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# THE MINNESOTA GEOLOGIST

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OFFICIAL BULLETIN  
OF

THE GEOLOGICAL SOCIETY OF MINNESOTA

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Vol. XVIII

Fall and Winter 1964

No. 3

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"We, here on earth have all the stuff  
Of Paradise, we have enough,  
We need no other stones to build  
The stairs to reach the unfulfilled,  
Enough of marble for the floors,  
Enough of ivory for the doors  
Enough of cedar for the beam  
And dome of Man's immortal dream.

"Here! On the path of every day  
Here! on the common human way,  
Is all the stuff we need to take  
To build a Heaven, to mould and make  
New Edens: Ours the stuff sublime  
To build Eternity in Time."

Edwin Markham

FIELD TRIPS AND PICNIC  
GEOLOGICAL SOCIETY OF MINNESOTA

1965

DATE: Sunday, July 25, 1965

PLACE: St. Cloud, Minnesota

LEADER: Mr. Gerald R. Alquist

Objectives: --to study--	--to observe--
Granite ages	Hard rocks
Ice ages	Loose sediments
Flood erosion	Marks and evidences of flood

Leave St. Paul Bus Station at 8:00 A.M.; Mpls. Bus Station at 8:30 A.M.  
(We may stop at Anoka for a look at some rocks, courtesy Mr. Heilman).

Arrive St. Cloud about 10:00 A.M. Bring lunch and coffee for stop about noon.

Leave St. Cloud about 4:00 P.M.

Arrive Mpls. about 5:30 P.M.; St. Paul about 6:00 P.M.

APPROXIMATE COST: \$4.50 per person

MAKE RESERVATIONS WITH THE HAVILLS: PHONE 588-7136 between 10:00 A.M. and 9:00 P.M.  
before Friday evening.

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ANNUAL PICNIC BY PRIVATE CAR

DATE: Sunday, August 15, 1965

PLACE: Kings' place

TIME: Any time after 11:00 A.M. Bring your own tables, chairs, lunch, coffee, and jokes.

DIRECTIONS: From Stillwater take Highway 95 north approximately 15 miles to Copas. From Crabtree's Kitchen (a cafe) proceed north 1,000 feet and turn right into the Kings' driveway.

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Field trips in September (quartzite in southwestern Minnesota) and October (North Shore or Brainerd area) are in the planning stage. Mr. Brown will probably give us another trip around Minneapolis in cool weather to study and observe structural stones.

GEOLOGICAL SOCIETY OF MINNESOTA

EDITORIAL STAFF\*\*

Mrs. Marion S. Skahan,  
500 Ridgewood Ave., Minneapolis 3, Minnesota

Acting Editor

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\*Deceased

MEETINGS: October to May, inclusive, 7:30 P.M., every second and fourth Monday in Ford Hall, University of Minnesota, 17th and Washington Avenues S.E. Visitors welcome.

FIELD TRIPS: May until October, inclusive.

ANNUAL DUES: Residents in a 50 mile radius of the Twin Cities, \$5.00, plus \$2.00 additional for husband, wife, or dependent family members. Students and non-residents, \$2.00.

AFFILIATE MEMBERS: Midwest Federation of Mineralogical and Geological Societies  
and  
The American Federation of Mineralogical Societies

\*\*It is with regret that we advise of the removal from Minneapolis of Mr. and Mrs. Elmer Koppen and Miss Pat Summerfield, former Editors, which necessitated their resignations. Mr. and Mrs. Koppen have carried the responsibility for many years and have done a fine job, for which they merit our appreciation and thanks.

STANDING COMMITTEES:

Constitution and By-Laws	Miss Martha M. Peterson, Chairwoman
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Field Trips	Mr. Elmer Brown, Chairman Mr. George Rickert, Assistant

\* A list of informational books on Geology is included in this bulletin.

\*\* Cards will be issued by Mr. Havill on payment of dues. Early payment will be appreciated.

\*\*\* Contact has been made with radio stations and local newspapers regarding publicity for our program.

