August 2021

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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…

Hi GSM Members! I hope you are enjoying your summer and looking forward to our Fall activities.

A major occurrence, and a very disappointing one, has been the decision to withdraw our GSM Booth from the 2021 MN State Fair. The rise in Covid cases and the increased threat of the Delta variant resulted in a significant number of GSM members deciding to opt out of staffing the booth. This is very understandable. We have notified the State Fair of our decision and are taking steps to ensure we will be welcome back next year, a tradition that GSM began in 1970.

Perhaps not unexpectedly, GSM lectures this fall will continue to be featured virtually every other Monday. Steve Erickson has developed another fine series. See the Fall 2021 schedule of speakers and topics in this newsletter and on the GSM webpage. At this point, we are uncertain if the U will allow us to return to the classroom after the first of the year. Stay tuned, check the website, and watch your email for updates as well as a list of speakers. If you have ideas for speakers/subjects, please forward them to Steve for consideration.

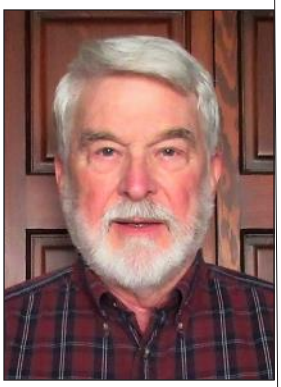
Also, the Fall 2021 Banquet is still scheduled for September 20 at the U Garden. (See the lecture schedule for details.) However, that may change. Watch for emails and check the website. I know we would love to gather, but recognize it may not be prudent.

Hey! It's time for GSM membership renewals. A renewal form is included in this newsletter. As your president, I deeply appreciate your dedication to this organization.

Many thanks to Dave Wilhelm, our GSM Liaison Officer, for his many postings of online seminars, articles of interest, and interesting activities for members to participate in over the past months. His postings have provided a wealth of activities for members during the isolation months.

Back the Fair. Kate Clover recently asked how long GSM had been at the Fair and Steve Erickson suggested maybe the 1960s? She scoured the archive of old GSM newsletters from the early 60s forward looking for mention of the Fair. She kept scanning the pages. Nothing.... In the late 60s, she found mention of establishing an outreach program, but no details. And finally, in the May /June 1970 issue—she found a short *Come to the Fair* notice and request for volunteers. That's 49 of the past 51 years.

It has been a long, difficult ordeal for the last year and a half. I think we all miss the



GSM President, Joe Newberg

Upper photograph, Mark Ryan

Inside this issue:

Visit us on Facebook!

from the GSM archives: Field trip to Brown County, Date unknown

personal interactions of the classroom lecture, cookies and field trips. Hopefully, over the next six months, we can begin to see a return to normalcy. If you have thoughts for future field activities, please forward them to Dave Wilhelm or any member of his Field Trip Team.

Warmest regards and wishes for an early and final end to our isolation.

Joe Newberg

GSM

2021 Board of Directors:
Joe Newberg, President
Patrick Pfundstein, Vice President
Dave Kelso, Treasurer
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Board Members: Wolf Bielefeld; Pete Hesse; Frank Janezich; Nancy Jannik; Roxy Knuttila Janezich; John Westgaard

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Membership: Joanie Furlong

Newsletter: Kate Clover; Mark Ryan; Harvey Thorleifson; Rich Lively

Programs/Lectures/Labs: Steve Erickson

State Fair: Patrick Pfundstein

Video Library: David Wilhelm

Webmaster: Alan Smith

Web Site: gsmn.org

The Geological Society of Minnesota is a 501(c)3 nonprofit organization.

GSM Mail 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 categories and dues:

Student (full time)	$10
Individual	$20
Family	$30
Sustaining	$50
Supporting	$100
Guarantor	$250

Individual and Family memberships can be renewed for 1, 2, or 3 years. Members donating at the Sustaining, Supporting or Guarantor levels will have their names highlighted in the GSM membership directory.

GSM News: The purpose of this newsletter is to inform members and friends of activities of interest to the Geological Society of Minnesota. GSM News is published four times a year during the months of February, May, August and November.

Newsletter contributions welcome:
GSM enthusiasts: Have you seen interesting geology while traveling? If so, please consider sharing your experiences with others through our GSM Newsletter. Write a short article, add a photo or two and send it in. Deadline for submission is the first of the month before the publication date. Send your story to newsletter editor: Kate Clover, kclover@fastmail.fm Thank you in advance.

GSM Board Membership:

The GSM Board consists of members who have a special interest in advancing the goals of the society, including lectures, field trips, and community outreach. The Board currently has ten members, and our bylaws limit terms to four years to encourage turnover, and a change of perspectives and ideas.

The Board meets quarterly, on the second Thursdays of February, May, August, and November, or on a different date if conflicts arise. In-person meetings are from 7-9 PM at the Minnesota Geological Survey at 2609 W. Territorial Rd, St. Paul, MN 55114.

