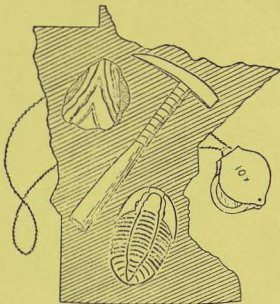


Jan-Feb-Mar 1974



NEWS

Geological Society of Minnesota

FIRST CLASS

MINNEAPOLIS, MINNESOTA



Mr. and Mrs. R.M. Gunville, Editors
1110 Gardena Ave.
Minneapolis, Minn. 55432

RETURN REQUESTED

Jan., Feb., Mar. 1974

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	John Snell	1398 Barclay St., St. Paul	711 8144

THE INCOMPARABLE YOSEMITE

by John Muir

The most famous and accessible of these canyon valleys, and also the one that presents their most striking and sublime features on the grandest scale, is the Yosemite, situated in the basin of the Merced River at an elevation of 4000 feet above the level of the sea. It is about seven miles long, half a mile to a mile wide, and nearly a mile deep in the solid granite flank of the range. The walls are made up of rocks, mountains in size, partly separated from each other by side canyons, and they are so sheer in front, and so compactly and harmoniously arranged on a level floor, that the Valley, comprehensively seen, looks like an immense hall or temple lighted from above.

But no temple made with hands can compare with Yosemite. Every rock in its walls seems to glow with life. Some lean back in majestic repose; others, absolutely sheer or nearly so for thousands of feet, advance beyond their companions in thoughtful attitudes, giving welcome to storms and calms alike, seemingly aware, yet heedless, of everything going on about them. Awful in stern, immovable majesty, how softly these rocks are adorned, and how fine and reassuring the company they keep: their feet among beautiful groves and meadows, their brows in the sky, a thousand flowers leaning confidently against their feet, bathed in floods of water, floods of light, while the snow and waterfalls, the winds and avalanches and clouds shine and sing and wreathe about them as the years go by, and myriads of small winged creatures - birds, bees, butterflies - give glad animation and help to make all the air into music. Down through the middle of the Valley flows the crystal Merced, River of Mercy, peacefully quiet, reflecting lilies and trees and the on-looking rocks; things frail and fleeting and types of endurance meeting here and blending in countless forms, as if into this one mountain mansion Nature had gathered her choicest treasures, to draw her lovers into close and confiding communion with her.

From "The Yosemite", John Muir



TWO-DAY DULUTH WORKSHOP
TO BE HELD IN MAY

Members of the G.S.M. will have an outstanding opportunity to learn geology at a special workshop to be held in early or mid-May at the University of Minn., Duluth Campus. It will be an intensive two-day weekend of lectures, lab exercises, films, field trips, and fun to be coordinated by Dr. Charlie Matsch, Dr. Jim Grant and Dr. Den Davidson, all from the U.M.D. Department of Geology and all held in high regard by our Society as memorable field trip leaders.

The men are planning this workshop to include a wide variety of activities which will suit the needs of the beginning, intermediate and more advanced club members. Participants will be able to choose the sessions they feel will be most helpful. Drs. Matsch, Grant, and Davidson have worked with our group and have a good idea of our members' interest, enthusiasm, and levels of understanding in the field of geology. They will be able to fit their instruction into an exciting program for everyone.

Field trips on Sunday will be planned in and around the local area. Activities will end around 2 p.m. Sunday in order to allow time to drive back to the Twin Cities in the afternoon.

If you feel that you might be interested, be sure your name is on the sign-up list, or contact John Snell, 1398 Barclay St., St. Paul 55106 (771 8144).



It is good to rub and polish our
brain against that of others
Montaigne

Spring Scene

Spring Banquet Coming April 22nd!

This year the G.S.M. Spring Banquet will be held on Monday, April 22nd at the First Unitarian Society (Church) Building, on 900 Mount Curve Ave., Minneapolis. The society is located two blocks south of the Guthrie Theater and Walker Art Center.

The dinner is scheduled for 6:30 p.m. with a social hour beginning at 5:30 p.m. The cost will be \$4.25 per person. An interesting program is being planned by Dr. & Mrs. Lewis and Mary Kimball will talk on their 1973 trip to Africa. There will be a discussion of field trips, fun, games, and surprises.

The banquet committee needs to know how many people to expect. Please make reservations at the lecture on April 8th, or mail your reservation slip and check to Mrs. Bernice Tepel, 1269 So. Cleveland Ave., St. Paul, Minn. 55116. Due to food prices this year, we urge you to pay for your reservations in advance - by April 15th.

