



# THE GEOLOGICAL SOCIETY OF MINNESOTA

## News

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

### GSM Dates to remember:

Feb. 25 — Lecture —The  
Rock Cycle

March 2 — Rock Cycle  
Lab

March 11 — Lecture —  
TCAP an MPCA  
perspective

Mar 25 — Lecture —  
Geobiology

April 8 — Lecture —  
Planetary Geology

April 22 — Lecture —  
Lakes East African Rift

May 4 — Kimball  
Memorial Banquet and  
Potluck - Silent Auction

**1938 GSM 2013**  
Celebrating  
— \*\* 75 Years \*\* —

### Our History

The Geological Society of Minnesota was started in the late 1930s when two separate but similar educational groups merged. One was an earth science club that had met regularly at the Minneapolis Public Library, The other was a group led by Edward P. Burch, from Minneapolis, a consulting engineer who had taken up an avid study of the geology of the Twin Cities area. During the years when Minneapolis was endeavoring, without success, to have the Milwaukee Railroad depress its main line tracks through south Minneapolis, Mr. Burch undertook an independent study of the problem. The proposed construction involved extensive excavation and required accurate knowledge of the rock formations under the city. This led to a study of deep well records of the Twin City artesian basin and to field inspection of rock exposures in the Twin Cities area. Mr. Burch invited others to join in the project, with the result that regular weekly field trips were conducted to study the geology of the area.

In 1938, the combined groups organized the Geological Society of Minnesota for the purpose of stimulating public interest in geology, and the Society began a year-round program of lectures and field trips to which the public was invited free of charge. In 1939, GSM was incorporated as a Minnesota nonprofit educational organization.

In 1949, an extensive geological markers project was started which aimed, in a limited way, to describe the geology of Minnesota in such a manner that it would develop interest by residents as well as visitors to the state. This was accomplished by the installation of bronze tablets at carefully chosen locations on state highway property and in city and state parks.

Since about 1950, the winter lectures have been held at the University of Minnesota. Over the years, many outstanding geologic professionals have given the lectures. Lecturers are from the University of Minnesota and other academic institutions, government agencies, engineering firms, and industry.

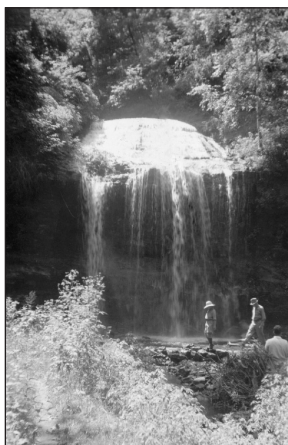
In about 1960, an educational exhibit was started at the Minnesota State Fair, which spreads interest to a broad spectrum of fair attendees, who also receive a program of the upcoming year's lecture series.

*From the GSM website*

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from the archives: A visit to St. Croix Falls, Wisconsin on a GSM Field Trip July 1939.



GSM News

Officers:

Theresa Tweet, President  
 Sherry Keesey, Treasurer  
 John Grams, Secretary

**Board Members:** Deb Preece; Lisa Peters; Rebecca Galkiewicz; David Wilhelm; and Mark Ryan

**Editors:** Katy Paul and Harvey Thorleifson

The Geological Society of Minnesota is a 501(c) 3 nonprofit organization. The purpose of this newsletter is to inform members and friends of activities of interest to the Geological Society of Minnesota.

Send all GSM membership dues, change of address cards, and renewals to:

Joanie Furlong  
 GSM Membership Chair  
 P.O. Box 390555  
 Edina, MN 55439-0555

Membership dues are: \$10 Full-time students; \$20 Individuals; \$30 Families

GSM News is published four times a year: **February 15, May 15, August 15, and November 15.** Deadline for article submission is the first of the month, before the date of publication.

Send all material to:

**Katy Paul**  
[keystone517@hotmail.com](mailto:keystone517@hotmail.com)

**New Members!**

Mary Buirid	St. Paul
Jim Lindner	Gem Lake
Jean & Michael Herron	Maplewood
Ashley Gauster	St. Paul
Ellie Krahn	Lake Elmo
Brent Rader	Minneapolis
Carol & David Olmon	White Bear Lake
Peter Truax	Minneapolis

Harry Wernecke	Roseville
Tyler Amick	Austin
Andrew Coil	Rogers
Jacob Hanauer	Minneapolis
Shanna Schmitt	Roseville
Ronald Corradin	St. Paul

