



# GEOLOGICAL SOCIETY OF MINNESOTA

# NEWS

FALL 2008  
VOLUME LXII NO. 3

<http://www.gsmn.org>

### **New Board Members Needed**

If you have a suggestion for someone, or would like to volunteer yourself, to serve on the GSM Board, we have three spots opening up. Two member's terms are up and one position presently remains open.

Call a member of the nominating committee: Bill Robbins, Ly Preece or Doug Zbikowski. with your ideas.

## **ANNUAL MEETING**

**September 22, 2008**

Grand City Buffet  
8912 Hwy. 7  
St. Louis Park, MN  
(952) 912-0888

**Lecture: Tectonic History of the Alps  
By Cameron Davidson, PhD**

**Business: Election of new Board  
Members**

## **WELCOME NEW MEMBERS**

Joel and Nancy Anderson  
Joan Benedict  
Grant Carlson  
Louise Fines  
John Jordan  
Sean Pajak Family  
Daniel Whitney

# Announcements

Aug. 21: State Fair Begins

Sept. 13: Field Trip to St. Croix River Valley area.

Sept. 22: Annual Meeting, Grand City Buffet, and the First Lecture of 2008-2009 Series

Oct. 4: Field Trip to the Duluth Area

## **GSM NEWS**

**Editor:** Judy Hamilton  
**Production Mgr:** Katy Paul

Geological Society of Minnesota is a 501(c)3 nonprofit organization. The purpose of this newsletter is to inform members and friends of the activities of the Geological Society of Minnesota. GSM NEWS is published four times a year: February 15, May 15, August 15, and November 15. GSM NEWS welcomes unsolicited Geology and Earth Science related articles and photographs. Deadline for article submission is the first of the month, before the date of publication. Send all material for GSM NEWS to the address below.

### **OFFICERS:**

Ly Preece, *President*  
Dick Bottenberg, *Vice President*  
Ed Steffner, *Treasurer*  
Gerry Paul, *Secretary*

Directors in addition to the officers listed above: Kathy Ahlers; Kate Hintz; Sandy Steffner; Harvey Thorliefson; one vacancy.

Send all GSM membership dues, change of address cards, and renewals to:

GSM Membership Chair  
P.O. Box 390555  
Edina MN 55439-0555

Membership levels are \$10 Full-Time Students;  
\$20 Individuals; \$30 Families

## **Water on Mars**

Laboratory tests aboard NASA's Phoenix Mars Lander have identified water in a soil sample. The lander's robotic arm delivered the sample to an instrument that identifies vapors produced by the heating of samples.

"We have water," said William Boynton of the University of Arizona, lead scientist for the Thermal and Evolved-Gas Analyzer, or TEGA. "We've seen evidence for this water ice before in observations by the Mars Odyssey orbiter and in disappearing chunks observed by Phoenix last month, but this is the first time Martian water has been touched and tasted."

With enticing results so far and the spacecraft in good shape, NASA also announced operational funding for the mission will extend through Sept. 30. The original prime mission of three months ends in late August. The mission extension adds five weeks to the 90 days of the prime mission.

"Phoenix is healthy and the projections for solar power look good, so we want to take full advantage of having this resource in one of the most interesting locations on Mars," said Michael Meyer, chief scientist for the Mars Exploration Program at NASA Headquarters in Washington.

The soil sample came from a trench approximately 2 inches deep. When the robotic arm first reached that depth, it hit a hard layer of frozen soil. Two attempts to deliver samples of icy soil on days when fresh material was exposed were foiled when the samples became stuck inside the scoop. Most of the material in the second sample had been exposed to the air for two days, letting some of the water in the sample vaporize away and making the soil easier to handle.

"Mars is giving us some surprises," said Phoenix principal investigator Peter Smith of the University of Arizona. "We're excited because surprises are where discoveries come from. One surprise is how the soil is behaving. The ice-rich layers stick to the scoop when poised in the sun above the deck, different from what we expected from all the Mars simulation testing we've done. That has presented challenges for delivering samples, but we're finding ways to work with it and we're gathering lots of information to help us understand this soil."

Since landing on May 25, Phoenix has been studying soil with a chemistry lab, TEGA, a microscope, a conductivity probe and cameras. Besides confirming the 2002 finding from orbit of water ice near the surface and deciphering the newly observed stickiness, the science team is trying to determine whether the water ice ever thaws enough to be available for biology and if carbon-containing chemicals and other raw materials for life are present.

