



News

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



GSM President, Dave Wilhelm

From the President's Desk...

I'm so glad winter is over; as I'm sure you are too. It was a very rough winter for our lecture series. We consider it a bad winter when we have to cancel/postpone one lecture. This year we did it three times, and had the mid-April snowstorm been 2 days later, it would have been a fourth. Program Chair **Steve Erickson** and I watched forecasts on Sunday nights and then made calls back and forth to make a decision, this became a dreaded norm. We were glad that a few years ago we established a standard procedure for dealing with weather issues, and thank goodness for e-mail and our web site for easily letting members know the situation. Fortunately, in each case, the presenter was available the following Monday, so we cancelled no lectures.

For 15 lectures in 2017-2018, we had a total attendance of 1181 persons, for an average attendance of 79. This is down 10-15 persons from recent years, but I believe most of that can be attributed to the weather, as attendance figures for postponed lectures are consistently below the average. Over the 15 lectures, 86 persons identified themselves as attending for the first time. In truth, there were probably more as we did not ask for that information at a few lectures. This shows we are making our presence known to non-members. The most common reasons given by first-timers are recommendations by friends & relatives and visiting our booth at the State Fair, although our web site, Facebook page, and booth at the Minnesota Mineral Club were cited by some. We had especially good turnouts of 130 for *Minnesota: A History of Ice, Rivers, and Landscape Change* and 126 for *Agate Hunting Made Easy*, including 28 first-timers. (Minnesotans love agates.☺) Many thanks to Steve for putting together another rock-solid program (pun intended). And thanks to all of you who are volunteering at this year's State Fair to reach out to potential new members.

The 2018-2019 lecture program will start with the **Fall Banquet** at U Garden on **Monday, September 17** and continue every other Monday until early December, before the year-end break and resumption in late January. Steve has already put together most of the program, as many of you heard at the Spring Banquet. The full schedule will appear in the August Newsletter, and will be available on our web site earlier. If you have an idea for a lecture or lab, or know of a possible presenter, contact Steve with the information.

One of our Board members and Treasurer, **Cathy Wait**, had to resign, as she is moving to the Los Angeles area with her family. At our May 10 Board meeting, **Dave Kelso** was elected as Treasurer, assuming that office in addition to his ongoing role as Secretary. The Board of Directors also appointed **Joe Newberg**, a member of GSM for 20 years, to fill out the remainder of Cathy's Board membership. I want to thank Cathy for her service to GSM (we will miss her), and Dave & Joe for stepping up to fill the open positions. The full Board membership is listed elsewhere in this issue.

Our Board has also decided to give back to the geological and education community. In the past few months, we have made grants to the **Institute on Lake Superior Geology Student**

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from the GSM archives:
Mn North Shore, Sept. 1939



Travel Fund and to the **St. Anthony Falls Lab Education and Outreach Fund**. The former financially helps college geology students attend ILSG, where many of them present their research findings to a large gathering of professional geologists for the first time – a great learning experience. The latter allows SAFL to pursue more opportunities for educating the general public (including us), such as conducting public tours and developing some cool demonstration flumes that might be used at the State Fair or the Stone Arch Bridge Festival.

How about the really fun stuff, field trips? As every year, we are looking forward to an exciting season of field trips; these are outlined elsewhere in this issue. Of course, most of you do your own field trips, aka vacations. Our great Newsletter editors, **Theresa Tweet, Mark Ryan, Harvey Thorleifson, and Rich Lively** are always looking for articles. If you have taken a trip (formally organized or not) or done an activity that you feel would interest others in GSM, consider writing a few words describing your experience and submitting them (and perhaps photos) to Theresa or Mark. Book reviews are welcome also. Our Newsletter is by GSM members for GSM members, and we'd love to hear from you. The deadline for the next issue is **August 1**, with earlier submissions encouraged. See our web site for submission details.

Enjoy Mother Earth this summer, and I hope to see you on field trips.

Dave Wilhelm

GSM

Officers:

- Dave Wilhelm, President
- Deborah Naffziger, Vice President
- Dave Kelso, Treasurer
- Dave Kelso, Secretary

Board Members: Dick Bottenberg; Kate Clover, Dan Japuntich, John Jensen; Theresa Tweet

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

Programs/Lectures/Labs: Steve Erickson

State Fair: Dan Japuntich

Newsletter: Theresa Tweet/Mark Ryan

Video Library: David Wilhelm

Webmaster: Alan Smith

Membership: Joanie Furlong

Field Trip Coordinator: David Wilhelm
GSM Outreach: Theresa Tweet
Geological Markers: Rebecca Galkiewicz
Video Programming: Joe Wright

Web Site: 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.

