GEOLOGICAL SOCIETY OF MINNESOTA

NEWS

FALL 1998
VOLUME LII NO. 3
http://geolab.geo.umn.edu/orgs/gsm/

CONTENTS

✓ '98-'99 Lecture Program ..... Insert
Announcements 2
✓ Board News 2
Destination: Earth 3
What's in a Mineral Name 4
gsm rockers 4
Reflections 5
Weather & Geology 5
45-Minute R & M Collection 6
Spring Banquet Pics 7
More Banquet Pics 8

Annual Fall Meeting

Monday, September 21, 5 PM
Old Country Buffet
3000 White Bear Ave.
Maplewood, MN

Board Member Nominations

There are five nominees for the board this year.

Running for their first term are:
Steve Erickson
Jean Hosterman
William Robbins
Running for their second term are:
Sylvia Huppler
Don Mattsson
The election will be held at the annual meeting on September 21.

Summer Field Trip

The days are long and the nights are warm, so load up your pack, set a good pace, and go where only your feet can take you.

by Galen O'Connor

September [redacted] 19[redacted]: St. Peter Sandstone along the scenic Minnesota River valley between St. Peter and Mankato.

Membership

RENEW NOW AND AVOID THE RUSH!

It's renewal time for almost everyone's membership in GSM. The renewal year begins October 1. For those who join after April 1 and before Oct.1, membership is good through Sept. 30 of next year. Note the expiration date on your address label.

Send your check for the membership category you desire to the address listed on page 2.

Announcements

Available free of charge: an IBM electric typewriter. Contact Marlys Lowe at 451-6853.

Wanted to buy or borrow: Minnesota Geological Survey pamphlet entitled "Fossil Hunting in Minnesota." (The pamphlet is out of print, and attempts to obtain it from the Survey have been unsuccessful.)
Contact Robert Hunt at 767-4459.

GSM *NEWS*

Editors
Martha Mayou ..... (612) 724-4044
adastra@wcc.net
Dwight Robinson ..... (612) 227-3394

Editing Consultant
Judy Hamilton

Circulation
Nora Mattsson

Production
Bruce Goetteman ..... bjgoetteman@worldnet.att.net

Staff
Iris Von Bargen
David Romportl

The purpose of this newsletter is to inform the members and friends of the activities of the Geological Society of Minnesota. GSM *News* is published four times a year: February 15, May 15, August 15, and November 15. Deadline for article submission is three weeks before the date of publication. Send all material for GSM *NEWS* to: Geological Society of Minnesota c/o Martha Mayou, 2621 E. 24th St., Mpls. MN 55406. Phone: (612) 724-4044, or e-mail: adastra@wcc.net.

Officers: Sylvia Huppler, *President*; David Christianson, *Vice President*; Don Mattinson, *Treasurer*; Pat Johnson, *Secretary*.

Directors: Tom Burt; Bruce Goetteman; Dick Heglund; Paul Lemke; Marlys Lowe.

Send all GSM membership dues, change of address cards, subscriptions, and renewals to the GSM Membership Chair: c/o Bruce Goetteman, 16125 Delarma Drive, Carver, MN 55315. Subscriptions cost $10 for full-time Students, $20 for Individuals, or $30 for Families.

GSM Board News

The July meeting was held at Goldie Johnson's lake home, and the beautiful weather and delectable food added to the enjoyment. Galen O'Connor reported on the field trip of June 6 and 7. The St. Cloud trip to the granite quarries on July 18, which has since been held, was also appreciated by all.

The Show and Exhibits committee (Judy Hamilton, Chair) is in the midst of State Fair preparations. The calling committee members are busy calling members to staff the Fair Booth. If anyone has not been contacted and would like to help, please call Nora Mattsson or Dr. Alex Lowe.

The Membership Chair presented new designs for a GSM brochure. 3,500 copies will be printed for distribution at the State Fair this year. The History and Archives committee (Marlys Lowe, Chair) has also been very busy consolidating GSM material, which had been stored at several sites. It includes books, newsletters, programs, photos, old Minnesota pamphlets and maps, and notes on Minnesota geology (some dated 1938, by Edward Burch, our original founder), and was carefully preserved by Jan and Warren Mitchell. The committee has been cataloguing the material.