**GSM field trip to Southern Illinois and Western Kentucky**  
**Arranged by Ed and Sandy Steffner**

Twenty-three GSM people went on this trip. I thought it a very pleasant trip to Kentucky, given construction and the distance, since for the most part, the weather was nice. I only made one error because of construction (that I recall) and veered off to the left on the freeway. Stopping at an Oasis gas station, and not really getting good instructions on how to get back to where I wanted to be, two blue jean clad gentlemen started to explain but seeing the “lost” look on my face told me to follow them. That in itself was amusing since normally I wouldn’t do that, but it turned out they have Highway Helpers in Illinois just like in Minnesota.

Another amusing item was when I got to Marion, drove to the far end of Main Street, but found no big red barn which I was looking for, I called Ed Steffner on his cell phone to ask him where the heck this place was. His first answer was, “What state are you in?” My reply: “What?” As it turns out, Illinois has a Marion also, about 35 miles from our destination. Learn something new every day!

Arriving at our destination in Kentucky, we found the lovely Marion Inn B & B, in the hickory wooded countryside, with gardens and ponds, and cows mooing somewhere nearby, and our special hostess, Rosalind Hillis. Her home is beautiful and the breakfasts were delightful and a great start to the day.

Marion, Kentucky has the world’s largest fluorite collection. Our first stop was at the Ben E. Clement Mineral Museum where his son, Ed Clement, led the museum tour and explained that while living, his dad had minerals in their home from wall to wall. In fact he had assembled over 50,000 pieces of fluorspar (fluorite). It is now housed in the museum, wall to wall. It is a spectacular collection and one room contains phosphorescent minerals; the collection is beautiful when room lights are turned off and UV lights are turned on.

Fluorite has been called the most colorful mineral in the world as its colors are many but most commonly purple. It is calcium fluoride formed over 150-200 million years ago and forms at shallow depths in relatively cooler conditions than what many other types of crystals form at. Fluorite is second only to quartz as being the most popular mineral for collectors but can be easily scratched or broken. Therefore it is not very useful as a gemstone. Calcium fluoride is used as a flux in the aluminum industry and to flux steel and make glass, as a source of fluorine for hydrofluoric acid production, oil well stimulation, making rocket fuel and much more. It is also used in the process of separating isotopes to enrich uranium fuel for nuclear reactors. Mining and milling of fluorspar is a major industry of the Illinois-Kentucky Ozarks.

Another museum visited was the American Fluorite Museum located in the town of Rosiclare, Illinois. We used a ferry to take us across the Ohio River to a landing in Cave-in-Rock, Illinois. (Now isn’t that an appropriate location for the GSM bunch?) This museum will preserve the history for future generations since, along with huge pieces of fluorite; it also contains old mining paraphernalia. Our geologist and tour guide was Eric Livingston. The town of Rosiclare even holds an annual fluorspar festival.

The fluorite “dig” took place at a spot on a creek owned by Bill Frazier. Not able to get down or up the bank of the creek where our people were digging, some in the water, some along the bank – I watched from above, occasionally with amusement. One of our members fell in the shallow creek while traversing to a good digging site, but was not hurt as I understand it. I promised not to reveal the individual’s name. When Bill Frazier stopped to chat with me at the spot where I was sitting, he glanced down at our feet and found two small rocks containing fluorite. I didn’t see them, of course, because of the muddy matrix they were in. He gave them to me. Some nice specimens were found at this spot and also at the night dig. On another evening, at a cook out in the backyard of the Inn, when it became dark, people displayed their fluorescent pieces under black lights. The cookout, by the way, was fun and everyone on the trip attended, including Mr. Frazier and his wife Carol.

A couple of side trips were made by some GSMers. The National Quilt Museum in Paducah, Kentucky, was fabulous; a few of us did some shopping in the Amish community, which was nearby. Their food products were out of this world. Some folks visited Patti’s Settlement, near Paducah, which I know nothing about. Ask the Steffners for further information. Several of us also visited the Garden of the Gods in the Shawnee National Forest in Illinois. The Wilderness area is over 320 million years old and covers over 3,300 acres of old growth forest. The rock formations are terrific.

My trip companion, Marlys, and I did not go to Mammoth Cave with the others as I had been told there are many steps – which is common in caves. Instead, we headed home and drove through Galena, Illinois. This had been discussed originally as a stop on our way to Kentucky. Since it is known for its lead mining, it might be a good spot for a future field trip.

