

GEOLOGICAL SOCIETY OF MINNESOTA

NEWS

SUMMER 1998
VOLUME LII NO. 2

www.geolab.geo.umn.edu/orgs/gsm/

CONTENTS

Announcements	2
Board News	2
Why a Field Trip	3
MN Odyssey	3
Beak of the Finch	4
Galapagos	5
Lake Superior geology	6
A Remembrance	7
Hints for Field Trips	7
Bits and Pieces	8

Manning the Booth at the MINNESOTA STATE FAIR

Just want to let you all know that the Great Minnesota Get Together this year will be held August 27 through September 7. We will staff the booth as we have in the past using three shifts each day, two people per shift. *You will be called!* Alex Lowe and/or I will be calling you to reserve your spot. The calendar is ready, so hopefully we can start calling early.

The State Fair draws many interested (and interesting) people to our group. That's how we got many of you as members. And are we glad you joined!

If you have questions, I am chairing the Fair Committee this year, so feel free to call. I'll also accept any suggestions for the booth that you may have. A planning meeting will take place in June. Leave a voice mail at 699-9812.

See you at the Minnesota State Fair.

Judy Hamilton

Summer Field Trips

If the chill of winter and mud of spring put you on field geology hiatus, now is the time to dust off that rock pick, clean your magnifier and put on your hiking shoes. A profusion of geologic sites in Minnesota awaits.

by Galen O'Connor

July 18 : granite quarries near St. Cloud,
leader: Terry Boerboom

August 3-13: Eastern Ontario: We will study the Proterozoic Eon of mountain-building periods of ancestral North America. Leaders: Rick Utte and Judy Hamilton. The last pre-trip meeting will be at 7:30 PM, June 27th, at the home of Alex and Marlys Lowe, 2206 Caroline Lane, St. Paul. The contact for this trip is Rick Utte (625-0193 or <uthex001@tc.umn.edu>).

September: near St. Peter and Mankato: Cambrian outcrops along the road

Flyers will be sent to members. Call Galen O'Connor at 522-2538 with questions.

Field trip information will soon be added to the GSM web site: <www.geolab.geo.umn.edu/orgs/gsm/>.

Announcements

Video Library: The \$15 deposit for the use of the video library is no longer refundable.

Field Trips: The last pre-trip meeting for the Eastern Ontario field trip in August will be at 7:30 PM, June 27th, at the home of Alex and Marlys Lowe, 2206 Caroline Lane, St. Paul.

Geology Mentor needed: a 16-year-old boy interested in geology is looking for a mentor with whom he can explore this subject. For more information, contact Lori Hewitt, a resource developer with Family Service, Inc., in St. Paul, at 451-1434.

GSM NEWS

Editors

Martha Mayon (612) 724-4044
adastm@ccc.net

Dwight Robinson (612) 227-3394

Editing Consultant

Judy Hamilton

Circulation

Nora Mattson

Production

Bruce Goetteman bgoetteman@worldnet.att.net

Staff

Iris Von Bargen

David Romport

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 Mayon, 2621 E. 24th St. Mpls, MN 55406. Phone: (612) 724-4044, or e-mail: adastm@ccc.net.

Officers: Sylvia Kuppfer, *President*; David Christianson, *Vice President*; Don Mattson, *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 Delarosa Drive, Carver, MN 55315. Subscriptions cost \$10 for full-time students, \$20 for individuals, or \$30 for families.



GSM Board News

It's back to the basics for this coming year in the Geology Lecture series. The series is complete now, and the programs will be available for State Fair distribution. We will have sessions on rocks, minerals, earthquakes, mountain building, climate, atmospheric circulation, floods, glaciers, oceans, shorelines, deserts, and climate variations. Our lecture meetings will take place in Murphy Hall, room 105. Complementing this will be three laboratory sessions on rocks, minerals, and topography, and we will have a tour of the National Weather Service and River Forecasting office in Chanhassen in March.

Thanks to Bruce Goetteman who made the arrangements for the 1998 Directory, which includes members' e-mail addresses.