**FROM THE PRESIDENT’S DESK**

More than just the changes of the seasons, a new year offers the chance for personal growth, renewal, and reflection. On that note, I want to personally thank Roger Benepe for his service as President for the GSM calendar year in 2012. Roger had already served a lot of time as a past President in the organization, but when Dick Bottenberg had finished his term, Roger stepped in and ably filled the vacancy. At the December 8th board meeting and social gathering hosted by Ed and Sandy Steffner (thanks you two!) I was voted in as the GSM President for the 2013 calendar year. Other notable changes that took place in 2012 included: Alan Smith is no longer on the board but will continue with our Internet Committee; Allan Bowles, our Secretary, finished his term with John Grams stepping in to take over this position; Ed Steffner completed the Ad-Hoc Committee sessions on a positive note; and long-time member Doug Zbikowski has moved on, but not before donating numerous items to our Silent Auction. Thanks are extended to all of these and other GSM members for their help and dedication in running such a fine organization.

This winter has been a beautiful one; lots of sunshine, plenty of snow, and we are fortunate to live in Minnesota, a state that recognizes the importance of preserving beauty in the way of

National, State and Regional parks. Snowshoeing is on the top of my list for winter favorites so I will soon be heading out the door to Afton State Park, but there are other activities and family fun available. Take a moment to check out the site:

[Best Minnesota State Parks to Visit in the Winter](#)

[<http://usparks.about.com/od/stateparksus/a/MNwinterparks.htm>] and enjoy!

For more information on the GSM Board meetings, Spring Banquet / Silent Auction, up-coming seminars, field trips and more, check out the GSM webpage at: <http://www.gsmn.org>.

Have you considered becoming more involved with the GSM? We still have positions available: Vice President, Public Service/Outreach, Field Trip Coordinator and Board members. Volunteers are always welcome even if you would prefer to start out on a slower track.

Theresa Tweet



### IN MEMORIAM

Dorothy Alicia Kuether

Jan. 5, 2013

Dorothy Alicia Tyrrell was born July 22, 1925 near Chicago. Dorothy attended the University of Michigan where she was an education major. That is where she met Bill Kuether. They were married while still in school; they had three sons.

When her children were older, Dorothy went back to school to renew her teaching credential, eventually achieving a Master's degree in elementary education. Bill died suddenly, and Dorothy raised the three boys as a single parent while teaching elementary school in Edina. After retirement, Dorothy continued to be active at her Church, birding, geology, travel and Knotty Quilters. She traveled widely (USSR, China, Peru, and Churchill to see polar bears) most recently to Panama, Antarctica, and Ireland.

Dorothy served in the Geological Society of Minnesota as a board member, President, and most recently as Secretary. She was always there to lend a hand at the Silent Auction and had a gift for baking. Dorothy served in various positions in the GSM, but to those of us who knew her, her most important role was friend.

We will miss you Dorothy

### Death Valley Reminder...

There is still time to sign up for the Spring GSM Field Trip to the Mojave National Preserve and Death Valley National Park. March 9-16, 2013. There is nothing like seeing geology in the field. The trip will emphasize the basin and range tectonics, desert landforms, Mesozoic and Cenozoic volcanoes and mining history. GSM's charge will be less than \$100. Other costs will depend on what options you chose for lodging, food and transportation. Come join us for a fun trip. For more information contact Randy Strobel at [randy.strobel@metrostate.edu](mailto:randy.strobel@metrostate.edu) or call at 651-731-0458.

### Institute on Lake Superior Geology

59<sup>th</sup> Annual Meeting

Wed. May 8 thru Sat. May 11

Franklin Square Inn

Houghton, Michigan

Field trips and technical sessions in the Keweenaw Peninsula of Michigan's UP. For more information go to [www.lakesuperiorgeology.org](http://www.lakesuperiorgeology.org)

**In honor of the 75th Anniversary  
GSM THROUGH THE YEARS....  
Compiled from past issues of the  
GSM Newsletter**

**70 Years ago – 1943**

The Minnesota Geologist: The Official Bulletin of the Geological Society of Minnesota, Vol. 1, No. 1 was published in October 1943. It was announced that the group would endeavor to have a field trip each week, from May until October, "...when gasoline rationing doesn't interfere." Geologists all hope that the war will be over soon...Annual membership dues are \$3 plus an additional \$1 for spouse or other family member...A "thumbnail sketch" of the current president, Charles Herbert Preston, revealed that he is a descendant of Governor Bradford of the original Plymouth Colony; he is a Republican, and belongs to the Unitarian Church...Postage to mail the newsletter is 2 cents.

