



Granite State Geologist

The Newsletter of the Geological Society of New Hampshire, Fall-Winter (December) 2006 Issue No.55

www.gsnhonline.org

SEASONS GREETINGS & HAPPY NEW YEAR FROM THE GSNH BOARD OF DIRECTORS!

2006-2007 GSNH Officers:

President –Julie Spencer
ENSR
Westford, MA
jspencer@ensr.com

Vice President-Council - Jutta Hager
Hager GeoScience, Woburn, MA.

Vice President –Society - Lee Wilder
Colby-Sawyer College
New London, New Hampshire

Secretary – Doug Allen
Haley & Aldrich
Manchester, New Hampshire
dallen@HaleyAldrich.com

Treasurer – Rich Moore
US Geological Survey
Pembroke, New Hampshire

Past-President – Mike Robinette
Gilmanton, New Hampshire

Members-at-Large:

Richard Moore
US Geological Survey
Pembroke, New Hampshire

Ralph Wickson
NHDES Waste Management Division
Concord, New Hampshire

Membership:

Doug Allen
Haley & Aldrich, Inc.
Manchester, New Hampshire

Website:

Julie Spencer
ENSR
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Newsletter:

Bettina Eames
Loureiro Engineering Associates
Merrimack, New Hampshire
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October 2006 GSNH Election Results

Submitted by Chip Crocetti, GSNH Nominating Committee Chair, and outgoing Secretary

The election of the 2007 Geological Society of New Hampshire Board of Directors was held at the Annual Fall Dinner Meeting on October 12, 2006 at the Cat n-Fiddle Restaurant in Concord. Forty-four members voted with the results as indicated below. While most of the Directors were elected unanimously, the election results for two of the positions, Treasurer and Member-at-Large, were the closest in recent history – one vote really does matter! The winners are indicated in **bold**, with the term they are entering also noted:

President
Julie Spencer – 44 (1st term)

Society Vice President
Lee Wilder – 44 (1st term)

Council Vice President
Jutta Hager – 44 (2nd term)

Secretary
Doug Allen – 44 (1st term)

Treasurer
Rich Moore – 22 (1st term)
Wayne Ives – 20

Member-at-Large
Paul Rydel – 22 (1st term)
Suzanne Wall - 21

The second Member-at-Large is Ralph Wickson, who will be serving the second year of his current two-year term in 2007. A hearty congratulations to the 2007 Board of Directors, and thank you to all the candidates. Contact information for the Board members will be posted on the GSNH website, and is also in the membership directory.

Message From the President

Submitted by Julie Spencer, GSNH 2007 Incoming President

It's a pleasure to write this article as your new president. On October 12, 2006, 68 geologists and geology enthusiasts gathered for our annual meeting at the Cat-n-Fiddle in Concord. The official results of the election for the 2006-2007 Board of Directors are included in another article in this newsletter. After our usual buffet dinner, Bob Whitmore entertained and amazed us with his photos, stories and minerals from his trip to Brazil seeking pegmatites. After dinner we held our customary mineral raffle. Joyce Bledsoe won a beautiful quartz crystal from Brazil donated by our speaker Bob Whitmore and Tania Coffin won a large piece of gypsum from Port Hood Island, Cape Breton, Nova Scotia donated by Lee Wilder.

Congratulations to the winners and thanks to those who donated the minerals!

This promises to be a very good year for GSNH. I hope you will join us on January 18, 2006 for our winter meeting. Our speaker is Dr. Lawrence Krissek of the Department of Geological Sciences at Ohio State University. He is a Distinguished Lecturer with the Joint Oceanographic Institutions/U.S. Science Advisory Committee and we are very fortunate to have been awarded this opportunity to hear his lecture. Dr. Krissek's topic will involve his studies of iceberg-rafted debris (IRD) in the deep ocean and their relationship to Northern Hemisphere glaciation. Recent work has demonstrated that IRD deposition is sometimes dominated by local or regional controls, complicating the IRD records with relation to the hemispheric or global changes in ice volume. Dr. Krissek is visiting us shortly after returning from a drilling program in Antarctica and should have some very interesting stories about his experiences.

