THE GREEN MOUNTAIN GEOLOGIST

QUARTERLY NEWSLETTER OF THE VERMONT GEOLOGICAL SOCIETY

VGS Website: www.uvm.org/vtgeologicalsociety/

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The Vermont Geological Society's
Fall Field Trip & Annual Meeting

An Overview of the Bedrock Geology between Middlebury Village and Middlebury Gap, Vermont

October 20, 2007

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FALL FIELD TRIP DESCRIPTION AND ROAD LOG

Saturday, October 20, 2007

TITLE: An Overview of the Bedrock Geology between Middlebury Village and Middlebury Gap, Vermont.

LEADER: David West, Geology Department, Middlebury College

TIME: 9:00 AM to mid-afternoon

MEETING POINT INFORMATION: We will meet at 9:00 AM at the Maplefields Convenience Store (also a Mobil Gas Station) on US Route 7 approximately 4.5 miles north of the traffic circle in Middlebury. Please note there are a couple of Maplefields store locations in and around Middlebury – this one is located ***4.5 miles north of Middlebury*** on Route 7 and is on the ***east*** side of the highway.

FIELD TRIP OVERVIEW: The purpose of this trip is to visit and discuss bedrock exposures along the western flank of the Green Mountains and the eastern side of the Champlain Valley at the approximate latitude of Middlebury, Vermont. We will visit two large quarry exposures in Ordovician carbonate rocks of the Champlain Valley sequence where participants will have opportunities to view spectacular continuous 3-D exposures that illustrate the deformational style of rocks in the Middlebury Synclinorium. The trip will then progress down-section with a visit to a classic exposure of Cambrian quartzites, and culminate with exposures of Middle Proterozoic basement rocks in the Lincoln Massif and surrounding metamorphosed cover rocks of the Hoosac Formation.

Participants should bring water and lunch, although we will be in the vicinity of a country store around noon. Participants should wear sturdy shoes as a moderate hike is planned for later in the day (at the Middlebury College Snowbowl). We will be visiting two active quarries during this trip and thus those following this guide in the future will be responsible for securing permission prior to visiting these sites.

Finally, the field trip leader does not profess to be an expert in the geology of this region as he is not currently mapping or conducting research in the region. Many of the localities we plan to visit are simply used by the leader as teaching sites for students at Middlebury College. The overall plan is to visit and discuss geological relationships at several exposures in the Middlebury area – and to incorporate what we see into discussions of the overall Middle Proterozoic to Early Paleozoic geologic history of the region.

FIELD TRIP ROAD LOG: (See above for information on departure location)

Mileage

0.0 Exit Maplefields Convenience Store parking lot and proceed north on Route 7.

0.8 Turn left (west) onto Campground Road.

1.0 Turn right into the Pike Aggregate Quarry service road. Please note that the distances traveled within the quarry are variable depending activity levels – *so the mileage readings should be reset at this point upon exiting the quarry.*

Stop 1—Weybridge Member of the Chipman Formation (upper part of the Beekmantown Group): Spectacular exposures of upright shallow-plunging folds in well-bedded light gray limestones. In addition, small-scale west-directed thrust faults with associated fault bend folds, and numerous high-angle oblique slip faults are exposed in the quarry walls. This quarry is located near the axis of the Middlebury Synclinorium.

1.0 Return to vehicles and exit via the quarry service road. Turn left on Campground Road at the entrance to the quarry and reset mileage. Drive east on Campground Road towards Route 7.

1.2 Intersection of Campground Road and Route 7. Turn right (south) on to Route 7 and drive towards Middlebury.

2.9 Cross bridge over the New Haven River.

6.2 First stop light in Middlebury. Turn right onto Elm Street.

6.3 Four-way stop sign. Continue straight across intersection.

7.0 Road bears left and Pulp Mill Covered Bridge crosses Otter Creek.

7.1 Immediately upon exiting the Pulp Mill Bridge, bear to the left.

7.5 Intersection with Route 23 (Weybridge Street). Turn left.

7.7 Turn right into Middlebury College Entrance Road (there is a sign for the entrance to the Freeman International Center).

7.8 Road forks – bear to the left towards the Atwater Parking Lot.

7.9 Park in the parking lot and proceed south to blasted outcrops behind the Atwater B Dorm (easternmost building).

Stop 2—Middlebury Limestone (Chazy Group): Freshly blasted exposures of dark gray, slaty, dolomitic limestone. In contrast to many of the more competent units within the Middlebury Synclinorium, rocks of the Middlebury Limestone are well cleaved and multiple cleavage generations are preserved.

