

Geological Society of Minnesota
Board Meeting Minutes for February 8, 2018

- I. Notes and opening comments.
 - A. Board members present: Cathy Wait (via phone), Dave Kelso, Deborah Naffziger, Dave Wilhelm, Dick Bottenberg (via phone), Kate Clover, Dan Japuntich, John Jensen, Theresa Tweet.
 - B. Other GSM members Present: Steve Erickson, Mary Helen Inskeep, Ruth Jensen, Alan Smith, Joan Furlong
 - C. President Dave Wilhelm called the meeting to order at 7:00 pm and indicated that a quorum was present.
 - D. Minutes for the Nov 9, 2017 Board Meeting were previously approved by e-mail and posted on the GSM website. FYI: Board members have 10 days to review the preliminary minutes after the Secretary sends them out. Please be sure to do that by the date set by the Secretary.

- II. Agenda items for consideration by the Board.
 - A. Review and agree on the agenda for Feb 8.
 1. Board members agreed on the agenda.
 - B. Future Board meeting dates.
 1. 10 May 2018
 2. 9 Aug 2018
 3. 8 Nov 2018
 - a) Board members agreed to set the 8 Nov. meeting date.
 - C. Board status Dave W
 1. Current Board membership

a) Cathy Wait	2018 to 2021
b) Dave Kelso	2018 to 2021
c) Deborah Naffziger	2017 to 2020
d) Dave Wilhelm	2017 to 2020
e) Dick Bottenberg	2016 to 2019
f) Kate Clover	2016 to 2019
g) Dan Japuntich	2015 to 2018
h) John Jensen	2015 to 2018
i) Theresa Tweet	2015 to 2018 term began Nov 2015
 2. Current Officers.
 - a) President – Dave Wilhelm
 - b) Vice President – Deborah Naffziger
 - c) Treasurer – Cathy Wait
 - d) Secretary – Dave Kelso
 - D. Treasurer's report – Cathy/Mary Helen via phone
 1. Treasurer transition – going smoothly and almost done.

2. Financial report – a verbal report was given in conjunction with an income statement and balance sheet.
 - a) Two speakers returned their honorarium.
 - b) The GSM currently has \$4900 in their CD/Savings account.
 - c) The authorized signers need to sign forms for Capital One.
 - d) The Treasurer would like to consider using electronic statements.
 - e) The Treasurer will consider possible adjustments to the CD and make any recommendations by the next Bd. Meeting.
 3. Board Member review of finances – Deborah
 - a) Ongoing
 4. Plans for GSM investments and savings accounts – Cathy/Deborah/Mary Helen.
 - a) Capital One is no longer doing CD's. Once they mature we should consider moving them to a different bank.
 5. M/S/P by Deborah and John to accept the Treasurer's report.
- E. How should financial reports be maintained by the GSM – Dave W/Cathy/Alan
1. Dave W proposes posting them (and other sensitive information) to the password protected portion of the web site, same as the membership roster.
 - a) Discussion with Alan as to how this could be done. Dave W will work with Alan on a process.
 2. Cathy recommended that the Board consider using a laptop for presenting reports and information instead of producing a lot of paper. Cathy may be able to bring a laptop to Board meetings.
- F. Online application/renewal of GSM memberships – Joanie/Dave W/Alan/Cathy
1. After much discussion on the pros and cons of using PayPal for membership renewal it is recommended that the GSM not do so at this time. However, Theresa Tweet agreed to investigate this capability further.
 2. Some of the complications of using PayPal include.
 - a) There is a "setup" charge along with charges for each transaction.
 - b) It appears that a personal SSN may have to be used for the account although an EIN could possibly work.
 - c) If there is some type of problem the account, under the SSN, will be shut down and very unlikely to be re-instated.
 3. Please see "Report on PayPal" attached to these minutes.
- G. PO Box Status and Issues – Cathy/Mary Helen
1. Who has the PO Box keys and who should?
 2. Cathy, Joanie and Dave W all have keys and seem to be the appropriate key holders.
- H. Name badge status – Dave W
1. Dave W (who purchased 18 name badges) for Board members and others has been reimbursed. All have been distributed except to Dick and Cathy. No further discussion on this item.

