



THE GEOLOGICAL SOCIETY OF MINNESOTA

News

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

From the President's Desk...

Greetings fellow GSM members. I want to tell you how honored I am to be your President for the next year. I have been a member since 2004, and I highly value the work of the organization and the fellowship of its members.

Many thanks to retiring President Dave Wilhelm and Vice President Deborah Naffziger, who also retired as Board Members effective January 1. Also, welcome to new Board Members Pete Hesse and Nancy Jannik who started their terms as of January 1, 2021.

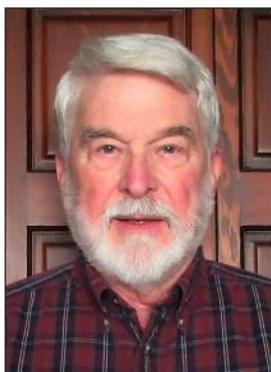
We have just ended a very difficult year for our State and our Country. GSM has adapted well to the COVID crisis with virtual lectures, but I think we all yearn for the ambiance of the classroom and the fellowship of face-to-face interaction with our peers. Our Zoom meetings on non-lecture Mondays have helped considerably with our fellowship needs, so please join us if you are so inclined.

GSM's upcoming lectures include: "Dawn of the Dinosaurs" with Kristi Curry Rogers from Macalester College on February 15, and "Remediation of the Saint Paul Ford Plant" with Amy Hadiaris from the Minnesota Pollution Control Agency on March 1. For other lecture information this winter/spring, see the GSM website, and watch for an email notice with a link to join the virtual webinars. Lecture information is also posted on the GSM Facebook page. And sadly at this date, we suspect the spring banquet will be cancelled, but again, watch your email.

Kate Clover's Platteville Limestone tour last September was a nice break. She plans to do a repeat this spring. Watch for an email notice at a later date. Hopefully, we can get back into conventional field trip offerings later this year. However, if you would like to take a mini-field trip on your own, find information in this issue in Justin Tweet's article about stromatolites in the Prairie du Chien formation at Spring Lake Park Reserve near Hastings. Also, Dave Wilhelm has been sending out tips on interesting online seminars and articles of possible interest to members. He has graciously offered to continue with this.

If you have any thoughts about GSM and its activities, please feel free to contact me or any of our capable Board Members, Officers, or Committee Chairs (see list below). I look forward to working with all of you in the coming year.

Joe Newberg



GSM President, Joe Newberg

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from the GSM archives:

*Edward Parris Burch
 1870—1945*



GSM

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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

New GSM Members:

Denise & Jon Beuen, Eden Prairie
 Dustin Mirick, Eagan
 Robin Eggert, Gonvick
 Craig Moody, Orono
 Gary Bastian, Oakdale
 John Archer, Minneapolis
 Stephen Scott, St. Paul

**GSM Member Profile
 Tom and Edna Schoenecker**

I've been involved with GSM for a long time, but I really don't know when I first joined. I do remember when I first really got seriously interested in rocks though. That was in 1991 when I was camping on the North Shore, near the Temperance River. I found a really nice agate and went into the Ranger station and bought a book on Lake Superior Agates written by Scott Walter. That book made me more interested in rocks and led me into an interest in geology.

After our camping trip, I made several inquiries into geology and wound up at



Tom and Edna Schoenecker, Photo –Dave Wilhelm

the Minnesota Geologic Survey. While at the Survey, I learned about the GSM, which I joined and have been a member since. I guess this means I've been a member for about 30 years.

I have never served on the board; however, I was the Chairman of the State Fair Committee for about ten years. I took over from Judy Hamilton a few years after I joined the GSM. In those days we had to contact each GSM member by phone to try to get the schedule of workers filled. My phone was very busy for a few weeks in June and July. It was never hard getting the schedule filled. It seemed like everyone wanted to be there. All of us know what fun it was working at the fair.

I attended meetings and went on field trips pretty regularly until about 2005, when I retired from my real work as a Professional Engineer and started playing Santa Claus at various malls around the country during the Christmas season. Then I played Snow Bird in Arizona during the rest of the winter. I stayed active during the rest of the year up to about 2015 when my body started catching up to my age.