Board meetings are open to all GSM members. If you are a new or long-time member and Board membership is of interest to you, please consider attending a meeting. If you have a topic you would like the Board to consider, please contact Joe Newberg, joenewberg@gmail.com

Geology and the Olympic Games

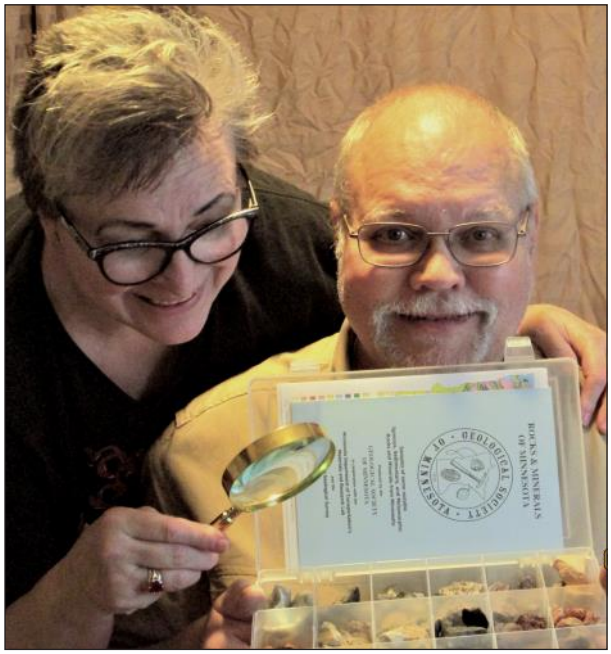
Did you watch the Olympic games this summer? Ever wondered where geology fits into the games? Recently, Aoife Glass wrote about the surprising links to geology at the 2021 Olympics Games on the BLOGS of the European Geological Union (EGU)'s GeoLog site.

https://blogs.egu.eu/geolog/2021/07/23/geology-and-the-olympic-games/

Kate Clover

No new members this period

GSM Member Profile
Ruth and John Jensen



Yearly visits to the GSM booth at the State Fair were intriguing—but a personal invitation from Dave Wilhelm got us to our first lecture. Wow, the speaker was fabulous! We were hooked and became members in 2010. We have both since been fortunate enough to serve two terms on the board.

Ruth has always been interested in science and learning. Her dad was a civil engineer and worked with geologists. At one point, we had to drive into a cave to get into his office. John, when hiking through Death Valley, California, wondered "Just how was this place formed?" He loves the stark beauty of the desert and is interested in planetary geology—especially Mars, Pluto and Arrokoth (MU69).

What do we dig about GSM? It has to be the lectures and the sense of camaraderie that exists among members. John was also thrilled to receive a box of Minnesota rocks as a birthday present!

One of our favorite destinations is the desert Southwest—places like Valley of Fire, Nevada and Bryce Canyon, Utah. You think that it couldn't possibly be more beautiful than this, and when you turn a corner it gets even better. We also enjoy Yellowstone with its many geothermal varieties. The Soudan Mine and installations was an amazing field trip with GSM. We highly recommend "Geological Wonders of the World, 36 Spectacular Sites" from the Great Courses.

GSM is withdrawing from the 2021 State Fair

After a GSM Board vote on my recommendation, I notified the State Fair today on August 4th that GSM is withdrawing from participation in this year's State Fair.

The reason is we just didn't have enough volunteers to staff the booth; even with a few heavy-load offers we would have peaked at covering only half of the slots needed with several unstaffed shifts, and too many with just one person, including a potential couple of 12 hour days.

Feedback from members, and I deeply appreciate those who were frank, as it helped paint the real picture, made it clear that this shortage was not a lack of support for GSM, but was instead a product of our COVID times. A general wariness of large indoor gatherings crystallized into some active alarm with last week's news about the Delta variant's ability to create rare, but countable break-through infections in the vaccinated, and the contagiousness of those break-throughs.

The Delta variant was the blow that took me from guarded optimism about staffing to recommending first to President Joe Newberg, and then to the Board that we withdraw from the State Fair, and make the decision quickly to give the Fair the maximum time to plan around that withdrawal.

Some of my Delta variant fears were coming true in that there were concerns, and understandable shift retractions sent to me before we even finished voting; staffing just wasn't going to happen this year.)

The Board did approve that plan, and immediately following the vote results, I reached out to the State Fair to let them know of the withdrawal, but also to know it was done with deep regret, and that we wanted to be back next year. I was able to talk directly with Pam Simon of the State Fair later in the afternoon, and we formalized the withdrawal.

I am set to remind Pam in October of GSM's strong interest in being back in the Education Building next year. Pam also let me know that GSM is not alone in its action; several others have withdrawn, some at the express instruction of HR departments.

This just isn't at all the kind of note I wanted to send out concerning the Fair, but as the contact person between GSM and the Fair, I'd like to toss out the following mentions of deep appreciation:

- to all of you who volunteered; thank you, thank you, thank you!
- to those who were clear about reasons for not volunteering, it both clarified the present, and makes me feel confident about the future!
- the board of GSM for adapting quickly to the shifting news, and acting quickly. I believe the Fair appreciates the notice coming as soon as possible.
- and even though she won't see this, Pam Simon of the State Fair facilitated this process with understanding and sympathy, and I'm sure she heard the regret in my voice. That also gives me hope for the future.