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The exhibit of the Geological Society of Minnesota, which was made in the windows of the Northwestern National Bank of Minneapolis from September 8-22, created quite a bit of favorable comment, which we hope will have a long range effect in stimulating interest in the study of Geology. Three panels 4' x 8' each formed the background; the first with a graphic illustration of the geological strata along the Mississippi River at the Twin City Brick Plant near Cherokee Park, the central panel with a geological map of Minnesota with key, and the third panel with a geologic time scale of the world. The display consisted of various Minnesota rocks in the first section, polished Minnesota granites and agates in the middle section, and fossils of the different periods of the world in the third section. It gave a comprehensive picture of the interesting features of geologic strata and rock formation.

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The Society had a quantity of books stored in the basement of the home of Mr. and Mrs. Koppen. These books had been donated to the Society by various members. When the Koppens moved from the city, the books were temporarily transferred to the Isaak Walton League Club House at 8816 Lyndale Avenue N. As it was impracticable to keep them there for reference purposes, it was decided that they should be sold to interested members of the organization. An auction was held on September 6, 1964, at the club house; and a total of \$72.25 was realized from the sale, \$19.65 of which was for rocks and a bird house donated by George Rickert, the amount of which was generously contributed to our Society. It was the best solution for the book problem as storage space for them was difficult to find and there was the possibility of deterioration and obsolescence. In the sale of books to members, the people will appreciate and enjoy the wealth of geological information they secured at a moderate cost. To George Rickert we owe our thanks and appreciation for arranging the auction.

A MESSAGE FROM YOUR PRESIDENT

With my election to the office of President in this Society, I gained a new set of problems, which were welcome because of the coming move of my only daughter and her family to California, where both she and her husband are teaching. The office was a challenge, and I wondered if I could be equal to the task; but gradually as problems unfolded, solutions followed wholly or in part, and my numerous doubts began gradually to be dispelled.

The main efforts of the Board were directed to the increase of membership. It has been my opinion that we have a remarkable organization in the Geological Society of Minnesota, which should be perpetuated so that its benefits and information can be shared by many who join now and others who follow us. In this process the Board will need the cooperation of each and every member in the group. An effort to interest friends and acquaintances in the opportunities for the study of earth science, geology, and rock composition should be rewarding in the interest and appreciation shown by those who become members.

Members can also be of invaluable assistance by volunteering a friendly welcome and greeting to visitors and a willingness to be of help in answering the questions of new members. We need help on our various committees and will be happy to have any of you volunteer in some way. It is the hope and intention of your Board to sustain your interest and enthusiasm in the program and field trips of the Society. With some assistance and consideration this plan may be assured to the satisfaction of all concerned. Your suggestions and help will be appreciated.

I regret that I will be absent from the middle of December to the first part of March, visiting my family in California; at this time, therefore, I would like to extend my best wishes to all members for a merry Christmas and a happy New Year.

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JUNE 1965 FIELD TRIP

In connection with our planned eastern field trip, if we are to secure accommodations in the New York area in June, we have been informed that reservations must be made immediately for the group. Accordingly, we have proceeded with a tentative itinerary. We are planning our tour to start on Saturday morning, June 12, and end on Sunday, June 27, giving us approximately 16 days in the field.

We will go first to Madison, Wisconsin, in the region of old Lake Michigan; then to St. Joseph, Michigan, to the famous sand dunes area; then to Detroit to visit the salt mines and chemical plant; then to Buffalo where we will make a stop at Niagara Falls and go on through the spectacular Finger Lakes Region to Albany; then down the Hudson Cascade area to New York, arriving there on the sixth day. We will remain in this locality four nights, spending three days at the World's Fair. From there we will cross a corner of New Jersey into Pennsylvania to visit hard coal mines, then go through Ohio into limestone country, through Indiana and Illinois into the lead, zinc and coal mines, and then through Iowa and back home.

We are contacting Geology departments in the universities of states through which we will travel for information regarding points of geologic interest. It is our intention to make this trip interesting--geologically, scenically, and historically. Please keep these dates open, and tell your friends about our trip so that we may have a full bus.