Also this winter, on March 11 to 14, 2007, the University of New Hampshire will be the location of the 2007 Northeast Section Meeting of the Geological Society of America. The GSNH, along with UNH, Keene State, Plymouth State, Dartmouth College, NHGS and USGS, will be hosts of this meeting. Details are still being finalized, but there may be a call for volunteers to assist before or during the meeting. I hope that we can count on our membership to be part of this important event either as volunteers or attendees. I look forward to seeing everyone in January!

Geology In the News – New Theory on Appalachian Mountain System Formation

Submitted by Bettina Eames, Loureiro Engineering Associates

A recent study by a team of geologists from Ohio University have identified a section of the Appalachian Mountain Range System in Mexico that has caused scientists to revise and redraw their maps of ancient Earth.. A portion of the Appalachian Mountain System of eastern North America which extends from southern Quebec to northern Alabama, was recently uncovered in Mexico in a rock outcrop known as the Acatlan Complex. Dating of the Acatlan Complex indicates that they were formed on the ocean floor and are much younger than previously thought which is changing theories on the formation of the Appalachian Mountain Range System.

Previously, scientists thought that 420 million years ago Earth contained two main land masses (Gondwana and Laurussia) that were separated by the Rheic Ocean - a large expanse of sea. According to present theories the Acatlan Complex was once part of Gondwana and broke from the supercontinent about 500 million years. The Acatlan Complex, along with a few other smaller land masses, drifted northward, which resulted in blockage of a stretch of ancient sea known as the Iapetus Ocean. It is believed that the Acatlan Complex eventually collided with North America forming the Appalachian Mountains.

The recent analysis of the Acatlan Complex's rocks revealed they once existed on the older Rheic Ocean floor, and not on the younger Iapetus Ocean floor, suggesting that the Appalachian-forming collision occurred about 120 million years later. Based on this scenario, the Acatlan Complex remained a part of Gondwana and the entire supercontinent slammed into North America. The collision then closed the Rheic Ocean, created the Appalachian Mountains and formed the gargantuan land mass known as Pangaea.

The information was translated from an article by By Ker Than dated November 20, 2006 and can be viewed at www.foxnews/natural science center). The full study is detailed in the October 2006 issue of the Journal of [Geology](http://www.geology.com), which can be found on the world wide web at: www.geology.com.

Waste Management Division - Technical Topics / Lunch Seminars – Late Fall 2006

Submitted by Ralph Wickson, NHDES

The New Hampshire Department of Environmental Services (NHDES) Waste Management Division will be hosting a series of special interest technical seminars for staff and all interested public, consultants, municipal officials, regulated community and other stakeholders at our offices on 29 Hazen Drive in Concord, NH. The sign in will start at 11:45 a.m. while the seminars themselves will be held in our auditorium from noon to 1:00 p.m. The presentations will be structured like a Town Meeting so that everyone can ask questions and participate in the discussion in any way they feel comfortable. Experts from UNH, industry and consulting will be part of the presentations and bring us up to date on the latest in technical innovations in waste site cleanup, waste management and waste reuse. A number of people have expressed interest in these topics so each seminar will certainly benefit from such free and open discussion. Please contact Amy Azeredo at aazeredo@des.state.nh.us or phone 603-271-2905, if you plan to attend so that we can plan our accommodations. Please feel free to bring your lunch. We also have a new food service, Paulson's Café, with take out in the building.

December 15, 2006 - **“Vapor Intrusion (VI) Guidance for Contaminated Sites in New Hampshire - Can We All Breathe Easier?”** VI is a new and important contaminant pathway, which has become a major clean-up criteria on some sites in New Hampshire which contain volatile contaminants in the groundwater. Using this pathway contaminant vapors, from substances like TCE and Perc, actually volatilize from the regional groundwater into the vadose zone and soil pores and have the potential to enter building spaces and affect indoor

air quality. This seminar will summarize key changes to the state Risk Characterization Management Policy (RCMP) and how the new guidance will address this emerging concern.