Please note the GSM change of address: Send all GSM membership dues, change of address cards, and renewals to: Joanie Furlong, GSM Membership Chair, P.O. Box 141065, Minneapolis, MN 55414-6065; Membership dues are: \$10 Full-time students; \$20 Individuals; \$30 Families
 GSM News is published four times a Year during the months of February, May, August and November. Deadline for article submission is the first of the month, before the date of publication. Newsletter contributions welcomed.

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!

- Daniel Scollan, St. Paul
- Greg Mace, Cottage Grove
- Rachel Tucker, Bloomington
- Jim Platt, Apple Valley
- Mary B Johnston, Woodbury
- Carolyn Dry, Winona
- Stacy Schultz and Dan Dee, Roseville

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;
Mary Kay Arthur**

1. **How long have you been a GSM member?** I'm trying to figure that out, I probably became a



member in the 1990's

2. **How did you get interested in geology?** Canoe partner and camping friend, Gail Marshal, long time GSM Membership Chair, would not give up - she was determined that I attend. And I am so glad that I did.

3. **What do you dig about the GSM?** The natural world is my long time interest. First trees and flowers – they stand still. Then birds, which don't. But the best is geology which tells us why they are, where they are, and how this world came to be. It's such an exciting story.

In Memoriam

In the past few months, GSM has lost four longtime members: Barbara Gudmundson, Judy Hamilton, Edward Huppler, and Edwin Ross.



Barbara Gudmundson

They were also good friends. These members were active in the GSM and their many contributions



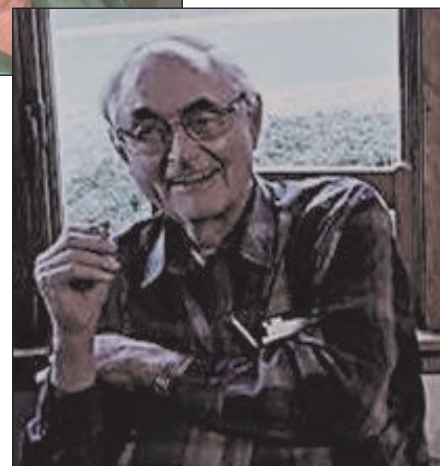
Judy Hamilton



Edward Huppler

helped to guide us in our efforts for running, improving and sustaining the GSM.

They will be greatly missed.



Edwin Ross

Submitted by:
Bill Robbins and
Theresa Tweet

Notes from the Past

The following appeared in the FALL 1998 edition of GSM News

WEATHER AND GEOLOGY

By Bill Robbins

Geology and weather interact in numerous ways; one of these is the focus of this piece.

Orographic winds are winds shaped by mountains ('oros' is the Greek word for mountain). Winds flow easily around mountains and through passes: but move with much more difficulty over mountains. A long mountain range perpendicular to prevailing winds may, however, force winds over the top of ranges. The windward side of such a range wrings moisture from this ascending air, which cools about 3.4 degrees C for each rise of 100 meters in altitude, leaving a dry leeward side. Water erosion dominates the wet side, wind erosion the dry side.

A few locations where weather and climate are dominated by orography and geology are listed below.

- Himalayan Mountain Range and the associated five-kilometer-high Tibetan plateau: Meteorological effects include the summer monsoon of the Indian subcontinent, but may also affect the Northern Hemisphere jet stream. The chemistry of the run-off, especially carbonates, may alter the level of atmospheric carbon dioxide, modifying global temperature.
- East African Rift Valley: Downwind, beyond the valley, the plains are hot and dry, due to the meteorological effects of the valley.
- The Great Plains of the United States: This area spawns three fourths of the world's total number of tornadoes. This is aided by the combination of cool dry winds from the northwest, created by the presence of the Rocky Mountains, and the warm, moist winds from the southwest, generated by the Gulf of Mexico. The cool winds override the warm ones, and the different wind directions provide shear; both over-ride and shear help trigger twisters.

In turn, weather changes geology through erosion and the chemistry of run-off water as mentioned above – but more of that for another time.