G. S. M. SPRING BANQUET

1st Unitarian Society
900 Mount Curve Avenue
April 22nd, 1974

Mail to: Mrs. Bernice Tepel
1269 So. Cleveland Ave.
St. Paul, Minn. 55105

I wish to make _____ reservations at \$4.25 per person

Name _____

Address _____

Guests _____

TENTATIVE FIELD TRIP SCHEDULE IS ANNOUNCED

Plans for this summer's field trips are being worked out now, and will include many kinds of activities. More details will be published in the next newsletter. John Snell, Field Trip Chairman, has set up the following plans, and would like to know the names of all who think they can take part in the various trips. If you think you can attend, or would like more information on each trip, get your name on the sign-up sheet or contact John at 1319 Barclay St., St. Paul 55106 (771 8144). This is not a commitment, but an indication of interest.

<u>Date</u>	<u>Description</u>	<u>Guide</u>	<u>Transportation</u>
Early to Mid-May	Two-day workshop at the University of Minnesota, Duluth	Dr. Charlie Matsch Dr. Jim Grant Dr. Ben Davidson	car
June 8-9	Baraboo-Devil's Lake, Wisc. to study the Precambrian rock structures which later developed as islands in the Cambrian seas	Dr. David Southwick	bus
July 13	Local bedrock and Pleistocene geology to include the St. Croix Valley and Taylor's Falls	Robert Kadwell, Dept. of Geology Univ. of Minnesota	car
Aug. 10-11	Tower-Soudan to International Falls Lower Precambrian Vermillion Granite and related geology, to possibly include a boat trip on Kabetogama Lake with a stop for lunch.	Dr. David Southwick	bus
Sept. 28-29	Northwoods Audubon Center, Sandstone, Minn. Geology of Pine County — Pleistocene features, Hinckley Sandstone formations, a marble deposit and an old copper mine.	Michael Link, Center Director	car

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welcome

NEW MEMBERS:

ADDRESS CHANGES

The G.S.M. extends a welcome to
the following new members:

Melvin Olsen
4249 Abbott Ave. So.
Minneapolis, Minn. 55410

Harold Wiegner
130 W. Haskell
West St. Paul, Minn. 55118

Miriam Anttila
116 N. Cedar Lake Rd.
Minneapolis, Minn. 55405

The following members have
changed addresses:

Thomas Protrowski
1910 E. 86th St.
Bloomington, Minn. 55420

Richard Wilcox
113 So. Main St.
Stillwater, Minn. 55047

Background

The work of the Geological Society of Minnesota is carried on through its various committees. This series of background articles will continue with reports on their activities by committee chairmen.

FIELD TRIP COMMITTEE

by John Snell, Chairman
(Fred Bradford, Asst. Chairman)

The Field Trip Committee attempts to plan field trips which will be of interest to the members of the Society. Normally we try to tie these in with the lectures and laboratory sessions of the previous winter series. All trips are guided by a professional geologist, and this is sometimes the winter lecturer. One-day trips are usually taken by car caravan, particularly when they are in the immediate local area. In the past, the members have usually preferred to charter a bus for the two-day trips. This enables the guide to describe the geology as the bus travels. The longest trip in recent years was a one-week trip to the Black Hills about three years ago. Perhaps the group will want to undertake another extended trip sometime. Last year we began the season with a one-day trip in and about the Twin Cities area. We took two trips to Southwestern Minnesota, studying glacial geology on one trip and pre-cambrian geology on the other. A fall trip to the North Shore and Gunflint Trail completed the season.

EXHIBIT COMMITTEE

by Mary Kimball, Chairman

The major responsibility of the Exhibit Committee is to prepare and staff the Minnesota State Fair booth each fall. In addition, we are usually invited to participate in the Minnesota Mineral Club and the Bloomington Mineral Club shows. We welcome these opportunities to make more people aware of the enjoyment and knowledge they may gain by participating in our Society's activities. At the same time, we are gaining knowledge ourselves as we develop and organize the display materials. Obviously, these projects could not be handled successfully were it not for the generous assistance of many people working together and becoming better acquainted in the process. If this sounds like your "cup of tea", won't you please get in touch with Barb Lundgren (633 5442) or Mary Kimball (644 6429). If we don't know you already, we welcome the opportunity of learning to.

NEW BOOKS AT THE ST. PAUL LIBRARY

Catherine McGough, Science Librarian for the St. Paul Public Library has sent the Society a list of new acquisitions by the library in the field of geology.

- | | |
|---|---------------------------|
| <u>Invitation to Geology</u> by William H. Matthews | call no's
(QE 31-M 33) |
| <u>Colorful Mineral Identifier</u> by Anthony Tennissen | (QE 365 t 37) |
| <u>The Colorado River Region And John Wesley Powell</u>
U.S. Geological Survey | (QE 795 C 75) |
| <u>Gold Fever And The Art of Panning And Sluicing</u>
by Lois DeLorenzo | (TN 423 A5 D4) |
| <u>Mysteries of Our World</u> by Peter Briggs | (QE 31 B 84) |

Most of these could be purchased from local bookstores or they may be checked out from the library. Call 224 3383, ext. 43 if interested.