Rick Uthe stated that the program lectures and labs are all "set." The lectures for the fall quarter will be in Room 105 Murphy Hall. Doug Zbikowski reported that 2,000 students have attended the School Outreach, and that the construction for Phase I of the Geological Markers will soon begin. He also reported that the Minnesota Historical Society has invited the GSM to have a meeting at its new location. A committee of three, Doug, Rick Uthe, and Dick Heglund, will consider the feasibility of having an extra lecture meeting there in December. Don Swensrud, Social Committee, has agreed to stay on as Chair until his term is up at the end of the year.

Many of us are anticipating our field trip to Eastern Ontario to study part of ancestral North America. This field trip will be concluded about the time this newsletter is delivered.

Sign-up sheets will be passed around during the first lecture meeting, so everyone should be considering what committee they would like to assist.

The annual meeting in September will be held at the Maplewood Old Country Buffet. We will be looking forward to seeing slides from summer field trips and the Galapagos Islands.

Sylvia Huppler, President

DESTINATION: EARTH

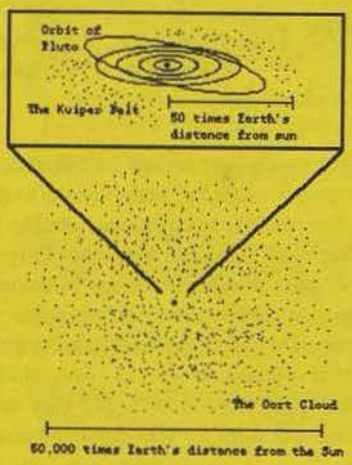
by Martha Mayou

Rocks can be dangerous.

For a few days in March, it seemed that our days might be numbered because of a rogue asteroid. It was announced on March 11 that this asteroid might come within 30,000 miles of Earth in 30 years. The culprit was 1997 XF11, discovered December 6 by an astronomer with the University of Arizona's Spacewatch program. This rock hurtling through space in our direction is a mile wide, so scientists ran to old images of the sky in hopes of better calculating the object's orbit. Luckily, someone at the Jet Propulsion Laboratory found images indicating that the asteroid would be 600,000 miles wide of the mark.

What would happen, though, if an object like this struck us? Apart from the devastation caused to the impact site itself, clouds of dust would enter the atmosphere and block sunlight for weeks, perhaps longer. Temperatures would fall, and we would experience earthquakes and violent windstorms. The food chain would be destroyed. Even with a smaller meteorite, tsunamis (giant waves) would engulf coastal cities, where over half of the world's population lives.

The two groups of objects with the potential to hit Earth are asteroids and comets. Most asteroids are found in the area between the orbits of Mars and Jupiter, whereas most of a comet's time is spent quite far from the sun, in the Oort cloud of comets (which extends a fifth of the distance to the nearest star, Alpha Centauri) and the Kuiper belt (just beyond Neptune's orbit). Both asteroids and comets have orbits around the sun that are normally stable. Most of the danger to us comes from asteroids, because there are so many of them in the asteroid belt that they can collide with one another. The fragments from these collisions then develop unstable orbits, possibly to be further destabilized by the massive planet Jupiter.



Great and small hits have occurred throughout the history of the solar system, resulting in the cratering seen for example on the Moon. That the Earth exhibits few craters is due to

geological processes such as weathering and erosion; also, some impact craters are now buried. The bombarding of Earth in its infancy boded ill for the development of life here, because the impacts burned up the atmosphere and boiled off the oceans. Comets later replaced the water, however. It's even believed now that the building blocks of life, organic carbon molecules, were brought by comets, meteorites, and dust from space instead of arising on home turf. So the primordial soup was itself an extraterrestrial.

