

NEWS

Geological Society of Minnesota

MINNEAPOLIS, MINNESOTA



FIRST CLASS



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RETURN REQUESTED

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GEOLOGIC PLAQUES

TABLET INSCRIPTION #24
Geology of Minnesota

TABLET INSCRIPTION #25
Geology of Minnesota

Moose Lake Region

Toward the end of the great ice ages about 10,000 years ago, the glacier, which had pushed its way along the trough of Lake Superior, retreated toward the northeast, and near Moose Lake crossed the divide between the Mississippi River and Lake Superior. When the lobe of ice was shrunken so that it lay wholly within the rim of the lake basin, Glacial Lake Nemadji was formed around the southwest margin of the ice.

The earliest outlet was at this, the western end, when the lake stood 523 feet above the present level of Lake Superior and nearly reached the elevation of the state hospital in the distance. During the centuries of drainage from here through the Moose River to the Mississippi this channel was eroded downward to the present level. When lower outlets for the Lake Superior basin were opened, the Moose River valley was abandoned as an outlet, and this part of the ancient water-course became the basin for Moosehead Lake.

Location: Wayside parking area, near south edge of village on the shore of Moosehead Lake.

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St. Louis River

The broad valley of the St. Louis River, visible from this point, is a western extension of the Lake Superior basin. The rounded banks are composed of red clay deposited in Glacial Lake Duluth during the centuries in which it flooded the St. Louis Valley. The scenery at this time is due to the partial removal of that clay by the river as the lake surface fell to its present level.

The St. Louis River today is the result of stream piracy and now comprises parts of two river systems. The Prairie River, which rose 30 miles north of Two Harbors, ran southwest from its source to the Mississippi, while the turbulent St. Louis flowed southeast to Lake Superior. The St. Louis River, falling rapidly in its steep descent, extended itself by erosion toward its source until it intercepted the Prairie River and, by an act of river piracy, diverted the headwaters of that stream to its own channel. The main stream of those headwaters is now the Cloquet River.

Location: Wayside area on Highway 23, eastern edge of Jay Cooke State Park, originally known as Wrenshell Overlook.

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1972

FIELD TRIPS*

MINNEAPOLIS LOOP DISTRICT

(E.H. Brown, trip leader)

Sunday, June 4

To view various structures including details of geological and architectural interest in and about the loop district in connection with many changes made in the redevelopment projects.

Departure Time: 9 A.M.

Meeting Place: Univ. of Minn. Hydraulics Laboratory, Third Ave. S.E. and Main St. S.E. (Old St. Anthony Village).

Special Notes:

1. We will travel by bus (Jefferson Lines).
2. Bring noonday lunch--we will picnic in a city park.
3. Wear easy footwear--walking will be necessary. Bring rain gear, if weather so indicates.

Collateral Reading:

U.S.G.S. Bul. 663, "The Structural and Ornamental Stones of Mn.", Oliver Bowles.

Minn. Geol. Survey Bul. 25, "The Architectural, Structural and Monumental Stones of Minn.", Geo. A. Thiel & Carl E. Dutton.

Reservations required

THE BLACK HILLS, S.D.

(Richard Bartels, Trip Leader)

June 14-18

Special group camping facilities are being arranged for. Motels must be scheduled individually. Call Bob Gunville (788-1421) for a list of accommodations, if you need one.

A preliminary meeting will be held to discuss all arrangements, and to give background material on the geology of the area. All people who have signed up will be notified about the time and place. Contact Bob Gunville if you wish to go on this field trip but have not yet signed up.

*There will be a nominal daily fee for all field trips.

NORTH SHORE AND RELATED AREAS

(Gerald Webers, trip leader)

July 8-9

Departure Time: 7:30 A.M.

Meeting Place: Macalester College Geology Building (one block north of St. Clair Ave. on Macalester St.)

Special Notes:

1. We will travel by car caravan, making stops along the way.
2. Camping is available at Jay Cooke State Park.
3. Overnight accommodations at the U.M.D. dormitories are being arranged for by Bernice Tepel (699-1793). The cost will be \$4 per adult and \$2 per child.



MINNESOTA PALEOZOIC SEDIMENTS

(Dr. Webers, trip leader)

Sunday, July 23

Departure Time: 8 A.M.

Meeting Place: Macalester College Geology Building (see address above)

This will be a one-day trip by car caravan. Bring a picnic lunch.