Student Outreach

For several years, the GSM has partnered with the geology lab at Macalester College to bring hands-on

learning into the Metro classrooms. The presenters are undergrad students who deliver their enthusiasm, geology skills, and rock and mineral samples to elementary and middle school settings. More recently; Sintra and Rachel were invited to visit a third grade classroom and share their love of geology with the students. The teacher was so thrilled with this hands-on learning experience that she captured it in pictures - here are just a few.

Theresa Tweet



Macalester Lab February 24, 2018

Once a year, the GSM tries to schedule a lab for its members to give them a chance to participate in some hands-on exploration of rocks and minerals.



The event this year was held at Macalester College, and hosted by Jeff Thole, their Laboratory Supervisor (the guy with all the great gadgets) along with a knowledgeable student staff to

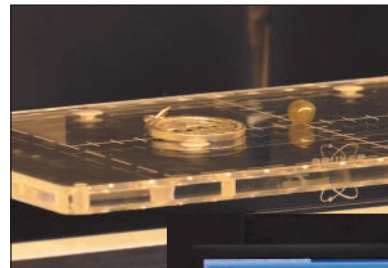


various specimens for streak, hardness, cleavage and special properties, to help determine what they were.

The other room contained displays of rocks sorted by the manner they were formed: igneous, sedimentary and metamorphic. There were boxes of rocks for us to identify by their properties. There



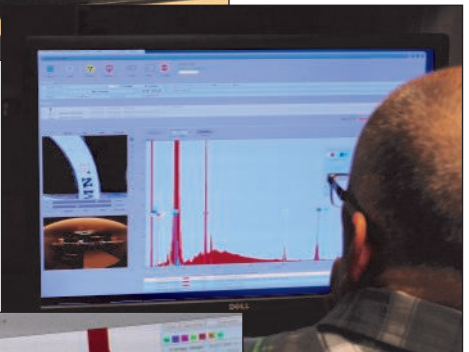
were also microscopes and thin sections to be examined. Additional rocks and specimens were



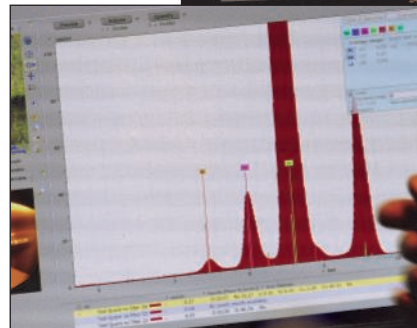
answer any of our questions. Rocks were displayed in two separate rooms. One room held a wonderful collection of minerals sorted by class and composition. Participants were invited to test



set along the walls - was a rock patters' paradise! People



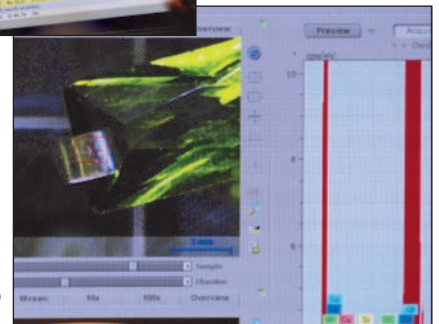
it



spent a couple hours going between the rooms, taking the provided quizzes and examining the



rocks. My favorite part was the new machine Jeff had access to that was called the Micro XRF. The Micro



XRF emits a high energy X-ray source and it can distinguish elements. Not all elements, but from carbon or so on up. It's less discerning than a mass spectrometer, but is cheaper and easier to operate. It was quite small, something on the order of a three-



foot square with an additional control panel and keyboard with a monitor. A specimen is placed inside the chamber and all the air is removed using an internal

vacuum. When the specimen is positioned under the emitter, a read-out of the chemical composition of the specimen is



produced. From this you can determine what it is. First, a medallion was placed inside the chamber and turned out to be silver, which made the owner happy! A coin was examined next, and although it looked to be gold, it turned out to be just copper and zinc. A pendant thought to be fake silver and chrysoprase turned out to be real silver and dyed glass. A rectangular piece thought to be silver bullion turned out to be fake silver. This was no big surprise; it was made up of copper, zinc and nickel with a bit of chlorine - simply put, fake silver. A cat's eye stone turned out to be apatite, which was a surprise as it was thought to be chrysoberyl. This specimen was more difficult to discern because chrysoberyl differs from plain corundum only by beryllium, which is too low on the table to show up on the readout. An earring with a stone in it was discovered to not be pure silver - and was instead nickel and silver. The stone had high amounts of zirconium, with small amounts of yttrium and hafnium, which made it cubic zirconium (CZ). Jeff said zirconium and hafnium occur together. This lab was a fun event for all of us. Jeff used the

opportunity to try out his new Micro XRF, the Macalester students were able to show off their geology skills in rock and mineral identification, and the GSM folks had a great time at this hands-on learning experience. The enthusiasm was quite infectious!