Telltale signs of a past crash on Earth include shatter cones, which are produced when a meteorite hits a fine-grained, brittle rock like limestone, and diaplectic glass, a natural glass formed by shock pressure from one of several minerals. On impact the meteorite can be completely vaporized, or the high pressures and temperatures will merely melt and mix it with the melted rocks below. The abundance of certain elements (iridium, osmium, platinum, palladium, and others) at the site, however, can pinpoint it as an impact site. Normally these 'siderophile' ('iron-loving') elements would be in the core of a planet like Earth, and rare on the surface, due to chemical segregation during the planet's formation.

One hard-to-miss remnant of an impact is the Moon. A planet-sized object once hit the Earth; its metallic core stuck to the Earth, but the silicate debris from both bodies was thrown up and formed the moon. This is why the moon does not have metallic iron at its center. The impact sped up the earth's rotation: if not for this event, days might last a year.

The place where a meteorite hits the Earth has a lot to do with how destructive the impact is for the planet as a whole. The crash that led to the extinction of the dinosaurs (at Chicxulub in Mexico; see last issue) hit a relatively rare rock type, a thick carbonate platform loaded with sulfur-rich rock. After the collision, tiny sulfuric acid droplets filled the atmosphere, obscuring light, and the surface waters of the oceans later turned toxic when the droplets fell in. The carbon freed by the crash increased the greenhouse effect.

We're safe from 1997 XF11. For the future, however, scientists are considering the best ways to deal with less benign visitors: an object threatening Earth could be deflected or destroyed with missiles, depending on its size and how much advance warning there is.

Sources: web sites of Scientific American, NASA, and Los Alamos National Laboratory; "Scientists paint dark picture if big meteor ever hits," *St. Paul Pioneer Press*, 4/13/98; "Target Earth," Richard Monastersky, *Science News*, 5/16/98; "Collisions with Comets and Asteroids," Tom Gehrels, *Scientific American*, 3/96; "The Scientific Legacy of Apollo," G. Jeffrey Taylor, *Scientific American*, 7/94; "First Cell," Carl Zimmer, *Discover*, 11/95.

What's in a Mineral Name?

by William S. Cordua, University of Wisconsin-River Falls

How do minerals get their names? Before 1960 mineralogists introduced new mineral names in papers they submitted to scientific journals. There was no one to check on the validity of these names, or whether they duplicated names already in use. In 1955 a compilation found that 25,000 names were being used to designate 2,000 minerals. For example, the mineral we know as galena might also be called galenite, steinmannite, targionite, johnstonite, Plumbo-cuprite or huascolite, depending on whom you read.

In 1960, to reduce this chaos, the International Mineralogical Society established the Commission on New Minerals and Mineral Names. Now when mineralogists believe they have found a new mineral, they send their data and proposed name to the Commission. If the Commission is convinced that the mineral has not been previously described and that the name is suitable, THEN the mineralogists may publish their data. This cuts down on confusion by keeping names out of print until there is enough data to prove conclusively that they refer to a mineral that hasn't been previously named. The procedures of the commission are described in detail by Dunn and Mandarino (1988).

The Commission also works on problems with minerals named before 1960. For example, "sphene" and "titanite" refer to the same mineral. When I took mineralogy as a student, "sphene" was the name commonly in use. The commission found that "titanite" had been proposed first; hence "titanite" is now the approved name.

Why should this matter to rockhounds? One reason is that many rockhounds are proud of their specimens and like to have them labeled correctly. Also, proper names allow us to communicate precisely. Some unofficial names can be confusing or even used unscrupulously. Some people, for example, do not realize that "Herkimer diamonds" are really quartz. When in doubt about the correct name for a mineral, a rockhound should check Michael Fleischer's Glossary of Mineral Species.

Since 1960, the Commission has approved over 1300 new minerals, an average of over 43 per year. Most of these are rare and found only in tiny grains. Is there any chance mineralogists will run out of names? Possibly. For example, some workers wanted to honor a mineralogist named Paul Moore by naming a mineral after him. But there was already a mooreite, so the new mineral was named ... paulmooreite. We also have minerals named jerrygibbsite, jimthompsonite, jeremejevite and joesmithite. As funny as these names may appear, they refer precisely to unique minerals, are substantiated by the Commission, and are accepted world-wide.