Trip Assistant: Ethel Shimek

MINNESOTA PALEOZOIC SEDIMENTS (CONT.)

(Dr. Webers, trip leader)

Sunday, July 30

Departure Time: 8 A.M.

Meeting Place: same as above

Same information as above.

news Highlights

The 1972 Rosters were distributed at the Spring Banquet. If you did not receive yours, contact Marjorie McGladrey (631-0237).

The next Board meeting has been scheduled for Tuesday, May 23 at 7:00 P.M. in the offices of Mr. Sam Mayo, Setter, Leach and Lindstrom, 133 Foshay Tower, Minneapolis. All members are cordially invited to attend.

Again this year, the Geological Society of Minnesota will have a booth at the Minn. State Fair. Ethel Shimek is in charge of arrangements, and is looking for people to help man the booth. If you think you might be able to give some time to this project, please call her (823-0169).

Dr Paul Sims, general chairman of the Geological Society of America's professional meeting, to be held in Minneapolis next November, responded to our Society's offer to assist at their upcoming conference. When his coordinating committee next meets, he will indicate to them our willingness to help.

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YOU WILL BE MISSED!

When Paul and Beverly Vogt announced that they would be moving to Oregon, it felt like an earthquake tremor reverberating throughout the membership of the GSM. Fulfilling their duties as president, board members and committee chairmen have been only some of the ways the Vogts have served the Society. Their enthusiasm for geology, their ideas for interesting directions in which to move, their strong leadership and their untiring energy devoted to GSM projects have meant a great deal to all of us. It will not be easy to fill the vacuum being created as they leave.



Paul and Bev, we all want to say thank you for all you have done, and for all you have meant to the Society. We aren't really saying goodbye, for we expect to hear from you from time to time, and you will be hearing from us. We do want you to know just how much you are appreciated. Good luck on all your new endeavors.

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NEW PROGRAMS NOW AVAILABLE

Programs for 1972-73 are available for distribution now. Two copies are included in this newsletter. One copy is for your use. Please give the other copy to a friend who might be interested in the Society's activities. The best way to attract new members is by word of mouth, and you are the one to do the job.

Next year's lectures will be given by Dr. Webers, and by Dr. Henry Lepp, Chairman of the Dept. of Geology at Macalester College. Films on geological topics will be added to the program, and will be presented at 7:00. Labs will again be held on alternate Monday evenings. The year promises to be a stimulating one.

President's Letter

It is with deep regret that I am resigning from the Geological Society of Minnesota; however, I am leaving the community for my new position in Oregon.

It has been a real pleasure to share with you the various activities of the Society; and the Society will, I know, through the strength of its members, continue to seek out and present excellent lectures, field trips, and other activities.

The program brochures for the 1972-73 year are now available, and two copies are included with this Newsletter. Additional copies of the program are also available; and I encourage your "missionary" efforts in informing persons interested in learning more about earth sciences, and in aggressively promoting the benefits and enjoyment of the Society.

The field trips planned for the summer have had the greatest response and interest which has been shown in the last several years. Also, the meeting of the Geological Society of America, from November 13-15 (in which our Society has been invited to assist), will commemorate 100 years of geological activities in Minnesota.

Beverly and I will certainly miss the Society; and we wish each and every one of you continued success through the Society.



Paul J. Vogt

NEW MEMBERS JOIN GSM

We would like to welcome our newest members into the Geological Society. They are:

Donald J. Langan
4426 Chowen Ave. S.
Minneapolis, 55410

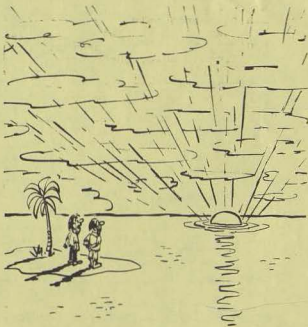
Mr. & Mrs. Wm. Henningsen (Carole)
7044 Portland Ave. S.
Minneapolis, 55423

Beverly Anderson
1205 S. 7th St.
Minneapolis, 55415
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CORRECTION

Since the last newsletter was published, we have learned that Lora Norenburg Hoppe was not a member of the GSM. Her sister, Winnie Norenburg, was a member. The property given to the Hennepin County Park Reserve District and to the Nature Conservancy had been her family's homestead.