**60 Years ago – 1953**

A number of geological books from W. C. "Bill" Wilson's library are available to members of the Geological Society. Please contact the newsletter editors for further information...Tentative Field Trip Schedule 1953 includes: June 7 Red Wing area. Leader Elmer H. Brown...Financial statement period ending Mar. 1 1953 Balance on Hand \$263.11...The article "Minnesota's First Geologist" by Dr. Bert Carlson, describes the life and times of Newton Horace Winchell.

**50 Years ago – 1963**

No Newsletters were published in 1963

**40 Years ago – 1973**

Officers: Mary Kimball, President; Dr. Alex Lowe, Vice President; Ethel Swanson, Secretary; Bernice Tepel, Treasurer...Michael Link, Director-Naturalist at the Northwoods Audubon Center near Sandstone, has requested help from the G.S.M. in making a display of native Minnesota rocks for use at the Center. The Board has agreed to undertake the project, which will become one of the responsibilities of the new Special Projects

committee and Sam Mayo, its chairman...Texts of two Geologic Plaques placed at Grand Marais and Detroit Lakes were printed in the newsletter.

**30 Years ago – 1983**

The December Board Meeting included a potluck supper, which was super, and a Yule Tide Sing-along. A new version of the Twelve Days of Christmas written by Dwight Robinson was acclaimed by the rock hounds present. The new Board, old Board and officers as well as committee chairs were in attendance.

**20 Years ago – 1993**

We've heard that the Geological Survey (University of Minnesota) has been receiving too many calls from folks looking for us (GSM). It was proposed that the Geological Society have their own telephone listing in the Minneapolis Directory. We now have an "Official GSM Contact." Fran Corcoran volunteered her phone and address for a listing in the Minneapolis telephone directory. Since the directories were recently printed, interested parties will need to call 411. At the February 22 lecture, the Board voted to try the listing for a year.

**10 Years ago – 2003**

Wells throughout southeastern Minnesota and adjacent areas of Wisconsin and Iowa suddenly began producing black water in early November, 2002 – an effect that may be related to a Richter 7.9 earthquake in Alaska on November 3. While no shaking was felt by people in the region, well drillers and environmental monitors interviewed by the Mankato Free Press blamed the water change on manganese released from the area's sandstone, limestone and dolomite bedrock by waves from the Alaskan tremor. Val W. Chandler, Acting Director of the Minnesota Geological Survey, said quakes of magnitude 8 or higher are well known to cause changes in groundwater thousands of miles from the epicenter.



**EDWARD P. BURCH, FOUNDER**  
**Geological Society of Minnesota**  
 1938

*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 Lowery 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 following is a reprint of that article, which was printed in the GSM Newsletter in 1943:*

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, of others. 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. (editors 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 had traveled, largely by auto, in every state of the Union, and over most of Europe. We liked to travel for its educational values.

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 the dimensional model of the underlying rock formations 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 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, the iron mining regions and throughout the states of Minnesota and Wisconsin. Five winters were spent in Florida and California studying the rock formations, marine shells and fossils

in a careful, systematic 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 technique of rock structures.

Back to Minneapolis in 1938, I organized the Geological Society of Minnesota, and gave lectures, on Monday Nights in winter and during 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, along the southwest shore to the Keweenaw Copper District, and 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 weeks outing. These trips combine fun, fishing, and scenery for nature groups.

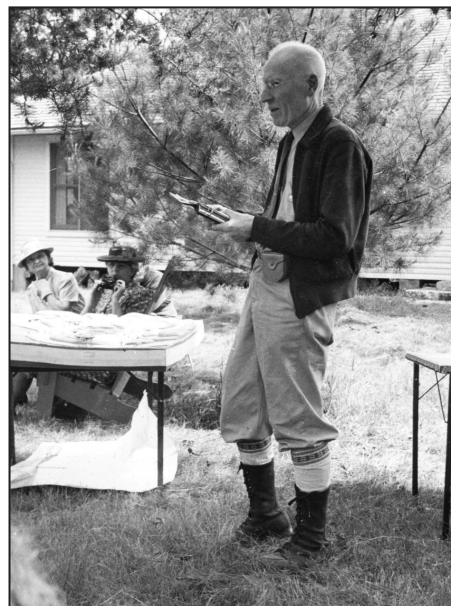
The geology of regions at a distance has given us material for our lectures. The regions studied by members have included Boston, New York, Florida, Colorado, Arizona, California, the Black Hills, Grand Canyon, Rocky Mountains, and even Scandinavia and the minerals of the South Seas.

And now, after ten years devoted particularly 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 involves 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 mosquitoes, and to go 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 out than to rust out.

