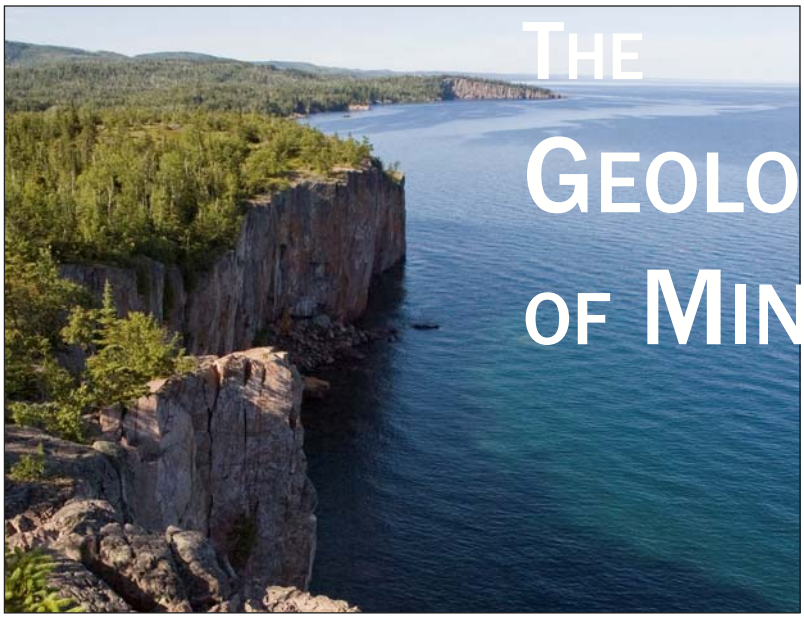
November 2017 Volume 71, No. 4

Promoting public interest and educational support in the geological sciences



The Geological Society of Minnesota News

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

From the President's Desk…

Hello everybody, —first a reminder—winter will come and snow will likely impact our lectures. The GSM will make any decision about cancelling or postponing a lecture due to inclement weather no later than 3:00PM the day of the lecture. This information will be posted on the GSM home page (http://www.gsmn.org/). So remember to check the GSM website for lecture status. Additionally, we will e-mail lecture postponement and cancellation information as needed.

At the end of 2017 the GSM continues to be financially sound with healthy programs. Look at all the activities that have occurred since the last Newsletter. We've been busy! Details of many of these events are in this edition. Thanks to the leaders identified on each activity.

- Solar Eclipse Field Trip (Dave Wilhelm)
- GSM Booth at the State Fair (Dan Japuntich)
- Minnehaha Falls Walking Field Trip (Randy Strobel)
- Fall Banquet and Annual Meeting (Steve Erickson and Dick Bottenberg)
- Fall Lecture series (Steve Erickson and Bill Robbins)
- Lecture Recording (Joe Wright)
- Video Library (Dave Wilhelm)
- Mississippi River Biking Field Trip (Randy Strobel)
- GSM Informational Table at the Minnesota Mineral Club's Annual Show (Kate Clover)
- Marker Survey (Becky Galkiewicz)
- Student Outreach (Theresa Tweet)
- Minnehaha Falls Marker Project (Kate Clover)
- Newsletters (Theresa Tweet and Mark Ryan)
- GSM Website update and management (Alan Smith)

GSM President, Dick Bottenberg

GSM Board membership continues to be solid as we transition to 2018. Thank you to Ruth Jensen and Mary Helen Inskeep who leave the Board after 4 years of service. Ruth has provided a supportive and innovative voice on the Board. Mary Helen energetically took over as Treasurer and had fun keeping the books in order! Also, we welcome our two new Board members Cathy Wait and Dave Kelso!

At the November meeting the GSM Board elected a new slate of officers. Thanks to the following who have agreed to lead the GSM in 2018:

Upper photograph: Mark Ryan

Inside this issue:

Visit us on Facebook!

from the GSM archives:
Field Triip, 1944

- President Dave Wilhelm
- Vice President Deborah Naffziger
- Treasurer Cathy Wait
- Secretary Dave Kelso

Next, I would like to address our progress on the Board's three goals for 2017:

- Install the new big-picture geological marker at Minnehaha Falls (near the Sea Salt Restaurant) this year or early next year. Our illustrator is working with the Minneapolis Park Board to finalize the design. Expect installation next spring. Plans are being made to address the missing Minnehaha Falls markers as an ongoing project once we finish with the big-picture marker.
- GSM marker database and survey the markers. Only a few markers are left to be surveyed. Expect this to be completed next spring.
- Lecture Video – have first video of lecture to be in Video Library this year. We are making significant progress. Expect the first video to be available in December. The next step is to form a team to video the lectures and complete the post-processing required to make them available in the video library.