The most recent board meeting was held at Tom Burt's home in Bloomington, and the members enjoyed seeing the beautiful garden with the many varieties of wildflowers. After the meeting, Sister Joan Kain showed slides of "Staking a Claim in Brownstone on the South Shore of Lake Superior." The Geology board has voted to award \$500.00 towards her videotape production, when she has the rest of her financing arranged. We will also receive copies for the GSM Video Library.

The nominating committee members for new board members are Judy Hamilton, Dwight Robinson, and Marlys Lowe. They will be interested to hear from members who would like to serve on the board. We are still looking for a replacement for the months of October and November for the position of social chairman.

Judy Hamilton announced that there will be a State Fair committee meeting in June. The fair dates are August 27th to September 7th. It is very enjoyable to talk to the interested fairgoers who stop at the booth, and the hours pass very quickly. Anyone interested in contributing time and effort to help should give Judy a call.

The next board meeting will be on July 11 at Goldie Johnson's home at the lake. This meeting has traditionally been open to all members interested in contributing time and effort to the program for the coming year.

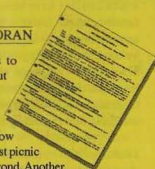
Sylvia Kuppfer, President

Why go on a Geological Society field trip?

by FRANCINE CORCORAN

The obvious answer is to directly learn more about the visible and invisible properties of the earth we briefly occupy. Another answer is to join our fellow explorers in pursuit of the best picnic spots in the Midwest and beyond. Another answer is to go to places rarely visited with an expert guide.

I go on field trips for the esthetic experience. The shapes of the land, shades of the soil, variations in rock texture and scale, infinite landscapes and cozy caves, contrasts between the most delicate of flora wringing a living out of the surrounding rock, the astounding inner history of the most ordinary boulder.



Joint
Interstate State Park, MN Geological Society Field Trip 6/00

I may not at all recall the name of a formation, chemical or anomaly, but I will remember the look and feel of the land and rock, and that's what I bring home with me every time.

The next time you find yourself in excellent company in the middle of nowhere absorbed with imagining the past, up to your knees in ticks and poison ivy in the rain, take a look around. You could be delighted.

[Editor's note: Photo by Francine Corcoran. Area shown is approximately 2' x 3']

review by WILLIAM ROBBINS

1998 Kimball Memorial Banquet
Lecture by
John R. Tester, Ph.D.

TEN THOUSAND YEARS AND FIFTY MILES

A Minnesota Odyssey

The effect on the flora and fauna of a small temperature difference over both time (10,000 years) and space (a specific 50-mile square in Minnesota) was discussed by Dr. John R. Tester, a professor in the Department of Ecology, Evolution, and Behavior at the University of Minnesota, at the Kimball Memorial Banquet. In his talk he also examined a geological cause for this spatial temperature difference, and prospects for the region's ecology as global warming occurs.

Dr. Tester, who has an MS in Forestry and a Ph.D. in Botany/Zoology, described a region of Minnesota about 50 miles from west to east (see map). He considered the impact of a rather small temperature increase on this area since the end of the last ice age 10,000 years ago. Worldwide, the temperature has increased an average of 3 to 6°F since then. Minnesota's average annual temperature is now 40°F.



grass prairie on the western edge, and oak savanna on the eastern edge. Ten thousand years ago the whole area was covered by a spruce/pine forest, indicative of a cooler climate than the present one.

Dr. Tester described and illustrated the present-day differences in flora and fauna observed along these west-to-east 50-mile-long transects. For example, tall grass prairie is found in the west (Fosston-Detroit Lakes area), with deciduous hardwood in the middle (Bemidji-Park Rapids area) and conifers in the east (Itasca area). These differences are associated with a 4°F average August temperature decrease from west to east and an increase in annual precipitation from 19.6" to 25.1", west to east. He observed that this summer temperature difference is similar to that associated with the net temperature change since the last ice age, and thus the flora and fauna changes are similar.

