



News

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



GSM President, Dave Wilhelm

From the President's Desk...

First, we have new Newsletter editors: Theresa Tweet and Mark Ryan. Thanks to both of you for stepping up to this important task, and to continuing editors Harvey Thorleifson and Rich Lively. And special thanks to outgoing editor Katy Paul for the many years she has contributed to compiling and editing this Newsletter, which both informs us and records our history.

We are well into the 2014-2015 lecture series, and so far it has been a great one. We are averaging around 70 persons per lecture, and had an especially good turnout for our banquet at U Garden on September 15. I particularly want to thank GSM members Roger Benepe and Joel Renner for their lectures. It is great to see two of our own presenting to the rest of us. The full schedule appears on our website (gsmn.org). All lectures and labs are free and open to the general public, so feel free to invite family or friends when topics are presented that you feel might interest them. If you have an idea for a lecture or lab, or know of a possible presenter, contact Steve Erickson with the information. Steve will not start creating the 2015-2016 schedule until January, but it is never too soon to send him a suggestion.

The only complication with lectures this year is that the doors of Keller Hall (and all University buildings) now lock automatically at 7:00 PM. This is one reason that we have moved the starting time of the lectures to 7:00. Bill Robbins has been looking into having the lockout time delayed to 7:30, but it is not looking like that will happen. I strongly encourage everyone to arrive before 7:00, but realize that is not always possible for various reasons. To accommodate late arrivers, Steve or another member has been checking the doors every few minutes until 7:20 or so. (Thank you!) Of course this disrupts the lecture for that person, but we don't want to exclude anyone for being a few minutes late. If you arrive late and the doors are locked, please wait a few minutes until someone lets you in.

Elsewhere in this issue, Sandy Steffner thanks everyone who staffed our booth at the State Fair. We have already gotten a number of new lecture attendees and members from our booth. I want to second Sandy's thanks to all volunteers, but I especially want to thank Sandy herself for all the time and effort she puts into planning the booth and arranging the volunteers, not just this year, but also in past years. Sandy has notified us that she is resigning as the State Fair Planning Chairperson, so we are looking for another member to fill that role. Note that this role does not need to be held by a Board member, that Sandy has promised to guide her replacement, and that there will be a committee of persons to assist the chairperson with the planning. Please consider filling this vital role, and contact Sandy or me if you would like more information before deciding.

In August, Randy Strobel and Joanie Furlong led a week-long field trip through eastern

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Montana and western North Dakota. It was a great trip, although we got a bit wet at the very end. (Most of us were camping.) Elsewhere in this issue Maria Delaundreau, one of our newest members, describes this trip. In October, Randy and Joanie led a very pleasant 3-hour trip to Dayton’s Bluff in St. Paul. Shannon Trego’s account is also in this issue. Thanks to Randy and Joanie for planning and leading these trips, and thanks to new Newsletter contributors Maria and Shannon for telling us all about these trips.

We are always looking for new field trip ideas. Is there some place of geological interest that you would like to visit, or have visited and would like to share with other members? Contact me and I’ll put you in touch with someone who has experience organizing our field trips. Local field trips can be as short as a few hours, and often we can recruit a professional geologist as the technical leader.

As in the past, I encourage you to visit our web site (gsmn.org). It includes a wealth of information about our organization and about geology in general. Alan Smith contributes considerable time keeping this site current, including listing a description of the upcoming lecture on the home page.

One feature of our web site I would like to point out is our page of Geological Links, to which you can navigate from the list on the left side of the home page. On the Links page, I recently discovered an entire trove of videos of local (western Wisconsin) geology created by Dr. Bill Cordua; these videos are 7 to 20 minutes each. Click the “Rock Talks” photo on the links page. Note that there are three pages listing these talks. And following his recent talk on Geothermal Energy, Joel Renner contributed an entire page of links on that subject; click on that subject in the left margin of the Links page.

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GSM News

Officers:

Dave Wilhelm, President
 Sherry Keesey, Treasurer
 Rebecca Galkiewicz, Secretary

Board Members: Mary Helen Inskeep; Deb Preece; Ruth Jensen; John Grams; Mark Ryan; and Roger Benepe

Editors: Theresa Tweet; Mark Ryan; 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:

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 GSM Membership Chair
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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 Members!