- I. GSM Operating Manual update and review – Deborah
 - 1. It is ongoing and getting more thorough. Deborah and the group are doing a wonderful job.
- J. Membership report – Joanie
 - 1. Joanie was asked to include “new” members on the next report.
 - 2. Please see the “Membership” report attached to these minutes.
- K. Lectures and labs – Steve
 - 1. The last three speakers, on the lecture list, need to be re-scheduled. Alan will make the necessary changes to the website.
 - 2. Some discussion on the policy for cancelling or postponing lectures due to inclement weather. How Dave W and Steve are handling this seems to be working quite well.
 - 3. If there are speaker recommendations, please let Steve know.
 - 4. Please see the “GSM Lecture Attendance” report attached to these minutes.
- L. Status of lecture videotaping – Joe
 - 1. Joe was not present however there was discussion on the status and equipment needs
 - 2. Joe had sent an email with some recommendations for equipment requirements. After some discussion the Board considered the email to be a request for equipment purchases.
 - 3. M/S/P by Dan and Deborah to authorize an expenditure of up to \$1,500 for videotaping equipment. Software purchase, if necessary, will be considered later. The vote was unanimous.
 - 4. Please see the email text “Camcorder and tripod for GSM” submitted from Joe Wright to Deborah Naffziger on Wed. Feb 7, 2018.
- M. Status of the new GSM web site – Alan
 - 1. Alan reported that other projects are now done so he will be moving fast on this. Alan will make access available to Board members.
- N. Field Trip plans and feedback – Dave W
 - 1. Dave W briefly discussed the GSM field trips and tours that are under consideration for this year.
 - 2. Please see GSM Field Trips and Tours – February 2018 Board Report” attached to these minutes.
- O. GSM contribution to SAFL education and outreach fund.
 - 1. Barbara Heitkamp (SAFL) has requested that the GSM take under consideration a “suggested donation” for the outreach/tour program. Funds generated through this donation would come back to the SAFL’s communications budget and used for education and outreach opportunities (like bringing back the Sip Science program or developing demonstration flumes that could be used at the State Fair or the Stone Arch Bridge Festival, etc.).
 - a) M/S/P by Deborah and Theresa to contribute a \$125 honorarium to the Education and Outreach fund. The vote was unanimous.

- b) Barbara Heitkamp has expressed deep appreciation when informed of our contribution.
 - c) Dave W will send a check to the SAFL.
- P. Video Library – Dave W
 - 1. Dave W will submit a report for inclusion in the minutes.
 - 2. Please see “Video Library Activity” attached to these minutes.
- Q. GSM scholarships – Dave W
 - 1. Last year GSM contributed \$200 for the ILSG student scholarship.
 - a) M/S/P by Kate and Deborah to contribute \$200 for 2018. The vote was unanimous.
 - b) Dave W will inform the ILSG of the contribution and send a check.
- R. State Fair – Dan
 - 1. The setup for the state fair will be the same for 2018.
 - 2. Please see “GSM State Fair Committee Report 2-8-2018” attached to these minutes.
- S. GSM Marker Survey project – Becky
 - 1. Please see “GSM Marker Task Force Report to the GSM Board of Directors” attached to these minutes.
- T. Minnehaha marker replacement status – Kate
 - 1. The Minneapolis Park Board has some comments, so the status is ongoing.
 - 2. Please get any comments and/or suggestions to Kate by Monday. Dave W. will stay involved to coordinate finances.
 - 3. Please see the “draft layout” of the marker attached to these minutes.
- U. Mineral Club Rock Show – Kate
 - 1. No information currently.
- V. GSM Student Outreach – Theresa
 - 1. Training is done and currently we have 7 students available to do presentations.
 - 2. Something new this year, both Joy and Theresa have offered to help with lesson plans if the students request it.
 - 3. Also, Jeff Thole at Macalester has recently set up storage space for presenters called the “Geological Society of Minnesota” through Google. What this means to the Outreach program is that after the lesson plans and power points have been completed, there is now a place to store them in the form of a “Team Drive”, making these lesson plans available to other Outreach presenters.
 - 4. The MESTA Conference went very well and the GSM gave away a Minnesota Rock and Mineral box, plus approximately 2 dozen pieces of Decorah Shale encrusted with fossils collected with permission from a St. Paul building site. Justin Tweet helped in the collecting of these as well as wrote up an information sheet on the samples. Harvey Thorleifson, Director of the Minnesota Geological Survey gave permission for her to use the “Ordovician Fossils of Minnesota, Twin Cities’ Area”, image on

the back of the document. Theresa wished that she would have had more of these to pass out because they were very much appreciated. Please see the Handout (Decorah Guide) attached to these minutes.