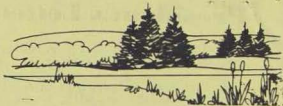
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"You're right -- It usually goes down over the horizon"

AUGUST 8 PICNIC

On the Calendar



Save August 8 on your calendar for the Society's annual picnic. This year it will be held at Birch Lake, four miles north and four miles west of Elk River. Paul Stor has offered us the use of this camp property belonging to his church. The land contains many features of geologic interest, and interpreting them will add to the day's enjoyment.

GREAT VACATIONLANDS--GLACIER NATIONAL PARK

by Marcia Gunville

Do you like to take your experiences with a sharp sense of excitement? Then go to the mountains. And if you want to pick some of the most spectacular in the U.S.A., go to Glacier National Park. Glacier Park has so much to see and do that any vacation there, no matter how long or short, cannot fail to be an adventure.

If driving through superlative scenery is for you, you will be delighted. Excellent roads both parallel the ranges and cross over the passes. They wind up and down over the glaciated hills and valleys, crossing the old moraines, cutting through grasslands and forests filled with the many flowers so typical of each.

On Going-to-the-Sun Highway, you can literally climb a mountain from the comfort of your car. It is one of the great roads of the world, taking you past beautiful mountain lakes, through the tall forests of the lower elevations, on up in hairpin turns with always more exciting vistas of mountain meadows and glacial valleys. You pass spectacular streams and waterfalls, moving still higher to where the air is harsh and trees are dwarfed, and finally up to Logan Pass, sitting atop the Continental Divide. If it is early in the season there, you have an opportunity to get out of your car to inspect the glacier lilies coming through the melting snow of this lovely alpine meadow. Or you can take a short walk down one of the many trails leading from the parking area. The views from the top--the many miles of rugged peaks, glacial cirques, the tiny lakes, and distant snowfields and glaciers--defy description. Descending again on the other side, you will sense the excitement of the climber as your road clings to the sheer cliff of the mountain face on its way down to the streams, the deep cedar forests and the big lake of the McDonald Valley.

Perhaps you, like our family, prefer the slower, more intimate pace of hiking. This is truly the way to feel the sharpened sense of beauty all around you. Glacier Park is a hiker's paradise, and the trails are designed for every level of hiking ability. There are numerous short, self-guided nature trails. You can hike for one or two hours over relatively easy country, or you can scale mountain cliffs by rope. Some trails go over fairly level terrain, and others rise several thousand feet. Most are made for easy walking, designed for the use of pack animals. Every day park rangers accompany groups of hikers, interpreting the area as they go. Or you can go as we do, with our books in our packs, setting our own pace and doing our own interpreting.

Glacier National Park (cont.)

* We like best to backpack, taking all our needs for five or six days and roaming wherever we please. Time places no restrictions upon us this way. At the end of the day we can stop at any of the small campsites available. We don't have to leave the prettiest places.

There are many things that make Glacier Park outstanding to us. Such spectacular beauty has to be digested slowly. The colors of the rock formations is obvious. These beds of yellow, red, blue and green limestones and argillites, along with the Precambrian algal formation, the dark basalt band, and various dikes and sills all make the high-thrusting rock walls a rainbow of colors. It is exciting simply to see these walls. It is more exciting to learn to understand what formed them. The work of glaciers is obvious everywhere. There are a few glaciers still at work, and you may visit them by trail. But the present topography is the result of tremendous glacial forces. For this reason, the park is well named. To contemplate this glacial power is an overwhelming experience. You can only try to imagine how much strength it took to carve the knife-edged aretes and horns, the hanging valleys and huge cirques, the immense U-shaped lake-studded valleys. Boulder erratics, some the size of a room, have been carried to unlikely places, the huge moraines were pushed many miles out onto the prairie.

Then there is the delicate, exquisite beauty of the flowers. Glacier Park is always a flower garden, an ideal place to learn about wildflowers. Different plants will be in bloom at various elevations, depending on the "season" there. They are of all colors, all sizes. Some grow best in wet, shaded areas, others on drier hillsides. Some fill the high mountain meadows with riotous color. Some of the prettiest have to be hunted for. If you have ever visited the park during a beargrass year, you will not forget this, the park's official flower. It thrusts its blossom three to four feet high like a large, white plume made up of tiny, lily-like flowers.