- Barb Heideman, Grand Marais
- Cheryl Anderson & Charles Turner, Minneapolis
- Frank Janezich, Bloominton
- Kathleen Cantner, St Paul
- Maria Delaundreau, St Paul
- Steve Forsythe & Jayne Nord
- Tia Troy, Minneapolis

from the archives: Trip to the Black Hills, South Dakota, circa 1947.



Our membership year starts in September, when everyone's annual membership payment comes due. Please remember to renew if you have not already. The easiest way is to pay Joanie Furlong or Sherry Keeseey at one of the lectures. Or mail in your membership form and dues at the address listed in this Newsletter and on our web site. Be sure we have your e-mail address exactly right. The largest portion of your membership dues contribute toward our speakers' honoraria, so all of us as members are doing our part in making the 2014-2015 lecture and lab series possible.

Finally, I'd like to invite any members who are interested to one of our Board meetings. The next meeting is scheduled for February 12; see our website for scheduled dates. We typically meet between 7:00 & 9:00 PM at the Minnesota Geological Survey building (2642 University Ave. W. in 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

GSM President, Dave Wilhelm

****2014 GSM Holiday Celebration****

Ed and Sandy Steffner will again be opening their doors to the GSM clan. The Steffner's will welcome guests on **Saturday, December 13, 2014, at 3:30 pm** for appetizers and plan 5:00 pm for the Pot Luck Dinner. There will be no board meeting again this year. Before long, we will be sending invitations by email that will provide directions to the Steffner's' home and any last minute details. Meanwhile, please think of the dish you would like to share, and you can let Sandy know anytime at her email address, ssteffner41@gmail.com.

Notes From the Past:

From the 1958 Minnesota Geologist, official publication of the Geological Society of Minnesota

A MESSAGE FROM YOUR PRESIDENT: As you know, I am one of the editors of the Minnesota Geologist, the official publication of our Society. As such, I am in a position to read the publications of a great many other clubs and Societies like ours because we exchange publications. After reading them all from cover to cover as they arrive, one gets to form some kind of an idea as to what kind of an organization each one is, what their activities and interests are, the amount of enthusiasm in each one,

and whether or not they seem to be enjoying themselves. Among all the clubs and Societies with which we exchange publications and they range all the way from Michigan to California, I believe our Society is unique. I know of no other organization that has carried out a program of geological markers throughout the state as we have. I know of no other organization that has a continuing program year after year of lectures on some facet of geology by professional geologists every two weeks during the winter months, and field trips every two weeks during the summer months. In addition each year we have a "long trip" to such places as British Columbia, The Grand Canyon, Quebec, The Great Smokey Mountains, and this year to Jackson Hole and the Wind River country in Wyoming. And finally, I know of no other organization that has had the continued support and advice and assistance of the Department of Geology of the State University over the years such as we have. Therefore, I believe we are a unique organization, and we should all be proud of our Society. I personally, feel honored to be its President.

