



GSM NEWS

GEOLOGICAL SOCIETY OF MINNESOTA

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Aug. 14-15 - Iron Range Field Trip

The field trip to the Iron Ranges in August was a real adventure! We all rode in an air-conditioned bus (with a bathroom!) and our Bus Driver was just as enthusiastic about our trip as we were. We met in Cloquet on Sat. AM, loaded onto the bus, and drove to our first stop (see photo on right).

Our Leader, Dick Ojakangas grew up in the area, and as we traveled, he told us several stories about his youth, and how he got into the field of geology. It was fun hearing all the tales of what things were like, way back when. After lunch, we visited the DNR Core Storage Library in Hibbing and saw how drill core samples are stored. Many, many boxes of cores are stacked on shelving that reaches to the ceiling. Next stop was Mineview in the Sky, which overlooks the Virginia Horn. We saw some of the old mines from the top of this mine dump. Good photo opportunities here.



Collecting at the Thunderbird North Mine. Great specimens of Magnetite were found here.



Our First Stop: The Natural Resources Research Institute in Coleraine, MN.

Our first stop on Sunday was at the Soudan Iron Mine. A tour of the Mine and the Physics Research Facilities (2,340 feet below the surface) lasted about 2 hours. We also stopped to view 2.7 Billion year old turbidite beds (greywacke) near the Pike River Dam. And we spent a lot of time at the Cliffs-Erie Mine (no longer active) where we saw amazing stromatolites in the Biwabik Iron Formation. This was a surface mine, so we drove the bus directly to the destination. We saw a lot of shallow “pits” and dumps too. Joel Evers, a geologist with Cliffs, was our guide through this area. He provided samples of anthraxolite for us that he found in another area of the mine. Anthraxolite is an organic bitumen (coal) that contains 95% or more carbon. It is black with a vitreous luster and resembles obsidian. Most of us had never heard of it before. At our last stop, we saw a large outcrop of archean pillowed greenstone, located behind the Eveleth-Gilbert Junior High school. What a trip! Very educational and fun!

Dec. 6 Dino. Fossil Lab at Macalester — Olin-Rice Bldg. Room 100

GSM NEWS

Editor: Katy Paul
952-829-7807

E-mail: kpaul@fs.com

Layout: Bruce Goettman
952-448-5422

bjgoettman@worldnet

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 three weeks before the date of publication. Send all material for GSM NEWS to: GSM NEWS, c/o Katy Paul, 6901 West 84th Street, Bloomington, MN, 55438, or to the e-mail listed above.

GSM OFFICERS – 2004

Paul Martin, *President*
Roger Benepe, *Vice President*
Ted Chura, *Treasurer*
Dorothy Kuether, *Secretary*

Directors

Cindy Demers Bill Farquhar
Marlys Lowe Tom Smalec
Rose Mary O'Donovan

CHANGE of ADDRESS & NEW MEMBERSHIPS

Send all GSM membership dues, change of address, and renewals to the GSM Membership Chair: Gail Marshall, 12232 Allen Drive, Burnsville, MN 55337; phone: (952) 894-2961. See form on Page 7.

Membership Levels

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

From the President... Paul Martin Changing of the guard

In my letter last November, I exclaimed that our year was off to a great start, and it was! This year I can report that our first events have been at least as successful as those last year.

Unfortunately, this year the excitement of a great beginning has to be tempered by sadness at the loss of two of our members, who died in September, Dr. Alex Lowe and Tom Smalec.

I had several meetings with Alex and Marlys over the last four years and always enjoyed Alex's quiet enthusiasm for geology and for learning in general. Even though he was ailing, he always had a warm smile and was as upbeat about his situation as you could reasonably expect. I shall miss him. Marlys says we will see her again!

Tom Smalec was our newsletter editor for the last few issues, and was very enthusiastic about doing it and had several interesting ideas about what could be done to improve the newsletter, and the work of the society in general. Personally I will miss his good ideas, and all the time he spent on the newsletter.

Our 2004-2005 season started out on a high note with an excellent fall banquet, and a great illustrated lecture by Minnesota Geological Survey director Harvey Thorleifson. We also elected new board members Gerry Paul and Janet Hopper.