Besides "Geology" the things I really like about the GSM are the people, the lectures and the field trips. Edna, my wife, joined me in the GSM years ago, and we have always felt welcome at the GSM activities. We've made a lot of friends. We find the lectures interesting and informative and fun. How can you have more fun than playing with "Rocks" at the State Fair?

We've found the field trips particularly interesting and fun and probably went on at least twenty different ones. One that was particularly interesting and fun was the August 1997 trip to Eastern Ontario. This field trip, led by Rich Uthe and Chuck Brennecke, was full of

tremendously interesting geology and lasted for nine days. We made at least six stops a day and had an opportunity to collect many samples. I don't know how our van carried all our rocks home. Another great trip was the one we made to California in 2012. This trip to the San Andreas Fault was led by Dave Lynch and was for about eight or nine days. We had the chance to explore the boundary between the North American and Pacific tectonic plates. It was very interesting and exciting to follow this Fault. We also were introduced to a lot of California history. It was very exciting when you had one foot on the North American plate and the other on the Pacific plate. The last big quake of the San Andreas occurred 1906. The next one is overdue. Think about that when you're straddling the fault or standing on a bridge that does so.

On the California trip, we also had the chance to visit the La Brea Tar Pits in Los Angeles. Of course, some of the other great, great fun times on our field trips were the evening get-togethers and dinners.

I've always been a curious person; my first question has always been: How does that work? or How was that made? Having been born and raised in Minnesota with its iron mines, as a kid I had the chance to explore an abandoned mine and walk the gravel roads looking for pretty rocks. I've always asked question about the geology around me. I just find geology very interesting and have had many of my questions answered through my association with the GSM.

Tom Schoenecker

NOTES FROM THE PAST

Edward Parris Burch and the Founding of the Geological Society of Minnesota

Editor's Note: At lectures presided over by Dave Wilhelm, past GSM president, he has mentioned that GSM has been around since 1938. Diane Lentsch, GSM member, found the following story of GSM's founder in a 2005 GSM newsletter. Following is a reprint of that article, which was reprinted in the *GSM News* both in 1943 and in 2005. It's time again to share this story. Coincidentally, he also mentions the "hard Platteville Blue Limestone" which we saw on the fall 2020 fieldtrips around Saint Paul. –Kate

Edward Parris Burch (1870-1945) founded the Geological Society of Minnesota in 1938. Graduating from the U of M in 1892, with a degree in Electrical Engineering, he went to work for Thomas Lowry and the Twin Cities Rapid Transit Company. His job was installing electrical equipment, during the Company's conversion from horse-power to electricity. In 1900, he began a consulting business, which took him all over the US. He was asked by the Minnesota Federation of Engineering Societies to write an article describing his work since his "retirement" in 1933.

The Request on behalf of the Bulletin for an Article on the Particular Circumstances and Personal Bents which led to Adoption of and Concentration on, Geology as an Avocation.

I began engineering work after graduation from the University of Minnesota in 1892. After forty-one years of steady and hard work, including some pioneer work in electrical engineering, I was up against a stone wall. Business was bad, a post-war depression was on, and consulting engineering was in a trough. My major business had consisted of handling difficulties, and

making the best of bad situations. But here was a real personal problem. How could this depression be solved?

After two years, I decided to quit, and to save \$130.00 per month in office rent and typist costs. [Note: He had an office in the "new" Foshay Tower.] I wanted to get out-of-doors, winter and summer. But I must prepare, and find something which would take me out. I had sufficient money, and no dependents, except my wife, and no worries. We traveled, largely by auto, in every state of the Union, and over most of Europe. We liked to travel for its educational value.

My work during 1893 had included the setting of trolley side-poles in downtown St. Paul, where compressed air was needed to drill through the hard Platteville Blue Limestone, and again in 1896 and 1897, during the conduit construction for the lower dam at St. Anthony Falls, the same limestone and the St. Peter White Sandstone below it, had been encountered. I began to ponder and to study. Were these sedimentary layers continuous, and level, and if not, what deformed them? And what was below them? How thick were they and how far did they extend beyond the Twin Cities?