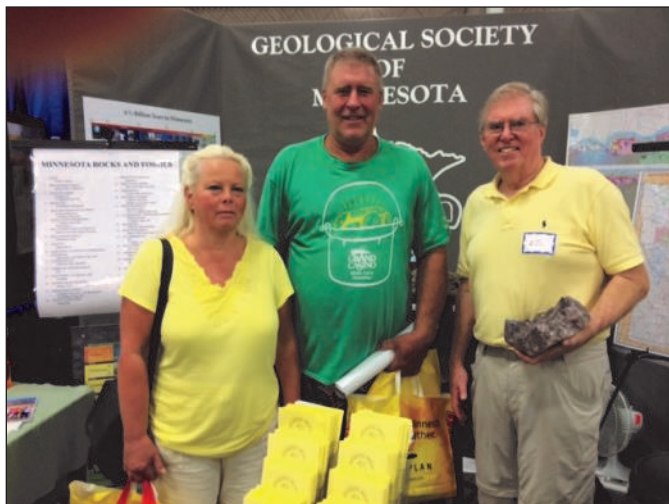
Elmer L. Koppen

The GSM quarterly **Board of Directors** meeting was held November 13 at the Minnesota Geological Survey Building. All Board members were in attendance. The Board welcomed the new members for 2015 that had been elected at the annual meeting in September: Dan Japuntich and John Jensen. Officers for 2015 were elected: President – Dave Wilhelm, Secretary – Rebecca Galkiewicz, Treasurer – Mary Helen Inskeep. The Board thanked outgoing Treasurer Sherry Keeseey for her years of dedicated service. The next Board meeting is scheduled for Thursday, February 12, 2015. As always, the full minutes of the meeting will be posted on the GSM web site a few weeks after the meeting.

State Fair Booth 2014

The temperature was much cooler this year and it certainly added up to a record turnout crowd at the State Fair as well as our Fair Booth. We were kept busy with the traffic and time flew by while chatting and pointing to our charts, maps, pictures, rocks and posters. Thanks to our State Fair Committee of Theresa Tweet, Sherry Keeseey, Ly Preece, Deb Preece, Roger Benepe, Dave Wilhelm, Ed Steffner for their efforts of setting up the booth and for Dick Heglund (and granddaughter) who also assisted us in packing up the booth after Labor Day. What a great crew! Again this year, we displayed large samples from around the world (borrowed from the

Minnesota Geological Survey), and also some collected from our GSM field trips. The trays of Minnesota rocks were as popular as ever, initiating many stories of collections at home in closets, basements, etc. Could there really be that many agates out there?



We know Labor Day is a busy time - travel for family reunions, and cabins, so we really hoped people could fit the GSM booth into their schedule somewhere. We certainly thank the many volunteers who were able to assist us - those who made the trip to the fair, paid the entrance fee, and gave four hours of their time to teach at our GSM State Fair Booth. Some members were generous enough to serve two and even three times. They include as scheduled:



Sandy Steffner, Ed Steffner, Tom Burt, Joel Renner, John Grams, Cathy Grams, Bill Robbins, Lee Kaphingst, Dick Heglund, Lynn Grigor, Cindy Schneider, Tom Noerenberg, Paul Jansen, Janet Hopper, Abigail Anderson, Fran Corcoran, Sherry Keeseey, Elaine Handelman, John Jensen, Ruth Jensen, Dick Bottenberg,

Joe Wright, Victoria Bonnstetter, Mary Kay Arthur, David Wilhelm, Alfred Kauth, Jack Matlock, Mary Helen Inskeep, Theresa Tweet, Dick Heglund, John Ernst, Frank Janezich, Roxie Knuttila, Mary Davitt, Jean Doyle, Patsy Huberty, Ken Holmbeck, Ted Chura, Ed Steffner, Mark Ryan, Pat Ryan, Lisa Peters, Sherry Keeseey, Dan Japuntich Theresa Tweet, Becky Galkiewicz, Rosemary Kowalchuk, Tom Noerenberg, Cindy Schneider, Steve Erickson, Rosie O'Donovan, Mark Ryan, Lee Kaphingst, Dick Heglund, Diane Lentsch, John Maronde, Harry Wernecke, Galen O'Connor, Don Swensrud, Marilyn Nelson, Larry Kalina, Vern Schaff, Roger Willette, Alan Smith, Kay Smith, Joanie, Furlong, Randy Strobel, Mark Nupen, Steve Erickson, Mary Helen Inskeep, Bruce Nelson, Deb Preece, and Ly Preece.

Next year will roll around before we know it. I hope all of you will share your ideas and will be willing to assist us in our biggest GSM Membership Drive. Please plan on taking part in our State Fair efforts. AGAIN, MANY THANKS!! Sandy Steffner

Montana - North Dakota Field Trip; Part 1: "Natural Geology"

There was so much to our summer field trip to eastern Montana and North Dakota I'm covering it in two installments. The first focuses more on natural geology and the second focuses on the industrial side.