*"Minnesota is really a geologist's paradise. It has the oldest rocks in the world, the Ely Greenstone lava, great slate beds covering one-third of the state, four iron-ore bodies of*



*different ages, extensive lava flows, leading granite and basalt quarries, eleven major sedimentary formations deposited during the last 550,000,000 years, five glacial drift sheets from two different directions, the last glacier only 25,000 years ago and covering the deep excavations of ancient rivers.*

*There are enough faults, troughs, domes and distortions to be measured in miles, to supply us with problems throughout the century. Geophysical measurements will supersede the work of the diamond driller in solving these problems."*

Edward P. Burch, 1943

photo Kenyon, MN., 1940

## Kimball Memorial Banquet

### 75<sup>th</sup> Anniversary Celebration/Pot Luck/Silent Auction

### Help us to celebrate our Dodranscentennial!

That's right - the Geological Society of Minnesota is 75 years strong! Come and join in the celebration at a Spring Banquet/Silent Auction to benefit the GSM. The Spring Banquet is a Pot-luck, a time to thank our wonderful volunteers for all of their work, and a time to sit back and enjoy a seminar together. The Silent Auction piece is just plain fun.

#### SPRING BANQUET – SILENT AUCTION

Saturday, May 4, 2013

Affinity Plus Federal Credit Union in the Community Conference Room

2750 Snelling Avenue North, Roseville, MN 55113

The doors open and set up begins at 3:30, with dinner to follow at about 4:30. The lecture will be starting at 5:00, followed by the Silent Auction from 5:30-6:45 (all times are tentative)

*(NOTE: This date replaces the item on our lecture schedule which shows Spring Banquet on May 6. The May 6 date is no longer accurate.)*

Please bring food items to share and if you would like to help, or simply have some questions, please send an email to Theresa Tweet: [phoenix8185@gmail.com](mailto:phoenix8185@gmail.com)

#### Lecture:

### Paleobiology of Hadrosaurs

(Duck-billed Dinosaurs) - Justin Tweet, M.Sc.

#### Abstract:

Hadrosaurid dinosaurs, popularly known as “duckbills”, are among the best-known dinosaurs. Many hadrosaurid species are known from multiple skulls and skeletons covering a range of growth stages. Hadrosaurid paleobiology has been a matter of discussion since the beginning of dinosaur research in North America in the middle of the 19th century, but is still yielding surprises. Soft tissues, taxonomic aspects of scalation, tooth structure, and the unique feeding mechanisms of hadrosaurids are a few of the most recent topics of study. This presentation will begin with one of the most well-preserved dinosaur specimens known, the brachylophosaurs duckbill known as “Leonardo”, and will then work from this specimen to discuss various recent discoveries.

#### Biography:

Justin Tweet is a research consultant who works closely with the paleontological wing of the National Park Service's Geologic Resources Division. He earned a BA with a major in geology and a minor in biology from the University of St. Thomas in 2003. He earned a master's degree in geology from the University of Colorado at Boulder in 2006.

## PROMOTING EARTH SCIENCE LITERACY WITH BIG IDEAS

Defining a set of essential ideas that a literate American should know about the geosciences is a critical national need in an information-rich age characterized by a rapidly changing planet and numerous resource challenges.

The Earth Science Literacy Initiative (ESLI), funded by the National Science Foundation, has gathered and codified the understandings of Earth sciences into a succinct document. This document, representing the current scientific knowledge in Earth science, is helping to shape decisions by government and industry and helping to guide the direction of educational curricula. It establishes 9 "Big Ideas" and supporting concepts that all Americans should know about Earth sciences and clearly shows that the entire geoscience community is very unified in their convictions of the reality of a basic set of ideas and concepts.

Each big idea is backed by several supporting concepts comparable to those underlying the National Science Education Standards and the American Association for the Advancement of Science Benchmarks for Science Literacy. Here are the 9 Big Ideas:

1. Earth scientists use repeatable observations and testable ideas to understand and explain our planet.
2. Earth is 4.6 billion years old.
3. Earth is a complex system of interacting rock, water, air, and life.
4. Earth is continuously changing.
5. Earth is the water planet.
6. Life evolves on a dynamic Earth and continuously modifies Earth.
7. Humans depend on Earth for resources.
8. Natural hazards pose risks to humans.
9. Humans significantly alter the Earth.

Read more about the Big Ideas and the supporting concepts, and download the complete [Earth Science Literacy Principles brochure](http://www.earthscienceliteracy.org) at <[www.earthscienceliteracy.org](http://www.earthscienceliteracy.org)>.

Submitted by Katy Paul



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FIRST CLASS MAIL