I have thoroughly enjoyed being your President the last 2 years. It's an easy job when there are so many volunteers and dedicated leaders! Special thanks go to Vice President Theresa Tweet who seems to be on top of everything. Thanks again to all the volunteers and leaders who made 2017 a great geological year. Gotta dig it!

Dick Bottenberg

GSM News

At the November 9th GSM Board meeting, new officers were voted into place. Please congratulate:

Dave Wilhelm, President
Deborah Naffziger, Vice President
Cathy Wait, Treasurer
Dave Kelso, Secretary

The terms of the new officers begin January 1, 2018. Under the management of these individuals, there is no doubt that the GSM will continue in its long standing commitment of promoting public interest and supplying educational support in the geological sciences. Add to this a note of thanks to Ruth Jensen and past Treasurer Mary Helen Inskeep for sharing their time and talents with the Board these past four years, and to continuing Board members Dick Bottenberg and Theresa Tweet for their service as President and Vice President.

Officers:
Dick Bottenberg, President
Theresa Tweet, Vice President
Mary Helen Inskeep, Treasurer
Open Position, Secretary

Board Members: Kate Clover, Dan Japuntich, John Jensen; Ruth Jensen; Deborah Naffziger; and Dave Wilhelm

Editors: Theresa Tweet; Mark Ryan; Harvey Thorleifson; Rich Lively

Web Site: *www.gsmn.org*

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.

Newsletter contributions welcomed

Of interest to our GSM enthusiasts: While out and about enjoying your vacation time – when you visit a site that you find interesting, please consider sharing your experiences with us by writing up a few words and sending it to Theresa Tweet at phoenix8185@gmail.com. Thank you in advance!

New GSM Members!

Mark, Sally & Sarah Pearson, St. Paul
Corinne Cavanagh, Inver Grove Heights
Shelly Arens, Roseville
Ann & Brian Shields, Bloomington
Leslie Modrack, Minneapolis
Teresa Russell & Norm Peterson, Roseville
Ken Koolmo, Richfield
Michael & Linda Hancher, Minneapolis
Bette Groven, Minneapolis
Ron Dextor, St. Paul
Logan Connaire, St. Paul

GSM Board Membership

The GSM Board consists of members who have a special interest in advancing the goals of our society, including lectures, field trips, and community outreach. The Board currently has nine members. Our bylaws limit the terms of Board members to four years, to encourage a turnover of perspectives and ideas. The Board typically meets quarterly, on the second Thursdays of February, May, August, and November, or a different date if conflicts arise. We typically meet from 7 to 9 PM at the Minnesota Geological Survey at 2609 W Territorial Rd, St. Paul MN 55114.

Board meetings are open to all members of GSM. So, whether you are a new member of GSM or have been a member for many years, if Board membership is something that might interest you, or you are just curious to see what our Board does and how it works, we encourage you to attend a meeting. And, if you have a topic you would like the Board to consider, please contact Theresa Tweet at phoenix8185@gmail.com.

Member Spotlight;

Theresa Tweet

1. How long have you been a GSM member?

   I have been a GSM member for 13 years.

2. How did you get interested in geology?

   Like many other enthusiasts, my love for geology began as a child, talking with my dad and walking along the North Shore, picking up rocks on the way, and tossing everything but the agates back in (that's what my dad did anyway). At one point, I picked up a septarian concretion. Imagine my surprise at finding out that there were other types of rocks besides agates lining the North Shore beach front! Dad has been gone awhile, but I still get excited when I walk along the shorefront, picking up the tumbled agates, quartz, granite, and chert as well.

3. What do you dig about the GSM?

   I enjoy volunteering and being a part of the organization. The GSM is just large enough to have a variety of different areas to work in, and small enough to get to know the names and faces of some of the members.

Notes from the Past

From the August 1971 issue of GSM NEWS

Tablet Inscription #16
Geology of Minnesota, Rochester area

The diversified scenery of Minnesota – of which the Rochester area is one phase – is due to the location of the state in the approximate center of the continent. Situated midway between the Atlantic and Pacific Oceans, Hudson Bay and the Gulf of Mexico, the state has within its boundaries three principal divides in the watersheds of North America. Minnesota lacks the rugged topography and high elevations found in most continental divides. Its highest elevation, 2300 feet on the Mesabi Range, is in close proximity to its lowest, the surface of Lake Superior, 602 feet above the sea.

The central surface of the state slopes from the North-Central portion near Itasca Park in four directions toward its distant and opposite corners.

The 10,000 lakes of Minnesota cover 5,800 square miles, an average of 1 square mile of water for every 15 of land. This unprecedented supply of water which has a surface exceeding the water area of any other state, finds its way to the ocean through Hudson Bay, the Great Lakes and the Gulf of Mexico.