Trees and shrubs, too, are interesting to learn about. If you are going up in altitude, you will notice the different life zones. Plants typical of northern United States are limited to lower elevations. The Canadian zone, like most of the heavily forested parts of Canada, is more typical. Higher on the mountain you will find the Hudsonian zone, dwarf-type species and smaller individual plants like those found around Hudson's Bay. And at the top of the mountains is the Alpine zone, or the tundra, typical of land above the Arctic Circle. In a single day the hiker can travel through all of them, and he will sense what it must be like in widely separated parts of the continent.

If you want to know something about the animals of Glacier Park, it is well to take binoculars along. Large animals seldom come very close to man. The small ones do, however, and become great friends, or pests, depending on your point of view. One interesting small animal which we seldom see but always hear when hiking through high country is the pica, a tailless member of the rabbit family. It lives at timberline, and always calls out a loud, high-pitched "eep" when we pass by. Sometimes we see its bundles of dried grass poked under rocks. The "little haymaker" is preparing its food for storage. Once, after hiking across a high pass, we had an opportunity to observe a white mountain goat at fairly close range, and once in early fall, we saw a herd of bighorn sheep coming down to the valley for the winter. Mule deer are common, and if you are lucky you may see the big American elk. We did once, across a wilderness lake having a drink of water. We have never seen grizzly or black bear at Glacier Park, though they both live here.

Glacier Park is well worth all the time and effort you can spend there. Try not to hurry your stay too much. You will be the richer for whatever you can invest.

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GEOLOGY OF GLACIER NATIONAL PARK

by Bob Gunville

The valley glaciers of the Pleistocene ice age carved the peaks, cut and plucked the stream valleys whose cascading basins now contain the alpine lakes so notable at Glacier Park. This work of the ice, aside from giving the present form of the mountains, has opened for us, like pages in a story book, a view into the Precambrian past.

These colorfully banded strata were laid down during the late Precambrian, 0.8 to 1.2 billion years ago. Shallow seas (belt seas) filled a north-south trough with sediments. The floor of these seas evidently subsided about as fast as the sediments accumulated. Evidence, which is fun to examine, indicates that the belt seas were continually shallow, sometimes at sea level, other times deeper, yet thousands of feet of sediments were deposited.

Imagine this elongated sea, perhaps 100 feet deep, surrounded by barren, lifeless land. When conditions were right the water teemed with primitive life--single-celled colonial plants called algae. Their life processes contributed oxygen to the atmosphere by photosynthesis and precipitated calcium carbonate on the surfaces of their colonies. The colonial patterns were preserved at stromatolites or fossilized algae. Isolated colonies are scattered throughout the thick limestone beds and are easily accessible, but one only needs to look up to the nearest mountainside to see, high on the wall, a ribbon of algal stromatolites.

As conditions varied in the belt seas, the water became shallower. Well weathered clay materials settled to the bottom, and at times were exposed on the surface; see the abundant mud cracks and ripple marks now preserved in the red and green argillites (similar to clay-shale) exposed on the sides of the mountains everywhere. These striking bands of red rock are a good example of the "red beds" that began to appear around the world between 1 and 2 billion years ago, and have recurred ever since. This is an indication that oxygen, so necessary for animal life to develop, was now building up in an amount sufficient to oxidize the iron present in the rocks, readily coloring them. It is these purplish-red to red to green banded rocks which make Glacier Park so colorful. Further, as the photosynthetic algae and other primitive organisms of the sea steadily increased the oxygen content of the atmosphere, two crucial turning points for higher life were made possible. 1) The sun's deadly ultraviolet rays were screened by a new, protective ozone (O₃) layer, allowing life to crawl out of the sea at some future time, and 2) the oxygen (O₂) level of the atmosphere was increasing to the critical point where more advanced respiratory life could develop. Respiration is a vastly more efficient process for producing energy and all higher forms of animal life depend upon it.

It remains to describe how these ancient sediments, deep in the ground, laid down in the belt seas and long since covered by younger sediments are now towering thousands of feet in the air as the mountains of Glacier National Park. Years, centuries, millenia passed until in relatively recent geological time (about 65 million years ago in early Cenozoic) this region was subjected to inconceivable stresses from the southwest. These pressures were released to some extent by a major thrust-fault deep underground, allowing these ancient beds to be thrust as a single block almost horizontally over the much younger and softer Cretaceous beds, now beneath. This is the famous Lewis Overthrust, which can be traced at the eastern base of the mountains today.

After regional uplift and consequent erosion, which stripped the younger layers above, these mountains were sculptured to their present form by the Pleistocene glaciers, Glacier National Park of today.

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