



THE MINNESOTA GEOLOGIST

OFFICIAL BULLETIN
OF

THE GEOLOGICAL SOCIETY OF MINNESOTA

VOL IX

SPRING 1952

NO. 1

MORE SECRETS OF KNOWLEDGE HAVE BEEN
DISCOVERED BY PLAIN AND NEGLECTED MEN
THAN BY MEN OF POPULAR FAME.

Roger Bacon.

1211-1294.

G E O L O G I C A L S O C I E T Y O F M I N N E S O T A

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J. Merle Harris	Staff Member
Ruth Harris	Staff Member

The Society is devoted to the study of GEOLOGY,
Mineralogy, and Paleontology for their cultural value.

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MEETINGS : October to May inclusive, 7:30 P.M. every Tuesday not
a holiday, auditorium, Minnesota Museum of Natural History,
University of Minnesota, 17th Ave. S.E. and University Avenue.
Visitors welcome.

FIELD TRIPS : May until October inclusive.

Annual dues : Residents of Hennepin and Ramsey counties \$ 3.00
plus \$ 1.00 additional for husband, wife, or dependant family
members ; for students and non-residents, \$ 1.00.

AFFILIATE MEMBER

MIDWEST FEDERATION OF MINERALOGICAL AND GEOLOGICAL SOCIETIES
and
THE AMERICAN FEDERATION OF MINERALOGICAL SOCIETIES

* Deceased

EDITORIAL

ELECTION OF OFFICERS: At the annual dinner meeting, April 28, Helene M. Becker and John O. Engen were re-elected as directors for two year terms. Dr. Bert Carlson and Lucille M. Brewster were elected to succeed J. Merle Harris and Loretta E. Koppen as directors. Since the annual meeting the directors have met and elected Dr. Bert Carlson president, and Helene M. Becker vice-president for the ensuing year. Wesley S. Bender was re-elected secretary and J. O. Engen was re-elected treasurer. With your help the new officers look forward to another successful year for our Society.

PUBLISHING DATES: "The Minnesota Geologist" will be published semi annually, at least for this year. The first issue will be published in the spring following the election of officers and the second issue will be published in the fall at the start of the lecture season. Field trip notices will be sent out every month from May to October inclusive and all special notices will be mailed out during the lecture season as usual.

EARTH SCIENCE DIGEST: Many of you will remember the "Earth Science Digest" formerly published by Jerome Eisenberg. When Mr. Eisenberg joined the armed forces, the magazine was left without an Editor and Publisher. Recently five members of societies in the Midwest Federation purchased the assets and copy-rights of the magazine and formed the Earth Science Publishing Co. The first issue will be published in June and will contain an article on "Minnesota Geology" by Dr. George A. Thiel and articles by Hazen T. Perry and Wm. H. DeNeul. It will also contain news of Societies in the Federation. It was recently endorsed as the official bulletin of the Federation subject to the approval of the Midwest Federation Societies at the annual meeting in July.

STATE FAIR: Do you remember, those of you who helped man the geology booth at the State Fair last year, how much you enjoyed it? If you would like to help again this year or if you have any suggestions for the exhibit, please call Mrs. Helene M. Becker, MI 3519.

AUCTION: Please remember to bring material for the Midwest Federation auction.

In remitting your dues by mail, send them to Mr. J. Orval Engen, Treasurer, 5317 Chown Avenue South, Minneapolis 10, Minn.
Any other Society correspondence should be sent to Mr. Wesley Bender, Secretary, 1828 Chicago Avenue, Minneapolis 4, Minn. or Dr. Bert Carlson, 3034 46th Avenue South, Minneapolis 6, Minn.
All Bulletin correspondence should be sent to the Editors, 3376 Brunswick Avenue, Minneapolis 16, Minn.

MIDWEST FEDERATION CONVENTION

JULY 1,2,&3

TO ANYONE INTERESTED IN THE EARTH ON WHICH WE LIVE

GREETINGS from the President:

The Geological Society of Minnesota was created to stimulate interest in geology and give its members and guests an opportunity to obtain information on the subject in an easy and convenient way.

Whether you are a novice or an advanced student in geology, you will always find something useful and interesting in every lecture and field trip throughout the year. A series of lectures is being planned for the coming season which will give new members a chance to catch up on the principles of geology as well as a welcome review for those who are already versed in the subject. The main series of lectures will be interspersed with lectures on many special topics of interest to any student of geology.

May I extend this greeting as an invitation to members of the Society and their friends to continue or begin many evenings of relaxation and enjoyment for the coming season.

Bert R. Carlson.

EDITORS NOTE: It occurred to us that you, the members, would be interested to know of the splendid work being done at the University with the aid of the "Hayden Fund". The following information was graciously supplied by Dr. George A. Thiell.