2017 GSM Holiday Gathering!

Ed and Sandy Steffner, 9619 Briar Circle, Bloomington, MN 55437; **952-831-5165**, will again be opening their doors to the GSM clan.

The Steffner's will welcome guests on **Saturday, December 9th**, at **3:30 PM** for appetizers, and 5 PM for Pot Luck Dinner.

There will be no board meeting again this year. For food plans, please call Sandy Steffner cell **612-201-2092**, or e-mail ssteffner41@gmail.com.

State Fair Thank You!

It has been my privilege to be Chair of the GSM State Fair Committee Chair again this year! I would like to personally thank all of the volunteers for representing the Geological Society of MN this year at the State Fair.

Everyone showed up on time with very few changes of personnel or times. The booth was kept clean and optimized to be functional by all of you. The State Fair Committee booth set-up and take-down went flawlessly, and the booth is stored in my basement, ready for next year. Thanks for your comments on improvements, which we tried to accomplish. If you have ideas to further improve the booth and our delivery, please email me.

Thanks so very much!

Dan Japuntich
2017 State Fair Committee Chair

GSM Field Trips and Tours

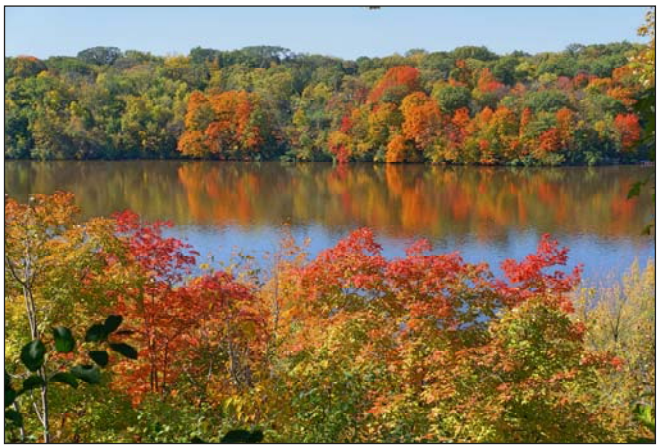
Summaries provided by
GSM Field Trip Coordinator Dave Wilhelm

We have had a number of exciting excursions since May. First, the University of Illinois Twin Cities Alumni Association arranged a visit to **Eagle Lake Observatory** on Friday, May 5, hosted by the Minnesota Astronomical Society. As there was room for additional participants, they generously invited GSM members and friends to join them, which about 10 did, including one three-generation family. We listened to a great talk on deep-sky objects (star clusters, nebulae, galaxies, etc.) by amateur astronomer Suresh Sreenivasan, followed by a wonderful evening of viewing through a clear, cool sky.

There was a **total solar eclipse** across the United States on Monday, August 21, 2017. **Dave Wilhelm** organized a field trip whose primary purpose was to view this eclipse near **Kearney, Nebraska**. This was within easy car driving distance from Minnesota, with a Saturday, August 19 departure. Since we headed hundreds of miles southwest, we included some geology and made a week of it. Over 50 persons viewed the eclipse from a cow pasture 13 miles north of Kearney, and around 30 remained for some or all of the geology portion starting Tuesday, August 22. Look for a report by Deborah Naffziger in this Newsletter. See the GSM web site for the full trip itinerary and photos.

On Sunday, September 17, **Randy Strobel** led 18 persons on two walking trips of Minnehaha Falls and the nearby Mississippi River gorge, including a look at the location of the new GSM marker soon to be erected in the park. The first walking trip was offered from 10 AM to 12 noon, followed by lunch at Sea Salt Eatery. The second was offered from 3 to 5 PM, followed by dinner at Sea Salt Eatery. These walking trips covered areas that Randy described in his February 6, 2017 lecture. Participants enjoyed perfect weather during the walks.

On Sunday, October 8, **Randy Strobel** led 17 GSM members and guests on a bike tour of the **Mississippi River Gorge**, also covering areas described in the February lecture. We met at the GSM markers overlooking Minnehaha Falls at 11 AM. This biking trip ran on both sides of the Mississippi River Gorge, starting at Minnehaha Park, proceeded to overlooks of Lock & Dam # 1, went up the St. Paul side of the River to the Stone Arch Bridge and back on the Minneapolis side to Minnehaha Park (about 15 miles with a few hills). Along the way, we saw three



Fall colors along the Mississippi

small waterfalls on tributary streams of the Mississippi (Hidden Falls, Shadow Falls, Bridal Veil Falls – all unfortunately much altered by human development), sculptures that are part of the 2006 "Minnesota Rocks!" project, large polished banded-iron formation specimens on the University of Minnesota campus, an overlook of St. Anthony Falls at Water Power Park, the now-repaired site of the June, 2014 landslide along West River Parkway, and a large sinkhole in south Minneapolis. Temperatures were in the 60s, and fall colors along the River were

GSM Bikers

brilliant – it was an ideal day for biking. We finished around 3:30 PM, after which a few of us enjoyed late lunches at Sea Salt Eatery. Photos from the bike tour are on the GSM web site.

