



# THE GEOLOGICAL SOCIETY OF MINNESOTA

## News

*Volunteer opportunities, field trips, lectures, and public service, since 1938*

### From the President's Desk...

As I write this, we are approaching the end of our lecture season, with our last lecture and Spring Banquet scheduled for May 5. I'd like to thank Steve Erickson for once again lining up an outstanding series of presenters and topics. Excluding the final lecture, we have had 13 lectures in 2013-2014 with a total attendance of 923, which averages 71 attendees per lecture. (This does not include the paleontology lab at Macalester University and the bonus lecture Bill Robbins arranged for March 31.) It was good to see such great turnout, especially during a winter that did not always make lecture attendance easy. The largest portion of your membership dues contribute toward our speakers' honoraria, so all of us as members have done a part in making these fine lectures possible. Steve is currently recruiting speakers for the 2014-2015 lecture series. If you have ideas for speakers or topics, please contact Steve.



GSM President, Dave Wilhelm

As the lectures end, summer begins, which means field trip season. Randy Strobel and Joanie Furlong are planning a week-long field trip to eastern Montana and North Dakota in August. If you have expressed interest to Randy about this trip, he'll send you updates as he prepares them. Randy is also planning an all-day geology/bicycle tour of the Mississippi River Gorge in the Twin Cities. Date and exact itinerary are TBD, but Randy promises "This would be a very leisurely ride (about 5 mph or less)", to start at Minnehaha Falls where bike rentals are available. Bill Robbins will send out a mailing when Randy has determined the particulars. And Roger Benepe is planning a special tour in May of "Ultimate Dinosaurs" at the Science Museum of Minnesota, for which you should have already received a mailing. We are always looking for new field trip ideas; if you have an idea and would like to organize a trip and have not done one before, contact me and I'll put you in touch with someone who has experience.

Summer also means Minnesota State Fair. The Fair is still months away, but please consider volunteering for the GSM booth when Sandy Steffner contacts you. It is lots of fun.

If you have not done so in a while, take a good look at our web site ([gsmn.org](http://gsmn.org)). New to the web site is the catalog of titles (~160) in our Video Library, which includes a search capability making it easy to find DVDs on particular subjects. Thanks to Alan Smith and Sherry Keesey for their work to make this catalog possible. Other content on our web site includes a list of links to other geologically related web sites, archives of GSM Newsletters and GSM Board meeting minutes, descriptions of all our State Fair rock samples, and much more.



**Inside this issue:**

Presidents message	1
New GSM Members	2
Dinosaur Tour	2
State Fair Update	3
Poem, D. Zbikowski	3
Fossil Lab	4
Notes From the Past	4
Gems and Minerals, Tuscon	5
USGS turns 135 yrs old	6
Oceans in the mantle?	7
Spring Banquet	8

Finally, I'd like to invite any members who are interested to one of our Board meetings. Our 3rd quarter meeting will occur in late July or early August; our web site will list the date. Our 4th quarter meeting is currently scheduled for November 13. We typically meet between 7:00 & 9:00 PM at the Minnesota Geological Survey building, 2642 University Ave. W., St. Paul. These meetings are open to all members of GSM. If you have a topic you would like the Board to consider, contact me about getting it on the agenda.

Have a safe, interesting, and fun summer.  
GSM President, Dave Wilhelm

**GSM News**

**Officers:**

Dave Wilhelm, President  
Sherry Keesey, Treasurer  
John Grams, Secretary

**Board Members:** Mary Inskeep; Deb Preece; Ruth Jensen; Rebecca Galkiewicz; Mark Ryan; and Roger Benepe

**Editors:** Katy Paul; Harvey Thorleifson; Rich Lively

The Geological Society of Minnesota is a 501(c)3 nonprofit organization. The purpose of this newsletter is to inform members and friends of activities of interest to the Geological Society of Minnesota.

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

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

Membership dues are: \$10 Full-time students; \$20 Individuals; \$30 Families

GSM News is published four times a year: **February 15, May 15, August 15, and November 15.** Deadline for article submission is the first of the month, before the date of publication.