A report on the proposed artesian well water supply, by Sven A. Norling, dated 1931, held particular attention because it furnished the deep-well records in and beyond the Twin Cities. I made a large three-dimensional model of the underlying rock formation between St. Cloud, St. Croix Falls, Hastings and Chaska. As my interest grew, I saw the need of greater preparation.

In 1932, I registered in the Department of Geology at the University for a three-year course. My only study was geology—not one hour per day, but six hours, under Professors Schwartz, Thiel, Dutton, Gruner, Stauffer and Emmons.

It was pretty hard to begin all over again, at age 62, in classes with youngsters, but I stuck it out, 6 to 8 hours on weekdays, field trips on Saturday and Sunday, and during two summer vacations, with Professors on geological surveys. Then I visited the lava flows on the North Shore of Lake Superior, and the iron mining regions throughout the states of Minnesota and Wisconsin. Five winters were spent in Florida and California studying the rock formation, marine shells and fossils in a careful, systemic way.

In Mineralogy, a collection was made of the common minerals and ores, placing them in a large cabinet, properly labeled and cross-indexed.

In 1936, I registered at the School of Mines and took a course in ore assaying under Professors Pease, Christianson, and Appleby.

In 1937, I registered at the University of Arizona, at Tucson. The leading mineral state of the Union, is Arizona, and the University has a splendid collection of world-wide rock and mineral specimens. There I learned more of mineralogy, mining and the techniques of rock structures.

Back in Minneapolis in 1938, I organized the Geological Society of Minnesota, and gave lectures, on Monday nights in winter, and led the weekly field trips in summer, for over three years. The Society is now incorporated as an educational institution, and it has had a remarkable growth. It is composed largely of teachers, doctors, lawyers, engineers, accountants and retired men and women who have taken courses in geology at the University, and who desire to extend their knowledge.

The field trips have been helpful. We first found the outcropping rocks of the sedimentary formations near the Twin Cities, and then made radial trips for new formations to southeastern and southwestern Minnesota, to St. Croix Falls, to the Iron Ore Ranges, to the northwest shore of Lake Superior in Canada, and along the southwest shore to the Keweenaw Copper District. Also, along the Minnesota River from Mankato to the Ortonville Granite Districts. One trip, with thirty-four members in automobiles, was made to the Black Hills for mineral specimens. Another was to Yellowstone Park for a week's outing. These trips combine fun, fishing, and scenery for nature groups.

The geology of regions at a distance has given us material for our lectures. The regions studied by members have included Boston, New York, Florida, Colorado, Arizona, California, the Black Hills, Grand Canyon, Rocky Mountains, Scandinavia and the mineral of the South Seas.

And now, after ten years devoted to geology, and when the light was breaking through on some hard problems, another World War comes on, and this has curtailed our plans. But we carry on, with restrictions on gasoline and rubber, and without our young men. We still collect rocks and ores, minerals, fossil shells, and we make models.

Retirement involved some preparations, and a study of the things you like to do. To enjoy an avocation requires work, and enough of fun to compensate one in the solution of problems. It seems quite necessary, with geology as an avocation to: hustle out in the morning, wear old clothes on a trip, select a good camp, cabin or perhaps sleep on a lava bed, always get chilled on a mountain top, learn to avoid marshes, divide with the ants and be eaten by mosquitos, and to be dog-tired, all in order to gain in experience for just another problem. To become a member of an alert and eager group of men and women and to be able to share in their leadership, and in their cultural life, has been a challenging experience. New worlds have opened up to enrich and broaden our lives. The work at times has been hard, exacting and discouraging, but, in such voluntary service, how much better it is to wear our than to rust out.



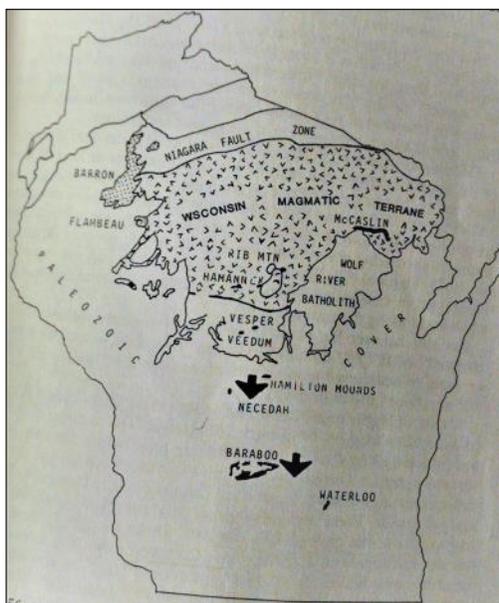
Edward Farris Burch
Kenyon, MN
Aug. 23, 1940