On Wednesday, November 15, around 12 GSM members participated in a one-hour tour of the **St. Anthony Falls Laboratory**, organized by Dave Wilhelm and conducted by Lab personnel. Dave will organize future tours of this unique lab each semester as member interest dictates.

So what is next?

GSM is tentatively planning a field trip in the **Thunder Bay, Ontario** area during **Summer, 2018**, led by members of the Ontario Geological Survey. OGS personnel are very eager to show us the highlights of geology in that area, and there is quite a bit to see. We will start actively planning this in January; members will be notified by e-mail. Most likely duration is 2.5 to 3.5 days.

GSM is tentatively planning a field trip to **Isle Royale National Park** during **June or July, 2018**. This trip would leave on the Ranger III from Houghton, MI, spend 3 full days on Isle Royale, returning on the Ranger III on the fifth day. While on Isle Royale, the Michigan Tech research vessel Agassiz would take us to many scenic and geologically interesting sites, allowing us to see the beauty of Isle Royale from both land and water. We will start actively planning this in January, 2018; members will be notified by e-mail. Persons who are members prior to January 1, 2018 will have priority, as the trip will be limited to 17 persons. Eight GSM members participated in a similar trip during June, 2017, and had an excellent time. Look for Dave Wilhelm's report of the 2017 trip in the August, 2017 Newsletter. Specific information on the 2017 trip is here: **https://tinyurl.com/IRtrip2017**. More photos of the 2017 trip taken by Dave and other participants are here: **https://tinyurl.com/IRphotos2017**.

To see other trips GSM is considering, select the "GSM Field Trips" link on the web site home page and click 2018. Members will receive e-mail on these possibilities and any others that arise when there is sufficient detail. As always, contact Dave Wilhelm with ideas for other field trips that would interest you. Our past field trips are also described in this area of the web site, sorted by year. These summaries provide a good way to learn more about GSM.

The Great American Eclipse August 21, 2017

The eclipse trip and tour of Nebraska was planned and managed by Dave Wilhelm (newly retired) and it was several full days of tours, activities, and fun in Nebraska and environs. A total eclipse is like nothing else, and you have to experience it to appreciate how unique it is. Dave herded all of us like cats, and nobody got lost or strayed from the group. Our tour numbers decreased as the days progressed past the eclipse, but everyone seemed happy. We all learned a lot about Nebraska, their geology, and how they make the most of their resources to maximize agriculture.

People arrived in Kearney, Nebraska by various means, and on Sunday August 20th, we congregated in the late afternoon in the lobby of the Econolodge. We picked up Bob and Barb for supper at Arby's. They accepted our Minnesota coupons and were really happy to see us there. Generally, the populace of Kearney was very happy to have all the visitors; we experienced no gouging in prices, and we felt welcomed and highly valued. It was so very nice and helped add to the enjoyment of the trip.

In the evening there was a talk by an astronomer Dr. Tabetha Boyajian, Louisiana State University, detailing how she discovered a planetary system around a star using magnitude changes as the planet 'eclipsed' the star. It was well attended. There were many high-powered JPL scientists attending as well as scientists from University of Nebraska Kearney (UNK), and other places. It was good science and fun as well. Afterward we toured the city a bit, and then went back to the hotel for some sleep as it was an early day on Monday.

Monday Aug 21--Eclipse Day!

This was the big day we had all planned for since last fall. Today was eclipse day and it was all we had hoped for and even more! I had been to a total solar eclipse in 1979, so I knew what to expect, but each one is unique.

The people of Kearney had prepared and worked hard to make us feel welcome and wanted. They put out a free tabloid paper about the eclipse listing the activities before and after. Maps were available everywhere, and the stadium was open for a public viewing. Some of us bought eclipse t-shirts at our motel or from street vendors. They were plentiful the day of, but after that they disappeared, which was a disappointment for many.