The cause of this temperature decrease and precipitation increase from west to east is likely the underlying geography, specifically the Alexandria moraine, a 200-300-ft.-tall north-south ridge. Orographic wind (winds shaped by "mountains") thus may be the dominant cause, with the detailed shape of the moraine and soil types possibly playing a role.

Finally, Dr. Tester posed a rhetorical question about the future: What will be the effect of global warming? Some models have suggested increases of 6 to 10°C (11-18°F), and much less precipitation. Will Minnesota become like Arizona?

Microscopic studies of pollen deposited in annual layers of silt (varves) at the bottom of bogs and lakes provide estimates of vegetation, and thus climate, surrounding each sampled lake. Pollen indicates that this area was warmer and drier 5,000 years ago than now, with mixed-



THE BEAK OF THE FINCH

a review by Dwight Robinson

Daphne Major is a tiny speck of an island in the Galapagan archipelago (refer to the map on the bottom of the next page). Although Charles Darwin's Beagle landed just a day's short sail from the island, if he noticed it at all, he did not see fit to comment on it. There were finches on Daphne Major, the progenitors of today's populations, but Darwin was not ready for them. Despite his latter-day connection to these famous finches, Darwin the young naturalist was more interested in trailing and riding giant tortoises and pulling the tails of the "imps of darkness" (marine iguanas). He noted the birds but only in passing, and he was uncertain and mistaken sometimes about their species.

He was yet to carry the memories of these strange Galapagan creatures back to England, where they would be transmogrified into that idea that certain members of our species seek to deny to this day - "...The Origin of Species by Means of Natural Selection...", i.e., evolution. When all of the arguments against such a process are said and done, the critics retreat into their one last, desperate, stronghold by arguing that since no one has ever "seen" evolution happening, it can not be said to exist. One might as well argue against the existence of atoms, and perhaps that is what they should do next, because the "walls" of their stronghold have been utterly and permanently demolished by one of the world's most elegant outdoor lab experiments.

The lab was/is Daphne Major. The famous finches were still there 138 years after Darwin's famous visit, still tame and committed to making a living on this barren piece of real estate. But in 1973, a new element invaded their island hideaway: two-legged, non-flying creatures with piercing, forward-staring eyes, who would sit and watch and occasionally trap and grab the finches to measure their beaks. Such beak measuring,

which couldn't have been more than one more tiny nuisance in the life of a busy finch, was adding up to something no one had ever "seen" before. The beaks were changing over time with the weather! The tougher things got during the El Niño cycles, the more the beaks diverged to allow exploitation of every available niche. The researchers were watching and recording evolution in action.

Their findings and the implications are set out in the elegant little book, *The Beak of the Finch*, by Jonathan Weiner (Vintage Books, 1994). Nothing could be more timely as we sit like finches (or sitting ducks) in the dawning light of our own self-generated "Age of Biotechnology." Weiner's text reaches a transcendent brilliance in the chapter entitled "The Metaphysical Crossbeak." It is a "must read" for anyone who cares about the world and the future of our species. Would that were most of us. Weiner has my undying gratitude for this masterful and beautiful work of scientific art - a true gem on the bookshelf.

My deepest gratitude also to Lisa Westbrook Peters for sharing her copy of *The Beak of the Finch* with me before my departure for the Galapagos, to Debra Preece for her timely delivery of said book, and to Charlie Brennecke, who had been urging me to read it all along. And last but not least, deepest thanks to Peter and Rosemary Grant, those beautiful humans who have so far devoted over twenty years of their lives to unequivocally documenting the reality of all of living beings - evolution happens! And books like this are truly one of its finest products.





The recent ILSG Meeting attracted not only its professional membership but also others with geologic interests. I attended the open-to-the-public Special Session, *Geological Overview of the Lake Superior Region*, in which six leading geologists summarized their special subfields for an audience from the Upper Midwest and Canada. The program followed a chronological sequence with each presentation focused on some aspect of current investigations, all of which are summarized in PROCEEDINGS VOLUME 44, Part I - Program and Abstracts. Perhaps I can share a few of the highlights with you.