Edward P. Burch

The Niagara Fault Zone

The Niagara Fault Zone (NFZ) runs across the northern part of the State of Wisconsin, and through the town of Niagara, a small town that lies on the Menominee River. It has nothing to do with Niagara Falls, New York, nor the Niagara Escarpment, which runs the length of Door County, Wisconsin. There is no record (that I could find) why the town was named Niagara.

The NFZ marks the main collision boundary between the Superior Craton and the island arc to the south, and later the continental crust. The subduction of the island arc and the continental crust created a large mountain range, known as the Penokean Mountains about 1,890 – 1,815 million years ago. These mountains have long since been eroded away, but the mountains’ roots can be traced across Minnesota to the west, and eastward across the Upper Peninsula of Michigan.



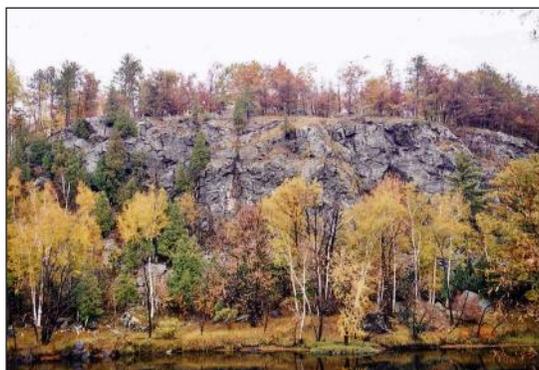
Geologic map of Wisconsin showing the location of the Niagara Fault Zone, from LaBerge, 1994, p. 111.

The Menominee River forms a 20-mile portion of the border between the Upper Peninsula of Michigan and Wisconsin and flows through the town of Niagara. Crustal alkalic-feldspar granites were intruded on

both sides of the NFZ. Exposures of these and

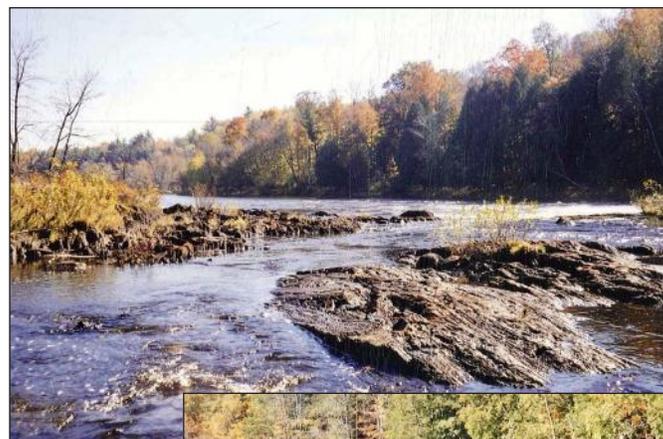
metamorphosed volcanic and sedimentary rock are visible along the river, looking across the river to Michigan.

Upriver from Niagara, a short distance into Michigan, is

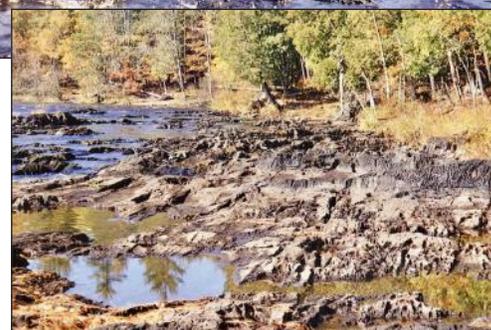


The Niagara Fault Zone looking east across the Menominee River into Michigan

the town of Norway. A section of the river near Norway is called Piers Gorge, and highly-sheared rocks of the NFZ are well exposed here. It is called Piers Gorge due to the four “piers” or falls of the river. This stretch of the



Piers Gorge on the Menominee River



Menominee River is a favorite of whitewater kayakers.