Our viewing site had been scouted out beforehand by Bill Allen, and after a 40 minute drive, we ended up on a ridge overlooking a rolling countryside near Hazard, Nebraska. Originally we had planned to be alongside the road, but the lady who owned the cow pasture/dirt bike track said we could use her pasture to watch as long as we didn't leave the gate open. So we all assembled among the cowpats (mostly dried) and sat on the top of the ridge with a panoramic view

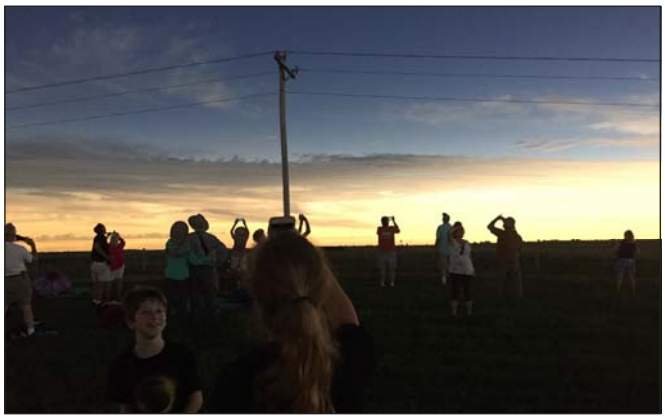
all around. We were about 14 miles north of Kearney, which is middle southern Nebraska and quite near the maximum line for the eclipse in that area which was 2:38 in duration.

There were 53 or so people in our group, mostly members of the Geology club. There were also a number of friends, relatives etc., including 10+ children of varying ages from 5 on up. We all had eclipse glasses and there was a really nice telescope with a solar filter to look through as well and see the sunspots, plus several people had professional photography setups, and many had their cameras outfitted with welders' glass. When the eclipse began at 11:33am, we saw the small notch appear in the upper edge of the solar disk. It was another 80+ minutes to totality, so we just milled around, chatted, nibbled lunches, while some of the kids played with a soccer ball, and others threw a baseball around. But as the eclipse progressed people became more and more excited. I had checked and made a map of the planets and where they would be. I hoped to see Venus, Mars, Mercury and Jupiter.

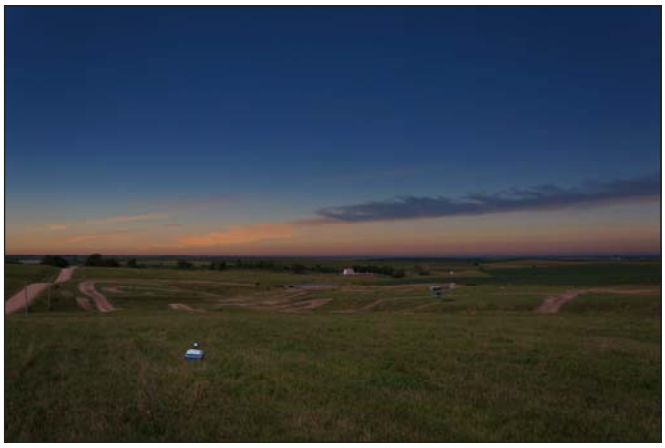
The weather was great, 85 and partly cloudy. There were wispy cirrus clouds that were not really obstructing our view, and with just 20 minutes to totality, it became noticeably dimmer--less light.

GSM members awaiting the eclipse (photo: Dave Wilhelm)

Fifteen minutes before totality, Venus was clearly visible about 30 degrees to the right of the sun/moon. Five minutes later, Jupiter appeared about 60 degrees on the opposite side, but was lower in the sky and fainter. Within minutes of totality, it became quite darker, dim like twilight approaching, but not the same. During totality, it's twilight all around, in 360 degrees. It never gets totally night dark, but dark enough to not be mistaken for anything else. The air temperature gets cooled about 10-15 degrees. Then the wind died down—though it never stopped—clouds dissipated and animals bedded down. With 5 minutes to go, the farm lights turned on by themselves. We looked to the west to watch the shadow's approach, but it was more like a dark sky before a storm, and then it was on us and total. People became quiet and marveled at the spectacle. The corona had a couple of



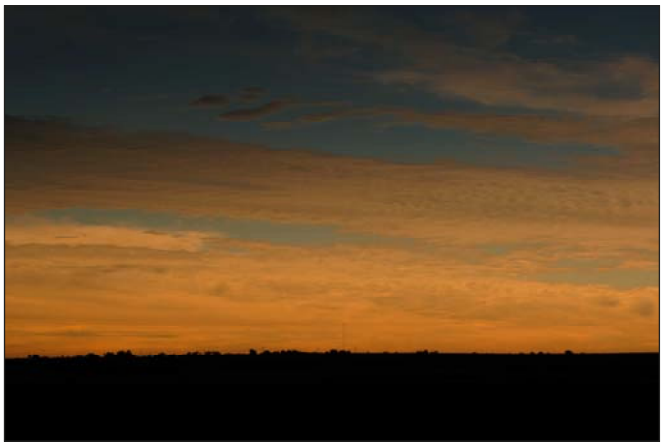
Celebrating the eclipse (Tom Walek)



Looking West during totality (Dave Wilhelm)

spikes to the upper right and one small and one large to the lower left. The sky was dim but not totally black, so we all were able to see Jupiter and Venus, and no other stars or planets. A friend later said Mercury was visible with binoculars, but we didn't see it.