Earth Science Teacher Workshop Reminders

GSA-NE Section Meeting in Durham, March 11-14, 2007: This workshop will be held in Durham, New Hampshire (<http://www.geosociety.org/sectdiv/northe/07nemtg.htm#sc>).

Southeastern Regional Educational Service Center: Also various earth science workshops are listed at <http://www.seresc.net/files/content/ceiupload/ceil%20science%20earth.pdf>. All workshops qualify for CEU's, Highly Qualified credit and/or graduate credit.

NHGS Groundwater Level Monitoring – September and October 2006

Submitted by Genevieve Al-Egaily, NH Geologic Survey

Ground water level measurements were collected by New Hampshire Geological Survey (NHGS) staff member Genevieve Al-Egaily on September 25-27, 2006 and October 23-25, 2006.

September 2006: During September, the statewide average ground-water level showed a 0.62 feet decrease from last month. The water levels decreased in all of the wells except the Lee well, which showed a slight increase. The greatest changes were in the New London and Enfield wells with decreases of 1.99 feet and 1.88 feet, respectively. When compared with September 2005, the statewide average ground-water level increased 0.92 feet.

October 2006: During October, the statewide average ground-water level showed a 0.66 feet increase from last month. When compared with October 2005, the statewide average ground-water level decreased 1.23 feet.

As of October 31, 2006, the Concord weather station reports that since January 1, 2006 the station had received 46.92 inches. Normal precipitation to October 31st is 31.07 inches.

Some Thoughts on New Hampshire Glacial Geology – “So Where Did All the Glacial Boulders Go?” Submitted by Lee Wilder, GSNH Vice-President

It occurred to me that currently, we may not have all the glacial boulders that were left after the last Pleistocene retreat. Not that I was here to inventory the cache...but I recently found several bits of evidence that got me to thinking. While helping with surficial geologic mapping this summer, I found a “Volkswagen Beetle sized” glacial boulder that had a rectangular shaped block of granite quarried out of it. If you look carefully at Figure 1, you will see the well-spaced drill and wedge marks that caused the granite to split. The rectangular piece that was freed was not to be found. What a convenient source of stone the early New Englander’s had available to them.



Figure 1- Glacial boulder showing drill marks and “missing” block.

The melting ice dropped the boulders that it had obtained from the lee slopes of up-ice bedrock knobs. Down ice from these bedrock outcrops, one often finds a valley-train of glacial boulders.

Boulders composed of a desirable bedrock type – esp. granites, provided a local source of building stone. With basic knowledge of rock texture and joint structure, the locals soon learned which boulders split easily to produce rough building blocks.

All six sides of a block did not have to be cleaved. For many applications, the builder only needed a flat “face” on the exposed surface. Figure 2 shows just such an application.

Numerous retaining walls (and old cellar walls) were laid up with rocks needing just one flat face. The stones used in blocks, type, variety

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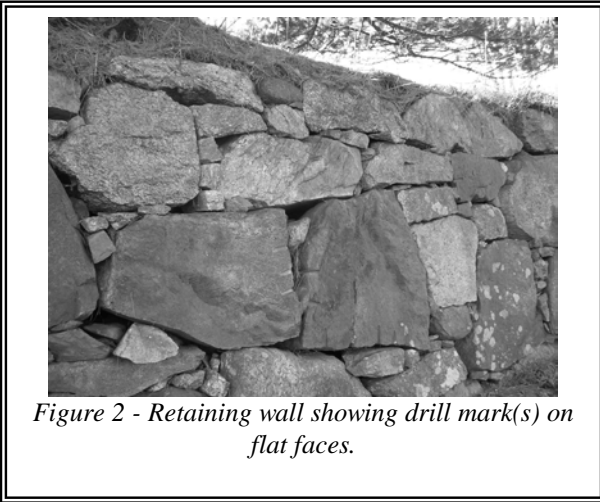


Figure 2 - Retaining wall showing drill mark(s) on flat faces.

these applications were not nice rectangular all uniformly cut from the same quarry/rock They appear to have been collected from a of local sources. We must also consider that transporting such large cut pieces would require extensive man and animal power to haul them to building site...another reason to use what was available locally.

other bit of evidence came forth in my search for quarry on South Road (in Hopkinton),” referred source of the “granite” used in the construction Andrew’s Church in Hopkinton Village. Church says that “the granite for the (1827) church came quarry / or was quarried on South Road.”