References

Geology of the Lake Superior Region by Gene L. LaBerge. Geoscience Press 1994
 Roadside Geology of Wisconsin by Robert H. Dott Jr. and John W. Attig. Mountain Press Publishing Company 2004.
 US Geological Survey Bulletin 1904-S The Great Lakes Tectonic Zone—Revisited. By P.K. Sims and W.C. Day.
 ILSG Field Trip Guide Book: Iron Mountain Michigan 2003.
 Story and Photos by Katy Paul

The Prairie du Chien at Spring Lake Park Reserve

Most of you are probably very familiar with the basic Paleozoic stratigraphy of the Twin Cities metro area, at least the part from the Jordan Sandstone up to the Decorah Shale. The lowest Ordovician unit, above the Cambrian Jordan Sandstone and below the St. Peter Sandstone, is known as the Prairie du Chien Group. It is frequently exposed within the valleys of the Mississippi, Minnesota, and St. Croix rivers outside of the core Twin Cities Basin, a geologic pucker which formed in the old



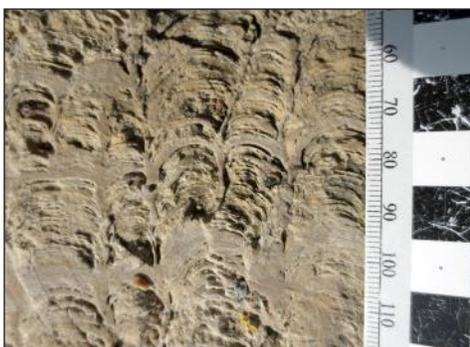
Midcontinent Rift. (There's a lot of geologic time in that sentence; the rift is on the order of a billion years old, while the Paleozoic rocks were mostly deposited between about 500 and 450 million years ago, and the river courses are Quaternary, practically yesterday.)

Introduction to the Prairie du Chien Group

Classically, the Prairie du Chien Group is composed of the lower Oneota Dolomite and the upper Shakopee Formation, which is also mostly dolomitic but includes some dolomitic sandstone and sandy dolomite as well. These two formations are sometimes divided into members, but these subdivisions are less widespread. The Prairie du Chien Group is noted for its practical uses. Both formations are used as building stone, although the Oneota is much preferred, being the purer dolomite. You may have heard of the trade name, Kasota stone; one of its most visible installations is at Target Field. The Shakopee more typically ends up as aggregate.

The rocks of the Prairie du Chien were deposited during the Early Ordovician, between about 485 and 470 million years ago. They have been interpreted as representing shallow marine deposition under conditions that were generally stressful to multicellular life. Although there are intervals with body fossils, particularly mollusk shells such as snail and cephalopod shells, the most abundant evidence of ancient life are stromatolites, layered sedimentary structures produced by microbial colonies (cyanobacteria or "algae"). Stromatolites are famously among the earliest fossils. By the Early Ordovician, though, the microbial mat lifestyle was difficult to sustain in a world of grazing seafloor dwellers such as snails, so well-developed stromatolites are seen as evidence of some kind of environmental situation which restricted the rampages of grazers.

The Prairie du Chien tends to form steep bluffs when given the opportunity, and holds artificial cuts well. You might have seen this phenomenon on Highway 10 between Hastings and Prescott, for example, or on Highway 61 northwest of Red Wing. Highway roadcuts, of course, are not the most convenient places to get acquainted with a formation. The Prairie du Chien is not in the business of doing



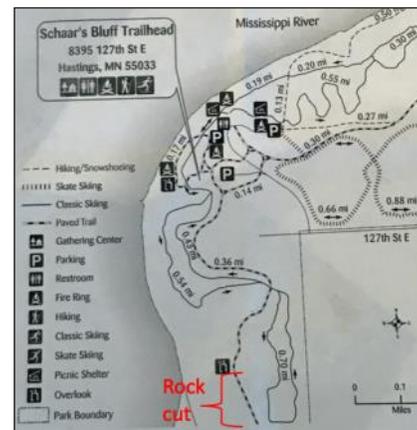
Stromatolite on Grey Cloud Island showing laminations and columns. The island is located northwest of Spring Lake Park Reserve, across the Mississippi river.

you any favors, either. The steep faces mean that whatever's above eye level is out of range, unless you get ambitious (which should be avoided at highway roadcuts). However, there are places where you can see

this unit without highway traffic, including a new cut in a metro park where you can get a good look at about 50 vertical feet.