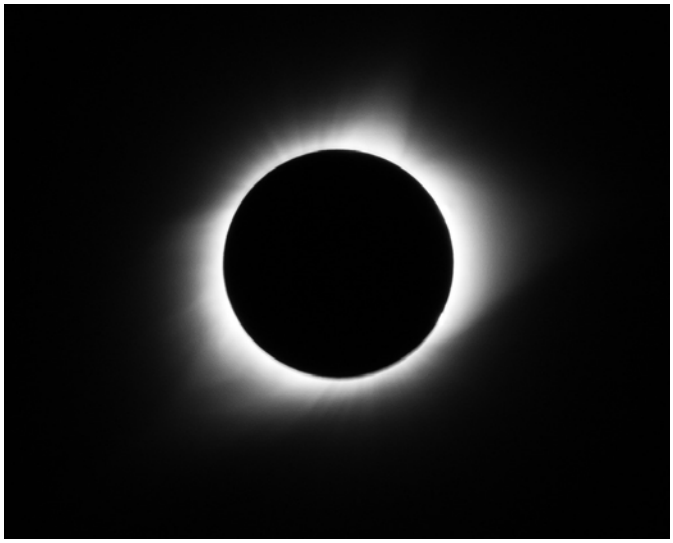
We also saw the diamond ring and Bailey's beads coming out (and going in also) and then totality was over, but we could see the darkness to the east, as it



The horizon at totality (Dave Wilhelm)

receded. It got bright at the same rate it grew dim. There were more activities planned for this trip, and Jake Bruihler, MA Physical Geology, University of Nebraska, Lincoln, gave his talk after the eclipse as he had to be back in Lincoln the next day. Jake talked and showed diagrams about the alluvial deposits from the glaciers in the Platte River. There was more of the eclipse left, but most of us were tired, sunburnt, and left after his talk.

That was our experience with the eclipse itself. Afterward, some went to the Archway museum, but we went back and napped before meeting at Whiskey Creek Steakhouse and having a wonderful supper. I indulged and had the prime rib, and a hot fudge brownie with ice cream and whipped cream for dessert. A million calories, but very yummy, and as I had little breakfast and lunch earlier, it was okay. The next day, we were scheduled for geology stuff, and learning about Nebraska's geology.



The corona during totality (Dave Eckmann)

A great time was had by all. Everyone was awed and very happy they had come to see the Great American Eclipse in person.

GSM group after the eclipse (Dave Eckmann)

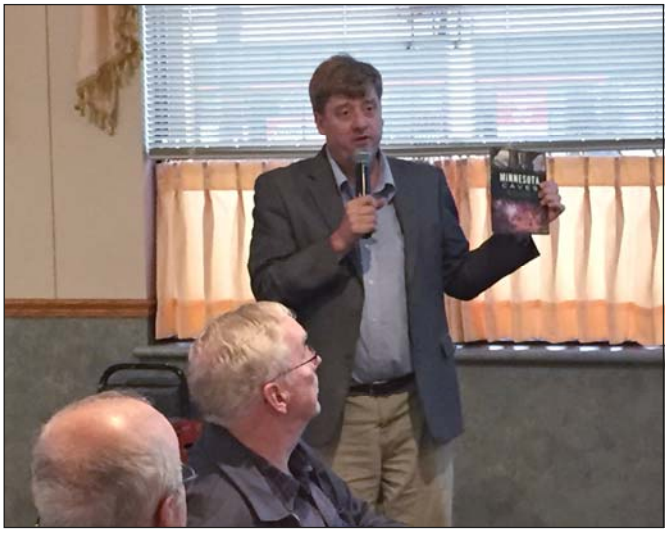
GSM Annual Banquet
September 18, 2017

Dr. Joe Eastman at the kick off to the 2017-2018 Lecture Series

Having our "Annual" banquets at the U-Garden is fast becoming one of our GSM traditions. As usual the U-Garden restaurant did a great job hosting a delicious meal. The table company in attendance was wonderful as well, with 8 new attendees, including several who were there because of the information they received at the Minnesota State Fair – thank you Dan Japuntich for the wonderful job chairing the State Fair!

Next on the agenda was the election of members to the Board of Directors. There are two members whose terms expire: Mary Helen Inskeep and Ruth Jensen. Thank you to Mary Helen and Ruth for all of your time and efforts! Cathy Wait and David Kelso were unanimously voted onto the Board of Directors. The terms of these new members begin on January 1, 2018. To you two, I say "Welcome!"