Send all material to:

**Katy Paul**  
[keystone517@hotmail.com](mailto:keystone517@hotmail.com)

**Welcome, New Members!**

- Abigail Anderson, Minneapolis
- Cindy Demers, Blaine
- David Friedman, Mendota Heights
- Gay Canseco, Minneapolis
- Gratia Reynolds, Minneapolis
- Jana Kramer, Minneapolis
- Jim Gerlich, Minneapolis
- Mary Brown, Montrose
- Stephen Willing, Minneapolis

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**TOUR: Ultimate Dinosaurs  
at the Science Museum of  
Minnesota and  
VIEW: Dinosaurs Alive!  
in the SMM Omnitheater**

A GSM Tour of the "Ultimate Dinosaurs" show at the Science Museum of Minnesota (SMM) in St. Paul, including a showing of Dinosaurs Alive! on the huge Omnitheater screen, will be led by Roger Benepe on July 10th.

As this tour likely will fill, **YOU MUST register** by e-mailing Bill Robbins at [argongas@q.com](mailto:argongas@q.com), and please indicate if you wish to attend the tour only or attend the Omnitheater as well. The first tour filled rapidly!

*from the archives: A trip to the Iron Range, Fayal Mine, circa 1939.*





**DATE:**  
**Thursday Evening,**  
**July 10, 2014**



**TIME:**  
**Arrive by 5:30 PM in the**  
**SMM lobby,**  
**120 Kellogg Blvd W,**  
**St. Paul, MN 55102**

Photo credit—Mark Ryan

**REMINDER!**  
**THE MN STATE FAIR IS COMING !**

It's just around the corner....

In the next couple of months, the State Fair Committee will start planning our display and putting together a list of workers for our Fair Booth in the Education Building. The dates this year are Thursday August 21 to Labor Day September 1, 2014. We will need 72 people, each to work a 4 hour shift at the booth. Each day is divided into three shifts; 9 am to 1 pm, 1 pm to 5 pm, and 5 pm to 9 pm. Two people are required to work each shift, according to the rules of the Minnesota State Fair Administration.

Staffing the State Fair booth is a lot of fun and you don't have to be an expert in geology to talk about our rocks on display with the visitors and most likely hear about their valuable finds, as well. Discussing our field trips and the variety of professionals who speak at our lectures seems to spark interest in people of all ages. Our job at the fair is to show our enthusiasm and invite others to come and join us. We'll have our new Fall Lecture Schedules and brochures to hand out and discuss, along with touch and feel rocks, maps, pictures of our Marker Project, and Field Trips. Please share your enthusiasm with visitors, as the State Fair is our main source of new members.

It may seem early, but this is also a busy time with field trips and hopefully summer fun! So please call early in order to get the shift that works best for you.

Call Sandy Steffner 952-831-5165  
 or email [ssteffner@comcast.net](mailto:ssteffner@comcast.net)

Thank you, Sandy Steffner



**Blue Life on a Blue Planet**

The Sun just set and 'round we go—  
 through twilight, dusk, and stellar show.

Another rest for troubled life;  
 our turn to pause from human strife.

And in the darkest part of night  
 I gaze upon the stars,  
 knowing how they formed the dust  
 that makes us what we are.

So, if every smallest part of us  
 was fashioned by a sun,  
 what deeply ordered chemistry  
 makes what we call fun?

The answer:

It's up to us to make this stuff,  
 the Universe consigns.  
 Enjoyment that we get from life  
 is by our own designs.