Spring Lake Park Reserve Exposure

Spring Lake Park Reserve is a regional park in Dakota County, a short drive west of Hastings along the south side of the Mississippi River. In 2015, a segment of the Mississippi River Trail bikeway was developed within the park. One of the features of this paved bike trail is an excellent cut of the Prairie du Chien a short distance from the Schaar's Bluff parking area (about a 10-minute walk for a fast walker; see park map). This "trail cut" descends going north to south, so you begin at the top of the section and work your way down, getting a view of the whole thing. It's possible to get right next to the rock face, although doing so does expose you to the risk of being struck by a falling rock. Otherwise, the main hazard is cyclists and other users of the bikeway. Despite the well-developed cut, it is not entirely certain which part of the Prairie du Chien Group is exposed here; in the Twin Cities, the classic division of the group is harder to apply (T. Runkel, Minnesota Geological Survey, personal communication, December 2020).



One of the more apparent features of this rock face is a stratigraphic break (see next photo) a few feet below the top. It is most easily seen near the north end of the cut, where it is closer to eye level. Farther down the trail, the upper part of the stratigraphic section has been cut back from the main face. A possible reason for this engineering is a greater propensity for the upper part of the section to shed blocks. Inspection of the upper and lower sections shows that the upper section, above the break, is stromatolitic, whereas the lower section has greater sand content and



Partial view of the rockcut-looking south



Partial view-looking north

includes cross-bedding. The visibility of the cross-bedding varies, so if you don't immediately spot it at one location, keep going along the trail. The cross-bedding shows the existence of moving bedforms such as dunes. The moving sand probably restricted what kind of organisms could live here during deposition.

Above the break, stromatolites can be seen in the rock. They range from large rounded structures several feet across to complexes of columnar colonies as wide as a finger. Some paleontologists have given scientific names to certain kinds of stromatolites, but these names don't work quite the same as *Tyrannosaurus rex* or *Homo*



A view near the north end of the exposure, with an annotated version below showing the position of the stratigraphic break. A person is visible near the bend of the trail for scale.

sapiens; they're more structural than genetic. The microbial colonies which make stromatolites today are known to be influenced by environmental conditions

such as current strength and sediment input. So, for example, the same kind of microbes that make a flat-topped colony in one area may make a conical or domed



One of the better-exposed cross-bedded intervals. Scale bar is one cm interval.

conditions. Narrow small colonies may coalesce into single large colonies. Two kinds of stromatolites have been named from the Prairie du Chien Group:

Cryptozoon minnesotensis and *Cryptozoon rosemontensis*. The difference between the two is that *C. minnesotensis* is a singular large hemispherical structure, whereas *C. rosemontensis* is made up of groups of columns or pillars with convex upper surfaces, with individual columns less than an inch across.

You can see stromatolites that are similar to both types along the trail. At several places large colonies not made up of columns



A large bulbous stromatolite, partially eroded, a short distance above the stratigraphic break.

can be seen in place just above the stratigraphic break. These are more like *C. minnesotensis*. There are also examples of columnar colonies, more like *C.*

rosemontensis. It seems that the presence of stromatolites in the upper section has made the rocks more susceptible to breaking down. Stromatolites may be difficult for the beginner to spot, but once you know



Columns of laminations in a fallen stromatolite fragment.



Broader, non-columnar laminations in another fragment.

what to look for, they begin to pop out. Standing farther back, it's easier to appreciate the shape of the colony as a whole; columns or large rounded



Stromatolites with multiple centers (starred in the annotated photo) coalesced over time. Lines have been added to the annotated version to illustrate the framework.

shapes may be apparent. Up close, you can see the fine laminations, representing alternating episodes of mat growth and fouling by sediment.

Thank you to Kate Clover for alerting me to this site, and to Tony Runkel for comments on the stratigraphy. Remember, Spring Lake Park Reserve is both a regional park and within Mississippi National River and Recreation Area of the National Park Service, so take photos but leave stromatolites and other rocks where you find them for everyone to enjoy!