7.9 Return to vehicles and retrace route back to Route 23 (Weybridge Street).

8.1 Intersection of College Entrance Road with Route 23. Turn left.

8.4 Turn right onto Morgan Horse Farm Road.

8.8 Stop sign. Bear to the right and cross the Pulp Mill Covered Bridge.

9.4 Stop sign. Continue straight as the road curves to the left.

9.5 4-way stop sign. Continue straight.

9.6 Stop light – intersection with Route 7. Turn right (south) onto Route 7.

9.9 Enter Middlebury traffic circle and continue south on Route 7.

11.0 Last traffic light in Middlebury – McDonalds on the right. Continue south on Route 7.

12.7 Turn left onto OMYA service road (green road sign is labeled "1975 – Private Road"). This road is easy to miss – it is just beyond a large industrial building on the left and before a car dealership.

13.0 Stop sign. Proceed straight across and through the gate to the OMYA quarry. Please note that the distances traveled within the quarry are variable depending activity levels – *so the mileage readings should be reset at this point upon exiting the quarry.*

Stop 3—Shelburne Formation: Expansive exposures of steeply dipping white marble and subordinate beds of light grey dolomitic marble. If time allows, we will examine unconsolidated glacial and post-glacial sediments (till and overlying varve sequence) that unconformably overlie the marbles.

13.0 Return to vehicles and exit the quarry via the service road. Reset mileage at the stop sign just beyond the gate and the entrance to the quarry. Turn left at the stop sign onto dirt road.

13.3 Stop sign – intersection with Cady Road. Turn left (east) onto Cady Road.

14.4 Stop sign – intersection with Route 116. Turn right (south) towards East Middlebury.

15.4 4-way stop sign – intersection with Route 125. Turn left (east).

16.5 Road turns sharply to the right and a bridge crosses over the Middlebury River. Immediately after crossing the bridge, pull over to the right side and park.

Stop 4—Cheshire Formation: Very carefully walk back across the bridge and proceed to outcrops just downstream of the bridge. At this latitude the Cheshire shows considerable

lithologic variability (e.g., phyllites, rusty weathering horizons), however, at this locality the rocks show little variability and consist of relatively pure, well-bedded quartzites.

16.5 Return to vehicles and continue east on Route 125 towards Ripton.

19.1 Approximately 100 meters south of the Ripton Country Store, pull over to the right (just before the guardrail) and park.

Stop 5—Deformed Middle Proterozoic intrusive rocks of the Lincoln Massif: Proceed very carefully down to bedrock exposures just upstream of the bridge. Please be careful, as these exposures are typically wet and slippery. Exposed in the stream are highly sheared, porphyritic (alkali feldspar up to 10 cm in length), muscovite-bearing granitoid gneisses. In places these gneisses are sheared against rusty weathering muscovite schists.

19.1 Return to vehicles and continue east on Route 125.

20.0 Pull over to the right, immediately beyond the sign for Old Town Road (Private).

Stop 6: Middle Proterozoic gneisses of the Lincoln Massif: Proceed very carefully to the small set of outcrops just below the bridge over the stream. This will be a quick stop with the primary purpose being to illustrate the lithologic variability in the Middle Proterozoic gneisses – and to contrast this exposure with what was observed at Stop 5.

20.0 Return to cars and continue east on Route 125.

22.2 Middlebury College's Breadloaf campus. Continue east on Route 125.
24.2 Entrance to the Middlebury College Snowbowl. Continue east on Route 125.

24.9 Pull over to the right and park in the parking lot where the Long Trail crosses Route 125. This is just to the west of the crest of Middlebury Gap.

Stop 7—Hoosac Formation: This stop involves an approximately 1.5 kilometer hike (each way) to the south along the Long Trail. Our ultimate destination will be Lake Pleiad. Along the hike we will see numerous exposures of greenish-gray schist/phyllite of the Hoosac Formation. At Lake Pleiad are extensive exposures of light gray, well-crenulated, albite–white mica schist (+/- chloritoid?). Return to vehicles.

End of Field Trip. Annual Meeting follows (see details below).

