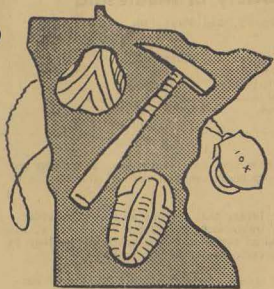


AUTUMN -- 1985



Geological Society  
of Minnesota

NEWS

Geological Society of Minnesota

MINNEAPOLIS, MINNESOTA



FIRST CLASS

EDITORS:

GEORGE AND GOLDIE JOHNSON  
5146 - 197th Avenue N. E.  
Wyoming, Minnesota 55092

PLEASE FORWARD



## Geological Society of Minnesota

1711 Marshall Avenue, St. Paul, Mn. 55104

### OFFICERS:

Pres. Eva Selander  
V. Pres. Warren Mitchell  
Treas. Dwight Robinson  
Sec'y. Marlys Lowe

### DIRECTORS:

Jeff Garry  
Bob Gunville  
George Johnson  
Jack Nesheim  
Dick Uthe



FROM - -  
- YOUR -  
PRESIDENT

For some time now we have been considering ways to enlarge our membership. Every group needs constant renewal and ours is no exception.

It has occurred to me lately that perhaps we should consider establishing chapters throughout the state. Very often at the State Fair people show an interest in our booth and geology in general but they live outstate and find it impossible to attend our lectures.

It should be possible to gradually set up small groups who would then take care of running their own organizations, perhaps get lecturers from their area or whatever. We could perhaps have some of our good speakers talk to groups here or there and tell them what we do and encourage them to start their own group.

It is not impossible for us to grow into a very large organization with a lot of clout.

I would like to propose that we look into this idea to see if it's feasible.

Eva Selander, President

## INTERESTED IN FORMING A CHAPTER???

For anyone interested in pursuing the formation of a chapter in your area, please write to the Geological Society of Minnesota, 1711 Marshall Avenue, St. Paul, Mn. 55104.

\* \* \* \* \*



ANNUAL MEETING TO BE AT VIKING VILLAGE - - -



This year's Annual Meeting of the GSM will be held at the Viking Village Smorgasbord, 510 Snelling Avenue North (Snelling and University) St. Paul on Monday evening, September 23 at 7:30 pm.

Members and guests who wish to attend dinner should plan to come around 6:00 pm so that we may proceed promptly with the business and program at 7:30 pm.



The meeting will include the election of board members. The following have been nominated:

For a first term: Jeff Garry, Goldie Johnson and Marion Marien

For a second term: Warren Mitchell and Dwight Robinson

Additional nominations may be made from the floor.



The program will include a review of the year's activities, treasurer's report and announcement of the lecture program for the coming year. In addition, Bob Gunville will give a presentation on a total experience in Glacier National Park, Montana (the site of one of our field trips for July 1986).



The membership secretary will also be on hand to receive membership dues for the year beginning October 1, 1985 and ending September 30, 1986.

\* \* \* \* \*

TIME TO RENEW YOUR MEMBERSHIP - - -

Our membership year begins October 1, and we need to receive dues early in the program year to meet expenses for our lecturers, program printing, rosters, newsletters and other activities. Our dues are a BIG BARGAIN considering the dozen lectures, lab sessions, workshops and field trips (which are for members only).

An opportunity will be given for you to renew your membership at the annual meeting September 23. Others will want to become members early in the fall so we will avoid spending time and money on requests later.

As we head into our 48th season, remember its your membership support that keeps the Society going!! Thanks for early action.

Bob Handschin, Membership Chairman

(Regular dues are \$10 - single; \$15 - double; \$3 fulltime students; Associate dues - \$7 and \$10 for those unable to attend lectures)



FAIR BOOTH GETS RECORD ATTENTION

In the 25 years of our booth, never have so many stopped to visit as this year. The many attractive color photos taken on four recent field trips by Jeff Garry (who also edited them) drew many comments. Among those who picked up our 1985-86 program, over 400 signed up for a sample newsletter. We expect many of them will be among the new faces at our upcoming lectures. Our exhibit again received a Certificate of Appreciation from Education Department officials.