Douglas W. Zbikowski © BY-ND-23Jan2014



## Fossil Lab

GSM offers more than lectures: we also offer outstanding labs. On February 8th, the GSM had a fossil lab hosted by Macalester College, presented by Jeff Thole and staffed by a group of his top-notch students. The fossils were provided by GSM member Roger Benepe from his private collection. Participants were given a short lecture on fossil identification, a handout on different marine fossils, and a sheet to write down their results. We were also given a sheet listing metro area sites where we can collect fossils (see link below). As always, the hands-on activity was a great success for the very young, the young at heart, and everyone in between. A special thank-you goes to Steve Erickson, GSM Lecture Coordinator, for setting up this lab, Roger Benepe for sharing his fossils, and Jeff and his geology students for all of their help in making this an exciting event. - Theresa Tweet

Free PDF download from the Minnesota Geological Survey - [Minnesota Fossils](http://conservancy.umn.edu/bitstream/11299/59440/63/Mn_Fossils.pdf) or enter the following URL into your browser.

[http://conservancy.umn.edu/bitstream/11299/59440/63/Mn\\_Fossils.pdf](http://conservancy.umn.edu/bitstream/11299/59440/63/Mn_Fossils.pdf)



## NOTES FROM THE PAST

### First GSM State Fair Booth - 1951: From the *Minnesota Geologist, Bulletin of the Geological Society of Minnesota, v. VIII, no. 3, 1951*

Our first attempt at having a display booth at the State Fair attracted many interested visitors from all parts of the State. Keen interest was also expressed by a number of out-of-state people. Our sincere appreciation goes to all those who gave so generously of their time and service. This project appears to be worth repeating next year.

### The Public Reacts to Geology by Reuben Nordberg: From *The Minnesota Geologist, Bulletin of the Geological Society of Minnesota, v. IX, no. 2, 1952*

The opportunity given by the State Fair to appreciatively acquaint the public with geology was attested by the considerable interest manifested in the exhibit which The Minnesota Geological Society jointly with Minnesota Geological Survey of the geology department of the University of Minnesota, erected in the 9' by 8' booth in the Educational building at the fair this year. Thanks to the preparatory work of Dr. Schwartz's department, the help-fully cooperative suggestions of Dr. Thiel, and the creative ingenuity of Joseph Zalusky, curator of the Hennepin County Historical Society, a magnet was made which compelled notice, evoked curiosity and questions. For provoking



interest from young and old, Mr. Bender's cabinet, showing places on the state map of Minnesota's representative rocks, was primary. For the more astute the geological time-table, an accompaniment of the cabinet, provoked amazement, was revelatory of a new appreciation of geological time, or evoked a problem and, possibly a cosmological disturbance. For attracting adults and evoking their interest, and eliciting their inquiries, the foremost provocative in the exhibit was Edward Burch's model of the Twin Cities basin, exposing the topography of the bedrock after removing the drift – a topography of buttes and mesas, creek and river beds, the present hazards of heavy construction. The results of the exhibit commend an evaluation of the opportunity given us in making geology understood, and how to tackle it most advantageously.

The contact with the public indicated the great diversity of approach or provocation. Some were certain of a meteor in their field or pasture, which when described, was, in all probability, an erratic; of similar occurrence, might be a specimen of ore which should commend the area for exploration. Soils, water levels, sure water supplies, hard or soft water, required depths of drilling, what might be services of the state or university for water and soil analyses, were only a few of the many questions incurred every day. The most arguable question was why do geologists discourage the discoverability of oil in Minnesota? Many asked if there existed a sponsoring set-up for organizing within a town or community a group for the study of rocks and general geology. Did we have slides, or samples of specimens? Would we arrange for a visiting introducer of geology to an interested group? Several young people from small towns and countryside left me their names for literature which would enable them to follow up the interest provoked by the exhibit. Some visitors came back from time to time, some on different days, some brought specimens on repeated calls which had been mentioned earlier. ... Although, frankly the assignment proved more arduous than anticipated, every moment was enjoyed and I'm grateful to the board for the assignment. To those who cooperatively contributed of their time at my request, I take the opportunity to commend them for their good work. The availability of commendable assistance from within the society speaks well for its attainment.