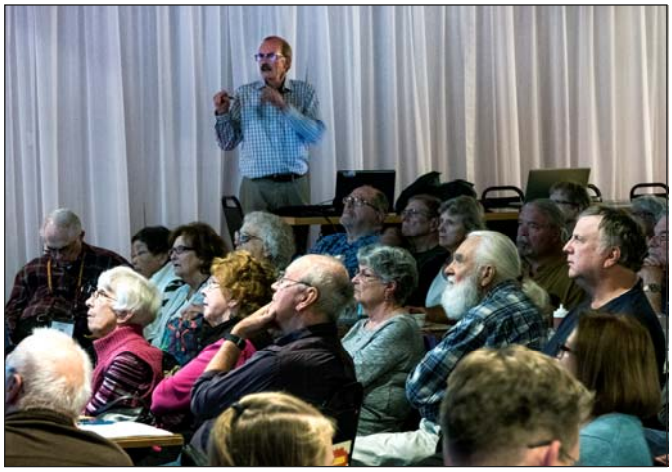
The election of new members to the Board of Directors is followed up by announcements. I remember a time when the announcements were few – but not anymore. Considering we are a nonprofit run entirely by volunteers, the GSM is doing an incredible job in the area of outreach: the MESTA Conference, classroom outreach (a collaborative effort with Macalester College), a short stint at the Hospitality House, and the GSM's first time manning a table at the Minnesota Mineral Club's Annual show in Cottage Grove (October 21-22). FYI -Steve pointed out that all but one lecture in the fall series will be at the Tate Physics building.



Greg Brick

Greg Brick was on hand to introduce his new book: Minnesota Caves. Dues were being collected; the cookie sign-up sheet was available – it was a busy and informative night of fun.

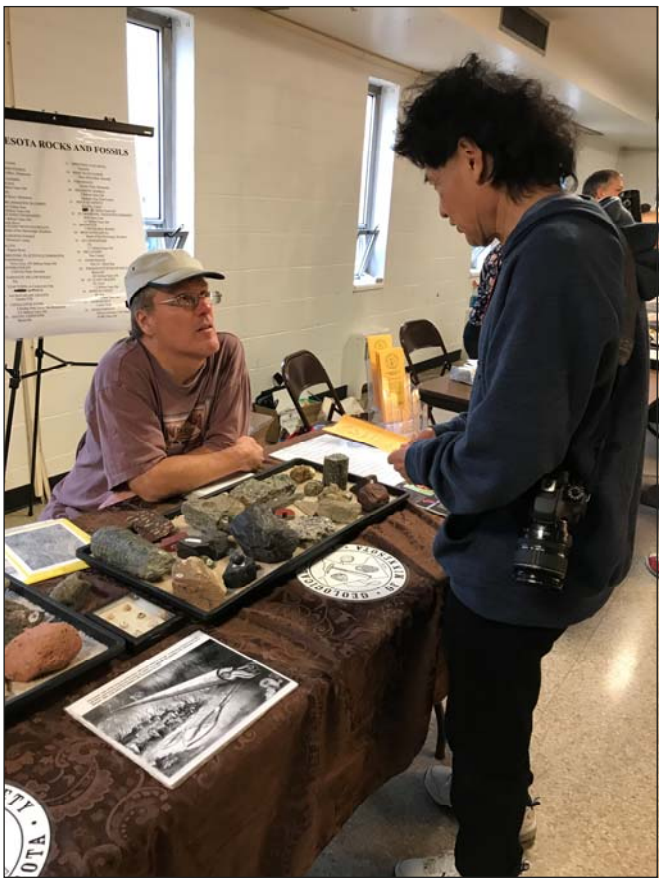
The evening concluded with a lecture presented by Joseph Eastman, Professor Emeritus of Anatomy at Ohio University. The title was "Historical Perspective on the Evolution of Antarctic Fish Fauna". Dr. Eastman's talk centered on the Antarctic, its unusual floras and faunas that lay claim to the sea instead of the land, and the diverse display of aquatic life that call this cold, icy region home.



Dr. Joe Eastman

GSM visits the Minnesota Mineral Club Annual Show

For those of you who were able to make it to the Minnesota Mineral Club's Annual Show the weekend of October 21 -22, you may have noticed some familiar faces and seen that the Geological Society of Minnesota had a booth there. GSM volunteers were on hand to talk about our organization, the Lecture series, and passed out GSM fliers. They also answered questions on memberships, Outreach, and of course there was a Minnesota rock and mineral display on our table. They listened to stories about vacations taken at fantastic locations, and talked about our own GSM field trips. Thank you to the Minnesota Mineral Club for opening your doors for our information table. Thank you to Kate Clover for pulling this event together and staffing the GSM table. Also, a thank you to Dave Wilhelm, Steve Erickson, Mary Ann Arneson, Randy Strobel, Charlie Turner, Cheryl Anderson, and Theresa Tweet for volunteering to staff the table and visit with the interested attendees.