POSTAL SERVICE ANNOUNCES MINERAL STAMPS

America's mineral heritage will be the subject of four 10¢ stamp designs to be issued in Lincoln, Nebraska on June 13th. This date will coincide with the National Gem & Mineral Show there.

The stamps show amethyst, rhodochrosite, tourmaline, and petrified wood. They will be diamond shaped positioning on the envelope. This is the first time the Postal Service has used this device and also the first time minerals have been used as a subject.

People can receive first day cancellations on envelopes by sending a request to "Mineral Heritage Stamps", Postmaster, Lincoln, Nebraska, 68501. Enclose a self-addressed envelope and 40¢ for each block of four. Requests for single stamps will be honored if the name of the gem wanted is written in the upper right corner of the cover (envelope).

Amethyst is a violet color of quartz, a silicon oxide, one of the first materials used by prehistoric man. Quartz is very widespread, found in acid igneous rocks in pegmatites, in hydrothermal lodes and in crystalline schists. Tourmaline is a complex borosilicate, providing stones of marvellous colors; the range extends from pale pink, yellowish brown, green to greenish blue. Some crystals are two colored. Rhodochrosite is a manganese carbonate. It can be found with various manganese ores and in certain substitution deposits in limestone. Petrified wood was once wood but now has been completely replaced by stone. Some of the best specimens are found in the Petrified National Forest of Arizona. Also, fine specimens are found in the Gallatin National Forest and Yellowstone Park. Millions of years ago mud dissolved minerals from volcanic ash and carried them to the buried trunks, where they slowly and delicately permeated the wood spaces. Eventually, the minerals entirely replaced the cell structures of the wood though it was not destroyed in form. Iron and manganese impurities added bright colors.

-Source Material
American Philatelist, March 1974
The Mineral Kingdom by
Paul Desautels
Gems and Jewels by Henri Jean
Schubnel

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FAMPHLETS OF INTEREST

The following publications are put out by the U. S. Geological Survey and are available from the Superintendent of Documents, U. S. Gov't Printing Office, Washington D. C. 20402.

<u>Our Changing Continent</u> , 1973	O-497-957	20¢
<u>Land Forms of the United States</u> , 1973	O-500-823	25¢
<u>Volcanoes of the United States</u> , 1973	O-499-053	40¢
	(Stock No. 2401-00262)	
<u>Geysers</u> , 1971	O-444-074 (Stock No. 2401-2029)	25¢
<u>Earthquakes</u> , 1973	O-499-231	35¢
<u>Gemstones of the United States</u>		
Geological Survey Bulletin 1042-G	1973 O-509-186	55¢

MEETINGS AND SHOWS

BROOKDALE EXHIBIT SPONSORED BY MINN. MINERAL CLUB

The Geological Society of Minnesota will have a booth at the Annual Minnesota Mineral Club Show at Brookdale (East Mall), Saturday, April 20th from 9:30 a.m. - 6:00 p.m. and Sunday, April 21st, noon - 6:00 p.m. There will be educational and working exhibits of many aspects of mineral collecting and lapidary. The G.S.M. is having an educational display of geology in Minnesota. Members are urged to attend to see the show or to help by volunteering in maning the booth.

AMERICAN FEDERATION CONVENTION AND NATIONAL GEM &

MINERAL SHOW TO BE HELD IN LINCOLN, NEBRASKA

The American Federation's Annual Convention and the National Gem & Mineral Show will be held in Lincoln, Nebraska on June 13-16, 1974, at the State Fair Grounds. There will be special exhibits, including minerals from the Smithsonian Institute, special events and features, speakers, working demonstrations, retail dealers, etc. If you are interested in attending, write the Lincoln Gem & Mineral Club, Inc. P.O. Box 5342, Lincoln, Nebraska, 68505 for more information.

(A FIELD TRIP REVISIT TO THE MINNESOTA VALLEY --cont.)

warped and bent into major synclines and anticlines as well as many minor ripples, all folding in the same east-northeasterly direction. Melting and partial melting occurred, and the stretching and flowing of materials stirred some of the rocks into a marble cake appearance. Near the end of these events a plutonic mass of magma was injected into them. This Sacred Heart granite-like (quartz monzonite) rock body appears to push into and to dilate rocks of Unit A. It was at about this same time major deformation also took place in the Northern Minnesota region. Minor deformation continued here for a long time, causing additional changes in the rocks, and at about 1.8 billion years magma was again intruded to form such small bodies as the "granite" (quartz monzonite) near Granite Falls.