## Tucson Gem and Mineral Show

During the second week in February this year, I had the opportunity to visit the Annual Gem and Mineral Show in Tucson, Arizona. My first thought was that the exhibition was in one place, when in fact there were a number of locations, as shown by the stack of assorted brochures placed just inside the baggage claim area at the airport. Yes, the fossil, gem and mineral shows have become a big draw to the city.

Our first day there was spent at the "Fossil and Mineral Show". On display, we found stones both in the rough, and cut and polished smooth. Also available within the grounds was a variety of exquisitely crafted jewelry, books, maps, statuary, and fossils from around the world.

The "Gem and Mineral" show featured displays from several different state geological surveys, a Cartier display, silver pouring/moldings, and artistic endeavors made in stone.

Tucson has many other exploration opportunities too: Saguaro National Park, the Sonoran Desert Museum, Old Tucson, Gates Pass, Kitt Peak National Observatory, and many other attractions. One day we did a hike in Sabino Canyon. What I liked most about the hike was the beautiful scenery we saw along the way. There was one small oasis after another as we made our way up through the canyon and the arid vegetation until we reached the end of our journey – paradise - a large, beautiful pool of water just right for a wade after a long hike. This was Seven Falls (below). If you do decide to take in one of the hikes, something to remember is that much of the grading of the hikes are done by professional hiking groups, so their "easy", might not be equivalent to your "easy". Best of all, cell phones







don't work in many of the areas so there will be plenty of family/quiet time to take the sights in!

[Tucson Visitor Center](http://www.visittucson.org/about/visitor-center/) at: <http://www.visittucson.org/about/visitor-center/>

**Theresa Tweet**

## The USGS Turns 135

Fundamental knowledge of the land and its resources is a basic need for effective government and a productive economy in any nation. The U.S. Geological Survey (USGS), which celebrated its 135th birthday on March 3rd, serves our Nation by providing reliable scientific information that can be used in many different ways: to

describe and understand the Earth; to minimize loss of life and property from natural disasters; to manage water, ecosystem, energy, and mineral resources; and to enhance and protect our quality of life.

In 1867, shortly after the Civil War ended, Congress authorized the first of a series of major western explorations that were led by Clarence King (USGS first director), F. V. Hayden, George Wheeler, and John Wesley Powell (USGS second director). On March 3, 1879, the 45th Congress and President Hayes agreed to promote governmental economy and efficiency by discontinuing the three ongoing geological and geographical surveys and replacing them with a U.S. Geological Survey. They made the new organization responsible for the scientific "classification of the public lands and examination of the Geological Structure, mineral resources and products of the national domain."

Through 135 years the USGS has evolved from a small group of scientists and surveyors who provided guidance on how to describe and manage the public lands of the West to a leading Federal science agency that conducts research and assessment activities on complex natural resource and science issues at scales ranging from local to global.

### The USGS Today

The institutional strength of the modern USGS is the broad array of science expertise it has. The USGS operates programs that include natural hazards research, such as earthquake, volcano, and landslide programs; a network of 8,000 stream gages that monitor water availability and help in forecasting floods; and other programs that investigate invasive species, wildlife disease, and climate change.

Nearly 9,000 science and science-support staff are at work at more than 400 USGS science centers across the Nation. The USGS leverages its resources and expertise in partnership with more than 2,000 agencies of State, local and tribal government, the academic community, other Federal partners, non-governmental organizations, and the private sector.

The Survey does not manage any land or resources or have regulatory responsibilities. Their priority is "boots on the ground" scientists who work with sophisticated monitoring networks to study our world and its natural processes. Their entire focus is on providing objective,

ready-to-work science that decision-makers need to face difficult, multi-faceted issues.

The Survey conducts vital resource assessments for energy and mineral potential. It also conducts research on the environmental and human health impacts of the production and use of various energy resources. The USGS is the sole Federal source of scientific information and research on nonfuel mineral potential, production, and consumption, as well as on the environmental effects of the extraction and use of mineral resources. To support the development of economic and national security policies in a global context, the USGS collects and analyzes data on essential mineral commodities from around the world.