SPECIAL THANKS to Liz Ooten for designing the booth, to Jeff Garry for the outstanding photos and prints, to Dick Selander for sign art, and to Clarence Ooten, Bob Handschin, Mary Kimball, Dwight Robinson, Warren Mitchell, George Johnson, and Conrad Nelson for their help in setting up the booth.



STAFFING our 1985 fair booth were 38 persons: (some of whom served two 4-hour turns) Grace Benz, Alois and Philomena Bilek, Virginia Black, Walt Blowers, Irene Carlson, Fern Belle Frost, Henry and Marjorie Gangle, Jeff and Krista Garry, Ray Gilles, Paul Glotzback, Bob Gunville, Bob Handschin, Walt Handschin, Jay Hutchinson, Dale and Wilma Johnson, Sister Joan Kain, Mary Kimball, Harry Leisering, Alex and Marlys Lowe, Conrad Nelson, Jack Nesheim, Ralph and Mariette Novotny, Glenn Nyberg, Liz and Clarence Ooten, Dwight Robinson, Dick and Eva Selander, Allan Siekmeier, Mike Solveson, Dick Uthe, and Jean VanDusan. Once again the Novotnys came from their Renville County farm to help out. Conrad Nelson did most of the phoning to get these volunteers.

\* \* \* \* \*

FIELD TRIP REPORTS - Jeff Garry



"GEOLOGY OF THE DULUTH AREA" Leader: Dr. Charles Matsch, Geology Dept., UMD - Saturday, June 8, 1985

Arrived by car Friday evening, stayed overnight at UMD. A field day with Charley Matsch is learning at its best, accompanied by much laughter and joy as always.

Early Saturday morning, we gathered at the Perkins Restaurant on London Road, then proceeded to the Lester River where we studied the glacial striations on the basalt lava flows exposed at the mouth of the river. We then proceeded north to a side near the Duluth water treatment plant where we studied a sequence of lava flows, glacial drift, and lacustrine clays. At Two Harbors we proceeded inland on Highway 2 to the White Pine picnic area for lunch.

After lunch we went to Sullivan Lake where we studied an esker and a tunnel valley. We drove through the Toim drumlin field and stopped to examine the types of rocks in the drift, noting the lack of basalt. We finished the trip at the Eli Wirtanen Farm, an early Finnish settlement. We must have picked the right day, because the temperature at the waterfront in Duluth was 56°F, whereas in the Twin Cities it was 104°F.

"KARST TOPOGRAPHY IN SOUTHEASTERN MINNESOTA" Leader: Dr. Calvin Alexander, Geology Dept. U of M  
Saturday, July 13, 1985

We gathered at Macalester College and proceeded by caravan to Rochester where we stopped at Golden Hill and examined the exposures of Galena limestone over Decorah shale which forms an impermeable layer, leading to Karst topography. Near Spring Valley, we observed the blind valley which, this time, was dry.

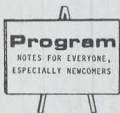
We lunched at Moth and Graban Springs and looked for fossils in the area. At Mystery Cave we took the 1 1/2 hour tour. We ended the trip in the Rifle Hill quarry where we looked for fossils and flowstone. Several magnificent specimens were found.

It has been heard that Conrad Nelson found a museum quality receptaculites or "sunflower coral" specimen.



One more field trip report will be forthcoming from the trip with Jim Miller, U of M, in the Boundary Waters.

\* \* \* \* \*



For those of you who will be coming to the GSM meetings for the first time to take part in what will be a very exciting series on evolution by Dr. Robert Sloan should allow some extra time to park and walk from a parking area if you are driving. The University parking is best and cheapest in the north lots on 4th Street S. E., north of University Avenue. Other parking is available under Northrup Auditorium, Coffman Union, and Mayo Auditorium, and on River Road East. Parking next to the new University Radisson Hotel on Washington Avenue is expensive. Bus service is available on Washington Avenue.