Geologist Kenneth Card of Card and Associates' Geosearch, Kanata, Ontario, in his "Archean Geology of the Great Lakes Region of North America" introduced the series by describing models of complex craton formation in the Early Archean. Richard Ojakangas, Dept of Geology, UMD, in "Generalized Early Proterozoic History, Lake Superior Region" detailed work on glacial units that allows identification and correlation of strata as distant as Wyoming and Finland. Recent information on environmental conditions at time of deposition is revising dating and correlation of iron formations in Minnesota, Wisconsin, and Michigan (7).

My personal interest was the Upper Peninsula of Michigan, particularly the Keweenaw Fault and mineral formations. William Cannon, of the USGS, cited work on the Middle Proterozoic Midcontinent Rift from which we learn: "...much of the magma was generated by partial melting of the primitive enriched mantle" (20). "It appears then that development of the Midcontinent Rift marks the arrival of a new plume head at the base in the lithosphere of the Lake Superior region at about 1108 Ma" (20). The processes that formed the rift were also responsible for the formation of the major mineral deposits, the Duluth Complex and the Keweenaw native copper district.

Anthony Runkel of MGS discussed problems in the "Paleozoic Rocks of the Northern Part of the Central Midcontinent of North America." Current investigations are deciphering the challenging lateral extent of these formations, the puzzling change from tropical to temperate style of carbonate deposition, and the extreme textural and mineralogical maturity of the sandstone (28). Recent work is finding "subtle subaerial surfaces of erosion" (30), possibly a partial answer to questions concerning unconformities.

Carrie Patterson, MGS, in her "Models For Interpreting the Quaternary History of the Lake Superior Region" made use of new oceanic oxygen-isotope data and new mechanical models of dynamic ice flow to question the classic interpretation of the Quaternary. "Evidence indicates that the number of Quaternary glaciations is significantly greater than the fourfold glacial chronology devised for North America around the turn of the century..." (33). David Southwick, Director of MGS, ended the morning program by asking "What's Next for Geology in the Lake Superior Area?" He listed eight areas of growth, most of which focused on environmental issues of concern to the public. In his opinion, future geological work will become more dependent on government financing and less dependent on economic geology: "...traditional hard-rock work will diminish in favor of nontraditional investigations in which hard-rock thinking and skills can be applied. Flexibility of training and outlook will be critical to professional success" (37).

Beside summaries of the six presentations, Part I contains *Abstracts for General Technical Sessions*, further information on topics of interest in the Lake Superior region - each with additional references. Part 2: *Field Trip Guidebook* details the five field trips in Minnesota and Wisconsin that were a part of this professional meeting. Both are available (@\$10) at the Minnesota Geological Survey.

A Remembrance

A noted geologist, Eugene Shoemaker, was killed in July this past year in a car accident in Australia. He was on vacation studying impact craters there. It is a sadness and reminder of our own mortality. I recall vividly a week spent with him, two decades ago, rafting 180 miles down the Colorado River through the Grand Canyon. When I first saw Gene Shoemaker, dressed in blue jeans and a railroader's cap, he looked to me like a "small civilian." He sat down opposite us at our introductory dinner and began to talk, with twinkling eyes and stimulating ideas; we were enthralled. I should have been intimidated but he made us feel comfortable. There was nothing arrogant or standoffish about Gene: he was a man with nothing to prove.

Gene was a leading planetary geologist, indeed, of the whole solar system. He was the expert on meteor craters and this was a life theme. He wanted to be an astronaut, but instead helped select them. Gene was a principal investigator of the geology of the moon. Studying moon craters and the rock specimens returned led to a much better understanding of our own earth's early history. He and his wife, Carolyn, also discovered numerous comets, recently the Shoemaker-Levy Comet that captured the world's interest as it plunged so spectacularly into Jupiter a few years ago. He told me he thought he had too many interests and ideas. Considering the wide knowledge he advanced and the people he touched, I don't think so!