Searching the entire length of South Road, found no quarry in either Hopkinton or in Weare. Since there doesn’t appear to be a Concord Granite quarry on South Road, maybe it would have been more correct to say that the granite was “quarried” on South Road. The removal of blocks of granite from glacial boulders could be called “quarrying.” If you examine the 1997 *Bedrock Geologic Map of New Hampshire*, John Lyons and others, there are exposures of several types of granite to the northwest of town, in the up-ice direction. Granitic glacial boulders, brought from this direction, could have served as the “quarry.” A stretch? Maybe...until you look closely at the walls of the church.

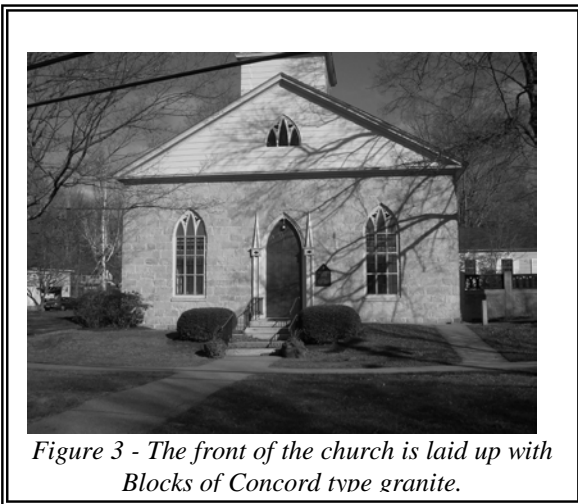


Figure 3 - The front of the church is laid up with Blocks of Concord type granite.

You can see in Figure 3 that the front of the church is laid up with fairly nice blocks of Concord type granite. But the side walls (See Figure 4) are NOT all Concord granite, nor are they all nice rectangular blocks. It is the rear of the church that demonstrates the scarcity of good building stone or using what was available locally. This north wall of the church (See Figure 5) has a great variety of different shaped stone.

The absence of drill marks on many of the stones used on the back wall of the church, indicates that many of these “faces” were “left over pieces,” that resulted from the quarrying of other blocks or just stones that occurred naturally, already having a flat face. Early stone masons in NH were frugal.

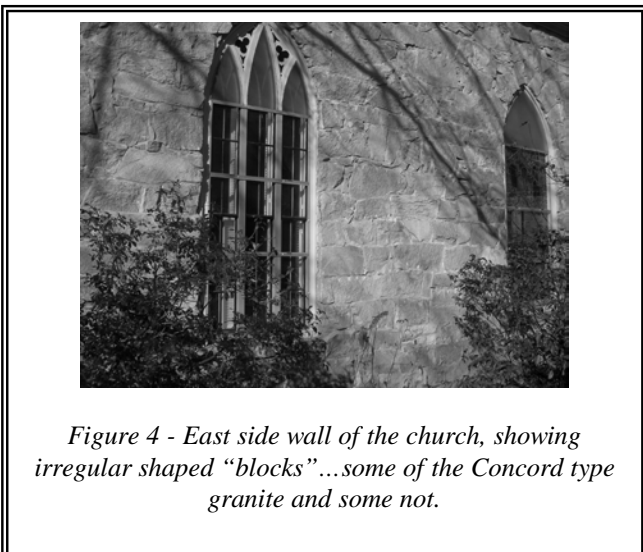


Figure 4 - East side wall of the church, showing irregular shaped “blocks”...some of the Concord type granite and some not.

They sorted through the local stone, using blocks of the most uniform composition and rectangular dimension, on the “show” side (the front side in the case of the church).

Construction of cellar walls, retaining walls and the “back” of buildings used stone of lesser quality that did not need “the best.” However, the early stone masons did not use all the glacial boulders. A few glacial boulders still exist (See Figure 6). Some because they were left by the ice, too distant from building sites or located on terrain too difficult to access by horse or

oxen. Others because they were composed of a bedrock type that did not easily split into useable building blocks. It would be interesting to have seen New England when the colonists began to clear the land. What glacial boulders would be seen? How many were there? How big were they? Where were they located?