Deborah Naffziger

2018 State Fair!

Please join us at our GSM State Fair Booth this year. An important source of funding for GSM Lectures comes from new membership generated from our State Fair Booth.

State Fair dates are Thursday, August 23 to Labor Day, September 3. We need 2 people for each of the 3 four-hour shifts per day. Shift times are 9 AM- 1 PM, 1 PM- 5 PM and 5 PM- 9 PM in the Education Building. GSM does not pay for Fair entrance fee. Volunteers hand out our 2018-2019 Lecture Series handouts and chat about our Lectures, our Field Trips, and our "MN Rocks". Instructions will be provided. Please email your preferred days to Dan Japuntich at danjap7@gmail.com.

We are in our 80th Year and are very proud to be Supporting and Promoting Public Interest in the Geological Sciences since 1938!

GSM Markers become a Geology Tour

It isn't easy to visit all of the GSM Markers in a state as big as Minnesota, but the Marker Committee reports that all 53 markers have been checked out.

Additionally, there are 14 locations that are being transformed into Virtual Markers. This means that the individual marker hasn't been installed, but the place where it would have gone has been identified. The Virtual Markers can be found by their GPS coordinates and driving directions. Using a smartphone, a visitor can read the text about the geological significance of the marker. Another way to think about it is "geo-caching", a popular activity at State Parks.

Why is this important? Since 1949, GSM has been involved in designing and installing markers for the benefit of Minnesota citizens and visitors - for science teachers and science students, families, and anyone who has an interest in Minnesota geology over the past 3 billion years.

What's next? Now it's time to prepare the GSM

website for hundreds of new visitors. The committee plans to work with Minnesota's Department of Natural Resources and the Explore Minnesota tourism office to publicize our Geology Tour of the state and encourage people to visit. We hope to roll out the Geology Tour in time for State Fair.

See for yourself! Go to the GSM website (www.gsmn.org), click on GSM Markers in the Navigation Bar, and enter the world of GSM markers. Look at the Minnesota map and see markers explaining such things as the glacial periods, the glacial lakes and rivers, volcanic activity, a vast inland sea, and much more. Take your own Geology Tour this summer using this link – and enjoy!

Rebecca Galkiewicz

GSM Field Trips and Tours

On Wednesday, April 25, 2017, 11 GSM members participated in a 1.5 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 and its varied experiments each semester as member interest dictates.

So what's ahead?

Dave Wilhelm has arranged two free tours of the **St. Paul Water Treatment Plant** at 1900 Rice St, St Paul for **Wednesday, May 23 at 1 PM and 3 PM**. Contact Dave at dewilhelm53@msn.com if you are interested and have not already registered, as there are still openings. Each tour lasts 1.5 hours and requires continuous walking and the climbing of stairs. For those who are unable to walk for that long or who have difficulty with stairs, the plant can make accommodations.

GSM is planning a field trip to **Isle Royale National Park** during June 18 through 24. This trip will leave on the Ranger III from Houghton, MI, spend 3 full days on Isle Royale, returning on the Ranger III on the fifth day. The sixth day will be an overview of Keweenaw geology. Although this trip has reached its capacity of 17 persons, contact Dave Wilhelm to be added to the waiting list.

Mary Kay Arthur is planning a field trip in the **Thunder Bay, Ontario** area for **Thursday, July 19 through Saturday July 21**, 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. Here are the plans for each of those 3 days:

- On **July 19**, visit both an amethyst mine and an agate mine. Organizers are investigating the possible sites.