5. A Science Curriculum Coordinator for the North Star Academy School in Duluth asked if we could visit their school for a Science Family Fair night. Unfortunately, with this school located in Duluth, it will be difficult to get there on time during the work week, so Theresa had to turn them down,
6. Additionally, the GSM has an opportunity to man a table and pass out our brochures at Willow Lane Elementary School in White Bear Lake. On April 20, 2018 from 6:00-8:00. Currently; there is one person available, with another "maybe" on the side.

W. Transfer of GSM rock box supplies/rocks to Dave W. – Dave W

1. The collection is currently in Dick's garage; awaiting his return from CA.

X. New Topics – all

1. None at this time.

Y. Goals status – Dave W.

1. Install new big-picture marker at Minnehaha Falls during 2017 – ongoing.
2. Continue developing a GSM marker database and survey the markers in 2017 – in progress.
3. Lecture video – have first videotape of a lecture on the new website in 2017 – was not completed but is progressing.
4. Transfer of PO Box to a new location in 2017 – completed.
 - a) When we receive a document forwarded from the old PO Box we should consider notifying that sender of the new PO Box address as the Post Office will not continue forwarding mail for very long.

Z. 2018 Draft goals – Dave W.

1. Install new big-picture marker at Minnehaha Falls during 2018 – progressing.
2. Develop a plan and prioritize marker installation/repair for Minnesota's geological markers based on the recent marker survey – Becky will head up this project.
3. Continue developing a GSM marker database and survey the markers in 2018 – Becky will also head up this project.
4. Develop a videotaping crew and optimize the equipment and process; have first videotape of a lecture available to members in 2018 – ongoing
 - a) Dave W. will talk to Joe to keep this moving.
5. Complete update of GSM Operating Manual during 2018 – on going
6. Other goals for consideration – none at this time however, we should consider what else can be done to make Geology more visible in Minnesota.

III. Adjournment

- A. M/S/P by Theresa and all to adjourn.

IV. Attachments

- A. Report on PayPal

- B. Membership
- C. GSM Lecture Attendance
- D. GSM Field Trips and Tours – February 2018 Report
- E. GSM State Fair Committee Report for 2-8-2018
- F. GSM Marker Task Force
- G. Draft Layout – Minnehaha Park
- H. Video Library Activity
- I. Camcorder and tripod for GSM email text
- J. Handout (Decorah Guide)

Attachment A - Report on PayPal
Submitted by Joannie Furlong

Report on PayPal

After checking about using PayPal for the GSM I cannot recommend it at this time.

- Whoever sets up PayPal needs to provide personal information (social security number, address, email). When asked if could provide an EIN (Employee Identification Number) or for an address the GSM PO box she said “You could try”.
- I spoke with MAS (Minnesota Astronomy Society) They were in the process of cancelling PayPal as the person who set it up had left the society. They were going to try to use their banks third party credit card processor. Checked with US bank and they told me you need to set up a gateway which would be \$20/month and a 3.5% transaction fee.
- I spoke with the MMS (Minnesota Mycological Society). They use PayPal and it works well for them. The person who set the it up has a previous business account with PayPal so is used to PayPal. Has been and will be a member for a long time.
- I think PayPal is a good system. You could have three people set-up PayPal together. One would provide their information and then all three would be able to access account if needed interactions with PayPal.
- I would recommend if you belong to other organizations to see how they do things.

Attachment B – Membership
Submitted by Joanie Furlong

Membership

We have 182 members

63 Family

118 Individuals

2 Students

2 Life members

Attachment C - GSM Lecture Attendance
Submitted by Dave Wilhelm

GSM Lecture Attendance

2017-2018

Summary to-date for 2017-2018: 9 lectures, 793 total attendance, 88 average attendance

2018-02-05 79 Bedrock Geology of the Twin Cities: New Insight from Recent Mapping
2018-01-29 55 The Minnesota Mineral Collection (*lecture rescheduled one week later due to snowstorm; 7 new persons – state fair, Minnesota Mineral Club, new members received e-mail, son is on U of M faculty*)