Field Trip Committee



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THE MINNESOTA GEOLOGIST

No bulletins were published in 1963. Early in 1964 one issue was circulated, followed by a second issue a few months later.

When we were notified by the Koppens, our former editors, of their contemplated move from the city, it was realized that all books, records, paper stock, and equipment such as a typewriter and copy machine--in fact, all material and property of the Geological Society--would need to be moved. We immediately began to search for a new place to store these materials and equipment. Some of the books, records, and rocks were moved to the Isaak Walton League Club House (8816 North Lyndale Ave.), and the equipment, paper and supplies were moved to 5321 Chowen Ave. S., the home of Mrs. Robert C. Jensen, adjacent to the home of Mr. Engen. Mrs. Jensen will be cutting the stencils and making copies of the bulletin.

Shortly after the Koppens left, our newly appointed editor, Miss Patricia Summerfield, informed us that because of a change in employment she was leaving the Twin Cities and gave notice of her resignation, leaving us without an editorial staff.

According to the former staff assistants on the Board, we did not have the "know how" to operate the copying equipment, so our notices to members, as well as field trip notices and programs, had to be produced with outside help. Within the last week a representative of the copy equipment manufacturer checked and repaired it and showed Mrs. Jensen and Mr. Engen how to operate it.

Collection and preparation of material for the bulletin has taken until the last week of November, and it was delivered to Mr. Engen for stencilling and copying by Mrs. Jensen. We are now hopeful that the bulletin will be ready for distribution early in December. It will be noted that it is numbered Vol. XVIII--Fall and Winter, 1964--No. 3, to correct the former numbering irregularities and give the bulletin consecutive order. We regret the delay in issuing the bulletin, but the conditions contributing to it were beyond our control.

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NEWS NOTES\*\*

Because of Miss Patricia Summerfield's move from the city and her consequent resignation as member of the Board, Miss Martha M. Peterson was appointed and elected at the Board meeting on November 16, 1964, to fill the unexpired term of Miss Summerfield.

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Congratulations to a member! An avid collector of rocks and fossils, Mr. Louis Eggerichs, a new member of our Society, was recently awarded a blue ribbon for the fine ammonite fossil he found and submitted at the meeting of the Minnesota Mineral and Gem Club.

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The Bloomington Mineral Club invited the Geological Society of Minnesota to participate in its display and meeting at Southdale on September 13, 1964. We were assigned a table for Sunday afternoon, and our Society was ably represented by Miss Wilma Monserud and Messrs. Clyde Case, J. O. Engen, and William F. Schroeder.

IN MEMORIAM

We are sorry to announce the death during recent months of three of our members who have been our friends and fellow geology students for many years. They are:

Mrs. Henry L. Woltman, step-mother of Miss Marie Woltman, wife of the late Mr. H. L. Woltman, and formerly wife of Mr. Ignatius Donnelly. Mr. Donnelly was a particularly outstanding legislative and political figure, as well as a renowned orator and the author of several books, in the later years of the nineteenth century. Mrs. Woltman will be missed, for hers was a pleasing personality. She died on September 2, 1964.

Miss Marie Woltman has also suffered another loss in the recent death of her brother, Dr. Henry W. Woltman. He was the world's pioneering nerve specialist who died on Friday, November 27, at the Mayo Clinic in Rochester, after collapsing from a heart attack. He was the clinic's Neurology and Psychiatry head from 1930 to 1954. He was a senior consultant until his retirement in 1956.

Dr. Woltman, age 75, was born at Westfield, Wisconsin, and graduated from the Minnesota Medical School in 1913. He went to Rochester in 1917 and was appointed to the clinic staff in 1919. Friends also knew him as a cutter and polisher of fine stones and a fine cabinet maker. He was a member of the Geological Society and of the Mineral Club.

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Mrs. Anna Meuller Ermert, sister of Mrs. Helene M. Becker, died at the age of 90 at Dortmund, Germany. From 1950 until 1955 when she left for Germany, she was an enthusiastic participant in many of our field trips and lectures. She died on June 26, 1964.