Lee Wilder teaches Earth-Space Science at Colby-Sawyer College, in New London, NH. He is interested in your comments on this topic. Lee can be reached at

lwilder@colby-sawyer.com. All Photos by Lee Wilder.:



Figure 5 - The church's north wall shows a great variety local stone, of different "shapes." Also note the absence of drill marks.

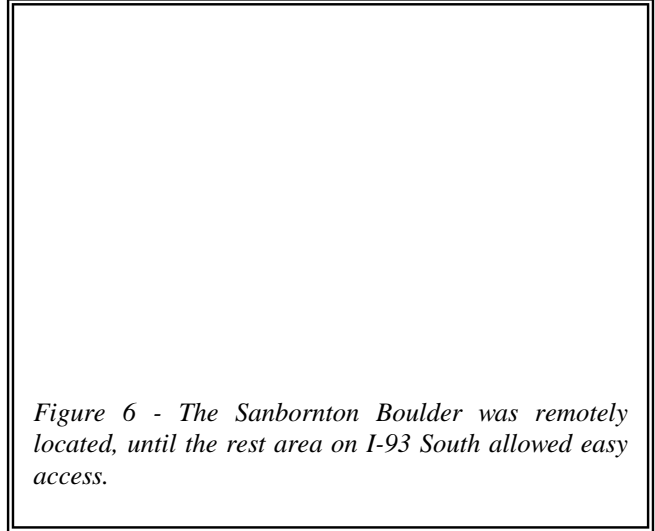


Figure 6 - The Sanbornton Boulder was remotely located, until the rest area on I-93 South allowed easy access.

NEW DIGITAL STATE GEOLOGICAL MAP - Submitted by Dave Wunsch, NH State Geologist

The New Hampshire Geological Survey (NHGS), a unit of the New Hampshire Department of Environmental Services (DES) is releasing a Bedrock Geologic Map of the state in a digital (electronic) format. This map was first published in 1997 and has been available in paper format at the 1:250,000 scale, and digitally from the GRANIT database. The Bedrock CD is a joint publication between the New Hampshire Geological Survey (NHGS) and the Mineral Resources Division of the U.S. Geological Survey, and can be purchased from the N.H. Department of Environmental Services Public Information Center, at pip@des.state.nh.us; or write NHDES – PIC, PO Box 95, Concord, NH 03302-0095; or call (603) 271-2975; or fax (603) 271-8013. The price of the CD dataset is \$30.

NHDES REGULATORY UPDATE – New Proposed Rules: Env-Or-600, Env-Or 700 and Env-Or-800, Submitted by Bettina Eames, Loureiro Engineering Associates

It was a full house in the auditorium at the NHDES in Concord on November 17, 2006, when representatives from the NHDES Waste Management Division, Site Remediation Bureau provided an informational session on new upcoming rule changes. The new rules are entitled: Env-Or 600 (Contaminated Site Management), Env-Or 700 (Groundwater Release Detection Permits), and Env-Or (Brownfields Program). The November 14, 2006 public hearing has passed and the public comment period ended on November 29, 2006. The new rules are expected to be adopted in January/February of 2007. Under the new proposed rules “**Env-Wm**” will become “**Env-Or**” and will involve many changes as a result of recently revised legislation – specifically the following

environmental statutes: RSA 485-C (Groundwater Protection), RSA-146-A (Oil Discharge), RSA-146-C (Underground Storage Facilities), RSA 147-A (Hazardous Waste Management) and RSA 147-F (Brownfields Program).