Summary for Fall 2017: 7 lectures, 659 total attendance, 94.1 average attendance

2017-12-11 86 What is Space Weather (and Why Should You Care)? (*4 new persons – 1 brother, 3 state fair*)
2017-11-27 130 Minnesota: A History of Ice, Rivers, and Landscape Change (*3rd highest attendance in a least 6 years; ~15 new persons – friend, web site, state fair, GSM plaque at Lake Minnewaska*)
2017-11-13 82 One Century and Counting: The Use of Geophysical Methods to Explore the Unseen Geology of Minnesota (*no new persons*)
2017-10-30 88 The Pros and Cons of Mining (*7 new persons – 4: friend/neighbor, 2: state fair, 1: MN Mineral Club Rock Show*)
2017-10-16 126 Agate Hunting Made Easy (*3rd highest attendance in a least 6 years; ~28 new persons (probably a record) – mainly from state fair*)
2017-10-02 73 Questions About Dinosaurs (*~6 new persons – state fair, friend, Mineral Club*)
2017-09-18 74 Historical Perspective on the Evolution of Antarctic Fish Fauna (*fall banquet & annual meeting; ~8 new persons – state fair, other reasons not recorded*)

Attachment D - GSM Field Trips and Tours – Feb 2018 Bd Mtg
Submitted by Dave Wilhelm

GSM Field Trips and Tours – February 2018 Board Report

On Wednesday, November 15, 2017, 12 GSM members participated in a one-hour tour of the **St. Anthony Falls Laboratory**, organized by Dave Wilhelm and conducted by Lab personnel. Deborah Naffziger wrote report in the February, 2018 Newsletter. Dave will organize future tours of this unique lab each semester as member interest dictates. Starting soon, SAFL will likely begin asking for a \$3 donation from participants; I have told Barbara Heitkamp at SAFL that this sounds like a very reasonable request. Barbara has asked if GSM could donate a nominal amount to seed this fund of donations; we will consider at the February Board meeting. GSM is planning a field trip to **Isle Royale National Park** during **June 18 through 24**. This trip will leave on the Ranger III from Houghton, MI, spend 3 full days on Isle Royale, returning on the Ranger III on the fifth day. The sixth day will be an overview of Keweenaw geology. While on Isle Royale, the Michigan Tech research vessel Agassiz will take us to many scenic and

geologically interesting sites, allowing us to see the beauty of Isle Royale from both land and water. We are actively planning this trip; members are being notified by e-mail. Eight GSM members participated in a similar trip during June, 2017, and had an excellent time. Dave Wilhelm's report of the 2017 trip is in the August, 2017 Newsletter. Specific information on the 2017 trip is here: <https://tinyurl.com/IRtrip2017>; we'll send a link for the 2018 trip when it is ready. Likely cost of the 2018 trip will be around \$1000. Sign up will be in the latter part of February. As the trip is strictly limited to 17 participants, we will do sign up by e-mail, with priority to members who did not go in 2017.

GSM is planning a field trip in the **Thunder Bay, Ontario** area during **Summer, 2018**, led by members of the Ontario Geological Survey. OGS personnel are very eager to show us the highlights of geology in that area, and there is quite a bit to see. **Mary Kay Arthur** will start actively planning this in February. Most likely duration is 2.5 to 3.5 days, and most likely time is latter part of July.

In April and/or May, we'll schedule one or more walking tours of the **St. Paul Water Treatment Plant**, which we last did about 6 years ago. These tours are free, last about 1.5 hours, and will start at 3 PM on a work day, although we might be able to schedule an evening tour during their open house tentatively on Thursday, May 10. The tours are limited to 20 persons each; we'll schedule as many as interest dictates.

Steve Erickson will lead one or more 90-minute walking tours of the building stones and architecture of downtown **St. Paul**, using the book "Rocky Roots" as the primary source book. We will cover a 1½-mile course from the [Science Museum of Minnesota](#) to [Rice Park, Landmark Center](#) and several other interesting buildings along St. Peter Street and Wabasha. We will discuss the geology of the building stones, architecture of the buildings, and history of St. Paul and the state of Minnesota. Our leaders will show many interesting features found in rocks and discuss how these are formed in geology. Highlights will include some of the most spectacular examples of the [Morton Gneiss](#), cleanly cut and polished. We will see examples of the products from the [Twin Cities Brick Company](#) that went into many of the buildings in St. Paul.

The U of MN Earth Science Department will have an open house soon. Dave Wilhelm will send e-mail to GSM members informing them of this.