Any comments/questions are welcome to me at patrickpfundstein@mac.com.

Patrick Pfundstein
GSM VP/State Fair Chair

Notes from the Past

From the November 1943 edition of the GSM newsletter

"Our Society meets every Monday evening, not a holiday, in the large auditorium in the Museum, on the 4th floor of the Public Library at Hennepin Avenue and 10th Street, Minneapolis, Minnesota, at 7:30 P. M., from October to May. From May until October, we endeavor to have a field trip each week (when gasoline rationing doesn't interfere). Visitors are very welcome. Dues are $3.00 annually, and $1.00 additional for your wife or husband, or dependent family members."

2021-2022 GSM LECTURE SERIES

Lectures and Labs are free and open to the public.

Virtual Lectures 7:00 PM CT Mondays, except the September 20 Banquet)

Participation instructions and last-minute changes will be posted on our website: www.gsmn.org

Sept 20 *Minnesota Underground: A Guide Book to Exploring the Minnesota Underworld*; Greg Brick, Ph.D., MN Department of Natural Resources; Fall Banquet 5:00 PM, Annual Mtg. 6:30 PM, Lecture 6:45 PM; Location: U Garden Restaurant, 2725 University Ave. SE, Minneapolis, map on website

Oct 4 *Earthquake Science and Impacts of a Major Earthquake on the New Madrid Seismic Zone*; Larry Pierce, M.Sc., Chief, Geologic Resources Section, Missouri Geological Survey

Oct 18 *A Brief Geologic History of Colorado*; Lon Abbott, Ph.D., Teaching Professor, Dept. of Geological Sciences, U. of Colorado

Nov 1 *Geology of North Carolina*; Kenneth B. Taylor, Ph.D., P.G., State Geologist, North Carolina Geological Survey

Nov 15 *A Billion Years of Early Earth History: Perspectives from MN's Nearest Neighbor, Ontario*; Ben M. Frieman, Ph.D., Laurentian U., Sudbury, Ontario, Mineral Exploration Res. Centre

Nov 29 A Brief Overview of Black Hills Geology; Mark Fahrenbach, Ph.D., CPG, Environmental Scientist III, South Dakota Geological Survey; and Gold and the Black Hills; Brian Fagnan, M.Sc., CPG, Environmental Scientist III, South Dakota Geological Survey

Dec 13 *Assembling Oregon*; Sheila Alfsen, M.A., Adjunct Professor of Geology, Portland State U.; and William Orr, Ph.D., Professor Emeritus, Geological Sciences, U. of Oregon

2022 Lecture Dates – Check the website www.gsmn.org for lecture titles and updates – January 31, February 14, February 28, March 14, March 28, April 11, April 25, May 9

GSM Returns to the Rock and Gem Show!

The Minnesota Mineral Club's annual Rock, Mineral & Gem Show is planned to return from its hiatus on September 25-26, 2021 at the State Fair Dairy Building, and GSM will hopefully be able to be there. Please make plans to see one of the largest local gatherings of vendors, exhibits, and demonstrations under one roof. Get that odd item identified, visit the Kid's Corner, and dine in food truck splendor!

If you'd like volunteer for GSM at the show, please stay tuned for an opportunity to sign up after we see how the State Fair shakes down. Details can be found at: minnesotamineralclub.org

A Minnesota Meteorite?? By Glenn Lee

Summertime, and the living is easy - especially now that we've finally been able to get out to baseball games again! Whichever way this summer turns out for the Twins, there is a much older season in progress: The World Series of Meteorites! Yes, our region has been the target of meteorite hits both large and small since Precambrian time. And the preliminary stats here in the upper Midwest conference are something like this:

The big Grandaddy of Homers with the bases loaded goes to the Manson Meteorite in northern Iowa, which left a crater about 25 miles across. Its smaller cousin under Decorah adds to the record with its three-mile-wide crater. Next in line is in Wisconsin with its sizable Rock Elm and Glover Bluff craters in addition to 13 smaller hits recorded since the 1860's. We can give the Badger State a solid line drive to right field. Safe on second!

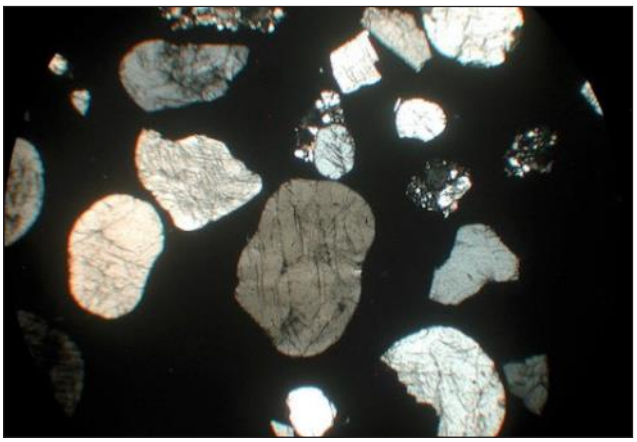
And then comes Minnesota - sadly, all of the meteorite finds in our beloved state could be toted home in a large baseball bag. We'll have to give the Gopher State a half-hearted bunt to first. How did we end up with such a sorry record? Is there any hope of getting back in the race for the pennant?