The new ***Env-Or 600*** or ***Contaminated Site Management Rule*** will combine the practices for site assessment and remediation as currently followed under Env-Ws 1600 - *Standards for Reporting and Remediation of Oil Discharges* and Env-Wm 1403 – *Groundwater Management and Groundwater Release Detection* Permit and the *Risk Characterization & Management Policy (RCMP)*. The new 600 Rule will involve a rewrite and consolidation of Env-WS 1600 and Env-Wm 1403 and merge the Method 1 standards or “look-up numbers”, the Method 2 standards and the Method 3 site specific risk assessment criteria and UCLs. In addition, the requirements for notification, for preliminary and comprehensive response actions, groundwater management permits and Activity and Use Restrictions (AURs) will all be consolidated under one “umbrella”. Some new changes you can expect to see include: establishment of an ambient groundwater quality standard (AGQS) for hydrogen sulfide, reduced requirements for the initial site characterization (ISC) report, expanded conceptual site model (CSM) as part of the Site Investigation (SI) Report and regulatory requirements for professional PE/PG stamping and certification of documents.

The new ***Env-Or 700*** or ***Groundwater Release Detection Permits Rule*** will involve a re-write of Env-Ws 1403 as they apply to hazardous waste disposal facilities, lined solid waste landfills, lined wastewater facilities and facilities that process petroleum-contaminated soils. In particular, requirements for *new* solid waste composting facilities/resource recovery facilities/outdoor road salt storage structures and *existing* snow dump and motor vehicle/salvage yards located in Class GAA wellhead protection areas will be detailed. The new ***Env-Or 800*** or ***Brownfields Program Rules*** are entirely new as promulgated under RSA 147-F: 18, which will legally formalize the goals of the NHDES Brownfields Program. The new 800 rules will include ten subparts addressing: purpose and applicability, definitions, application for brownfields covenant programs, eligibility determinations, program fees as well as information on program withdrawal, requirements for property transfer, property subdivision, site investigation and remedial action.

The new rules can be viewed on the state website at <http://www.des.state.nh.us/Rulemaking/>. For further information and/or have any questions on the new Env-Or 600 (Contaminated Site Management) Rule and the Env-Or 700(Groundwater Release Detection Permits) Rule contact Robin Mongeon, P.E. at 603-271-7378 or by e-mail at rmongeon@des.state.nh.us. For further information and/or have any questions on the new Env-Or 800 (Brownfields Program) Rules contact Michael McCluskey, P.E., at 603-271-2183 or by email at mmcluskey@des.state.nh.us.



Geological Society of New Hampshire

2007 WINTER DINNER MEETING

**Speaker: Larry Krissek
School of Earth Sciences
Ohio State University, Columbus, Ohio**

Topic: "Iceberg-Rafted Sediment in the Deep Ocean -An Ice Volume Story or Not?"

Thursday, January 18, 2007

**Cat-n-Fiddle Restaurant
Exit 13, I-93, Manchester Street, Concord, NH**

6:00 pm Social Hour, 7:00 pm Buffet Dinner, 7:45 pm Speaker

GSNH 2006 Annual Winter Dinner Meeting, Thursday, January 18, 2007

Advance Reservations: _____ Member (Dues Paid) @ \$20.00.

- Member at the Door or Non-Member with Reservation (\$22.00).
- Non-Member without Reservation (\$24.00).
- Students \$10.00 with valid student ID card (Reservation Requested).

Note: GSNH will also accept dinner reservations by e-mail, which will then allow you to pay at the door. Please note that e-mail reservations constitute an agreement with the Society for which you will be responsible to pay, whether you are able to attend or not, unless you cancel your reservation by noon the day before the Dinner.

Note: Reservations will be taken until Monday January 15, 2006! Make checks payable to: Geological Society of New Hampshire

Mail to: Lee Wilder, 477 Putney Hill Road, Hopkinton, NH 03229. Reply via e-mail to: boslwne@tds.net.

Name(s): _____

Address: _____

Phone and/or Email: _____

Half the cost of the dinner may be tax-deductible as a business expense.

The lecture part of the program counts as 1.5 hours of CEU contact hour credit.

Upcoming Events/Dates to Remember!

- JANUARY 18, 2006 – GSNH Winter Dinner Meeting at Cat-n-Fiddle, Concord, NH
- MARCH 1, 2007 – Next GSNH Newsletter Deadline. Send your articles to Bettina Eames at Loureiro Engineering Associates at beeames@loureiro.com.
- March 11-14, 2007 –Geological Society of America-Northeast Section at UNH, Durham, NH



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