"I touched dinosaur rocks!" That's the easiest way I've found to explain to the non-geology people in my life the thrill of touching the Cretaceous-Paleogene boundary in Mikoshika State Park in



Badlands, Mikoshika State Park

Montana and intrigue them enough to keep listening to yet another exciting geology lecture. While touring the park's visitor center earlier that morning with a park ranger, we learned a lot about the park's ancient past, focusing on the charismatic dinosaurs of land and sea. The park used to be

swampland near the shore of an ancient sea, an area that was biologically diverse and supported large populations of dinosaurs, such as Tyrannosaurus rex and Triceratops. Dinosaurs that have captured the imagination of humans used to roam here.

As we hiked in Mikoshika State Park, it was easy to imagine that a tragedy occurred there. The Lakota named this area 'Mikoshika,' meaning 'bad



Maria; golden tan over dark grey Cretaceous-Paleogene boundary to the right

earth' because they saw a torn up landscape littered with skeletons of strange creatures we now know as dinosaurs. Like the Lakota, I was also struck by the incredible erosive influence of water and wind on the site. Learning more about the dinosaurs and their extinction was fascinating, but eerie. It's amazing how quickly the world changed so many millions of years ago.

This change was evident in the rocks. Randy Strobel pointed out a dark band of lignite coal, evidence of the swamp that was once home to dinosaurs. Immediately above the coal was a golden layer of sandstone. These layers touch and



Maria touching the Cretaceous-Paleogene boundary



Dinosaur bones in a hillside

form the Cretaceous-Paleogene boundary, formerly referred to as the Cretaceous-Tertiary or K-T boundary. The sandstone hints at a sudden



The Little Missouri River looks peaceful and innocent, but it is responsible for the badlands topography we see today

change in climate, when the shore of an ancient sea advanced upon the area and eventually covered with a shallow marine environment.

On a larger scale, the boundary reflects a time when dinosaurs ceased to roam the earth, a time



Signs of erosion were everywhere

that ended suddenly and gave rise to a world dominated by mammals. Touching the line was sobering for a moment as I reflected on how



A trail highlighting the beautiful effects of erosion

quickly the world can change, but there’s also a feeling of awe and euphoria that comes with touching the boundary. You don’t get to touch dinosaur rocks every day! It’s an exciting way to start a hike.

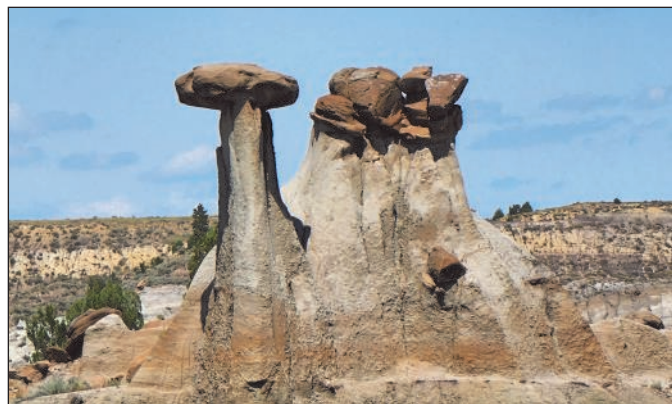
Another trail at the park gave us another unique opportunity. There in the hillside was evidence of dinosaur bones! Someone had the brilliant idea to leave them there so we could feel the excitement of a paleontologist making a new discovery, or the shivers the Native Americans must have felt when they named this area ‘bad earth.’

Climbing up and down the badland topography and creating noticeable erosion just from walking drove home Randy’s message that these hills experience 6 inches of erosion in a single year. This pattern of erosion we see today began thousands of years ago with an advancing glacier that suddenly changed the course of the Little Missouri River,



Maria on a cap rock, showing softer layers below

causing it to tear apart the landscape, exposing the soft and easily erodible layers that continue to retreat today under the erosive pressures of wind



Hoodoos are common in the badlands

and water.

The rock layers had differing levels of resistance to this erosion. Here we saw cap rocks -erosion resistant rocks that at least partially shielded the less resistant rock beneath, atop the abundant hills. Sometimes portions of the cap would be separated, resulting in neat formations called ‘hoodoos,’ cap rocks on a pillar of softer rock. They are a beautiful



The dark grey band is coal that elsewhere burned and collapsed, leaving pink clinker visible at center

addition to the landscape. Eventually, they will collapse but for now they are stunning.