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

Attachment E - GSM State Fair Committee Report for Feb 8, 2018

Submitted by Dan Japuntich

GSM State Fair Committee Report for February 8, 2018

Chair: Daniel Japuntich

State Fair Committee (tentative): Rebecca Galkiewicz, Dan Japuntich, Debra Preece, Edward Steffner, Ly Preece, Roger Benepe, Sandra Steffner, Theresa Tweet, Patrick Pfundstein

Report:

- Registration for the license for the 2018 Minnesota State Fair booth was sent in last fall, and the License Registration Confirmation Card was received in November.
- The next step in April is the receipt of the 2018 License Agreement. At that time, the GSM will:
 - Receive license agreement/invoice and return payment.
 - Submit proof of liability insurance (certificate of ins. To State Fair)
 - Submit Workers' comp. Insurance form (lime color to fair)
 - Booth staffing recruitment note in newsletter
 - Begin Booth staffing lecture announcements

GSM STATE FAIR SCHEDULE	WEEK	1-Jan	1-April-May	7-Jun	14-Jun	21-Jun	28-Jun	5-Jul	12-Jul	19-Jul	26-Jul	2-Aug	9-Aug	16-Aug	23-Aug	30-Aug	6-Sep	13-Sep	20-Sep	27-Sep	4-Oct	
TASKS																						
RECEIVE COLORED CONFIRMATION CARD																						
RECEIVE LICENSE AGREEMENT/INVOICE-RETURN PAYMENT																						
PROOF OF LIABILITY INS. (CERTIFICATE OF INS. TO STATE FAIR)																						
WORKERS COMP. INSURANCE FORM (LIME COLOR TO FAIR)																						
BOOTH STAFFING RECRUITMENT IN NEWSLETTER																						
BOOTH STAFFING LECTURE ANNOUNCEMENTS																						
CONFIRM STATE FAIR COMMITTEE MEMBERSHIP																						
STATE FAIR COMMITTEE MTG.																						
BOOTH STAFFING ANNOUNCEMENT EMAIL BROADCASTS																						
COMPLETE WS FOLDERS, TICKETS, INFO																						
SEND REMINDERS TO VOLUNTEERS																						
BOOTH STAFFING PHONE CALLS (IF NECESSARY)																						
LECTURE SCHEDULE COMPLETION (STATE TO BILL.)																						
FORMAT BROCHURES FOR PRINTING (BILL R.)																						
PRINTING BROCHURES, MEMBERSHIP SUPS. (STEPHANI)																						
BOOTH SET-UP REMINDER TO COMMITTEE																						
BOOTH SET-UP- BRING HANG TAGS (45 PEOPLE)																						
STATE FAIR																						
BOOTH TAKE-DOWN REMINDER TO COMMITTEE																						
BOOTH TAKE-DOWN- BRING HANG TAGS (45 PEOPLE)																						
SUBMIT THANK YOU TO NEWSLETTER																						
PARTICIPATION LICENSES SIGNED AND RETURNED																						

Attachment F - GSM Marker Task Force
Submitted by Rebecca Galkiewicz

GSM Marker Task Force
Report to the GSM Board of Directors
8 February 2018

Progress report

- A total of 52 markers have reportedly been installed. 47 have been visited since 2014. 5 markers remain that need to be checked. There are plans for 15 more but funding is needed.

- On the website, Alan has organized the markers by location in the state, allowing people to find all the markers in close proximity to each other. Web site is available to GSM members.
- Format is Do it yourself Geological Marker Field Trips. (call it a Geology Trail?)
- An article will appear in the February Newsletter to encourage members to visit.

Plan

- The goal is to reach the citizens and visitors of Minnesota and encourage them to visit the markers. Particularly science teachers and students, families with children, anyone with an interest in geology.
- Finish checking the remaining 5 markers in the summer and fall of 2018. Review every marker entry in the database to check for errors.
- Contact Greg Brick about writing an article on the markers to promote geo-tourism.
- Consider the format of future markers – hot spot, physical marker with metal or acrylic plaque, geo-cache. Contact potential collaborators – DOT, Minnesota Historical Society, DNR, Tourism.
- Add more markers. Use the 15 locations and text that were generated in 2003. Consider changes to the text and to marker locations.
- Approach grant-giving organizations for monetary help with new plaques.
- Encourage GSM members and Survey employees to submit ideas for new markers
- Publicize!