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Mr. Harry Sommers, for many years an active member of our Society, passed away on April 26, 1964. Mr. Sommers was a devoted student of our subject, and when he was persuaded to lead a field trip his interest knew no bounds. Each member of our Society recalls with gratitude the many annual picnics held upon the invitation of Mr. and Mrs. Sommers at their attractive suburban home in North Hudson. Mr. Sommers' genial and kindly personality will be remembered by all who knew him.

Our deep sympathy is extended to all survivors.

There is a destiny  
that makes us brothers  
None goes his way alone;  
All that is sent  
into the lives of others  
Comes back into our own.

Edwin Markham

GEOLOGICAL SOCIETY OF MINNESOTA

FIELD TRIP

May 24, 1964

Leader--Wm. F. Schroeder

Decorah Shale--Twin City Brick Yard  
Fossil Falls--Minnehaha Park

The Decorah Shale formation is located in the east bank of the Mississippi River at the foot of Cherokee Park, St. Paul, and within the confines of the Twin City Brick Company yards. The road leading to it is by way of West Water Street, passing over the alluvial deposits of the old River Warren. In the river bank are well-defined exposures of St. Peter sandstone; above it some remnants of Glenwood shale and Platteville limestone are to be found. At the place where we saw the Decorah shale these are hidden underneath the waste material of the brick yard's operations. These shale beds of the Decorah formation consist of fifty feet of vertical exposure, greenish in color, with intermittent exposures of limestone. The Decorah shale, a mixture of mud, sand, limestone, and silicates of aluminum, was deposited in the warm waters of the Ordovician seas some 450 million years ago. It is very fossiliferous. Corals, bryozoa, brachiopods, gastropods, crinoids, and some trilobites can be found here in great numbers with very little effort, particularly in the waste dumps.

The top of the Decorah shale beds is covered by glacial drift of variable depth.\*

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The abandoned falls (Fossil Falls) are located in the northwest corner of Minnehaha Park.

The Mississippi River in its early history many times changed its channel, each time veering eastward. This again took place shortly after the starting time in the building of what is now St. Anthony Falls. To begin with, when the volume of water carried by the River Warren began to diminish and the water carried by what is now the Mississippi began to increase, a ledge began to form at the juncture of the two structures, due to the difference in altitude of the beds in the two streams; that of the River Warren was lower and that of the Mississippi was higher, a difference of approximately 40 to 60 feet. The waters of the Mississippi at that time were flowing on the Platteville limestone, while those of the River Warren on St. Peter sandstone made a combination ideally suited for a vertical falls. Again a shift in the channel by the water flowing in the Mississippi was made, again eastward. The volume of water increasing in the Mississippi by melt waters of the receding glaciers made progress greater in the new-found channel by flowing over layers of rocks subject to faster erosion, resulting in abandoning the old channel and with it the old falls.\*\*

\*Reference: G. R. Stauffer, G. A. Thiel, The Paleozoic and Related Rocks of Southeastern Minnesota, Minnesota Geological Survey, Bulletin 29, 1941.

\*\* Reference: George M. Schwartz, Geology of Minneapolis, Bulletin No. 27.



GEOLOGICAL SOCIETY OF MINNESOTA

FIELD TRIP

June 21, 1964

Leader--Wm. F. Schroeder

Water Conservation  
Hutchinson Area Magnetic Survey

The purpose of this trip was to call special attention to the lowering of the water level and the disappearance of the storages of surface waters in the streams and lakes to the west and south of the Twin Cities. The route taken started at Hennepin Avenue and Lake Street, continuing on Minnetonka Boulevard to Lake Minnetonka, to Highway 101, through Wayzata, then on Highway 19 to Mound, on to Watertown Road and Winsted, then on Highway 60 to Lake Hook, center of the magnetic survey.

Lake Minnetonka, with an average water surface area of 22 square miles and a depth of 105 feet at its deepest point, had at the time of the field trip been reduced to approximately 18 square miles of surface area with a maximum depth of less than 100 feet.