We experienced this badland terrain again at



Pink clinker is a hint that coal once burned here

Theodore Roosevelt National Park, but here we focused on different parts of the geological story. We followed a trail to a depressed, grassy field. Randy informed us that this was the site of an underground coal vein that burned for several decades, likely started by a lightning bolt. As the coal burned its heat metamorphosed the surrounding rock while the coal itself burned and disintegrated, causing the ground to collapse. Now



At Theodore Roosevelt National Park

we can walk over the collapsed ground with rose colored clinker and see black coal on the hill and appreciate the power of burning rock in changing the landscape.

In the next part of this piece I'll talk about the part of our trip that focused on fossil fuels for human use, but the first part of our trip that focused on the natural side of geology helped give a more personal connection to the ancient deposits that became the fossil fuels and the landscape from which they are now being extracted. Maria Delaundreau

Roger Benepe Lecture & Open House on Fossils

Over 90 GSM members and fossil enthusiasts gathered at the U Garden Restaurant on University Ave. on September 15, for the first GSM talk of the season. This was our annual meeting, at which by-laws changes were voted on (thank you Mary Helen



Roger Benepe discussing trilobites

for researching these changes), and new Board Members John Jensen and Dan Japuntich were unanimously elected. After a great meal, former GSM president Roger Benepe spoke on fossils. Roger's interest in fossils arose in his teens when he purchased a trilobite at the Science Museum of Minnesota, and grew while in graduate school at



Albertosaurus teeth

Montana State University-Northern in Havre, Montana. While there, he made some of his favorite fossil finds, including the remains of an Albertosaurus at nearby Fresno Reservoir. He set up a program in the college and enlisted students



Roger with visitors

(aka free labor) to help extract the fossil bones from the ground. Forty-five percent of the skeleton was recovered. Another special find occurred while



Trex skull cast

leading a senior hostel group in the same area. It was a hot summer afternoon and they were all standing in shallow water to help stay cool. In the



Sabertooth skull

middle of his lecture to the group, Roger spotted something just beneath the surface that turned out to be a Hadrosaur jaw.

Roger’s talk focused on trilobites. According to Roger, there are 10 orders of trilobites, over 150 families, and about 5000 genera, with new species



Teeth and claws



Trilobites

being discovered yearly. Being that the soft tissues and organs such as the brain have deteriorated, the majority of the fossils that are found of trilobites are simply their molted shell. It is rare to find a complete exoskeleton with legs, eyes, antennae, and so forth. They appeared over 520 million years ago



Trilobites

and had shapes that varied according to their location and environment. According to the evidence, we know that trilobites lived in warmer, tropical waters, and whether the waters were murky or clear, determined whether the trilobite species had eyes or not. A point of interest was that



Fish fossils

the trilobite gets its name, not from the three sections cephalon, thorax and pygidium, but

instead from the left and right pleural lobes, and the central axial lobe. Scientists have no idea as to their coloring, how to distinguish the male and female of the species, or the age of a mature specimen. However, trilobites lived for 300 million years, and have been found on almost all of the continents. Trilobites were an extremely successful group that easily adapted to their environment, leaving us to wonder, "What was the reason for their extinction?"

Roger also hosted an open house at his home this summer, to view his collection of fossils. Roger had his fossil collection spread out on the first and second floors of his house for visitors to see. Among them were fish, dinosaur claws, mastodon and mammoth teeth, and casts of Sabretooth and Nanotyrannosaurus skulls. And of course lots of trilobites. Thanks Roger for sharing your passion for fossils with everyone!

Dayton's Bluff Field Trip

On October 5th, 24 GSM members met at the Indians Mound Park Pavilion in St. Paul for a 3 hour tour of the area. Randy Strobel was the organizer and our tour guide. The park, established in 1917, sits on the bluffs above the Mississippi River. Behind the Pavilion you will find Native American burial mounds. Of the original 39 mounds, there are 6 that remain. Of these 6, 5 were



Burial Mounds (David Wilhelm)

restored and 1 remains unexcavated. As we walked towards the St. Paul Municipal Forest, we passed a retaining wall built by the Works Progress Administration (WPA), and a few of the thirty-one trees that were marked with name plates labeling them such as the white pine, horse chestnut, mulberry, etc.