The GSM Marker Task Force requests help from the Board –

- Approval of the concept
- Names of contacts in state agencies that are potential collaborators
- Suggestions for how to go forward

Submitted by: Becky Galkiewicz

Attachment G - Draft Layout – Minnehaha Park
Submitted by Kate Clover

Waterfall Geology

Minnehaha Regional Park



Minihaha is a Dakota place name: Mini means water, haha describes the cascading effect of water as it falls and becomes turbulent. Mihaha is any type of waterfall.

—Ethan Neerdaels, Dakota
 Dakota Language Teacher

Waterfalls retreat upstream

Explore the geology of Minnehaha Park. Hike the trail into the river gorge and stop at Bridge #2. Picture the creek meeting an ancient Mississippi flowing ninety feet above your head. (Time travel.)

Here, imagine the roar of glacial River Warren Falls carving a gorge up the Mississippi, meeting Minnehaha Creek and creating Minnehaha falls as it passed by. Look back towards present-day Minnehaha falls and realize that it, too, has retreated upstream and carved a gorge.

This is the story of two waterfalls moving in geologic time.

About 13,000 years ago

A great glacial lake began to melt.



Meltwater from glacial Lake Agassiz poured into glacial River Warren (Minnesota River) and overwhelmed the tiny Mississippi River near Fort Snelling at St. Paul.



About 10,000 years ago

The Mississippi flowed in two channels around an island near the mouth of Minnehaha Creek. As glacial River Warren Falls retreated up the Mississippi, the falls split around the island, following the two channels.



In their upstream retreat, the arm of glacial River Warren Falls traveling the eastern channel passed the upstream end of the island first and caused the western falls and channel to dry up. Today, Minnehaha Creek flows in the former western channel.



A. Minnehaha Falls
 B. Bridge #2 (Bridge over Minnehaha Falls)
 C. Minnehaha Creek
 D. Mouth of Minnehaha Creek on the Mississippi River
 E. Fort Snelling
 F. Fort Lyon

Why do waterfalls move?

Waterfalls form where a stream flows over hard rock and erodes the weaker rock below, creating a ledge over which water falls. Left unsupported, the ledge eventually collapses. Repeated undercutting and collapse results in the falls retreating upstream and carving a gorge.

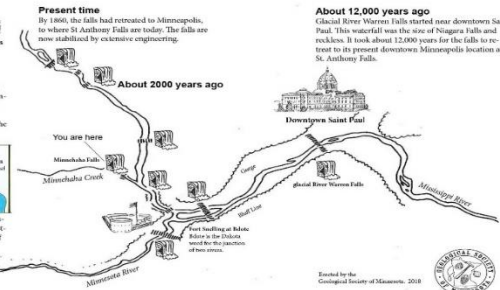
Here at Minnehaha Falls, water flows over hard limestone onto sandstone, creating a waterfall that moved up the creek. The same geologic process created glacial River Warren Falls in Saint Paul and caused its retreat up the Mississippi River.

Rock layers wear away, some faster than others

Rock layers in the Park and along the Mississippi

- Glacial Sediments**
Clay, silt, gravel and boulders cover the limestone
- Platteville Formation**
Hard limestone ledge resists erosion.
- Glenwood Formation**
Flakey shale erodes easily.
- St. Peter Sandstone**
Loosely cemented quartz sandstone erodes the fastest.

Falls keep moving. Because Minnehaha Falls has not been artificially stabilized to prevent erosion, its rock ledge will eventually collapse again.



Attachment H - Video Library Activity
Submitted by Dave Wilhelm

Video Library Activity

06-NOV-2017 through 08-FEB-2018

New VL members: 2

- Norm Schiferl
- Greg Mace

Rentals: 17

Purchases: none

Donations: none

Total Titles: 293

New reviews: 1 (Deborah Naffziger)

Finances:

\$25 cash

Deposited \$35 on 18-DEC-2017

Attachment I - Camcorder and tripod for GSM email text
Submitted by Joe Wright

Deborah,

I went back and did some searching for low light Camcorders that fit into the budget. There are two from Sony that I think would fit our needs. Here is the original page that lists a number of camcorders:

<https://www.smartreview.com/best-low-light-hd-camcorder-comparison-and-reviews>

After looking at that page I looked at some comparisons between models and it appears that in the price range the Sony's work better.