The Physics Building faces on the Mall in front of Northrup Auditorium, and is on Church Street (the same as 17th Avenue S. E.)

\* \* \* \* \*

#### ORIGINS: THE GEOLOGICAL HISTORY OF MINNESOTA

The Audubon Chapter of Minneapolis's Conservation Committee is cosponsoring a lecture series with the Bell Museum of Natural History on the geological history of Minnesota. It will be a series of three lectures featuring three outstanding lecturers in the field of Geology. An informal reception will follow each lecture.

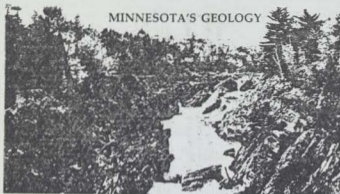
LOCATION: BELL MUSEUM OF NATURAL HISTORY AUDITORIUM

ADMISSION: \$2 for Audubon/Bell Museum members and \$3 for non-members

NOV. 6, 1985  
Wednesday  
7:00 pm  
The Formation: Minnesota During the Pre-Cambrian - How were the continents formed? Were they in the same location as today? Come and find out what current theories are on the origins of the continents. Speaker: Dr. David L. Southwick, Senior Scientist at the Minnesota Geological Survey.

Nov. 13  
Wednesday  
7:00 pm  
The Evolution of Continents and Life: The Last 600 million Years of Minnesota History Why do we find seashells so far from the sea? Explores the period in the earth's history when continents moved across the face of the globe, giving us the global geography we know today and when great seas covered parts of North America, creating the sea live fossil beds that attract professional geologists and weekend collectors alike. Speaker: Dr. Gerald Webers, Professor of Geology and Paleontology at Macalester College.

Nov. 20  
Wednesday  
7:00 pm  
North American and the Great Ice Age - Much of the landscape of Minnesota and indeed North America owes its existence to the action of now vanished glaciers. Beyond the physical actions on the land itself, the advance and retreat of the ice sheets shaped the distributions of plants and animals including humans. Speaker: Prof. Charles L. Matsch, Head of the Geology Department, UMD, who has been appointed a national lecturer by Sigma Xi, the Scientific Research Society.



## MINNESOTA'S GEOLOGY

### Richard W. Ojakangas and Charles L. Matsch

For the last 1,000 million years or so, what is now the state of Minnesota has experienced no mountain building and no volcanic eruptions; nothing but an occasional earthquake has jarred the serenity of the landscape. The only significant geological activities were erosion and the slow but repeated encroachment and recession of warm, shallow seas. More recently, during the last several million years (geologically speaking, just yesterday) repeated invasions by expansive glaciers and their final melting left a land surface decorated with ice-crafted forms. But, as geologists Richard Ojakangas and Charles Matsch point out, that is not the whole story. For example, volcanic eruptions on a grand scale during the Precambrian Era created thousands of meters of layered rocks. Subsequent mountain building 2,700 million years ago elevated and deformed those thick sequences of rock, tilting, folding and breaking them to form complex structures into which massive bodies of molten rock forced their way and cooled as granite. Millions of years of erosion by water and ice removed the mountains, but their twisted roots remain to provide us with evidence of that early, violent time. For the geologist this history is documented in the outcrops of rock in northern Minnesota.

In *Minnesota's Geology*, Ojakangas and Matsch share with the reader the pleasure they have found in studying the rocks, soils, and landscape they know well as field geologists and as continuing students of earth history. Intended as a successor to *Minnesota's Rocks and Waters* by George M. Schwartz and George A. Thiel (University of Minnesota Press, 1954), the new book reflects the fact that geological knowledge has grown immensely during the last three decades. In an opening section the authors present basic geological concepts—including the new plate tectonic theory—and clear, vivid definitions of earth materials: minerals, rocks, fossils, and soils. They place Minnesota in the larger geological picture, and sketch a history of geological investigations since 1872, when the Minnesota Geological Survey was established.