- On **July 20**, geologists from OGS will lead us to the debris-site **breccias** from the 1850 million-years-ago (mya) **Sudbury Impact** event, the **Kaministiquia River Valley** and its **Kakabeka Falls**, evidence of the approach and retreat of the Superior Lobe Glaciation, and **Midcontinent Rift** Formations.
- On **July 21**, OGS geologists will lead us east to the formations of the **Sibley Peninsula** and its **Sleeping Giant Provincial Park**.

We suggest that participants spend a fourth day touring historic **Fort William**, which covers the history of the North American fur trade as a living history trading post set in 1816 (with enactors in historically accurate costumes). However, that won't be an official part of this trip.

If you wish, you can participate for only some of the days. All persons are responsible for arranging their own transportation to Thunder Bay and their accommodations. If you are interested in this trip and have not already signed up, contact **both** Mary Kay Arthur (mkarthur@msn.com) and Dave Wilhelm, as further details of the trip are being sent only to those who express interest. Your response at this time is not a commitment.

Tentatively, **Randy Strobel, Roger Benepe, and Steve Erickson** are planning a field trip to **southeastern Minnesota and northeastern Iowa**, to study geology, visit caves, and hunt fossils. Trip length will be 2 to 4 days over a weekend, probably in September. Members will receive further information by e-mail as it develops.

On a Sunday afternoon in early October, we'll do one or more 90-minute walking tours of the building stones and architecture of **downtown St. Paul**, using the book "Rocky Roots" as the primary source. We will cover a 1½-mile course from the **Science Museum of Minnesota** to **Rice Park, Landmark Center** and several other interesting buildings along St. Peter Street and Wabasha. We'll discuss the geology of the building stones, architecture of the buildings, and history of St. Paul and the state of Minnesota. Our leaders will show many interesting features found in rocks and discuss how these are formed in geology.

To see other trips GSM is considering, select the "Field Trips" link on the **GSM 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 on the web site, sorted by year. These summaries are a good way to learn more about what GSM does.

GSM Field Trip Coordinator; Dave Wilhelm

Big Bend National Park

In March of this year, I had the privilege of spending 2.5 weeks driving through Texas, a state I had not been to before. I spent part of my time visiting relatives in Lubbock, Roma, and Dallas, and part seeing the natural wonders of the state. Places I visited that I recommend are Palo Duro Canyon (second largest canyon in the U.S.), Midland Petroleum Museum (with 3 nodding donkeys pumping at same surface hole - mesmerizing),



One hole with three pumpers

Seminole Canyon (be sure to take guided tour of the petroglyphs), Enchanted Mountain, Pedernales Falls, and Waco Mammoth N. M. But the highlight of my trip was Big Bend National Park.

Before I describe my visit, let me digress with a bit of travel advice: In Texas, there is Spring Break – all schools at all levels have spring break the same week in early



Santa Elena Canyon, Mexico on the left



Canoeists entering Santa Elena Canyon

March. If you travel in Texas at that time, you will find that accommodations fill fast, so plan accordingly. Since sites in the park were filled, I tent camped at an RV park in Terlingua, just west of the national park. Terlingua, part ghost town, is interesting in its own right, including an extensive pioneer cemetery.



Dave at the end of Santa Elena Canyon Trail

The park has three distinct environments: the river (Rio Grande), the desert (Chihuahuan), and the mountains (Chisos). It also has three major areas: The first day I explored along the Ross Maxwell Scenic Drive (west); the second day, the Chisos Basin (center); the third day, Rio Grande Village (east).

Most of the 30-mile Ross Maxwell Drive takes you



Mule Ears

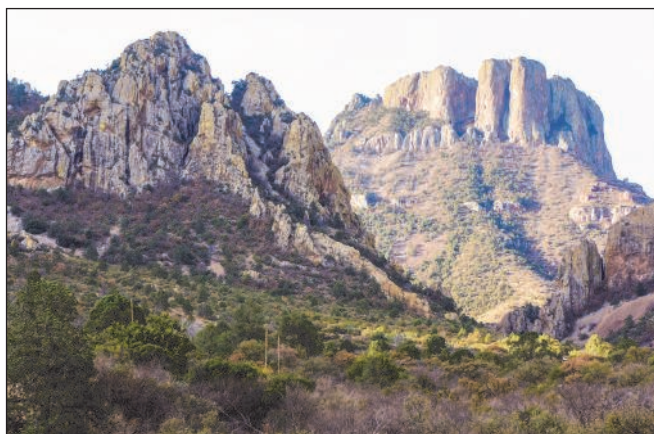
through beautiful desert scenery, with the last 8 miles roughly parallel to the Rio Grande. As you approach from the north, you see the tall Sierra Ponce Cliffs stretching across the horizon, with a sharp deep notch at one point. I