Our lecture series on "Parks of North America" has already had three excellent lectures and a very popular lab. Attendance at the first lecture (on Parks of the Lake Superior North Shore was an impressive, and room filling, 110! Attendance at the second and third lectures (Wind and Jewel Cave, and the Parks of Southern Utah) was also well received and had an average attendance of about 65.

The lab on rock identification drew more than 40 people. Several elementary teachers who had heard about the lab, came to learn something about rock identification, because they were going to have to teach it!

We have such a great schedule for the rest of the year! Hawaii, Yellowstone, Grand Canyon, etc, etc. Check your schedule for dates. They should all be excellent. And do not miss the next lab, on dinosaurs and the Missouri Breaks National Monument. That will be on December 6, at Macalester College.

I have mentioned several times in my letters that GSM succeeds because of the many people who help with the work. Steve Erickson arranges the lecture and lab series, Katy Paul has picked up the newsletter once again, Gail Marshall takes care of membership, and other stalwarts of GSM do various other vital tasks. However, we do require a couple more volunteers. Specifically we need two more board members to start in January. Please consider whether you can serve that way. Phone me or a member of the nominating committee: Diane Lentsch, Bill Robbins, and Judy Hamilton.

This is my final "President's Letter", so I will close by thanking all members who have helped me in countless ways over the last two years. I wish to especially thank Ted Chura who will be leaving the board and the post of treasurer, as soon as we can find a replacement (see above!) And I wish all the best to Roger Benepe, who will assume the presidency in January 2005.

A Word From the New President

As the new incoming president, I would like to take a few moments to introduce myself. My name is Roger Benepe. I have been a GSM member for four years and served as a member of the board for the last year. I grew up in St. Paul. After graduating from high school I attended a local community college. I went on for my four-year degree at Huron College, Huron, South Dakota, majored in Biological Education and minored in Natural History. I returned to Minnesota and discovered there were no full-time teaching jobs available, so I spent the next two years subbing. That got old real fast. I decided to go back to school to pursue a Masters Degree in Science Education at Northern Montana College, Haver, Montana. Along the way I also earned a Masters Degree in Counseling. After teaching 6 years in the state of Washington, I decided that teaching was not for me.

My interests in geology vary widely but my true passion is

Paleontology. Yes, digging up old bones and things, (but in the realm of geology, are they really that old?). I first got hooked when I was just a little kid and my mom would take me to the museum to see the dinosaurs. At that time, I knew the names of every dinosaur. Then I went to school and other things piqued my interest but I never lost my love of the dinosaurs. It's hard to keep it in the forefront when you can't go out in the backyard and dig one up, in Minnesota...unless you are Calvin & Hobbes. It was not until I went to grad school and attended my first class in Paleontology that I was hooked again. While in grad school in Montana, I spent most of my free time out in the Badlands collecting fossils. Most were of vertebrates; the majority were dinosaurs from the late Cretaceous (76 million to 68 million years ago). Throughout the years I have also collected many invertebrate fossils. My greatest find occurred when I happened



to be in the right spot (Haver, Montana) at the right time. I discovered fused sacral vertebrae along with a few other bones and believed they belonged to a large Theropod called Albertosaurus. After some research it was verified...only the thirteenth Albertosaurus found in the world. But that is another story for another time.

I think we have a great organization, wonderful lecture series, and outstanding field trips. I would like to see an increase in new memberships. (Here is a challenge for you. Each member should bring in one new member this year). During my term in office I intend to pursue the policy: "...if it's not broken, don't fix it."

Hope to see you at the next lecture.

IN MEMORIAM

We were deeply saddened by the death of our long time friend and fellow GSM member, Dr. Alex Lowe. Alex passed away September 6, 2004, after a long battle with heart disease. He was 75.

Alex attended the U of M Medical School and was a Family Practice physician for nearly forty years, retiring in 1994. Alex practiced medicine with his father and uncle at Lowe, Lowe and Lowe, in South Saint Paul. Alex and Marlys, his wife of 54 years, have six children and 21 grandchildren.

Alex was a committed member of GSM. He and his wife, Marlys, joined the GSM in the 1960's and Alex served as President in 1975. He served on the Planning Committee for Programs and Lectures for many years, and was the Video Librarian from 1996-2003. Alex also served on the History and Archives Committee and occasionally assisted on the Show and Exhibits committee as the calling person. He enjoyed many GSM field trips and was a friend to all. He and Marlys graciously opened their home to the GSM members for many committee meetings and board meetings over the years.