References:

Dunn, P.J., and J. Mandarino, 1988, "The Commission on New Minerals and Mineral Names: Its History, Purpose and General Practice," Mineralogical Record 19 (5): 319-23.

Fleischer, M., 1987, Glossary of Mineral Species, 5th ed., 1987, Mineralogical Record Pub. Co., P.O. Box 35565, Tucson, Arizona, 85740, 227 p.

gsm rockers set new record!

by Doug Zbikowski

On Saturday, July 25, 1998, the third annual GSM Rock Party was held at Doug Zbikowski's house. Since 1996, this gathering has been held to produce the now regionally famous GSM Rock Boxes. This year the boxes will be supplied to teachers attending the DNR's Teachers Workshop in Mankato, twenty DNR State Naturalists, and all metro area elementary and secondary schools receiving outreach presentations by GSM's college geology students.

This year's new record is 160 rock boxes built in one Saturday morning. Many thanks to the GSM volunteers who made this labor of love possible: Philip Curtis, Cathy Hier, Dick Heglund, Alex and Marlys Lowe, Gerry Paul, Margaret Rodina, and Tracy Westgard (with three young assistants). Also, many thanks to the people who donated their own Lake Superior Agates to the cause: Jim Edberg, Jeffrey Mattsson (son of Nora and Don Mattson), and Judy Hamilton. How noble they are to part with personal treasures for this highly educational purpose.

As is fast becoming customary, Saturday's party wasn't all work. After the assembly, most headed for the local pizza shop for a hearty lunch and some fun conversation!

photo by b. j. goetteman

GEOLOGICAL SOCIETY OF MINNESOTA

1998-99 Program

Free Lectures & Labs held at 7:30 P.M Mon. on the Minneapolis Campus of the Univ. of Minnesota. See map on back. For more info. call (612) 724-2101.

21 Sep 98 **Fall Annual Meeting** - Program: slides from summer field trips.
Dinner at 5 PM / Meeting at 7 PM. - Old Country Buffet, Maplewood (612) 779-1957.

Lecture Theme: **BASICS OF PHYSICAL GEOLOGY AND CLIMATE CHANGE**

5 Oct. 98 1. **Igneous Rocks and Their Minerals** - Room 105 in Murphy Hall.
Jim Stout (U of M, Geology Department)

12 Oct. 98 **LABORATORY: Igneous Rocks and Their Minerals** - Room 322 Appleby Hall.
Rick Uthe (GSM)

19 Oct. 98 2. **Tectonic Forcing of Weathering Patterns and Climates** - Room 105 in Murphy Hall.
Kerry Kelts (U of M, Limnological Research Center and Geology Department)

2 Nov. 98 3. **Metamorphic Rocks; The Rock Cycle** - Room 105 in Murphy Hall.
G. B. Morey (Minnesota Geological Survey)

9 Nov. 98 **LABORATORY: Sedimentary and Metamorphic Rocks** - Room 322 Appleby Hall.
Rick Uthe (GSM)

16 Nov. 98 4. **Earthquakes and the Earth's Interior** - Room 105 in Murphy Hall.
Ian Williams (UW - River Falls, Department of Plant and Earth Science)

30 Nov. 98 5. **Mountain Structures and Mountain-Building** - Room 105 in Murphy Hall.
Donna Whitney (U of M, Geology Department)

11 Jan 99 6. **Controls of Earth's Climate** - Room to be announced.
Allen Johnson (U of M, General College)

25 Jan 99 7. **Atmospheric Circulation and Air-Sea Interactions** - Room to be announced.
Allen Johnson (U of M, General College)

8 Feb. 99 8. **Of Trees and Tresses: Pattern Formation in River Networks** - Room to be announced.
Chris Paola (U of M, Geology Department)