In 1951 the flow of Minnehaha Creek at the Government check point at Minnetonka Mills was 300 cubic feet of water per second. This year it is completely dry except during a prolonged wet spell or in the Spring run-off due to melting snow. The same holds true of the smaller lakes such as Winsted Lake, Waaletall, Hyde, and Waconia--in fact, every lake in Hennepin, Carver, and McLeod counties.

The Crow River, south fork, and Buffalo Creek, whose banks were once dotted with springs flowing the year around, now have all disappeared, and the flow of water in stream beds has been reduced to a slimy trickle. Were it not for the sewage disposal plants built along the banks by the cities and villages bordering the streams, very little water would flow in them, except for intermittent drainage due to rain and snow melt water.

This loss of both surface and underground water can be attributed primarily to the building of drainage ditches, tiling and other possible means for a rapid run-off, fast evaporation due to the destruction of coverage such as weeds, grass, brush, and trees. Underground waters are also being depleted by pumping, particularly for the air conditioning systems in large cities of Minneapolis and St. Paul. If these depletion methods of our natural water supply are not checked, serious water shortage will develop in the not too distant future.

At Hutchinson in McLeod County we followed and studied the magnetic survey of recent date. We discussed the future of the mining possibilities that may lie buried beneath the glacial drifts, particularly in the vicinity of Hook Lake and Lake Emily, a short distance north of Hutchinson. This report of the magnetic survey of McLeod County under the direction of Dr. P. K. Sims and Dr. G. S. Austin of the University of Minnesota was released in 1963.

We also saw and discussed samples of the layers penetrated in the drilling of the city well at Glencoe. A table showing depth and thickness of these layers follows:

Water Conservation, Hutchinson Area Magnetic Survey, cont.

	Depth in Feet	Thickness in Feet
Pleistocene Drift	0- 354	354
Paleozoic Dresbach Formation	354- 544	190
Precambrian Hinckley Formation	544- 936	392
Fond du Lac Formation	936-1075	139
Sioux Quartzite	1075-1545	470
(No Sample)	1545-1640	95

Altitude of collar 1897 feet, and total depth 1,640 feet from the well log at Glencoe, 16 miles to the south. With the same formation possibly existing in the area of the magnetic anomaly, it may present some hint what to look for. However, core drilling in the area will give us the true story.

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ANNUAL PICNIC

Our annual picnic was held on Sunday, August 2, at the home of Mr. and Mrs. Harry Sommers on the St. Croix in North Hudson. About 60 members came to enjoy the generous hospitality of our gracious hosts.

Mrs. Linda Bennit, sister of Mrs. Sommers, gave a talk entitled "Following the Mississippi to the Gulf". It was based on the trip she and Mr. Bennit took in their cabin truck which they call "The Turtle." She described in interesting detail the numerous dams built along the river and the changing width of the channel at various distances; she also told about the difficulty they had in reaching a most distant point through the delta to the Gulf. Having been Geological Society members for many years, they were particularly alert to the geologic features of this challenging trip and were able to transfer some of their interest and enthusiasm to the group.

As usual, it was a delightful afternoon for our members, who expressed their appreciation of the cordiality of our hosts and the excellent sweet corn from their home garden.

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LECTURE PROGRAM--1964-1965, GEOLOGICAL SOCIETY OF MINNESOTA

1964--Oct. 12	Outline of Geological History of Minnesota	Dr. R. F. Sloan
Oct. 26	Geology of Northwestern Minnesota	Dr. R. F. Sloan
Nov. 9	Geology of Soil and Soil Formation	Dr. F. H. Arnesen
Nov. 23	Geology of Northeastern Minnesota	Dr. R. F. Sloan
Dec. 14	Gems and Precious Stones, Part I	Dr. T. Zoltai
1965--Jan. 11	Geology of Southeastern Minnesota	Dr. R. F. Sloan
Jan. 25	Geology of Southwestern Minnesota	Dr. R. F. Sloan
Feb. 8	Cretaceous Events in Minnesota	Dr. R. F. Sloan
Feb. 22	Gems and Precious Stones, Part II	Dr. T. Zoltai
Mar. 8	Outline of General Geology of Michigan	Dr. R. F. Sloan
Mar. 22	Outline of General Geology of Ohio	Dr. R. F. Sloan
Apr. 12	Outline of General Geology of New York State	Dr. R. F. Sloan
Apr. 26	Banquet	