Article and photos by Justin Tweet

Weird Movies –Part 3

Reviews by Deborah Naffzinger

Volcano

This 1997 turkey centers on a volcano appearing in the middle of Los Angeles, and chaos ensues. It starts with an earthquake, in a new fault. Then sulfurous gases erupt from an underground drain in MacArthur Park. Tommy Lee Jones is the director of the Office of Emergency Management. Seems the subway vibrations caused a weakness in the storm drains to crack and steam starts coming up. So, they call in USGS and Anne Heche starts monitoring. They go down into the drain, and find sulfur. Then a BIG earthquake happens, and the rift down to the lava opens up and vaporizes her assistant. Uh oh. And suddenly lava bombs start erupting from the La Brea Tar Pits. And the rest is disaster. Fire, explosions, trapped trains, power out, looting, ash falling everywhere, a big mess. People die, tear-jerking scenes, it is a total cliché. And the lava just keeps coming. The rest is predictable. And stupid. And the special effects are somewhat unbelievable. It's well acted, but the science and script cannot be overcome.

Mega fault

This 2009 Syfy production starts in West Virginia, just the place you would expect a big earthquake fault, right? It starts with routine blasting for mining, which triggers a mega fault with gigantic cracks in the earth, people falling in and all sorts of bad stuff. Then a scientist is lecturing about earthquake preparedness and an earthquake hits DC with catastrophic damage, including the Washington Monument falling down. Reality aside (and they certainly threw reality aside), it is a standard disaster movie. The CG effects of gigantic cracks moving across the landscape are good. Not at all realistic, but good. The gas and power blow out before the buildings fall down. "We have never seen an earthquake like this before." That is a gigantic understatement.

The earthquakes have spread across the Midwest. The whole world is shifting. Seems the army has developed a tectonic weapon that freezes and crystallizes the water table and creates quakes invisibly. So, if they trigger a quake in just the right spot, it will stop the megaquake that was triggered by the blasting. "Stop this truck! No way, there is an earthquake on our tail!" They do stop the megaquake, but wait, Yellowstone caldera has awakened. The tectonic weapon destabilized to the mantle, and the magma from Yellowstone has invaded the aquifer. (!?!). People spontaneously combust in the Yellowstone area because of the magma. (!?!?) So, if they can create another grand canyon in the coal fields of Wyoming before the quake hits Yellowstone, they can stop that too. Absurdity upon absurdity. Not as bad as most.

Category 7 the End of the World

This 2005 Echo Bridge Production, a made for TV

miniseries, starts with superstorms all over the world. Biggest disaster cleanup since 9/11. A new sexy female director of FEMA starts and she tries to get ahead of the game, by predicting the weather. She resurrects a censored report on global weather (this could never happen in real life!) that predicts what is happening all over. She recruits a group of mavericks to research and get data. As this is a miniseries, there is a big cast with many complicated interrelationships. James Brolin as a sleazy televangelist is especially good. George Washington's head falls off Mount Rushmore because of suddenly freezing weather. Then a tornado demolishes the Great Pyramid. Plagues of frogs and plagues of flies make people nervous. The disaster parts are shot in a shaky-cam style, which is difficult to watch. It is well written, well-acted and reasonably paced. But the science is just so implausible. They figure out the mechanism for the freak storms (do not bother trying to make sense of it), and try to work out a solution, as two mega-storms look to converge over DC into a massive category 7 storm. As things get more desperate, the FEMA director's cleavage gets lower and lower. And there are terrorists around also. The weird weather effects had me laughing out loud. Talk about not in this reality! It ends well, but it is really crazy. Apart from the awful science, it is not too bad. I guess if you have to watch one disaster movie, this might be it.