USGS maintains the National Earthquake Information Center (NEIC) whose mission is to rapidly determine the location and size of all destructive earthquakes worldwide and to immediately disseminate this information to concerned national and international agencies, scientists, and the general public.

USGS is the largest civilian mapping agency, continuously observing the Earth through the Landsat satellite program in partnership with NASA. The latest satellite, Landsat 8, launched in February 2013, has performed spectacularly in its first year in space.

Historical datasets that have been meticulously collected and archived by the Survey provide a critical context for the current state of natural systems as well as for discerning human influences on the environment. Some of these long-term USGS datasets include borehole temperature records in Alaskan permafrost; stream gage readings for over a century in several locations; over four decades of global change observations from Landsat satellites; catalogs of historical earthquakes and historical data from the Global Seismic Network; and paleoclimate records gleaned from ice cores and seafloor samples.

With historical records like these, in combination with cutting-edge research in paleogeology and chemical analysis, USGS scientists can look far back in time — across decades and centuries, in some instances; in other cases, even millions of years — to understand the global climate conditions of a certain age. This wealth and breadth of data provides an invaluable framework for understanding climate and environmental changes that are taking place today.

## ARE THERE VAST OCEANS BENEATH THE EARTH'S SURFACE?

An international team of scientists led by Graham Pearson, Canada Excellence Research Chair in Arctic Resources at the University of Alberta has discovered the first-ever sample of a mineral called ringwoodite. Analysis of the mineral shows it contains a significant amount of water -- 1.5 per cent of its weight -- a finding that supports scientific theories about vast volumes of water trapped 410 to 660 kilometers beneath Earth's surface, between the upper and lower mantle.

Ringwoodite is a form of the mineral peridot and has been found in meteorites but, until now, no terrestrial sample has ever been unearthed because scientists haven't been able to conduct fieldwork at extreme depths.

Pearson's sample was found in 2008 in the Juina area of Mato Grosso, Brazil, where miners unearthed the host diamond from shallow river gravels. The diamond had been brought to the Earth's surface by a volcanic rock known as kimberlite -- the most deeply derived of all volcanic rocks.

Pearson said the discovery was almost accidental in that his team had been looking for another mineral when they purchased a three-millimeter-wide, dirty-looking, commercially worthless brown diamond.

The sample underwent years of analysis using Raman and infrared spectroscopy and X-ray diffraction before it was officially confirmed as ringwoodite. The critical water measurements were performed at Pearson's Arctic Resources Geochemistry Laboratory at the U of Alberta.

Knowing water exists beneath the crust has implications for the study of volcanism and plate tectonics, affecting how rock melts, cools and shifts below the crust. "One of the reasons the Earth is such a dynamic planet is the presence of some water in its interior," Pearson said. "Water changes everything about the way a planet works."

Reference: D. G. Pearson, F. E. Brenker, F. Nestola, J. McNeill, L. Nasdala, M. T. Hutchison, S. Matveev, K. Mather, G. Silversmit, S. Schmitz, B. Vekemans, L. Vincze. Hydrous mantle transition zone indicated by ringwoodite included within diamond. *Nature*, 2014; 507 (7491): 221 DOI: 10.1038/nature13080.

*From the USGS.gov website*





**GSM Spring Banquet  
and Lecture  
May 5, 2014**

Photo credit—Mark Ryan



The GSM Spring Banquet and Lecture was held Monday, May 5th, at U Garden, 2725 University Ave SE, in Minneapolis. Our speaker was Mark Jirsa of the Minnesota Geological Survey, who spoke on Mapping Minnesota's Precambrian Bedrock; a primer, on the history, methods, examples, and relevance of geologic mapping in Minnesota.

The presentation was an outgrowth of one created recently to enlighten newly hired members of the Minnesota Geological Survey. It summarized the various methods and rationales for mapping the State's Precambrian bedrock, highlighting specific projects that utilized myriad GIS-enabled data sources. These projects contribute to an understanding of the protracted geologic history of Minnesota and its endowment of mineral resources.



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