15 Feb. 99 **LABORATORY: Topographic Maps** - Room to be announced.
Rick Uthe (GSM)

22 Feb. 99 9. **Floods and Flood Forecasting** - Room to be announced.
Dean Braatz (NOAA River Forecasting Center)

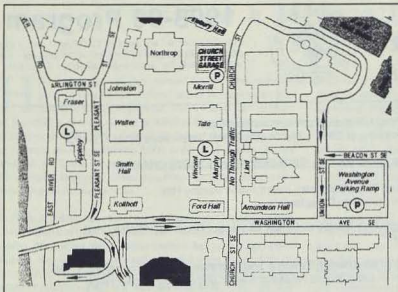
1 Mar 99 **TOUR**: National Weather Service and River Forecasting Office (in Chanhassen)
Craig Edwards (National Weather Service)

8 Mar 99 10. **Glaciers and Glacial Landscapes** - Room to be announced.
Kent Syverson (University of Wisconsin-Eau Claire, Geology Department)

29 Mar 99 11. **Oceans, Shorelines, and Deserts** - Room to be announced.
Chuck Nelson (Saint Cloud State University, Department of Earth Science)

12 Apr. 99 12. **Climate Variations: Space and Time Scales** - Room to be announced.
Kathy Klink (U of M, Geography Department)

26 Apr. 99 **Kimball Memorial Banquet** - Location to be announced.
How To Start an Ice Age — Now and Then or Should the Strait of Gibraltar Be Dammed?
Bob Johnson (U of M, Geology Department)



U of MN - Minneapolis East Bank Campus

L = Locations of Lectures & Labs

P = Convenient Parking

SOME REFLECTIONS

by Robert Gunville

We visited Yosemite National Park a year ago in April, just opened after a winter flood flushed the valley. Usually the valley is crowded with tourists; this time the beauty was complete, not the usual State Fair atmosphere. I have always used the National Parks to refresh my spirit--we grow older, cities and landscapes change, but the natural beauty of these rocks, trees, birds and wild flowers seems to remain the same, a constancy among the flux of our lives. We look up to see El Capitan, Bridal Veil Falls, Half-Dome, and the tumultuous water falling freely from Yosemite Falls. These majestic peaks, once pulses of molten rock solidifying deep underground, were raised and relatively recently sculpted by glaciers to their present beauty. We walked and stopped to watch school children laughing and jumping, putting a hat and carrot nose on a snowman; their joy seemed just as much in place here as the squirrels and flowering blue lupines nearby.

When we travel now, my pleasure is always a present blended with the past. I remembered the glee of my own children some years ago when they discovered big crystals of "gold," on a nearby wilderness hike. They were so excited about being instant millionaires that they refused to proceed. We had to leave them behind getting rich while we visited a nearby lake. I didn't have the heart to tell them their handful of gold was "fool's gold" (ordinary iron sulfide) until much later.

My girls were generally good travelers, but they always missed their friends back home. We were puzzled and disappointed about why these small children, no matter how spectacular the scenery, never seemed to notice---picking toadstools, skipping rocks, walking on logs or splashing in the water was their fun and, of course, complaining on this or that hike.

Memories flood back: Tuolumne Meadows in the higher parts of Yosemite National Park, sitting alongside the quiet meandering stream on a soft mat of grass providing a hands-and-knees garden of small flowers, familiar but not in any of my flower books. One night in our tent, as we were going to sleep with the birds, a young man and woman were cooking over a campfire next to us just as it was getting dark. I heard a hooting and hollering to chase away a bear; we were amused that it was the woman and not the man who chased the bear away.

WEATHER AND GEOLOGY

by William Robbins

Geology and weather interact in numerous ways; one of these is the focus of this piece.

Orographic winds are winds shaped by mountains ('oros' is the Greek word for mountain.) Winds flow easily around mountains and through passes: but move with much more difficulty over mountains. A long mountain range perpendicular to prevailing winds may, however, force winds over the top of ranges. The windward side of such a range wrings moisture from this ascending air, which cools about 3.4°C for each rise of 100 meters in altitude, leaving a dry leeward side. Water erosion dominates the wet side, wind erosion the dry side.

A few locations where weather and climate are dominated by orography and geology are listed below.