Sand grains studied for shocked quartz; photo Julia Steenberg

Well, it's great that you asked! According to the folks at the Minnesota Geological Survey, some recent findings have emerged that a sizable meteorite may have indeed struck big time and long ago in an area of present-day Dakota County near the city of Inver Grove Heights. Julia Steenberg of the Survey has studied the area and was kind enough to explain that subsurface geological anomalies stretch over roughly nine square miles. And before you jump in the minivan with the kids to go see this amazing sight, you should know that this and all of the big meteorites previously mentioned grand-slammed into earth with such velocity

and mass that they largely vaporized on impact and left behind very large holes. These impacts disrupted geological rock layers that were subsequently eroded and covered up by deposition of sandstone, limestone, shales, and glacial sediments. So, there's nothing much to see unless you're looking at rock samples brought up from well and borehole drillings or geophysical data. Interpreting the work of previous geologists on these stratigraphic anomalies takes a lot of time and patience, as Julia and her colleagues will attest to.

Most folks that live atop such phenomena have no idea of the amazing stories that lie beneath their local baseball diamonds. The citizens of the aforementioned town of Manson, Iowa lived happily unaware on their patch of prairie that stretched absolutely flat to the horizon until the early 1950's when deep water wells were drilled into some very strange-looking rocks. Investigations disclosed a geological disruption of extraordinary large scale and depth. Scientists initially thought that they were looking at a buried and extinct volcanic pipe, but additional evidence eventually



Microscopic view of shocked quartz grains, photo Julia Steenberg

showed the remains of an enormous crater. A huge meteorite had come down about 74 million years ago and the resulting crater and scattered debris underlay parts of four counties. As good luck will have it, the folks of Manson continued with their quiet lives, now blessed with groundwater from the deep wells which proved to be the best in the state.

Back to the Inver Grove Heights impact zone, additional efforts will be made to further delineate exactly what happened there. The best explanation is that it was indeed a meteorite, and the recent discovery of shocked quartz grains has added weight to that theory. More definitive work could be accomplished by drilling wells and examining the resulting rock cores, but this will have to await additional funding. In the meantime, Julia and her colleagues have their work cut out for them.

Perhaps they'll take time off to go see a baseball game. Batter up!! Many thanks to Julia Steenberg and the Minnesota Geological Survey for providing time and material for this article. All errors are the responsibility of the author and too many cups of coffee.

Memories of GSM Fieldtrips in the late 1950s

My parents were GSM members at least in the 50s and 60s, and probably before. When I was old enough, I attended the winter evening lectures in Ford Hall. I remember hearing Dr. Robert Sloan, professor of geology and paleontology at the University of Minnesota. It was always fun to bring rock samples up to the front of the room before and after the lecture to get some expert help on identification of minerals and fossils.

Our well-worn copy of *Minnesota Rocks & Waters* (MR&W) went with us on most road trips. I especially remember when we would tow our house trailer up the Gunflint Trail. My father was driving, and he would ask my mother to read aloud from MR&W about the geology of the north shore. At that time, most of the Gunflint Trail was not paved, and the bedrock sometimes was visible in the roadbed. We would typically zoom up a hill, only to zoom down the slope after we crested. My father would really give the car the gas going up the hill and catch my mother off-guard. As she was reading when we crested, she would be surprised by the sudden drop and say "Oh!" That would make my father chuckle, and he would set up another rollercoaster shot a few miles later. But in between we learned some geology.

I certainly remember being on a late 1950s field trip to Pipestone. Being a young boy, I was totally enthralled with the GSM practice of tying a white rag on our car antenna so you could follow the cars in the convoy to the next site.

Another memory of the GSM field trips was that there were always very sweet, older members who also belonged to the Audubon Society and wore their birding binoculars. We would get sidebars on birds, plants, trees and flowers as we walked to whatever site we were going to. It was quite an education for us!

Editor's note: Along with Terry's memory, he included a six-page story of a field trip to Pipestone, MN he accompanied his parents on in the late 1950s. He found this tucked into the front of the *Minnesota Rocks & Waters* book. I'll share the first paragraph. Sounds like it would have been a fascinating field trip.

Pipestone is more than a Calumet when seen on a field trip with Charlie Matsch, by Marcia Gunville.

Southwestern Minnesota was covered with dried-up corn fields last fall when Dr. C.L. Matsch took the GSM on a field trip to the Pipestone area. Obviously, there was not much water out there. However, this situation did not always prevail. Water conditions had been much different in this area during several other period of earth's history. Dr. Matsch showed us the unmistakable evidence for a number of watery environments.

Terry Mackin

Memorial Day Hike and Picnic

(Photos by Dave Wilhelm)

As vaccinations sharply reduced the dangers of COVID-19, Frank and Roxy Janezich generously invited us for a post-pandemic coming-out Memorial Day party. They were great hosts, and their backyard, adjacent to the Minnesota Valley National Wildlife Refuge (https://www.fws.gov/refuge/minnesota_valley/) is stunning. Many hiked in the refuge before the picnic. It was a perfect gathering on a perfect day, and the hike was a great bonus.