Alex loved the GSM and all the like-minded people in it. His warm and friendly personality and his many contributions to the GSM will be greatly missed.

IN MEMORIAM

We were deeply saddened by the death of our fellow GSM member, Tom Smalec. Tom passed away September 25, 2004.

Tom majored in journalism at Northern Illinois University, and spent his entire adult life working in that field, most recently as a press consultant to members of the Minnesota State Legislature, and as Editor of our GSM Newsletter. Tom has two young adult daughters, twins Heather and Andrea, who live in Little Rock, Arkansas.

Tom's passions were geology and other natural sciences, like astronomy and ornithology. He was an inveterate rock collector and remembered exactly where and when he found each of his samples. He had rocks from many parts of the world.

Tom served on the GSM board for the last two years. He attended our September board meeting just two weeks before he died, and participated actively in discussions about the newsletter and other important GSM topics. He's the one who strongly urged us to get a short, simple Internet address, which we now have. << www.gsmn.org >>

Tom first learned about GSM from our booth at the state fair. About four years ago he attended his first meeting, and later told his wife, Cathy, that he had found an organization that was just what he was looking for. Cathy said that Tom was frustrated for the last few months since his illness prevented him from being more active in GSM. We are very glad he found us, and that he did as much as he did. We are so sorry that he has now left us, and we wish we could have known him longer. We will miss Tom very much.

Why is Magnetite *Magnetic* and Hematite *Nonmagnetic*?

During the recent GSM field trip to the Mesabi and Vermilion Iron Ranges, this difference in magnetism was found to be central in understanding some challenges associated with recovering iron from ores in northern Minnesota.

Magnetism is created by motion of electrons in atoms. Motion of electrons circling around a nucleus produces a magnetic field. Electrons moving in one direction cancel the magnetic field of electrons moving in the other direction. As atoms generally have matched pairs of electrons circling in opposite directions, this leaves atoms with no magnetic field. Electrons also have the appearance of spinning like tops. This motion also produces a magnetic field. In most atoms, one electron spins in one direction for each electron that spins in the opposite direction, and the magnetic fields of these paired electrons cancel each other. In atoms of a few elements, the spins of some electrons are not paired. Iron is an example of such an element having unpaired electron spins. Each iron atom has a magnetic field, acts like a tiny magnet, and is called an atomic dipole. These atomic dipoles arrange themselves in certain patterns in relation to each other. In magnetite and hematite, these arrangements are different and produce a significant difference in magnetic properties as described below.

Magnetite, sometimes called lodestone, is a natural ferrite and exhibits “ferrimagnetism”. Ferrites are hard, brittle ceramic-like materials exhibiting magnetic properties. These materials have more atomic dipoles pointing in one direction than in the opposite direction. The parallel alignment or ordering of many magnetic dipoles produces magnetic behavior. Since magnetite exhibits strong magnetic susceptibility, only low, easily created magnetic fields are needed to separate magnetite from non-magnetic tailings in a finely ground mixture of magnetite and waste rock or tailings.

Hematite (iron rust) is actually weakly magnetic, exhibiting “parasitic antiferromagnetism.” In hematite, any atomic dipole points opposite to its nearest neighbors. An interaction tilts the atomic dipoles so they do not point in exactly opposite directions. The dipoles thus don’t completely cancel, providing this weak magnetic behavior.

For an in-depth essay on the difference between magnetite and hematite, including the implications for the processing of iron ore, go online to the GSM website: www.gsmn.org, where a newsletter addendum is available. – Bill Robbins –

2004 Minnesota State Fair

By the measure of the number of Lecture schedules given out (over 4000) and the notes left by the members in the "Brown Book", it seems that this year's State Fair was a success for the GSM.

Comments such as, "We had so many grade school children visit the booth;" "Fairly busy, lots of nice people;" "Very interesting ;" "Very busy all night. Nice crowd, Fun to work the booth;" and "Spotted a large cockroach on the green curtains.... killed it", gives you an idea of the fun members have when working the booth.