- Himalayan Mountain Range and the associated five-kilometer-high Tibetan plateau: Meteorological effects include the summer monsoon of the Indian subcontinent, but may also affect the Northern Hemisphere jet stream. The chemistry of the run-off, especially carbonates, may alter the level of atmospheric carbon dioxide, modifying global temperature.

- East African Rift Valley: Downwind, beyond the valley, the plains are hot and dry, due to the meteorological effects of the valley.

- The Great Plains of the United States: This area spawns three fourths of the world's total number of tornadoes. This is aided by the combination of cool, dry winds from the northwest, created by the presence of the Rocky Mountains, and the warm, moist winds from the southwest, generated by the Gulf of Mexico. The cool winds override the warm ones, and the different wind directions provide shear; both override and shear help trigger twisters.

In turn, weather changes geology through erosion and the chemistry of run-off water as mentioned above--but more of that for another time.

(Disclaimer: this is not intended to promote or encourage trespass)

A 45-MINUTE ROCK & MINERAL COLLECTION - FOSSILS, TOO!

by Bruce Goetteman

[Pretty unremarkable as it may seem, add a sturdy, plastic, compartmented box, and it compares handsomely with any commercial offering - a $30 value!]

My latent interest in rock and mineral identification and some idle time coalesced, launching a simple collection. An odd hour between meetings provided the opportunity. A local county park with a small construction site provided the setting.

The construction site had a low, decorative retaining wall with footings of 3/4" to 1 1/2" binder rock (washed river rock). This rock is the fodder for my foragings. However, all was guarded by a fluorescent-yellow ribbon. It encircled the entire site. As the ribbon fluttered in the afternoon breeze, it flagged a heedless warning. In quick succession, I glanced over my shoulder and ducked under. The game was afoot; my course was set for the stockpile of surplus rock.

From the onset of my assault, I noticed the absence of footprints in the disturbed soil and the annoying cry of a nearby nesting killdeer. These were ample assurances the site was abandoned. A fortnight's rain left gullies growing by headward erosion. It refreshed the stockpile, polishing the rock fractures. The cleaned surfaces reflected sunlight, emitting an occasional sparkle from within. It beckoned, evidence of hidden treasure.

My quarry now within reach, it was time to choose a search strategy. The best advice is to keep it simple. Remember, I have only 45 minutes. So the strategy I chose was to find at least two examples of the three rock groups, and fill in with as many minerals as time allows. Then there are the unusual rocks. The kind of rock one would take home to the family and say, 'See, isn't this pretty?'

Upon reaching my objective I assumed the mandatory elbow-on-knee position, firmly planting a Nike against the rock pile's angle of repose. The first step was taken. I hunkered down for a close look-see. And being a product of central Minnesota, the first thing I searched for was - you've probably guessed it - Lake Superior agate!

agates

The fruits of this prospecting episode are labeled and displayed. Look at that banded hematite. What a find! Additional minerals include muscovite mica and quartz, of course. From the igneous group I found a granite, amygdaloidal basalt specimens and rhyolite. The metamorphic group is represented by black slate and quartzite. Sedimentaries came quickly with both the conglomerate and sandstone surviving the crusher. Perhaps the most prized finds are the fossils. The two coral specimens are a surprise, and the brachiopod impression is icing on the cake.

muscovite

hematite

An inquiry with the local gravel mine operator revealed that the cost of binder rock is $11 per ton, plus delivery and tax. A ton is about 1.4 cubic yards, and a truckload is about ten yards. You know, my drive could use a fresh dressing, and a truckload would do the trick. Now all that's needed is a helping hand to spread it around. Of course, those hands could keep as many rocks as they can stuff into their pockets. I wonder how many rockhounds there are in the Geological Society?

amygdaloidal basalt

coral

conglomerate

worm burrows

1998 Spring Banquet

Old Country Buffet
Maplewood

photos by Alex Lowe

Geological Society of Minnesota
c/o Nora & Don Mattsson
1235 Yale Place #1706
Minneapolis, MN 55403

Forwarding and Return Postage Guaranteed
Address Service Requested

PD 10/1/98
Judy HAMILTON
1439 Sargent Ave.
St. Paul, MN 55105