ANNUAL MEETING AND ELECTION OF OFFICERS

The Annual Meeting will be at the Waybury Inn in East Middlebury immediately upon the completion of the field trip. It is estimated that the meeting will begin at approximately 4:30 PM. The Waybury Inn is located on the north side of Route 125 – approximately 1.5 miles from

the intersection of Route 125 and Route 7 (this intersection is south of Middlebury). If you are unable to attend the field trip and Annual Meeting, please send the enclosed absentee ballot by October 18, 2007 to David West, Dept. of Geology, Middlebury College, Middlebury, VT 05753. The ballot lists the names of the four officers to be elected.

PRESIDENT'S LETTER

Dear Members,

Our Society remains financially healthy and active. Check your recent e-mail or see the VGS website for student research grant announcements. I hear the Summer Field Trip went very well and I'm sorry I was unable to attend. Thanks to Peter Thompson, David DeSimone, and J. Gregory McHone for running the trip. For those of you looking for a speaker at your college or high school, check out our website and get the information on Jon Kim, the VGS Lecturer. He comes free of charge!

Fall approaches, which for many of us means we will be able to see outcrop again. If you are out in the field, enjoy. October 14-20 is the Tenth Annual Earth Science Week, with the theme "The Pulse of Earth Science," promoting public and professional awareness of the status of earth science in education and society. Locally, OMYA is holding their annual Middlebury Quarry Open House on the 13th. Hope our Society is out in force!

Have an enjoyable fall,
Rick Dunn, President

SUMMER MEETING MINUTES

No Executive Committee Meeting was held following the Society's Summer Field Trip to the Woodstock–Quechee Gorge area on August 11, 2007.

TREASURER'S REPORT

The financial condition of the Society continues to be very strong. As of September 1, 2007, the checking account balance was $6,020.22. To my knowledge, there are no outstanding bills. A financial statement for the period 9/1/06-8/31/07 is indicated below. Income significantly exceeded expenses during this 12-month period as only one Research Grant was awarded to a single applicant. The Green Mountain Geologist was printed this year at no cost to the Society due to the generosity of the Department of Geology of Middlebury College.

The following member has been approved for membership in the Society since the last report: Kim Greenwood, Montpelier, Vermont.

The 2008 membership renewal and directory information form will be mailed out to all members by December 31, 2007. The deadline for renewal will be January 31, 2008.

Respectfully submitted,
Stephen S. Howe, Treasurer

Income and Expenses
9/1/06-8/31/07

INCOME		
Total Dues		$1,595.00
Member	$1,305.00	
Family	$200.00	
Student	$0.00	
Institution	$90.00	
Student Research Grant Contributions		$590.00
Vermont Geology Sales		$0.00
TOTAL INCOME		$2,185.00
EXPENSES		
Green Mountain Geologist Printing		$0.00
Postage		$157.57
Office Supplies		$7.40
Post Office Box Rental (to 8/1/08)		$56.00
Fall Field Trip Handout Printing		$43.01
Fall Meeting Refreshments		$16.57
Winter Meeting Refreshments		$44.55
Spring Meeting Refreshments		$35.14
Awards	$775.00	
Research Grants	$500.00	
Spring Meeting Student Talks	$275.00	
TOTAL EXPENSES		$1,135.24
TOTAL INCOME – TOTAL EXPENSES		$1,049.76

ADVANCEMENT OF SCIENCE COMMITTEE REPORT

The Committee will recommend several dates in early March 2008 for the Society's next Winter Meeting. The theme for this meeting will be "Holocene Climate Change." Members are encouraged to contact me with any suggestions they may have for speakers.

Respectfully submitted
Stephen S. Howe, Chair

STATE GEOLOGIST'S REPORT

Vermont Geological Survey and Reorganization

In the fall of 2005, I reported to you on a sweeping reorganization at the Agency of Natural Resources. In government, such activities take time and changes are about to be implemented. If you think that geology and the earth sciences are important to the State of Vermont, I urge you to comment to the Vermont Way Forward at *www.anr.state.vt.us/site/cfm/TVWF/index.cfm*
The contact is Laura Pelosi, ANR Director of Policy Research and Planning, ANR.ReOrg@state.vt.us

The science function as separate from day-to-day regulation is important and necessary. Regulations certainly employ science and we provide per statute "advice to regulatory programs," but we do not get in the middle of the details of writing permits and the legal questions that surround this function. The constituency for geology, the earth sciences, and science in general should be heard. A "holistic" approach is the intent of the changes that are coming. In this context, earth systems science is a term that some use to describe our interest in integrating the geosciences for a public good. Health, safety and supporting the general welfare are outcomes reached through the use of Vermont Geological Survey studies and the information we provide.