Hikers: Back row, L to R: Dan Japuntich, Joe Newberg, Dennis Oestreich, Frank Janezich, Randy Strobel, Joanie Furlong, and Dorothy Edelson (front, center)

Diane Lentsch on the trail

Joanie swinging on a vine

Enjoying dinner. L to R: Ly and Deb Preece, Joanie Furlong, Randy Strobel, Ed and Sandy Steffner, Dorothy Edelson, Dan Japuntich and Mary Helen Inskeep

Dick Heglund and Dennis Oestreich enjoying beverages

Ed Steffner on his accordion

Joe Newberg and Dennis discuss Dennis Oestreich's plans for his next trip to Utah

Platteville Limestone Walls built by the WPA, Saint Paul, MN

In recent GSM Newsletters, I have shared information about the use of the Platteville Limestone in buildings and structures around St. Paul. My search has continued. Last winter, I found the wall and chimney built by the Works Progress Administration (WPA) at the Mendota Trailhead and described that in the May 2021 newsletter. Since, I have located 2 additional walls built in 1936 by the WPA. Eighty-five years later these solid walls still stand and illustrate our local rock, the skills of the stonemasons and the legacy of the WPA.

Notice on these walls how the stones were laid in courses (in rows) or not, and the blocks vs rough-cut stones used to construct the wall. The different looking stone on the two walls illustrates different members of the Platteville formation; some members weather more readily than others. Have you found other walls? Let me know.

Story and photos by Kate Clover

Cornerstones on both walls read ***Erected by WPA 1936***

The wall on the corner of Tedesco and Burr Street (in East St. Paul) extends on just two sides of the block. A modern building sits on the site

The wall at Fry and Dayton Streets, near Snelling Ave., extends around the block and alley at the former Richard Gordon School building, erected 1911

Adventures in the Maritimes

Twenty years ago, when I had a much more adventurous spirit, was nimbler, thinner, and almost arthritis-free, I went to see the Bay of Fundy, the home of the world's highest tides. I flew to Boston, and from there to Halifax, Nova Scotia (NS) where I rented a car. I had been studying travel guides and maps for years, planning this trip, and I knew exactly where I was going, the distance between my scheduled stops, and what I would see and do once I arrived. I had made reservations at B&Bs along the way and intended to see everything I had read about. Points of particular interest were the fossil cliffs of Joggins; Hopewell Cape and the Flower-Pot rocks; the Geology Museum in Parrsboro, NS; any and all lighthouses; covered bridges; the Fundy Hiking trail, and all interesting geology.

After leaving the Halifax airport, my first destination was *Grand-Pré*, near the town of Wolfville. French settlers lived here beginning in the early 1600's, and they built dikes and reclaimed many new acres of rich agricultural land from the marshes and tidal flats. They were known as Acadians. The British and the French fought over the area for many years, and eventually the British won and controlled the area. When the Acadians refused to fight for the British against the French, the British began deporting them to various points along the north Atlantic coast, the Caribbean Islands, and some to Louisiana where the term Acadian turned into 'Cajun.' In 1847, Henry Wadsworth Longfellow wrote the poem *Evangeline* which tells the sad story of two lovers who were separated during the deportation. A statue of the mythical heroine stands in front of the Memorial Church of *Grand-Pré*, which was built in 1922-1930 to commemorate the expulsion of the Acadians.

The statue of Evangeline in front of the Memorial Church of Grand-Pré

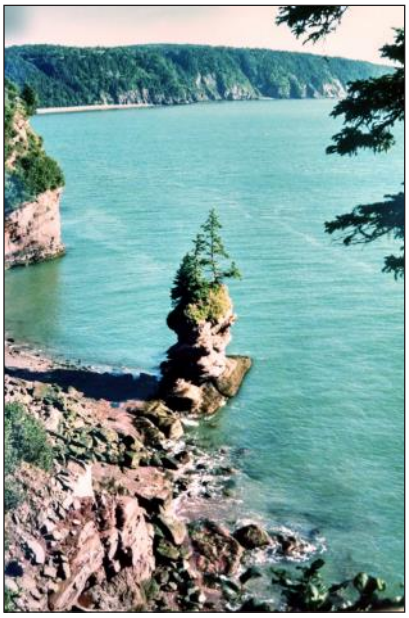
Intending to make a counterclockwise circular tour around the Bay of Fundy, my next stop was Parrsboro, NS just on the opposite side of the Minas Basin. There I visited the new (at that time) Geology Museum which displayed specimens of huge dragon flies and gigantic Arthropleura (looks like a giant sowbug) along with fossilized tree trunks and trackways discovered at Joggins. Staying at a lovely B&B for two days, I drove along the coast to visit Cape D'Or and its lighthouse. Blueberry fields carpeted much of the area, and I stopped at one to sample the crop. I also visited Advocate Harbor which was named by Samuel de Champlain who explored and mapped the coast in 1604. He named the harbor after his "advocate" or attorney who accompanied him on his voyage.