Randy Strobel staffing the table

BOOK REVIEW:
Bergbuchlein: The Little Book on Ores
By Ulrich von Kalbe

"The First Mining Book Ever Printed" was published in the sixteenth century (exact date unknown) and was written by "Anonymous". The first dated edition of the book is 1518. The book was later attributed to "Calbus of Friberg", or Ulrich von Kalbe, a physician who lived in Friberg in the Saxony region of Germany between 1454 and 1523. Written as a dialogue between Daniel, (a mining expert), and young Knappius, (a student of mining), the text summarizes the known mining knowledge of the day. (Knappe means miner in German).

The book begins with Daniel telling Knappius that he has "…decided to prepare a brief little book on metallic ores, based on the books of the ancient philosophers and on the experience of practicing miners, that will instruct you how to judge from promising indications which rock formations, which veins, stringers, or mineral matter are likely to bring forth metallic ores so that it would be promising and gainful to work them." He goes on to stress the importance of understanding from what matter, and where metals are generated by nature, by means of the mineral Power.

At this point in my reading, I began to recognize terms that are heavily used in Alchemy, and I realized that much of Daniel's knowledge in fact stemmed from alchemy. He states that each metallic ore receives an influence "…from its own particular planet, specifically assigned to it because of the characteristics of the planet and the ore, and also because of their conformity in warmth or rigidity, moisture or dryness. Thus gold is made by the Sun or his influence, silver by the Moon, tin by Jupiter, copper by Venus, iron by Mars, lead by Saturn and Quicksilver by Mercury." This association of a metal with a planet is a key tenet of Alchemy. Also, the moisture and dryness aspects of a metal are important in Alchemy. Hot, cold, wet, dry – these are reduced by alchemists to two elements: fire and water. These 2 opposed elements eventually became expressed in the metallic world, as Sulphur and Quicksilver (mercury). Daniel explains that the common matter of all metals is Sulphur and Quicksilver, "…which through the movement and influence of Heaven, must be joined and hardened into a metallic body or an ore."

The beliefs that metals all originate with sulphur and mercury led the early alchemists to experiment with these metals and others, in their laboratories, in different proportions, exposing them to different temperatures, for different durations, in different times of the year to gain the influence of a particular planet, in hopes that the result would be the "Philosopher's Stone": the miraculous ingredient that would turn any metal into gold. Each alchemist

carefully guarded their 'recipes' and anything written down was written in a sort of code so that no one could copy another's technique or ingredients. Although many claimed to have made this miraculous discovery, no proof exists. Today we know that this is impossible.

"Gold…is made from the very finest Sulphur—so thoroughly purified and refined in the earth through the influence of Heaven, especially the Sun that no fattiness is retained in it that might be consumed or burnt by fire, nor any volatile, watery moisture that might be vaporized by fire – and from the most persistent quicksilver, so perfectly refined that the pure Sulphur is not impeded in its influence on it and can thus penetrate and color it from the outside to its very core with its persistent shade of citrine." We learn that gold occurs in different ways, but the most suitable location is in river sand. "Gold generated in river sand is the purest and most exalted kind because its matter is most thoroughly refined by the flow and counter flow of the water and also because of the characteristics of the location where such gold is found, that is, the orientation of the river in which such placer gold is made."

A short chapter on each of the metals and their planets follows: Silver/Moon, Iron/Mars, Copper/Venus, Lead/Saturn, etc. Daniel tells Knappius that the placement and orientation of veins is very important to determine which are the most likely to contain metallic ores. Also, the color of the earth is a good indicator of which ore can be found there.

Modern day miners wouldn't gain much useful knowledge from this little book, but it is curious to look back in history and realize how fantastical the beliefs were then. Even though alchemy is an ancient practice, it was still around in the 16th century and heavily influenced the way people tried to understand nature.

Katy Paul

State Fair Question - How did 'silver' get its name?

"Our **name** for the element is derived from the Anglo-Saxon for **silver**, 'seolfor,' which itself comes from ancient Germanic 'silabar.' **Silver's** chemical symbol, Ag, is an abbreviation of the Latin word for **silver**, 'argentum.' The Latin word originates from argunas, a Sanskrit word meaning shining."
Thank you Chemicool!
Do you want to read more? Check out this site: Silver - Chemicool
Link: https://www.chemicool.com/elements/silver.html

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