Looking up at Lower Mesa Pour-off



Chisos Mountains



Chisos Mountains

thought the notch was just a tributary of the Rio Grande, but discovered that it is the majestic Santa Elena Canyon, through which the river and the international border pass. This sharp bend in the river was formed by movement along the Terlingua fault zone that crosses the park. For many miles upstream the river is trapped between the high walls. This is a popular passage for canoers and rafters. A three-quarter mile path, somewhat steep at first, follows the river upstream, until the sheer canyon walls make further foot passage impossible. The canyon is so narrow that by looking almost straight up



Carved steps on Window Trail

you see Mexico, not Texas.

I worked my way back along Ross Maxwell Drive, with many stops for photos and hikes (10 miles on foot that



Fractured rocks along Window Trail

day – went down to dusk). There is much of interest geologically. One of the longer walks took me past Mules Ears to the spring by that name, which is just a trickle but is surrounded by lush vegetation and has enough captured water to maintain a bit of pond life. I can now say that I have seen Bears Ears (in Utah) and Mules Ears within six months. (At least Mules Ears is in a national park, so cannot be unilaterally desecrated by POTUS.) I also learned a new term: pour-off, as I hiked the Lower Mesa Pour-off Trail, an easy mile round trip, but tiring since much is through loose sand. A pour-off is simply a



Dave at the Window



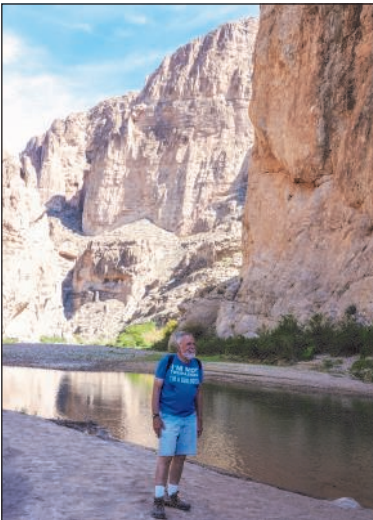
Panorama of Rio Grande U turn

plunge waterfall, like Minnehaha Falls. In this case, it was completely dry, which allowed a dramatic view straight up.

The next day I explored the Chisos Mountains, which have the distinctions of being the only mountain range contained entirely within a U.S. national park and the southernmost mountain range in the mainland U.S. These volcanic peaks were formed during the middle Cenozoic, and rise up to 7825 feet (Emory Peak).

I particularly recommend the Window Trail. Instead of the Visitor Center, I started from the Basin Campground to eliminate over 1 mile and 480 vertical feet of the hike. There is great and varied scenery along the way, as well as abundant wildlife. The trail follows Oak Creek Canyon downstream for 2 miles. The canyon becomes increasingly overgrown downstream, and the trail passes a good variety of vegetation plus some jagged rock formations; the best part is the 700 foot section just before the pour-off. Here the ravine is narrow and the creek flows over smooth, light grey rocks, forming pools and little cascades. Carved steps assist the path down some minor dry falls and on towards the final big dramatic drop-off, framed by dark brown cliffs. A great place to relax in the shade before trekking back.

I had hoped to hike part of the Lost Mine Trail, but after 6 miles of Window and Basin Loop trails, my legs and the altitude convinced me otherwise, leaving ample time to see the film at Panther Junction Visitor Center and to explore the ghost town back in Terlingua. My last full day in Big Bend I spent at Rio Grande Village, where I saw a lot more of the river. It is a great area for birdwatching. The Boquillas Canyon Trail afforded a very pleasant walk along the river at the east end of the road.