Fossils collected at Joggins

The next leg of my journey took me north to the Fossil Cliffs of Joggins, on Chignecto Bay, the upper portion of the Bay of Fundy. Here the cliffs expose a fossil record of the Pennsylvanian Coal Age, and seams of coal can be seen between layers of

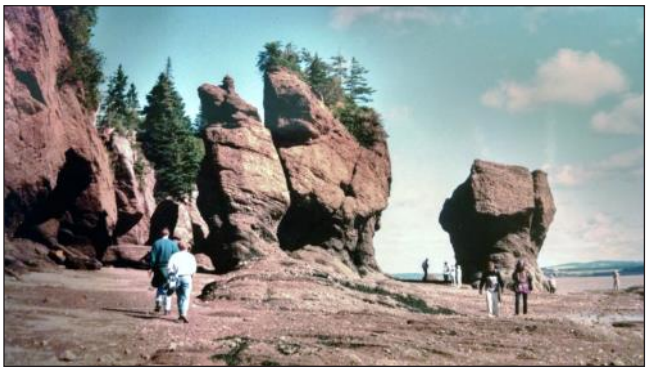
fossilized rain forest. Lucky visitors might get to see the outline of fossilized tree trunks before the sea washes them away. Although no chipping away at the cliff face is allowed, visitors can pick up fossils of leaves and trees found littered on the beach. Yes, I found a few good specimens and loaded my backpack.

Proceeding on up and around the tip of the Bay of Fundy to New Brunswick, I stayed at a B&B at Hopewell Cape, the home of the famous Flowerpot Rocks. I walked on the ocean floor when the tide was out, muddy as it was and thought to myself—this area could be under 53 feet of water when the tide came in. The next day I explored the tiny town of Riverside-Albert and a small gypsum mine which looked to be abandoned. I found a couple nice pieces of selenite for my collection.



View of a Flowerpot Rock from an overlook on the Fundy Hiking Trail

In view from Riverside-Albert is Grindstone Island which lies in Chignecto Bay. This island was home to sandstone mining and grindstone production from 1768 until the early 1900's. Ledges of superior quality sandstone were the source for grindstones and building stone. Throughout my travels around this area, I noticed large abandoned grindstones along some of the buildings. I imagined they had reached the end of their usefulness and were too heavy to move.



Hopewell Cape, Flowerpot Rocks

Driving further down the shore, through the Fundy National Park, I stopped in St. Martin's for three nights. From there, I accessed the Fundy Hiking Trail which follows the shore and provides access to several secluded beaches. In St. Martin's, I stayed at a B&B at the edge of town; it's a picturesque village which retains many stately Victorian homes along with some rather primitive seaside cottages. When not hiking the Fundy Trail, I made forays into the countryside each day, looking for covered bridges, and interesting geology.

Abandoned gypsum mine

Grindstone that reached the end of usefulness

Covered bridge in St. Martins

Early on the fourth morning at St. Martin's, I headed for the ferry in St. John. My rental car and I had a leisurely voyage across the Bay of Fundy, docking in Digby, Nova Scotia. From Digby I drove to Lunenburg–one of the most scenic places I have ever seen. It is a UNESCO World Heritage Site and has many colorful buildings along the harbor. It is the home to the *Bluenose*, the schooner featured on the Canadian Dime.

My last night in Nova Scotia was spent in the turret of an old Victorian Mansion in Peggy's Cove, home to the iconic lighthouse perched on a white granite outcrop. I

Lunenburg, Nova Scotia a UNESCO World Heritage Site

visited the memorial monument to the 229 people who died in the tragic l998 crash of Swiss Air flight 111. Residents of Peggy's Cove assisted emergency crews in clearing debris from the water after the crash.

As I look back over this trip, 20 years later, I am so happy that I did extensive planning before I left. My

Peggy's Cove Lighthouse

dual interests in geology and history came together nicely during this trip. I could write several more pages about my adventures in New Brunswick and Nova Scotia, but I recommend that anyone looking for a cool vacation adventure take a trip there and find out firsthand what these Maritime Provinces have to offer. When I began writing this, I looked up the websites for some of the places I visited and see that things have changed a lot since I was there. For one thing, there were no websites 20 years ago. (I didn't have a cell phone or digital camera either.) Many places that were just "there" (like Joggins) now have guided tours, hours of operation, interpretive centers, and improved parking lots and grounds. Some even have zip lines, rock climbing, and bungee jumping. It seems that they have realized over the years that tourists were coming, and there might be more of them if they offered these new features. I am glad I went when I did.

photos and story by Katy Paul

More Weird Movies!

We're all shut in due to the pandemic, and are watching things we may never have considered before. Here is a collection of movies with somewhat geological or at least scientific themes, from the totally absurd to almost plausible. Some are turkeys, some are tedious, some are actually watchable. They are listed from worst to best (comparatively) by my estimation. You may or may not agree. Get the popcorn, fire up the DVD and watch. At least it can kill an evening.

NOTE: These movies are all DVDs in the GSM Video Library. You can find the full collection of video titles on our GSM web site, along with many more reviews. Unfortunately, the Video Library is on hiatus while we don't have live lectures, as the Video Librarian, Dave Wilhelm, is not able to send DVDs by mail. However, you can maybe find these videos on an on-line movie channel.