Outside the 25 acre municipal forest we paused to examine 4 erratics left behind from the last glacial period. The municipal forest was set aside early on as an undeveloped area St. Paul citizens could



Glacial erratics (Shannon Trego)

enjoy, but it also has springs and a DNR fishery. Randy explained how the St. Peter Sandstone was a great aquifer due to high porosity and permeability, and this is where the spring water comes from. Because of the location of the springs, this meant it was a good location for a fish hatchery. The brown brick building at the bottom of the photo is the fish hatchery. The railroad tracks are behind the fish hatchery with the Mississippi River in the background.



Fish hatchery in the foreground; the Mississippi in the background (David Wilhelm)

The group then walked back through the municipal forest and back into Indian Mounds Park, where we came across stone art sculptures and an airway beacon and tower. The beacon and tower were constructed in 1929 for the St. Paul Downtown Airport (Holman Field). This airway beacon is one of the few remaining of the many that once existed between St. Paul and Chicago.

At this point Randy also explained how the Glacial River Warren Falls were 175 feet tall at the end of the last glaciation. The falls back then were near what is today the Lafayette Bridge in Saint Paul. As the waterfall migrated upstream, over time it



Airport beacon (Shannon Trego)

gouged out the river channel. Eventually the waterfall split. The St. Anthony Falls obviously still exist on the Mississippi River, but the Minnesota falls eventually disappeared when it ran out of the Platteville layer.



Restored prairies in the foreground; downtown St. Paul in the background (Shannon Trego)

We passed restored prairies and gorgeous views of downtown St. Paul as we walked to our next destination, the Bruce Vento Nature Sanctuary. The land that eventually became the 29 acre sanctuary is at the bottom of the bluff adjacent to the railroad tracks. It used to be a wetland, but the railroad added 12 feet of fill to be able to use the land. Also, because early St. Paul residents living up on the bluff used to dump their garbage over the side of the bluff onto this area, fifty tons of accumulated

garbage and industrial/railroad debris had to be removed, as well as the top 3 feet of contaminated soil. The sanctuary eventually opened to the public in 2005 and was named after Bruce Vento, prominent environmentalist and politician in St. Paul.

This area also holds a number of historical sites, such as the cave for the North Star Brewery which was built in 1858, one of the first breweries in Minnesota. It later became the Schmidt Brewery. The cave that stored the beer was an ideal temperature at 52 degrees. No brewery buildings remain today. Another historic site is called Imnizaska, which is a Lakota sacred site. It's nicknamed "the sandcastle", because of its sandstone cliffs and quartz-based sand. A little farther down, we came across another significant site for the Native Americans- Wakan Tipi, also known as Carver's Cave. Wakan Tipi is a sandstone cave over 100 feet wide. Early explorer Jonathan



Randy and the metal plate that covers Wakan Tipi (David Wilhelm)

Carver came across the cave, which is why it's sometimes called Carver's Cave. It was said to have been beautiful and to have had numerous Native American hieroglyphics on its walls, but those no longer remain. Additionally, to stop people from entering what was left of the cave, a large metal plate was put across its entrance in 1977.

The nature sanctuary is being restored as 3 ecosystems: prairie, oak savanna, and oak woodland. But the restoration is still a work in progress, which can be seen from the newly planted trees in the oak woodland region of the sanctuary.

Shannon Trego

Rock On Geology Day

Interstate State Park at Taylors Falls is unique in that it is shared by both Minnesota and Wisconsin. The scenic park boasts impressive vertical basalt cliffs, natural potholes, and a view from the bridge into this gorge that is breathtaking. The Park has been a favorite get-away for geologists, hikers, rock climbers, canoeists, nature enthusiasts and children of all ages for many years.



Activities at Rock On Geology Day

This year's annual "Rock on Geology Day" at the park included family fun activities. For example, we were invited to learn about fossils using Interstate's own and borrowed collection of hands on fossils, magnifying glasses, and assorted books. As we finished each station, we got our fossil card stamped with a letter, and then we had to unscramble the letters, solve a word puzzle, and turn it in for a prize – the children loved it!