The HDRCX900/B videos to full HD while the FDR-AX100/B can go to 4K (4 times better). I doubt that we would ever need 4K but who knows over the next 10 years, but the higher the resolution the larger the file and harder to use DVD or even BLUray. The one thing that the better camcorder can do is it can run longer on a charge. I am sure it is a function of the size of the battery but if we have to buy a bigger battery for the HDRCX900/X the prices come much closer together.

The both first came out in 2014 though the ones for sale here are new. I have Amazon Prime so I can order and skip any shipping.

I was going to suggest the HDRCX900/B until I saw the typical filming time of only 45 minutes versus 95 for the FDR-AX100/B.

HDRCX900/B \$1,200

https://www.amazon.com/Sony-HDRCX900-Video-Camera-3-5-Inch/dp/B00HNJWVVK/ref=as_sl_pc_tf_til?tag=smartreview9-20&linkCode=w00&linkId=HVMIVOD3UNCF4KCW&creativeASIN=B00HNJWVVK#customerReviews

Sony FDR-AX100/B \$1,400

https://www.amazon.com/dp/B00HNJWVIA/ref=psdc_172421_t3_B00HNJWVVK

We should also order the tripod that works with them and has a remote control so we could zoom if desired.
\$94

VCT-VPR1 Tripod

https://www.amazon.com/Sony-VCT-VPR1-Compact-Remote-Control/dp/B00C9FJLNQ/ref=sr_1_1?s=electronics&ie=UTF8&qid=1518058791&sr=1-1&keywords=VCT-VPR10

So if you really want to spend the whole budget I recommend the Sone FDR-AX100/B with the VCT-VPR1 tripod.

Joe

Attachment J – Handout (Decorah Guide)
Submitted by Theresa Tweet

Your rock comes from a group of rocks collected October 2017 from excavations for a house's basement on Mississippi River Boulevard, St. Paul. These rocks are from thin limestone layers in the Decorah Shale. The Decorah Shale was deposited in a shallow sea about 454 million years ago, during the Ordovician Period, when Minnesota was south of the equator and near sea level. Imagine something like the warm shallow seas around the Bahamas, except without fish. A lot has changed since then!

The Decorah Shale is made up of hardened seafloor mud. The limestone layers represent times when there wasn't much mud coming in, or when storms concentrated seashells. We sometimes use the mud to make bricks. If you have relatives living in St. Paul or Minneapolis, they may complain that their basements flood. The Decorah Shale might be responsible for that, because water does not pass through it easily.

Many kinds of fossils can be seen in the Decorah Shale, from many different invertebrates. Most of them were smaller than a couple of inches and lived attached to the seafloor or things on the seafloor, filtering tiny particles of food out of the water. Some of the fossils you might see on your rock include:

Bryozoans: Bryozoans are microscopic colonial animals, a little like corals, and are still around today. Look for objects that are branching or resemble tree roots: if there are tiny pores on the surface, smaller than a millimeter, that's a bryozoan colony. Each pore once held a bryozoan animal. You also might see flat strap-like fragments of colonies, or colonies encrusting other fossils (this is where their name comes from: bryozoan means "moss animal"). If you find tiny pores, it's a bryozoan.

Brachiopods: Brachiopods are shelled animals, still around today, that look like clams. The objects that resemble sea shells or clam shells are brachiopod fossils. Two common kinds of brachiopod fossils in these rocks are small (about the size of a fingertip) nut-like round fossils with ridges, and larger (inch-sized) flattened or domed D-shaped shells.