Dave in Boquillas Canyon,, Mexico behind

At a number of places I saw trinkets



Rio Grande at U turn



Downstream view from overlook

that had been placed for sale by Mexicans who crossed the river; you are asked to

pay on the honor system. The Rio Grande Village Nature Trail includes a wildlife viewing platform over a pond and dramatic views of a 180-degree turn in the river, which is narrow through that stretch. But my best view of the river in the entire park was after a short hike from Daniels Ranch toward Hot Springs. The entire trail



Canyon wall approaching Hot Springs



Rio Grande Hot Springs

is 3 miles each way, so I had not intended to hike there. But the trailhead sign said 0.3 miles to the

overlook. The trek to the overlook involved considerable climbing, but was it worth it. I had dramatic views of the Rio Grande in both directions, plus down in front. And I was all alone. As a bonus, I could hear and see a shepherd moving his flock on the Mexican side. My final stop of the day was Hot Springs. With its small parking lot, there was a half-hour wait until I was

allowed to drive in. The short drive itself was dramatic, through a small canyon with dozen of layers of sedimentary rock. The Hot Springs are right by the edge of the Rio Grande, where the hot and cold waters mix for a pleasant temperature.

Altogether, I had a very pleasant 3 ½ days in Big Bend, with cool overnight temps and warm days. (They do get unbearably hot in summer, such that many of the visitor centers close.) A very busy half week was sufficient to see the highlights of the park; I'm glad I allowed that much time. Allow more if you want a slower pace, or want to canoe. To see many more photos of my entire Texas trip, visit <https://tinyurl.com/DEWTexas2018>.

Dave Wilhelm

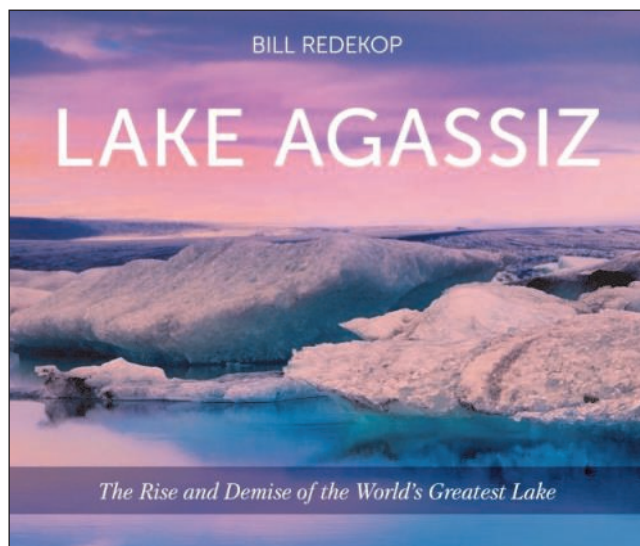
Who Likes Rocks? Who Likes Water? Who Likes Learning about Rocks and Water?

By John Porter, Editor, Minnesota Mineral Club

Two Minnesota Mineral Club members shared ideas that may interest all who said "I DO" to those questions. Club member, **Harvey Thorleifson**, University of Minnesota Professor, State Geologist and Director of the Minnesota Geological Survey, has shared two learning opportunities involving water and rocks with us.

The first is a new book: **Lake Agassiz: The Rise and Demise of the World's Greatest Lake** By **Bill Redekop**. (Note: information here about the book has been shamelessly cribbed from the publisher's website.)

Lake Agassiz may be the largest lake the world has ever known. By comparison, today's Great Lakes are puny. Born of the melting ice that had covered North America for millennia, Lake Agassiz was a force of nature for 6,000 years. Its story is one of superlatives: inconceivable tsunamis that bored through solid rock; tributary torrents that gouged huge valleys, and colossal outpourings that created a mini-ice age in Europe. Yet most of us know little about it. Bill Redekop's Lake



Agassiz: The Rise and Demise of the World's Greatest Lake will change all that. Enthralling, enlightening and often amusing, it tells the story of the huge phantom lake from its discovery in the late 19th century to its impact on our lives today.

Lake Agassiz: The Rise and Demise of the World's Greatest Lake by Bill Redekop
ISBN: 9781896150871

publisher: Heartland Associates

pub. date: 2017-11-01

<http://www.mcnallyrobinson.com/9781896150871/bill-redekop/lake-agassiz?blnBKM=1>

Second is a YouTube video from the Minnesota Geological Survey. Follow the link below to watch it.

<https://www.youtube.com/watch?v=uelSDhEKLo>

Also, special thanks to Club member **Ken Brown** for tipping us off to three exciting learning experiences offered this year by the North House



Folk School in Grand Marais. Each is a 2-1/2 day course designed to give participants an up-close and hands-on look into northern Minnesota's geology, which, of course, is about rocks and water.