Supernova

This is a 2005 apocalyptic thriller turkey from Hallmark. Just the credits with planets instantly exploding into chunks after their sun explodes in a supernova lets you know, this will not be good. Oh no, more weird magnetic anomalies affecting birds and other animals. (Why is it always magnetic anomalies?) This time the Sun is the culprit. And another world-weary scientist has all the knowledge, that the sun is unstable and will blow up in a week. A week? Really? But only he knows. Sigh. The graphics of the sun look little like the sun on the NOAA space weather page, and more like a cartoon. You would think they would look at the real thing first. This was filmed in South Africa, which stood in for Australia, with a few American actors to make it feel global.

They try for suspense, and end up with tedium. The sun is lots older than we thought (10+ billion years), so it will explode in a supernova. What about the Chandrasekar limit? We get absurdity upon absurdity. This is less entertaining than the Core. There are a few laughable moments, with accompanying effects. The disasters build, and you really do not care. They do destroy St. Louis, but leave the arch partially wrecked so you can tell. But like all Hallmark Productions, it ends well. Hint, the Sun does not go supernova, because of a math mistake. Really. Shorter, and it might have been good.

Ring of Fire

This is a 2012 miniseries event. It starts with a lake full of dead fish. Then a field of dead cows. What is happening? A big company is doing subsurface drilling for oil in a protected area in eastern Oregon (?!?), but guarantee it will be safe etc. etc. etc. And we will be free of countries that squeeze us and make gas prices go up $1.50 a gallon! (Oh, the horror of it all!) The area was depressed, and the drilling is a godsend to people out of

work. But CO_2 is being released after seismic events, with pictures of lava and churning stuff. Sigh. The usual cast of characters: a CEO who actually cares, a PR person who is ruthless, a protestor who wants to stop it all, miners who are desperate for a paycheck, a scientist who is baffled, his grad student who is hot, sassy and helpful, citizens who are baffled but trusting because they have a new park, etc. etc. etc.

"Magma can be easily mistaken for oil, and they could hit magma instead of oil. They are drilling deeper than they are allowed." "They could ignite the whole caldera." Honest, they say this and it sort of characterizes the whole movie. They hit magma, the well blows and it activates the entire ring of fire, 75% of all earth's volcanoes. The rest is explosions, special effects, harrowing rescues, dead people and the usual disaster stuff. It is a global extinction event, and you have a ringside seat. They use a sonic bomb to divert the magma to the ocean, and stop the chain reaction and save the earth. It is not bad enough to be a real turkey.

Dinotopia

This 2002 miniseries is a Hallmark Production, so you know it will be heartwarming. A small plane goes down in a storm, and the survivors end up at a small tropical island. An eccentric finds them, and he points them to the capitol of Dinotopia, Waterfall City. They are 'a little bit cut off from the rest of the world'. This place is basically the Flintstones in live action, but not funny. And just as realistic. They mix dinosaurs of different eras. Dinosaurs have evolved into sentient intelligent beings, except the carnivores who are the baddies. Their senate has people and dinosaurs serving there. It is a peaceful utopia, and people are vegans because all life is equal. There is little logic to the technology, everything is powered by sunstones, which come from the world beneath, the ground beneath Dinotopia. That's how the dinosaurs survived, they went into caves, and discovered the sunstones which give life. Uh huh.

There are anachronisms upon anachronisms, but if you suspend disbelief, it makes a sort of sense. The acting is good, and the CGI effects are passable. They spent a lot of money, but why? Many good actors risked their careers over this. It won a bunch of Emmys for effects and also best miniseries. One wonders what the competition was. It originally aired as a 3-part miniseries, but on DVD it is over 4 hours with no discernable breaks. It is mellow and peaceable, and has no real emotional intensity to make you care. It has a happy ending, and everyone is reunited. Kids will like it, because, dinosaurs. Duh!

Impact

This 2009 Sony miniseries starts with the greatest meteor shower in 10,000 years as people across Europe and North America watch. As usual, the scientists are the first to realize, there is a meteor twice the size of the one that killed the dinosaurs, and it will hit the moon. Debris from the moon will hit the earth, and bad things could come of that. Of course, all of this is televised live. The moon is now 30,000 miles closer to earth, but stable. Weird tidal changes start, and scientists are baffled. There are also weird magnetic anomalies: compasses spin, car batteries are dead, geese fly south in the spring, phones cut out unexpectedly. Then static electricity goes wild all over. Gas stations explode. Seems the meteor was a fragment of a brown dwarf, remnant of a dead star. (what?!?) The mass of the moon was altered by the brown dwarf, to twice that of the earth, and the magnetic field of the moon was boosted a lot, and it has magnetic and gravimetric implications for earth. Hence all the weirdness.

Scientific teams are assembled at the Pentagon to figure everything out. The orbit of the moon is more elliptical, and it is getting closer to the earth with each pass. Then gravity goes wild. "If the electromagnetic energy is strong enough it will override gravity." "We have no other choice, you cannot hide from gravity." They make a last-ditch effort to fix things, but it goes wrong. Then they do a last, last ditch effort, and it turns out ok, but with casualties. To be fair, the acting is good, and the non-scientific stuff is pretty plausible. But the science is total garbage. At the end, the moon is in two pieces, but it is orbiting fine. Yeah sure. Not as bad as it could be, and it is well acted.