Woodstock

The Town of Woodstock requested surficial and aquifer mapping from the Vermont Geological Survey to aid in groundwater protection and planning, which are priorities in the Woodstock Municipal Plan and the Two Rivers–Ottauquechee Regional Plan. Bedrock mapping was included since many residential wells penetrate bedrock. We are very proud of the results that include Peter Thompson's bedrock map, Dave DeSimone's surficial map, both of their groundwater interpretations, and Marjorie Gale's design and cartography for map presentation. Maps may be viewed and downloaded at *www.anr.state.vt.us/DEC/GEO/WoodstockWater.htm*

Respectively submitted,
Laurence R. Becker, State Geologist

OMYA QUARRY OPEN HOUSE, EAST MIDDLEBURY, VERMONT
Saturday, October 13, 2007

OMYA is once again holding its annual open house at its Middlebury Quarry to commemorate Earth Science Week. This large quarry produces white, high-calcium marble that is processed into fillers and extenders for the paper, plastic, and paint industries. It has also produced some very attractive salmon-colored calcite. This will be a family event that will include quarry tours, viewing quarrying equipment close-up, earth science activities, and refreshments. The event is free and will be held from 10:00 AM to 4:00 PM, with the last tour at 3:00 PM.

The road to the quarry is off the east side of US Route 7, 2.5 miles south of the *Middlebury Inn* (traveling southbound) and 1 mile north of the turnoff to the junction of Routes 125 and 116 (traveling northbound). The quarry road is between *Standard Register* and *Foster Motors*, and the green street sign is labeled *1975 Private Road*. Continue straight on this road at the first stop sign. The second stop sign is at the quarry. Please park where instructed. For further information, call Alice Blount at (802) 770-7267 from 8:00 AM to 5:00 PM, e-mail to marble2@sigmaxi.net, or visit the website at *www.omya-na.com* and click "Enter Site" and then click on "News" at the top of the page.

Members wishing to volunteer may contact Jerilynn Valente at (802) 770-7217. A dinner at Rosie's in Middlebury is planned for volunteers.

ANNOUNCEMENTS

VERMONT GEOLOGICAL SOCIETY LECTURER PROGRAM

The goal of the Vermont Geological Society Lecturer Program is to offer local colleges, universities, and high schools the opportunity to invite a member of the VGS to speak at their institution on timely topics within the broad realm of earth and environmental sciences. The program is primarily intended to reach those departments which either do not hold a regularly scheduled seminar series or whose finances do not permit them to invite external speakers to present talks on a regular basis. Any costs associated with the Lecturer's travel, lodging, and meals are borne entirely by the Vermont Geological Society.

Jon Kim, Ph.D., Geologist/Environmental Scientist, at the Vermont Geological Survey in Waterbury, Vermont, is our 2007 Lecturer. Jon is offering the following two lecture topics: "Nitrate Contamination of a Bedrock Aquifer in Central Vermont" and "Application of Tectonics to Groundwater Problems in Vermont." For scheduling information, see the Society's website at *www.uvm.org/vtgeologicalsociety/lecturer_program.html*

GREEN MOUNTAIN GEOLOGIST ARCHIVES

Kathleen Howe, the Vermont Geological Society's Webmaster, has begun the process of archiving an electronic version of every *Green Mountain Geologist* published since the dawn of the Society. Issues produced prior to 2005 must be scanned, but later issues are being archived from the original Adobe Portable Document Format (PDF). The archived issues are listed together with a brief note indicating each issue's highlights and can be accessed at the Society's website at *www.uvm.org/vtgeologicalsociety/gmgarchive.html*

ELECTRONIC *GREEN MOUNTAIN GEOLOGIST*

The Vermont Geological Society continues to encourage its members to receive the *Green Mountain Geologist* electronically. In fact, the Society is considering the possibility of a completely electronic *Green Mountain Geologist* beginning in 2008. Newsletters would be sent exclusively as PDF attachments to e-mail messages. Members who currently receive the newsletter as a paper copy sent by postal mail would need to provide an e-mail address when they renew their membership.