The success of the booth at the fair, of course, only results from the willingness of our members to work it. We really had a great turn out. We had a total of 58 people work a total of over 300 hours in setting up, tearing down and staffing the booth. We don't have room to list the names of all those who worked, however special mention should be given to Walt Blowers, Steve Erickson and Bill Robbins who each worked two shifts, and Dick Heglund, who worked four shifts. Special mention should also go to Paul Lemke, Dave Wilson, Dick Heglund, Derick Edge, and Tom Schoenecker who worked in setting up and tearing down the booth.

Many of you who visited or worked at the booth may have noticed that it's getting a little dumpy and ratty looking (maybe the reason for the cockroaches). Katy Paul and Judy Hamilton also noted this, so they volunteered to redo our table display for next year. They will redo the rock samples, keys to the samples, the literature, and the table in general. I'm sure Katy and Judy would welcome any comments.

Tom Schoenecker



Membership count for the year October 1, 2004 through September 30, 2005 as of November 1st:

79 Individual	24 Family
1 Student	1 Sustaining
2 Life	

Of the new memberships since May 21, 2004, 9 came in on state fair forms, 5 web forms and 3 from other sources.

There are 66 - 2003-2004 members who have not yet renewed.

Geological Society of Minnesota

c/o Gail Marshall
12232 Allen Drive
Burnsville, MN 55337

Membership Renewal – October 1, 2004 to September 30, 2005

- | | | |
|--|---|---|
| <input type="checkbox"/> \$10 Student | <input type="checkbox"/> \$20 Individual | <input type="checkbox"/> \$30 Family |
| <input type="checkbox"/> \$50 Sustaining | <input type="checkbox"/> \$100 Supporting | <input type="checkbox"/> \$250+ Guarantor |

Name _____

Address _____ Phone _____

City/State/Zip _____

E-mail _____

2005 SUMMER FIELD TRIP

GEOLOGY OF THE CENTRAL ROCKY MOUNTAINS

5 JUNE - 17 JUNE

This two-week field trip will take us from the arid badlands of western South Dakota to the pine-covered dome of the Black Hills to the volcanism of Devil's Tower and the vast coal resources of the Powder River Basin to the magnificent uplift of Wyoming's Bighorn Mountains. We will see evidence of ancient mountains rising and then being worn down to flat plains, huge underwater landslides, multiple episodes of intense mountain-building, igneous intrusions and associated ore deposits, and erosion on a grand scale which shaped landscapes past and present. Our investigations will span 2500 million years of earth's history and include techniques for interpreting ancient environments and mountain structures. And along the way we will see some spectacular scenery.

Trip participants use private automobiles and stay at motels or campgrounds of their choice. Participants may enter or leave the field trip whenever they wish. Most days include several stops, with picnic lunch brought by participants. Several partial days (just a couple of field stops) and transit days are included. A field trip guidebook at nominal cost will be available for purchase. There are no other costs. Two pre-trip meetings will be scheduled, probably during March and May of 2005 (date, time, location TBA); attendance is not required for participants. The March meeting will include an introduction to the trip, a slide presentation, and a detailed list, at nominal cost, of suggested motels and campgrounds. The co-leaders for this GSM field trip are Walt Blowers (651-645-3553) and Rick Uthe (952-544-1677).

Cookie List 2004-05	
Oct. 4, 2004	Paul Martin
Oct. 18	Roger Knutson
Nov. 1	Mary Caine
Nov. 15	Becky Kelly
Nov. 29	Kip Langeness
Jan. 24, 2005	Alan and Kay Smith
Feb. 7	Gail Marshall
Feb. 21	Lisa Peters
March 7	Lee and Deb Preece
March 21	Dave and Vern Schaaf
April 11	Bruce Goettman

The Geological Society of Minnesota Mission

To promote public interest and supply educational support in the geological sciences. We do this by:

- sponsoring free lectures & labs
- sponsoring regional field trips
- maintaining a media library
- distributing relevant information
- promoting the series of geological markers located throughout the state.

GSM NEWS
 c/o Katy Paul
 6901 West 84th Street
 Bloomington, MN 55438



FIRST CLASS MAIL

Membership Renewal
 Check the date on the label

With your membership support, GSM can continue to offer a fine lecture series, and introduce you to the pool of talented professionals in the field of geology. Flip this page for the renewal form.