Reviews by Deborah Naffzinger

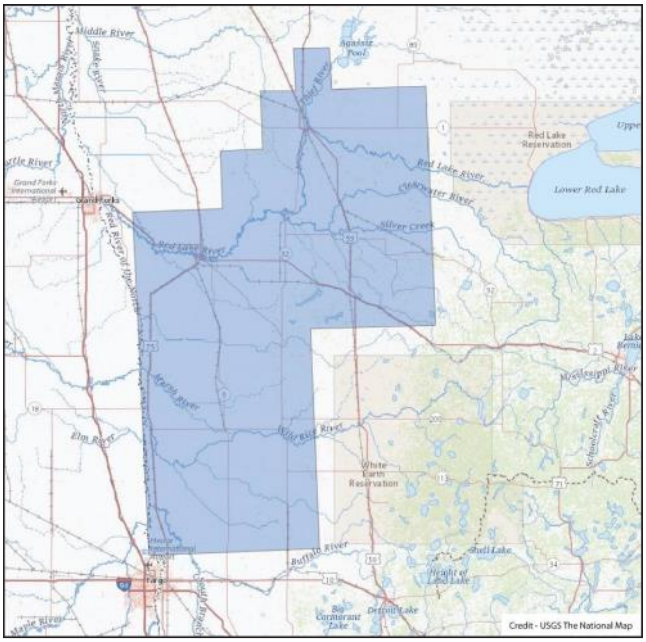
Geophysical Survey over Parts of Northwestern Minnesota to Map Geology

The goal of the US Geological Survey Earth Mapping Resources Initiative (Earth MRI) program is to improve our knowledge of the geologic framework in the United States and to identify areas that may have the potential to contain undiscovered critical mineral resources. Enhancement of our domestic mineral supply will decrease the Nation's reliance on foreign sources of minerals that are fundamental to our security and economy.

The motivations for starting Earth MRI and the potential returns on investment follow:

The United States is 100-percent dependent on imports for 21 critical mineral commodities and is at least 50-percent dependent on imports for another 28 critical mineral commodities.

Undiscovered deposits of at least some of these critical and strategic minerals almost certainly exist in the United States, but mineral exploration by the private sector is hampered by the lack of modern geological, geophysical, and topographic data. In contrast, governments of other countries provide such datasets



Area of western Minnesota under study

to the public and private sectors.

Studies in Australia and Canada have reported that investments by their federal governments in these basic geologic and geophysical datasets can be expected to lead to investments five times as large by the private sector (Duke, 2010; ACIL Allen Consulting, 2015).

Studies sponsored by Earth MRI aim to identify areas with potential for undiscovered critical mineral deposits that could reduce U.S. mineral import dependence, thereby strengthening national security, creating jobs within the private sector, and generating ancillary economic and social benefits.

Information acquired through this initiative could also advance our understanding of other economically valuable mineral resources (such as copper, zinc, gold, and industrial minerals), energy and groundwater resources, and geologic hazards. The newly acquired data also address other pressing societal issues in need of detailed geoscience information, such as identifying earth resources needed for revitalizing the Nation's roads, bridges, and other infrastructure systems.

As part of Earth MRI, a low-flying airplane was visible to residents in seven counties of northwestern Minnesota this summer, including the city of Thief River Falls and parts of the Red River corridor along the Minnesota-North Dakota border.

Scientists with the U.S. Geological Survey, Minnesota Geological Survey, Minnesota Department of Natural Resources and the University of Minnesota Duluth's Natural Resources Research Institute are partnering to image geology using airborne geophysical technology as part of the USGS Earth Mapping Resource Initiative (Earth MRI) project.

Beginning in mid-May and lasting through July, an airplane under contract to EDCON-PRJ, Inc. and Quantum Spatial, Inc. was flying over portions of Becker, Clay, Marshall, Pennington, Norman, Polk, and Red Lake counties.

Instruments on the airplane passively detected the Earth's naturally occurring magnetic field and radiation. This survey is one of several large airborne geophysical campaigns being conducted across various parts of the U.S. The surveys will help understand the geology over areas that may contain critical mineral-bearing deposit types. Data collected as part of this survey will be made public and used to guide more detailed geologic mapping at local scales. When the data analysis is complete, results will provide state-of-the-art, subsurface maps that will contribute to a wide range of 3D representations of the nation's exposed and concealed geology.

Typical airplane used for the Earth MRI survey

Flights occured at an altitude of 400-500 feet aboveground and were flown in a grid pattern with north-south lines spaced about 800 feet(250 meters) apart and east-west lines flown about 1.6 miles (2.5 kilometers) Apart. Experienced pilots specially trained and approved for low-level flying operated the aircraft. All flights occured during daylight hours and were coordinated with the Federal Aviation Administration to ensure accordance with U.S. law. The flights were based out of Crookston, Minnesota, and Grand Forks, North Dakota.

Low-level flights occured in the blue highlighted area of map, northwest Minnesota/North Dakota border.

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