member, committee member, or other member working in the name of the Society shall be held liable as a result of Society activities.

Section 2. Grievances concerning any aspect of Society activities shall be referred to the Executive Council for consideration.

FOOTNOTES:

*[1] A set fee schedule was eliminated at the Fall Meeting of November, 1988 (see GSM Newsletter: Feb. 1989; vol. 15, #2, p. 12.

*[2] See GSM Newsletter: Feb. 1989; vol. 15, #2, p. 12.

*[3] Proposed and accepted at the Fall Meeting of November, 1988 (see GSM Newsletter: Feb. 1989; vol. 15, #2, p. 12.

*[4] Proposed addition by the Executive Council, accepted at the Fall Meeting, Nov. 4, 2003.

*[5] Term of offices extended to two years at the Fall Meeting of November, 1998 (not found in published notes).

*[6] Additional responsibility proposed by Executive Council in Spring 2003, accepted at the Fall Meeting, November 4, 2003.

*[7] Change proposed by Executive Council in Spring 2003 to reflect current practice, accepted at the Fall Meeting, November 4, 2004.

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 modem 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 field trips). A newsletter, ***The Maine Geologist***, is published for all members three times a year. The Society year runs from August 1 to July 31. Annual dues and gift or fund contributions to the Society are tax deductible. There are three classes of memberships:

$12.00	REGULAR MEMBER	Graduate geologists, or equivalent, with one year of practice in geology, or with an advanced degree.	***NOTE NEW***
$12.00	INSTITUTIONAL MEMBER	Libraries, societies, agencies, businesses with interests in or practicing geology and related disciplines.	***FEE SCHEDULE AS OF***
$10.00	ASSOCIATE MEMBER	Any person or organization desirous of association with the Society.	***August 1, 2003***
$ 5.00	STUDENT MEMBER	Persons currently enrolled as college or university students.	

THE GEOLOGICAL SOCIETY OF MAINE ANNUAL RENEWAL / APPLICATION FOR MEMBERSHIP

Regular Member	$12.00	$__________	Name ____________________________________	**Make checks payable to:**
Institutional Members	$12.00	$__________		Geological Society of Maine
Associate Member	$10.00	$__________	Address ____________________________________	Rob Peale, Treasurer
Student Member	$ 5.00	$__________		Maine Dept. Enviromental
Contributions to GSM		$__________	____________________________________	Protection,
(please write gift or fund on check)				State House Station 17
TOTAL ENCLOSED		$__________	____________________________________	Augusta, ME 04333-0017

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

- -

2004/2005 SOCIETY YEAR BEGINS AUGUST 1 - PLEASE SEND DUES TO TREASURER

THE GEOLOGICAL SOCIETY OF MAINE
c/o Daniel F. Belknap, Newsletter Editor
Department of Earth Sciences
111 Bryand Global Sciences Center
University of Maine
Orono, ME 04469-5790

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.

Return Service Requested

Correspondence about **membership** in the Society, **publications** and **dues** should be mailed to:
Rob Peale, Department of Environmental Protection
State House Station 17, Augusta, ME 04333-0017

Items for inclusion in the **newsletter** may be directed to:
Daniel F. Belknap, Dept. Earth Sciences, University of Maine,
Orono, ME 04469-5790 <belknap@maine.edu>

President	Lisa Churchill-Dickson
Vice President	Tom Weddle
Secretary	Sean Dougherty
Treasurer	Rob Peale
Newsletter Editor	Dan Belknap
Directors	Joe Kelley (98-03)
	Walter Anderson (00-04)
	Dave Gibson (02-06)