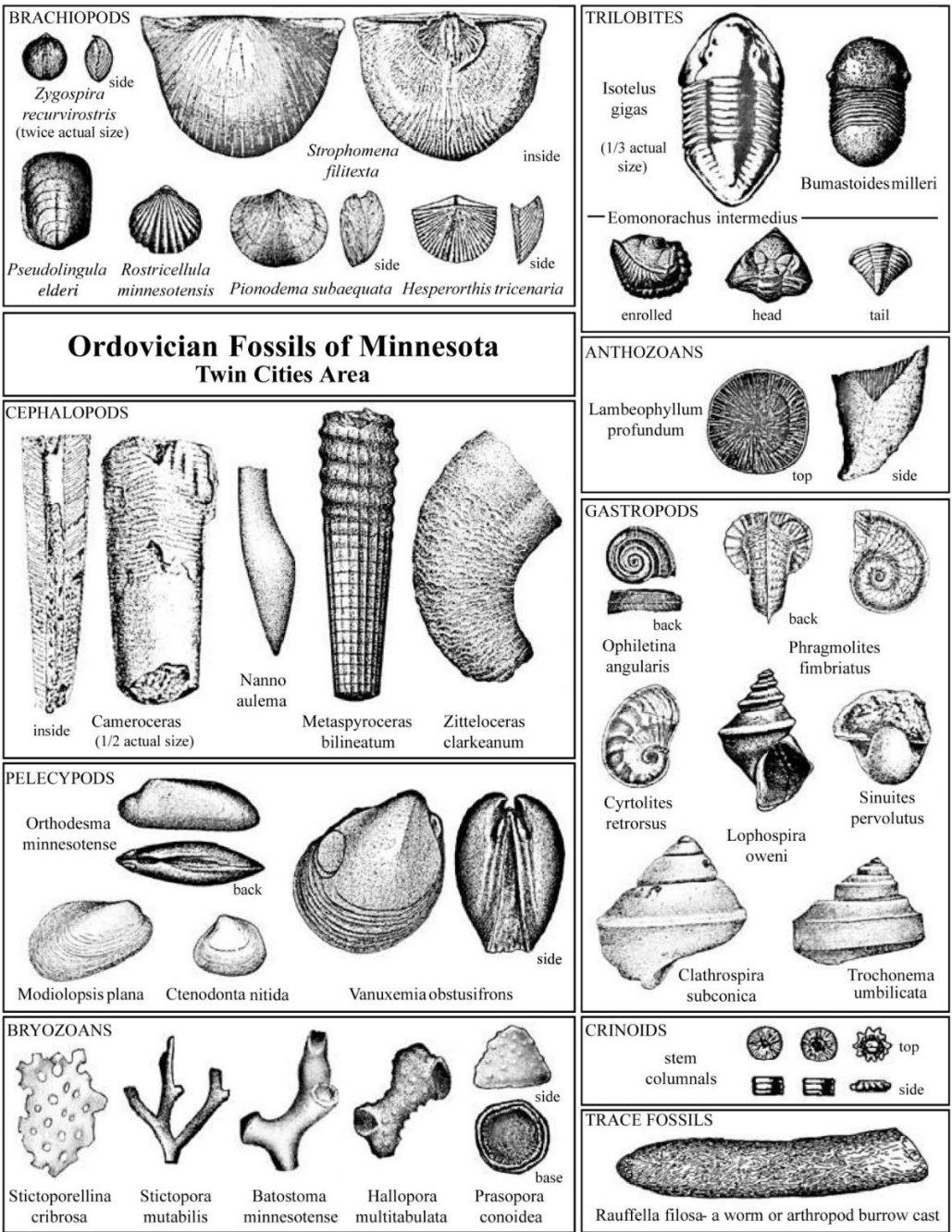
Crinoids: Crinoids are also known as "sea lilies", because of their feathery arms and stem-like stalk, but they are really animals related to sea stars and sea urchins. A crinoid body often has a sort of "root" holding it to an object, then a long stalk connected to a cup-like body, and many slim arms with tiny branching tendrils for filtering food from the water. Crinoid bodies quickly disintegrate upon death, so what we usually find are pieces. The most abundant pieces are the ring- or gear-shaped segments of the stalk, called "columnals". There are probably several on your rock!

Snails: If you see an object that looks like a snail shell, it probably *is* a snail shell. You might see shells coiled in a flat spiral, or in a high spiral, or something in between. Some of them are bulbous with a flared opening and coiled in a flat spiral, as if they're swallowing themselves.

Trilobites: Trilobites are extinct animals related to spiders and insects. They looked a little like the animals you might call pill bugs or roly-poly bugs, but aren't closely related. Trilobite fossils

are usually only parts of the body, because they would shed their exoskeletons to grow. Look for skinny dark-colored objects, which represent parts of the body segments, small segmented wedges, which are their tails, and cloverleaf-like pieces, which are parts of their heads.

There are fossils of many other animals in the Decorah Shale, such as cephalopods (squid-like animals), pelecypods (clams), and anthozoans (corals), as well as trace fossils (burrows and trails), but they are absent or very rare in this batch of rocks. Does anything in your rock look like the pictures below?



Minnesota Geological Survey, 1995