The Grand Canyon area was another of his great loves, and he shared his enthusiasm and great knowledge with us as we descended down the Colorado River through the G. C. on a raft trip, twenty years ago. It was a week of adventure, sensual beauty, and appeal to the intellect—a lifetime highlight! We were guests of our friends, and

our two families were accompanied by Gene Shoemaker, and his wife Carolyn, along with several other geologists and their wives.

To see and better understand the Grand Canyon, we made a slow descent of the river, running the rapids, to the roar of the water and hoops and hollers of our teenage children. Or, hiked up the side canyons for a refreshing swim in a cool pool of turquoise blue water. We examined each new layer of colorful rock with the geologists sparing no effort or detail to make us knowledgeable and at home in this Grand Canyon. Nowhere else can you see one and a half billion years of rock history at a glance, like a book, with here and there a chapter or page missing. We stopped to see fossils, to imagine advancing and retreating seas, or ancient sand dunes and even mountains once here. We also examined Indian rock carvings and pottery fragments of early residents in this canyon who lived more than a thousand years ago. Stopping for the evening on the sandy beach, while dinner was being prepared, we enjoyed a chance to relax and converse together.

Senses wide awake, silent to observe nature's rhythms, we observed the beauty of iridescent lizards, the vivid reds or yellows of blooming cactus, the late afternoon warm red glow of the Canyon. It was silent exhilaration. We heard the birds—the Canyon Wren with its lovely descending whistle. Finally, lying out under the stars, we smelled the perfumed air from desert blooms.



Robert Gunville
Minnesota Geological Society

PRACTICAL HINTS FOR FIELD TRIPS

Use the checklist below to help prepare for your trip.



- **CLOTHING:** Dress casually and practically. Layering will help you ease through those daily and seasonal temperature changes for which we're famous. Hats protect against sun and rain. Wearing comfortable walking shoes or boots is important. (Having an extra pair of shoes along doesn't hurt if you step into mud up to your knees...or fall into a stream.)
- **EQUIPMENT:** Plastic bags or other specimen containers, labels (masking tape works well), writing tool(s), notebook, rock pick.
- **FOOD & DRINK:** Plan for lunch in the field. Bring plenty of liquids.
- **OPTIONAL ITEMS:** Camera, binoculars, hand lens, rain gear, sunscreen, bug repellent, field guides for rocks, fossils, birds, bugs, etc.
- **OVERNIGHT:** Depending on the trip instructions, plan to bring canned or dry foods for more meals in the field.
- **SCHEDULE:** Plan to make a day or days of it; schedules, meeting sites, stops, restaurants and accommodations are usually suggested for overnights.

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

Forwarding and Return Postage Guaranteed
Address Service Requested

NON PROFIT ORG.
U.S. POSTAGE
PAID
PERMIT NO. 26430
MPLS, MN

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

In the next issue of GSM News:

- ◆ Reflections on Yosemite National Park - by Robert Gunville
 - ◆ Rocks Can Be Dangerous - by Martha Mayou
 - ◆ A 45-Minute Rock and Mineral Collection
 - ◆ Summer Field Trips
 - ◆ What's In A Mineral Name - by W.S. Cordua
- In the meantime, visit Dr. Cordua's Website:
<<http://www.uwrf.edu/~wc01/welcome.html>>

Additions/Corrections to GSM Directory

- p. 5: GSM e-mail address: fmcorcoran@stkat.edu
- p. 6,7,8,25: Uthe, home phone: 522-5029
- p. 12: P.B. Curtis, e-mail: porcurtis@aol.com
- p. 20: Martha Mayou, phone: 724-4044
- p. 21: add: Galen O'Connor, 3318 Logan Ave. N.,
Minneapolis, MN 55412, 522-2538

Total Solar Eclipse over the Galapagos

(an inverted image)



Membership

Membership is open to everyone with or without "faults."
Welcome new members. They are:

Thomas Callaghan of Maple Plain.

David Stavseth of Roseville.

Cathy Hier of Minneapolis.

To join or if you have questions, contact the membership chair
by phone: (612) 448-5422. Or write to:

GSM c/o B. Goetteman
16125 Delarma Drive
Carver, MN 55315