Mackenna's Gold

This 1969 feature film stars Gregory Peck and Omar Sharif. Sharif wants the location of an ancient Apache gold mine, and Peck has it. This is a relatively good movie, except for the weird geology. The climax is at the mine, and there the geological weirdness starts. This gold 'mine' is geologically impossible. There are random nuggets to cobbles of gold all around on the ground, with wide swaths of gold vein in the walls of the canyon. There is gold everywhere, with no indication of water washing it out or mining traces or anything. It is just lying around. It looks like they painted the canyon walls with gold paint, and they probably did. Then they anger the spirit of the place, and an earthquake happens. The floor of the canyon drops and has cracks, but nothing falls from the sides of the canyon. They ride like hell outta there, and only then does the trail start cracking etc. They get out, and everything falls around them and the trail into the canyon is buried. Once out, there is a weird visual effect, flashing colors, and the pinnacle that points to the secret trail crumbles. Yeah. I laughed my way through this unbelievable geology, and maybe you will too. But otherwise it is a good movie.

The Core

This 2003 turkey of a feature film is best watched in MST3K mode. It starts with people dropping dead, and goes downhill from there. Then pigeons go berserk. Why? Electromagnetic pulses are causing weirdness. Then (gasp!) the space shuttle (which dates it) has

problems landing, and has to ditch in the LA River. OMG, what is going wrong? Seems the core of the Earth has stopped rotating, which makes the electromagnetic shield all wonky. The science is total hogwash, so just yell at your TV and enjoy the ride. The acting is good, and they tried, but they cannot overcome the script. So, a renegade scientist has a magic machine that makes it possible to go down into the Earth and jump start the core again. He has an unobtainium capsule people can ride in. You get the idea. Enjoy the silliness.

EDUCATING FUTURE ENVIRONMENTAL STEWARDS (Notes from the Past: Winter 2001)

Back in 1965, James R. Lowenstine began to envision a future use for his 1,200-acre estate in northern Wisconsin. Plans evolved for a school that would teach youth to appreciate the natural beauty of the Northwoods and motivate them to become ethical environmental stewards of the future. Six years after his death, in the fall of 2002, Conserve School will open its doors to realize that dream. A non-sectarian, independent, coeducational residential high school, Conserve School will offer students a unique educational opportunity through its innovative, interdisciplinary curriculum focused on 21st century sustainability issues and ethical leadership.

Conserve School is located on 1,200 acres of Jim Lowenstine's former estate in Land O'Lakes, Wisconsin, a small resort community whose population of 800 year-round residents nearly doubles in the summer months. Known for its thick birch and evergreen forests, pristine lakes, wetland marshes, and abundant wildlife, this Northwoods retreat provides an idyllic setting for a school devoted to preserving the balance of nature. Future students will share their home with white-tailed deer, bobcats, black bears, bald and golden eagles, woodpeckers, red foxes, fishers, and other wildlife. School buildings will occupy only 120 acres of the 1,200-acre campus, leaving most of the land and the seven lakes on the property as an "outdoor classroom" for students.

Habitats are not disturbed, and impact on the ecosystem is minimized. Lumber from trees that must be removed is being used for exterior facing of the buildings, auditorium flooring and student projects. Conserve School is also participating in a regional re-forestation effort to restore the pine ecosystem that existed throughout the Northwoods in the early 1800s.

Experimentation and invention will be stressed throughout the Conserve School curriculum. In addition to college preparatory courses and studies of diverse global ecosystems, students will participate in hands-on, problem-solving activities. They will learn to generate creative solutions for the ecological concerns of the area, use the latest technologies as sustainability tools, and help area residents to understand and resolve issues such as changes in the water levels of nearby lakes, excessive destruction of wildlife habitat by beavers, or decreases in the loon population. To learn more about Conserve School, visit <http://www.conserveschool.com>.

Sylvia Huppler – In Memory

Sylvia Huppler, GSM President from 1998-1999 died February 1, 2021. She was 93. She and her husband Ed had a life-long interest in geology and were long-time GSM members. Memorial service is February 12, 2021 in Watertown, South Dakota.



Sylvia graduated from the University of Minnesota with a BS in Bacteriology. She was a loving mother to 5 children. When the children left the house for college, Sylvia went back to college herself and received a master's in Microbiology. She really enjoyed working at the Minnesota Department of Health as a microbiologist. She also had an interest in geology and travelled across the country to visit archeological digs with her husband. She often kept busy with postgraduate courses at the University of Minnesota



P.O. Box 141065, Minneapolis, MN
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