The second, and largest, part of the book is devoted to the geological history of the state, from Precambrian time—the span between the origin of the earth (about 4,500 million years ago) and the development of invertebrate life preserved as abundant fossils (about 600 million years ago)—through the eras of life (Paleozoic, Mesozoic, and Cenozoic), and the period known as the Quaternary. These last two million years encompass a time that included the Great Ice Age. The sediments left by glaciers were the last major deposits to form in Minnesota. Because they blanket much of the state and obscure the older rocks, many geologists consider them a nuisance, but the authors devote special attention to the subject of past glaciation and its effects on Minnesota's landscape.

The last two sections of the book are devoted to the state's mineral resources—the discovery and mining of iron ore, and the search for copper, nickel, and other metals—and the regional geology of Minnesota. For each of five geographic regions, the authors describe the lay of the land, the glacial and bedrock geology, and the most revealing and accessible geological sites. This part of the book will serve as a useful guide for residents and travelers who want to read geological history firsthand from the rocks and landscapes.

Richard W. Ojakangas and Charles L. Matsch are professors of geology at the University of Minnesota, Duluth. Ojakangas is coauthor of *The Earth—Past and Present*, and Matsch is the author of *North America and the Great Ice Age*.

ISBN 0-8166-0950-0

cloth \$39.50

ISBN 0-8166-0953-5

paper \$16.95

ix + 263 pages, 8½ x 11, 146 line and 275

1982

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# GEOLOGICAL SOCIETY of MINNESOTA



## Program 85/86

AT >UNIVERSITY OF MINNESOTA, MPLS CAMPUS \$FREE\$  
 IN >PHYSICS BUILDING, ROOM 131/170/TBA\* PUBLIC  
 ON >MONDAY EVENINGS: 7:30 P.M. WELCOME!

September 23 ANNUAL MEETING: Viking Village, Snelling Avenue, St. Paul.  
 Dinner: 6:00 p.m.; Meeting: 7:30 p.m.

### GEOLOGIC TIME

EARTH: 3,000,000,000 YEARS OF EVOLUTION by Dr. Robert Sloan,  
 Professor of Geology, University of Minnesota \*\*

October 7	ORIGIN OF LIFE **	Room 131
October 21	ORIGIN OF ANIMAL PHyla **	Room 131
November 4	PALEOZOIC EXTINCTIONS & RADIATIONS **	Room 131
November 18	CRETACEOUS FINALE: With a Bang & a Whimper **	Room 170
December 2	TERTIARY MAMMALS **	Room 131
January 13	RADIOMETRIC DATING, Dr. Calvin Alexander, Associate Professor of Geology, University of Minnesota	Room TBA*

APPROX. AGE IN MILLIONS OF YEARS (Radio-activity)	PERIOD
	Recent Pleistocene
	Tertiary
70	
135	Cretaceous
180	Jurassic
	Triassic
225	
270	Permian
	Pennsylvanian
350	Mississippian
400	Devonian
440	Silurian
480	Ordovician
600	Cambrian
3300	Approximate age oldest rocks discovered
4500	Approximate age meteorites

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EARTH RESOURCES: MINING TO AGRICULTURE

January 27	CRACKING THE CRUST FOR METAL ORES (2 FILMS), introduction/discussion by Dick Uthe, GSM member	Room TBA*
February 10	ADVANCES IN MONITORING AND PROCESSING MINERAL RESOURCES, Kenneth J. Reid, Professor of Mineral Engineering, University of Minnesota	Room TBA*
February 24	THE BEGINNINGS OF AGRICULTURE IN THE NEAR EAST: CULTURAL HISTORY/ENVIRONMENTAL CHANGE, Dr. Herb Wright, Regents Professor of Geology, University of Minnesota	Room TBA*
March 10	SHAKE, RATTLE & ROLL & EARTHQUAKE PREDICTION (2 FILMS), introduction/discussion by Dick Uthe GSM	Room TBA*
March 24	HALLEY'S COMET WATCH; SATELLITE UPDATE, Dr. Calvin Alexander, Associate Professor of Geology, University of Minnesota	Room TBA*
April 7	ANTARCTICA: GEOLOGY & MINERALS, John Spletstoeser, Senior Scientist, Minnesota Geological Survey	Room TBA*