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GEOLOGICAL SOCIETY OF MINNESOTA

FIELD TRIP

August 23, 1964

Leader--Mr. George Rickert

Moose Lake and Surrounding Area

Leaving St. Paul by way of Highway 61, we passed a large tamarack swamp at Bald Eagle. This swamp is glacial outwash country, becoming more undulated as we neared Forest Lake. As we came through Chisago City, we passed through the area of ground moraines, then crossed the Sunrise River, on which a large dam was built to hold the backwater for the propagation of more aquatic birds and animals. This dam has been destroyed a number of times by vandals. North of Harris, the country becomes more hilly, exposing additional ground moraines. The sandy soil has been changed to a clay soil, supporting hardwood trees.

At Pine City on the banks of the Snake River, exposures of basalt were noticed such as can be seen at Taylor's Falls. There is a large fault near Cross Lake. From Beroun to Hinckley the surface is slightly undulating, with large swamps which were at one time part of old Lake Grantsburg. We passed through Sandstone, where people once quarried sandstone for building. This sandstone is of Keweenaw age and was used in Minneapolis at the Great Northern Station and at Pillsbury Hall on the University campus. The area to the north consists of ground and terminal moraines covered with Jack pines.

We passed Coffee Lake at the most southern extremity of old glacial Lake Duluth. The Moose River once drained glacial Lake Nemadji which preceded Lake Duluth. We stopped and read the geological description on the tablet placed by our society at Moose Lake. From there we took a side trip, following the bed of old glacial Lake Duluth along the Soo Railroad tracks for about three miles. Returning, we went to Barnum for lunch.

After lunch we visited gravel pits northeast of Barnum, where we found specimens of various rocks indicative of the area, but very few agates. The Moose Horn River, which empties into Moose Lake, was a very large one in glacial times and formed many of the gravel beds in this area. Leaving the Moose Lake area, we travelled southwest to a gravel pit which was the highest point of old glacial Lake Duluth, where I gave a lecture on the glacial history of the area, from which we could see the great extent of the ancient lake bed.

During the Wisconsin state of glaciation, the glaciers from the Labrador center moved over the old shore lines of Lake Superior. Then when the ice began to melt, the waters formed a glacial lake known as Lake Nemadji. As this lake enlarged, it became known as glacial Lake Duluth, extending from Moose Lake to Keweenaw Point. The outline of glacial Lake Nemadji was west through Moose River and Kettle River, while the St. Louis River had been diverted toward Atkinson. Because of the ice blocks in Lake Superior, the outlet of Lake Duluth was changed to flow by way of the St. Croix and Brule rivers. As the glaciers retreated by melting, the Brule pass was abandoned for the lower outlets. The Nemadji River now flows through the old bottom of glacial Lake Duluth in red clay, much of which is now used for the making of brick at Wrenshall.

References:

- No-Saw-Je-Won, by Helen Martin.
- Geological History of Lake Superior, by Merrill.
- Geology of Duluth Metropolitan Area, by George Schwartz.
- Guide Book to Minnesota Trunk Highway No. 1, by Dr. Schwartz.
- Geology and Ground Waters of Minnesota, by Drs. Schwartz and Thiel.