Since the end of this period of igneous activity the area has been quiet, its rocks for the most part remaining deeply buried. This has not always been true, however, as was evident to us as we made a stop to see a large hill of regolith still containing the now familiar patterns of Morton gneiss. During the Cretaceous period these rocks had been exposed at the surface and subjected to tropical weathering conditions. It was impressive to realize that the extremely hard and durable Morton gneiss could be reduced to this pile of crumbly clay by weathering.

The story still goes on as geologic processes continue to act upon these rocks. Ice, one of the most recent of these processes, has allowed us our opportunity today to have a glimpse of them, and we enjoyed a fine outing in the company of an excellent teacher. Dr. Grant was able to explain the complex and difficult concepts involved here with clarity and good humor. The rocks he so obviously loves and respects appear disarmingly ordinary to the uneducated eye, but quickly take on a special sense of mystery as he talks about them. We shall continue to wonder about them, and the events in the Earth's past of which they speak.

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The Earth was still a fledgling planet of only about one billion years when remarkable geologic events were taking place. Virtually indestructible materials were being formed, crystals of zircon which, throughout the millennia to come, would subsequently undergo punishments unknown and unimaginable to men of today. Such materials still survive with their radioactive clocks set to tell us of their primeval origins. There are very few places on the present surface of the earth where rocks can be found containing crystals of such antiquity, and the Geological Society of Minnesota was privileged to have Dr. Jim Grant lead us on a field trip to the Minnesota River Valley where the oldest rocks now known on the North American Continent were uncovered by the torrents of glacial meltwater flowing down the Glacial River Warren.

The story he told us there opens 3½ billion years ago with an undefined beginning. The gneisses now found along this narrow slit in the Valley from Morton to Sacred Heart, and from Granite Falls to Montevideo are so old and so altered that geologists cannot be sure what they were originally. It is possible to imagine the pink and gray, swirly, granitic (quartzofeldspathic) gneisses with their dark amphibolite rafts and inclusions as having been subjected to a long cooking period, where some of the original materials could maintain something of their identity and some could not. Pink and gray appear to flow past one another, and around black, as if the rock mixture had very slowly stewed around for a long time in a hot, enclosed kettle to produce an interesting, if mysterious dish of gourmet geology.

The expert eyes of Dr. Grant could see these colored materials in terms of competency when subjected to high degrees of metamorphism, some remaining solid and others becoming softer, or even molten. He looks to see which minerals are present, and in what proportions, knowing the conditions of temperature and pressure under which they can remain stable. In his field work, he looks for relics of their former structure, such as vesicles, or crossbedding, or interlayerings of rocks of different compositions.

He needs to start with good geologic mapping of the area. with the former rocks long since changed to other rocks, a plan for mapping had to be devised. In the area from Morton to Sacred Heart he used a simple method. The pink and gray granite-like (quartzofeldspathic) Morton gneisses were categorized according to the amount of black amphibolite inclusions they contained and were called Unit A (with much), Unit B (with less), and Unit C (with little or none). These rocks exhibit the swirls and flowage lines, the sausage-like streaks and rafts, the stretched-out crystal forms of the building stone well known by architects as Rainbow Rock. There also is a fourth unit of biotite gneiss and amphibolite, Unit D, and these units A, B, C, and D appear to have been layered sequences, perhaps sedimentary, perhaps igneous. Because of their mineral assemblages, Dr. Grant prefers to think of them as having been igneous, but at least one layer, Unit D on the top, probably was a sedimentary graywacke. This unit in the nose of the Delhi synclorium, situated innocently in the pasture of the Breikreutz farm, contains a mixture of rocks with diagnostic mineral assemblages that offer good evidence for the metamorphic conditions occurring throughout the entire area. There is yet another plutonic type of rock body intruding into these layered rocks, the Sacred Heart quartz monzonite.

The rocks found in the Granite Falls-Montevideo area are slightly different, though equally old and showing a similar history. There is a pink granitic (Montevideo) gneiss, a gray-black (hornblende-pyroxene) gneiss which occurs both as separate layers and as lenses within the pink (Montevideo) rocks, and another dark gray (garnet-biotite) gneiss, all exhibiting a very high degree of metamorphism. These all are cut by dike intrusions, and a pink plutonic intrusion of granite-like adamellite (quartz monzonite) also can be found.

About 2.6 to 2.7 billion years ago, the entire region experienced a cataclysmic metamorphic occurrence. All of the existing rocks suffered under extreme conditions of temperature and pressure, and were changed to their present textures and gneissic character. Most radioactive clocks in the minerals were reset. The layered rocks were