Adobe PDF is a very common format that is used by both Windows and Macintosh computers. However, you must have the **free** "Adobe Reader" software installed on your computer to open this type of file. Many computers purchased within the last few years come with "Adobe Reader" already pre-installed. If you **do not** have Adobe Reader on your computer, go to the website below to read more about Adobe Reader software. This website also has a link to download the software, again, for free. See *www.adobe.com/products/reader/*

The Society is considering this change in the way its newsletter is distributed because of a combination of factors, especially the significant and increasing expense the Society incurs from postage and the significant workload associated with the production and mailing of the newsletter. An electronic-only newsletter would also reduce the amount of time spent maintaining separate membership databases, one for members receiving an electronic newsletter by e-mail and another for members receiving a paper copy by postal mail.

Another advantage of electronic newsletters is the ability to display graphic material, such as photographs of geological features in the field, in color, enhancing the appeal of the material that

appears in the newsletters. This is crucial to the Society's ability to attract new members, particularly students, many of who are accustomed to browsing colorful websites routinely.

Members wishing to comment on this proposed change should send an e-mail message to any member of the Society's Executive Committee listed below or a written note to the Society's mailing address of P.O. Box 1224, Saint Albans, VT 05478-1224 **prior to October 20, 2007**.

VERMONT GEOLOGICAL SOCIETY CALENDAR

10/5-7/07	NEIGC 99th Annual Meeting, Quebec City, Quebec, Canada
10/13/07	OMYA Middlebury Quarry Open House
10/14-20/07	Earth Science Week
10/20/07	VGS Fall Field Trip, Middlebury Area, Vermont
10/28-31/07	GSA Annual Meeting and Exhibition, Denver, Colorado

The **Vermont Geological Society** is a non-profit educational corporation.
The **Executive Committee** of the Society is comprised of the Officers, the Board of Directors, and the Chairs of the Permanent Committees.

Officers

President	Richard Dunn	(802) 485-2304	rdunn@norwich.edu
Vice President	George Springston	(802) 485-2734	gsprings@norwich.edu
Secretary	David West	(802) 443-3476	dwest@middlebury.edu
Treasurer	Stephen Howe	(518) 442-5053	showe@albany.edu

Board of Directors

Les Kanat	(802) 635-1327	les.kanat@jsc.vsc.edu
Jon Kim	(802) 241-3469	jon.kim@state.vt.us
John Van Hoesen	(802) 287-8387	vanhoesenj@greenmtn.edu

Chairs of the Permanent Committees

Advancement of Science	Stephen Howe
Geological Education	Christine Massey
Membership	Stephen Wright
Public Issues	Laurence Becker
Publications/Editorial	Stephen Howe

VERMONT GEOLOGICAL SOCIETY ANNUAL MEETING
October 20, 2007

ABSENTEE BALLOT

Please enter your name and address here:

_____

_____

_____

_____

Officers

President	George Springston	_____
Vice-President	John Van Hoesen	_____
Secretary	David West	_____
Treasurer	Stephen Howe	_____

Only Officers will be elected at the Annual Meeting this year. As Immediate Past President, Richard Dunn is appointed to a one-year term on the Board of Directors, per Society Bylaws. Les Kanat and Jon Kim will serve the second year of their two-year terms on the Board of Directors to which they were elected at the 2006 Annual Meeting. Returning Permanent Committee Chairs are:

Advancement of Science: Stephen Howe
Geological Education: Christine Massey
Membership: Stephen Wright
Public Issues: Laurence Becker
Publications/Editorial: Stephen Howe

If you will not be attending the Annual Meeting, please complete the absentee ballot and return it to David West, Dept. of Geology, Middlebury College, Middlebury, VT 05753 **no later than October 18, 2007**.

Vermont Geological Society
P.O. Box 1224
Saint Albans, VT 05478-1224

ADDRESS CHANGE?
Please send it to the Treasurer at the above address

Vermont Geological Society
Fall Field Trip
October 20, 2007, 9:00 AM

We will meet at 9:00 AM at the Maplefields Convenience Store (also a Mobil Gas Station) on US Route 7 approximately 4.5 miles north of the traffic circle in Middlebury. Please note there are a couple of Maplefields store locations in and around Middlebury – this one is located ***4.5 miles north of Middlebury*** on Route 7 and is on the ***east*** side of the highway.