GEOLOGICAL SOCIETY OF MINNESOTA

FIELD TRIP

October 31-November 1, 1964

Leader—Dr. Bert Carlson

A Study of the Granites of the Upper Minnesota Valley

After a passing look at the huge glacial erratics on Highway 7, south of Appleton, and lunch at Appleton City Park, the first stop of importance was at the Hunter Quarry a few miles east of Milbank, South Dakota. This is a granite quarry, and the predominant mineral is a potash feldspar. The granite is dark red to purple in color, the crystals of moderate size. The main interest at this quarry is the smooth unweathered original erosion surface. At this particular site the Cretaceous deposits were stripped off by the ice, and glacial striae are plainly shown. There are diabase intrusions and many xenoliths of basalt are incorporated in the granite. Glacial till covers the area and, on this particular spot, rests directly on the granite surface. The till at the quarry is about 25 feet thick and sorted into small boulders at the bottom, grading into finer material at the surface.

No special stop was made at Ortonville, but the many outcrops in the area could be seen from the road. There are numerous examples of exfoliation on the old exposed outcrops. The granite for the Minneapolis City Hall was quarried at Ortonville. The quarried blocks were brought to the city in the rough and dressed at the site of the building.

A quarry south of Odessa shows a granite of moderate sized crystals, somewhat grey in color and grading into a granite gneiss. In this area the Cretaceous deposits are shale and interbedded sandstone strata, the sandstone being very friable. The shale here has weathered to a buff color containing many marine fossils and some shark's teeth. Cretaceous rocks are found mainly in the western part of the state.

The broad valley of the Minnesota River can be well observed from the road at many places where the road follows the river. From Ortonville to New Ulm the river has incised to the granite surface, much of the valley now containing thick river deposits. The tributary streams are deeply cut in. A stop at the confluence of the Redwood and the Minnesota Rivers showed us that the river is incised deeply into the granite. The Minnesota valley lies 100 to 150 feet below the upland plain.

At Granite Falls a side trip was made to the east side of the Minnesota River a few miles north of town, to study a double intrusion of basalt into the granite. The intrusion here is a few hundred feet wide, and in its center is a second intrusion of agglomerate about six feet thick. The broken inclusions in the secondary dike, averaging about three inches in diameter, are of the same material as the large dike, the incorporating material being light grey in color.

There is a clay pit a few miles east of Redwood Falls which has been worked for some years. Most of it is a fair grade of kaolin with stringers of dark grey clay and layers of coal a few inches thick. The clay is used locally for tile and brick. This clay pit was visited after it had rained the night before, so the group learned that wet clay can be very sticky and slippery.

A quarry at Morton showed us an example of granite gneiss. This is a beautiful veined stone that has been used in many buildings in the Twin Cities.

GEOLOGY REFERENCE BOOKS\*

Assistant Librarian: Mrs. Elsie J. Sacia

<u>Quiz-Me, Dinosaurs</u> , by Brenda Biram. A Junior Golden Guide. Published by Golden Press, New York.	Paperback	\$ .25
<u>An Illustrated Guide to Common Rocks and Rock Forming Minerals</u> , by David Allen and Vinson Brown. Published by Naturegraph Co., San Martin, Calif.	Paperback	.35
<u>The Crust of the Earth</u> , a popular introduction to Geology Edited by Samuel Rapport and Helen Wright. A Mentor Book.	Paperback	.50
<u>Rocks and Minerals</u> , by Herbert S. Zim and Paul R. Shaffer A Golden Nature Guide	Paperback	1.00
<u>How to Know the Rocks and Minerals</u> , by Richard M. Pearl Published by McGraw-Hill (Same book--A Signet Key Book)	Hard Cover Paperback	3.50 .75
<u>Fossils, An Introduction to Prehistoric Life</u> , by Wm. H. Matthews, III, Published by Barnes & Noble An Everyday Handbook Series	Paperback	2.25
<u>Handbook of Paleontology, for Beginners and Amateurs</u> Part I. "The Fossils" by Winifred Goldring (1950 ed.) Published by the University of the State of New York. New York State Handbook #9, New York State Museum, Albany, New York	Paperback	1.00
<u>From Galaxies to Man</u> , by John Pfeiffer. A story of the beginning of things. Published by Random House	Hard Cover	4.95
<u>Things Maps Don't Tell Us</u> , by Armin K. Lobeck. Published by Macmillan Co.	Hard Cover	4.95
<u>The Geology of the Great Lakes</u> , by Jack L. Hough Published by the University of Illinois Press Urbana, Illinois	Hard Cover	8.50
<u>The Earth We Live On</u> , by Ruth Moore. A Story of Geological Discovery Published by Alfred A. Knopf, 1956	Hard Cover	6.00
<u>Adventures in Jade</u> , by James Lewis Kraft. Published by Henry Holt & Co., New York (This book was privately published and may not be available.)	Hard Cover	?