By Judy Hamilton

*[Photos will be available for viewing at the Annual Meeting Sept. 22]*

## **GSM field trip to Northeastern Wisconsin and the Upper Peninsula of Michigan Led by Gene and Sally LaBerge**

Gene and Sally were terrific hosts as well as field trip guides. They had lived and mapped the region in their early days—Sally’s family had owned much of the land around Niagara, WI; Sally and Gene were married in the shadow of the Quinnesec Volcanics. They took us to see highlights of the area including the textbook quality pillow basalts near Marquette and Jasper Knob in Ishpeming. They took us off the beaten path (and through the woods) to see the Quinnesec mine which closed in 1950 and has been slowly but dramatically collapsing—the support pillars of Briar slate left by the miners are slowly crumbling, leaving an arch-like structure overhead. In Negaunee we ate authentic miner’s lunch of pasties near the jasperlite monument to the discovery of iron in 1844.

The rocks of this region tell part of the story of how the North American continent was formed. The archaic-aged rocks are exposed at the surface and Gene and Sally interpreted what the rocks actually show us. And what a story it is! 1875 to 1850 million years ago two continental plates moved towards each other and one subducted under the other. But in this region, the rocks show that the granitic crust of the original craton subducted UNDER the heavier oceanic basaltic crust—a very rare occurrence expressed in the Quinnesec Volcanics.

We saw a most beautiful and dramatic exposure, Piers Gorge, outside Niagara, WI. Here the rocks are intensely deformed and foliated. The Niagara Fault forms this gorge and the Menominee River flows in it and this is the boundary between Wisconsin and Michigan. The gorge narrows at this outcrop and creates rapids with a 14’ drop which some of us experienced in a raft the day after the field trip!

We explored the McClure site that was recently discovered and interpreted to be “ejecta”—evidence of a celestial body that crashed into the Sudbury Ontario region about 1850 million years ago. The story is dramatic—the impact is believed to have been the second largest in earth’s history and to have generated seismic waves perhaps measuring 13 on the Richter scale. The magnitude of this catastrophic event is difficult to fathom.

The last stop of the trip was at Champion Iron mine that closed in the late 1960s. We were turned loose on its slagheap where we collected spectacular hematite as well as samples with garnet and a few tourmaline crystals.

The UP area has much geology to offer and we barely “scraped the surface”.

Very special memories of the trip:

- Finding and hearing about a deformed rock (from the Sudbury meteor) that hadn’t been identified for so many years, and concern that these precious pieces will be bulldozed to make yet another road.
- The rocks on Jasper Knob - such amazing colors and convolutions – they looked like grand jewelry. - Iridescent and resplendent
- The pasty was special and delicious.
- And, as always, a group of 22 people, diverse, interesting, and helpful.

By Diane Lentsch, Dorothy Kuether and Bill Robbins

## Chaitén Volcano

On Friday, May 2, 2008, Chaitén Volcano in southeastern Chile erupted for the first time since about 7400 BC. Its initial eruption produced a plume of volcanic ash and steam that rose nearly 17 kilometers high. Winds carried the plume east, over the Andes Mountains and into Argentina. The plume then drifted out over the Atlantic Ocean. It was visible on satellite images for hundreds of kilometers over the Atlantic. The volcano shows continued activity and produced additional ash plumes.

The town of Chaitén, located about 10 kilometers southwest of the eruption site, was blanketed with ash. About 4,000 people who lived there were evacuated by boat. The town of Futaleufu, with about 1000 residents, was also evacuated. Smaller communities to the southeast such as Chubut and Rio Negro also received heavy ashfalls. The ash plume was so thick in some parts of Argentina that schools, highways and airports were forced to close.

Before the eruption, Chaitén was a lava dome within a caldera about 2.5 kilometers wide and 4 kilometers long. The volcano has a history of explosive eruptions, dome building and pyroclastic flows associated with dome collapse. These characteristics, combined with its ability to produce substantial ashfalls, make it a potentially dangerous volcano.

### MEMBERSHIP RENEWAL

**Reminder...** if the label on this newsletter has the date 10/1/08 your GSM membership expires September 30<sup>th</sup>. With your support, GSM can continue to offer a fine lecture program, provide area schools with an invaluable resource through the Outreach Program, and introduce you to the pool of talented professionals in the field of geology. Please renew your membership by filling in the form below and mailing it to the address given.

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**Geological Society of Minnesota  
P.O. Box 390555  
Edina, MN 55339-0555**

#### **Membership Renewal - October 1, 2008 to September 30, 2009**

- \$10 Student                       \$20 Individual                       \$30 Family  
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