(Note: the following info is taken from the North House website.) The instructor is **Jim Miller**

(Ph.D., geology, University of Minnesota) an Emeritus Associate Professor of Geology at the University of Minnesota Duluth. Formerly, he was a Senior Geologist with the Minnesota Geological Survey (1983-2008). His research specialty is the geology and mineral deposits of northeastern Minnesota. He has conducted geological research and led field trips for geologists and non-geologists for over 35 years. He retired from UMD in 2016 and currently resides in Thunder Bay, Ontario.

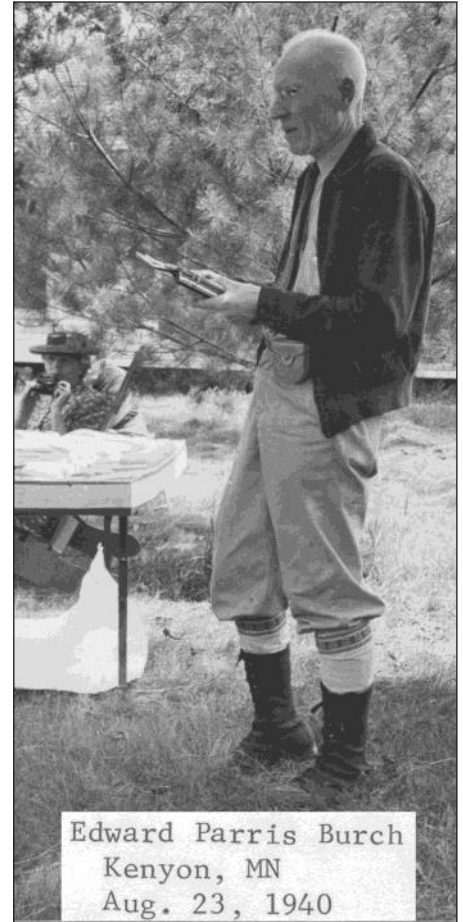
- Course 1: What's This Rock? Unraveling the Geologic Story of Minnesota's North Shore; Fri, Jun 1st, 2018 – Sun, Jun 3rd, 2018
- Course 2: What's This Rock Too? Unraveling the Geologic Story of MN's Central North Shore; Fri, Aug 17th, 2018 – Sun, Aug 19th, 2018
- Course 3: Geology Up the Trail: Exploring the Ancient History of the Gunflint Trail; Fri, Oct 12th, 2018 – Sun, Oct 14th, 2018

To register or for more information, check this North House website page: <https://northhouse.org/instructors/jim-miller>

80th Anniversary of the Geological Society of Minnesota

The Geological Society of Minnesota was started in 1938, when two separate but similar educational groups merged. One was an earth science club that had met regularly at the Minneapolis Public Library. The other was a group led by Edward P. Burch, from Minneapolis, who was a consulting engineer that had taken up an avid study of the geology of the Twin Cities area. During the years when Minneapolis was endeavoring, without success, to have the Milwaukee Railroad depress its main line tracks through south Minneapolis, Mr. Burch undertook an independent study of the problem. The proposed construction involved extensive excavation and required accurate knowledge of the rock formations under the city. This led to a study of deep well records of the Twin City artesian basin and to field inspection of rock exposures in the Twin Cities area. Mr. Burch invited others to join in the project, with the result that regular weekly field trips were conducted to study the geology of the area. In 1938, the combined groups organized the Geological Society of Minnesota for the purpose of stimulating public interest in geology, and the Society began a year-round program of lectures and field trips to which the public was invited free of charge. In 1939, GSM was incorporated as a Minnesota nonprofit educational organization. In 1949, an extensive geological markers project was started which aimed, in a limited way, to describe the geology of Minnesota in such a manner that it would develop interest by residents as well as visitors to the state. This was accomplished by the installation of bronze tablets at carefully chosen locations on state highway property and in city and state parks. Since about 1950, the winter lectures have been held at the University of Minnesota. Over the years, many outstanding geologic professionals have given the lectures. Lecturers are from the University of Minnesota and other academic institutions, government agencies, engineering firms, and industry. In about 1960, an educational exhibit was started at the Minnesota State Fair, which spreads interest to a broad spectrum of fair attendees, who also receive a program of the upcoming year's lecture series.

From the GSM web site



Edward Parris Burch
Kenyon, MN
Aug. 23, 1940



P.O. Box 141065, Minneapolis, MN
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