\*Additional lists will be published in future Bulletins.



NEW MEMBERS:

We are happy to welcome the following new members to our Society:

Baas, Miss Mary Ann, 1015 Essex St. SE, Apt. 310, Mpls. 55414	336-1949
Brown, Elmer H., 5225 Zenith Ave. S., Mpls. 55410	WA2-2438
Carr, Gerald W., 1117 E. County Road C, St. Paul	IV4-5427
Case, Mr. & Mrs. Clyde R., Rt. 3, Box 30, Mound, Minnesota	GR2-2969
Challman, Mrs. Esther N., 1727 Laurel Ave., St. Paul 55104	644-2320
Eggerichs, Mr. & Mrs. Louis J., 3512 Zenith Ave. N., Mpls. 55422	JUB-4898
Galchutt, Miss Eleanor, 5750 Bossen Terrace, Apt. 3, Mpls. 55417	729-9583
Hallberg, Mr. & Mrs. Fred W., 2294 Commonwealth Ave., St. Paul 55108	MI4-6725
Holmen, Mr. & Mrs. Donald R., 3848 Quail Ave. N., Robbinsdale	KET-7014
Inakson, Theodore G., 4327 Fremont Ave. N., Mpls. 55412	JA9-7980
Mack, Mr. & Mrs. Robert F., 6439 Washburn Ave. S., Mpls. 55423	UN9-0529
Nordberg, John, 2628 E. 22nd St., Mpls. 55406	FE3-1834
Nutter, Miss Marjorie, 2421-3rd Ave. S., Mpls. 55405	336-7431
Randall, Mr. & Mrs. Edgar K., 1974 Palace Ave., St. Paul	699-7854
Roy, Jeff, 3836 Lyndale Ave. S., Mpls., 55409	522-3092
Savard William, 1571 Charles Ave., St. Paul	
Stephen, Miss Ruth, 1880 Lincoln Ave., St. Paul 55105	699-4033
Storr, Prof. Paul W., 1622 Thomas Ave., St. Paul	644-6209
Swanson, Mrs. Eve, 4951 Emerson Ave. N., Mpls. 55412	
Jensen, Mr. & Mrs. Robert C., 5321 Chown Ave. S., Mpls. 55410	927-5744

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CHANGE OF ADDRESS OR TELEPHONE NUMBER:

There is a change of address or telephone number which should be noted for the following members:

Anderson, Mrs. Olga A., 1985 Grand Ave., Apt. 208, St. Paul	699-6675
Becker, Mrs. George R., 508 Humboldt Ave., Apt. 3, St. Paul	225-4036
Bukofzer, Ernest, 5552-40th Ave. S., Mpls. 55417	721-5880
Cooper, Mrs. Edna, 730 E. 16th St., Mpls. 55404	338-0437
Fritter, Mrs. E. G., 215 St. Mary Ave. S.E., Mpls. 55414	331-5701
O'Leary, Mrs. Eve, 1793 W. Minnehaha Ave., St. Paul 55104	644-0983
Rickert, George, 3246 Humboldt Ave. N., Mpls. 55412	522-5119
Sommers, Mrs. Harry, Hotel St. Paul, Room 501, St. Paul 55101	CA2-4114
Springer, Miss Frances M., 624 Summit Ave., Apt. 3, St. Paul	225-5129

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\* HOLIDAY \*  
 \* GREETINGS \*  
 \* FROM THE STAFF \*



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FROM THE STAFF  
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Alma Howard  
48 Blair Ave South  
Memphis, Tenn.  
55405 -