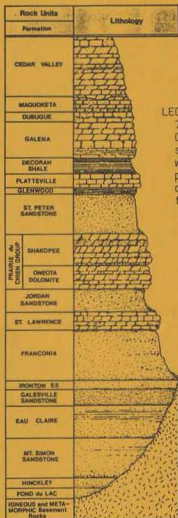
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 April 28 SPRING BANQUET: "PALEONTOLOGY IN CHINA" by recent visitor Dr. Robert Sloan, Professor of Geology, U of MN  
 Time/Place: To Be Announced (TBA)\*

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 M A WELCOME to the Geological Society of Minnesota (GSM) #  
 E P To join, complete the application below and mail to the  
 M P Membership Chairperson (see reverse) or better bring  
 B L it with you when you attend the meetings above:  
 E I  
 R C  
 S A  
 H T  
 I O  
 P N

NAME(S): \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_ (Street) \_\_\_\_\_ (City) \_\_\_\_\_ (Zip)  
 Type of Membership \_\_\_\_\_ \$ \_\_\_\_\_  
 (See reverse for categories)

#GSM is a non-profit organization existing only through its members





THE GEOLOGICAL SOCIETY OF MINNESOTA is an organization interested in the story of the earth, what it is made of and how it is put together. Geology, the study of the earth over billions of years of constant change is fascinating to many people. Members of the Geological Society are such people.

LECTURES are scheduled on alternate Mondays, October - April at 7:30 p.m. in a lecture hall on the University of Minnesota Campus. Generally, one area of study is pursued in depth over several meetings by one or more professional, local geologists who provide stimulating presentations geared to interested, non-professionals. A discussion session with refreshment is held during each presentation. Also, specimens may be brought in for identification and discussion.

LABORATORY SESSIONS are held whenever possible on alternate Mondays throughout the lecture series. These are informal, hands-on learning experiences also structured for the non-professional level of understanding and interest.

FIELD TRIPS during the summer fill out the schedule. They are led by geology professors or field geologists who lead trips to their special areas of interest. These trips provide first-hand encounters with earth processes forming the landscape. Members learn to observe and evaluate these processes.

THE SOCIETY aims to further understanding of geology by the public especially the geology of Minnesota. To this end, 33 roadside plaques have been written and installed under the sponsorship of the society and each year exhibits on the State's geology are presented at the Minnesota State Fair. Club members also serve as speakers at schools and meetings of other local organizations. Educational efforts are ongoing.

MEMBERS OF THE SOCIETY come from all walks of life and age groups. No particular scientific training or background is necessary. Members are united by their enthusiasm for geology as an absorbing intellectual activity and stimulating hobby.

THE GEOLOGICAL SOCIETY OF MINNESOTA MEMBERSHIP YEAR begins October 1, with yearly dues payable any time beginning with the Fall Annual Meeting. Membership includes subscription to the newsletter covering the society's various activities. We invite you to participate!

**Membership Chairperson**

Robert Handshin (612) 774-1431  
2029 Edgerton Road  
St. Paul, MN 55117

**Official Address**

Mary Kimball (612) 644-6429  
1711 Marshall Avenue  
St. Paul, MN 55104

**Membership**

**REGULAR**

Couples \$ 15.00  
Single \$ 10.00  
Student/Full Time \$ 3.00

**OTHER**

Sustaining \$ 25.00  
Supporting \$ 50.00  
Guarantor \$ 100.00

**ASSOCIATE\***

Couples \$ 10.00  
Single \$ 7.00

\*Associate membership is made available to those who due to health, location or financial status are unable to participate fully or sustain a regular membership

Approx. Max. Thickness in Feet, Meters

308/93

70/21

25/71

230/70

95/29

28/11

18/5

155/47

240/73

170/52

115/35

100/30

190/58

45/18

95/29

105/60

215/66