We also got to make a fossil, using a fast drying molding compound instead of mud, silt, compression and 500 million years. Families were invited to make impressions in clay using real and formed shells. Once the clay had hardened, we had a simple example of what a trace fossil looks like. There also was a Mix and Match Mineral station in which families were able to use simple tests and keys to determine the name of a mineral. The Pothole Game was a scavenger hunt for items related to the potholes and their history. They also had a mock pothole dig for replica artifacts.

Then at 2 PM, there was a walking geological history tour led by Dr. William Cordua from UW-River Falls. Dr. Cordua gave an excellent talk on how the Precambrian basalts had been formed by a series of lava flows a billion years ago. He described how later, the basalts were eroded and later buried under tropical seas that hosted marine life such as brachiopods and trilobites. Much more recently, the

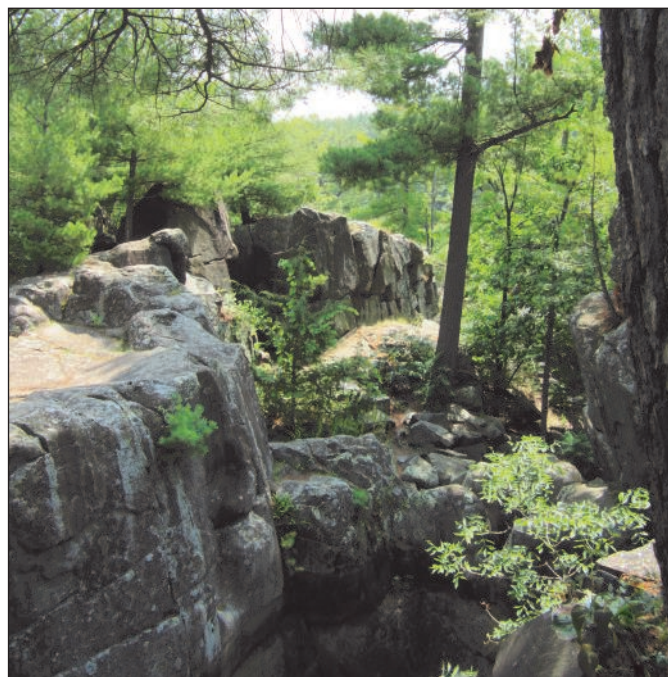


Dr. Bill Cordua leads a tour

area was carved and scoured by glaciers.

Thank you Jenni Webster, Interpretive Naturalist of the DNR for putting this event together, which seems to get bigger and better with each passing year. It was also a pleasure to visit with Dr. Cordua after his tour and find out even more about this Interstate Treasure.

More information about this Park and other State Parks was on hand at the park entrance office. These programs are free, although a Minnesota State park vehicle permit is required – available at the park entrance for \$5/day or \$25/year. Dr. Cordua has a video on Interstate Park, to view this or any of his other presentations, please refer to the [GSM web page](#) and look under Geology Links.



Scenery at Interstate State Park, Taylors Falls

GSA selects a Mark Ryan photo

The Geological Society of America has selected one of GSM member Mark Ryan's photographs to appear in the organization's 2015 Geomarvels calendar. Mark's image portrays the unusual split falls of the Brule River - known as Devil's Kettle - located in Judge C. R. Magney State Park on Minnesota's North Shore. The divided river's eastern portion tumbles over the escarpment in typical waterfall fashion before continuing on its way to the Brule's mouth on Lake Superior, while the western portion disappears into a large pothole. It has never been determined where that water ends up. Ryan's photograph originally won an Honorable Mention award in the GSA's 5th Annual Photographic Exhibition in 2013. The photograph's vertical orientation made it unsuitable for gracing one of the calendar's 12 months pages, but the editors included it on a special layout inside calendar's cover. The 2015 Geomarvels calendar can be purchased at the GSA's online store for \$9.95 (\$9 for GSA members) plus \$5 shipping/handling.

<http://rock.geosociety.org/Store/detail.aspx?id=CAL2015>



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