Funds from the Junior Hayden bequest to the Geology Department, University of Minnesota, have been used to purchase additional slides for the Kodachrome Collection he established in the Geology Department, and for the purchase of a natural color film on "An Eruption of Mauna Loa".

The bequest also supplied funds to help defray the expenses of a survey of the status of earth sciences in the Junior Colleges, the Liberal Arts Colleges and the State Teachers Colleges in Minnesota.

In accordance with recommendation made to the Board of Regents by the Geology Department, funds from the bequest have been set aside to finance the illustration for a book on the Geology of Minnesota. The manuscript for the book is completed and will be placed in the hands of the editor in the near future.

Bulletin Board

1952 TENTATIVE FIELD TRIPS

<u>DATE</u>	<u>PLACE</u>	<u>LEADER</u>
May 11	Minnehaha Falls Park	Jos. W. Zalusky
May 25	Anoka Sand Dunes and Cedar Lake Bog	Dr. C. O. Rosendahl
June 8	S.E. Minnesota Geologic column Cretaceous to Drasbach	Mrs. Sommers and Mrs. Bennitt
June 22	Copper Falls State Park, Mellen Wis. Pre-Cambrian Formations	Miss Hinchley
July 1-2-3	Midwest Federation Convention Field trip to Taylors Falls	
July 12-28	Black Hills - Yellowstone	Mrs. Lupient
Aug. 10	Annual Picnic Lake Minnetonka	Miss Noerenberg
Aug. 24	"Trilobites" Where they are found	Dr. Bell
Sept. 7	North Shore	Dr. Groat ?
Sept. 21	Geology of Western Wisconsin or Royalton - Little Falls	Hal E. Mowethy E. H. Brown

A slight charge of 15 cents will be collected
each day on all short field trips to defray costs.

E. H. Brown,
Field Trip Chairman.

MIDWEST FEDERATION CONVENTION

Convention time is approaching. This year the Midwest Federation of Mineralogical and Geological Societies will hold their annual convention at Macalester College in St. Paul on July 1-2 and 3. For those of us interested in the many phases of earth sciences this event is a stimulating experience and should rate top priority in your vacation plans for the summer.

The Minnesota Mineral Club in cooperation with the Geological Society of Minnesota are the host societies. It is not often that we have the privilege of entertaining a convention. It requires a lot of work and planning and it is the personal responsibility of each individual member to cooperate and actively participate so that its success will be assured.

Excellent facilities for the gathering are available at Macalester college which is located outside of the congested areas midway between St. Paul and Minneapolis. There will be no parking problems and there is a beautiful campus to enjoy.

The program will include a gigantic display of rocks, minerals, lapidary work and geological items by the local societies as well as by other clubs and individuals throughout the Midwest. Commercial dealers in minerals and lapidary equipment will be on hand to supply specimens and cutting material. The exhibit will be housed in the Shaw Gymnasium which will be the center of the activities. This is a good sized building with a floor space 90 feet by 135 feet, a much larger area than we had at Milwaukee. All societies comprising the Midwest Federation are expected to have a display and actively participate in the fun. Lunches will be served on the campus in the cafeteria. A good sized mineral auction will be held. Program lectures will be conducted in the Little Theatre building. There will be field trips for the geologist, for the paleontologist and the rock collector. Chartered buses will be provided at nominal expense. Everything is being done to make this 12th annual convention an interesting and enjoyable event which will be long remembered.

To those members and their friends who have not previously attended our conventions let me say that you have really missed something. The opportunity to see what others have been doing in your hobby field and to meet and talk with the many fine people in the midwest who have mutual intererests is invaluable. To those who regularly attend our conventions I can assure you of another pleasant and valuable experience.

In behalf of the Midwest Federation, the Minnesota Mineral Club and the Geological Society of Minnesota I extend to you a most cordial invitation to attend.

H. T. Perry, President,
Midwest Federation.

Midwest Federation Convention Program.

Macalester College, St. Paul, Minn.

TUESDAY, JULY 1.

- 9:00 A.M. Registration.
- 9:00 A.M. - 9:00 P.M. Exhibits open to registrants only.
- 11:00 A.M. - 12 noon. Midwest Federation business meeting.
- 2:00 P.M. Welcoming address by Dr. Charles Turck, President of Macalester College.
- 2:30 P.M. "Geology of the Twin City Area" by Dr. Waldo Glock, Head of Geology Department, Macalester College.

WEDNESDAY, JULY 2.

- 9:00 A.M. - 9:00 P.M. Exhibit open to the public.
- 10:00 A.M. Lecture on "Minnesota Iron Ore" by Dr. George M. Schwartz, chairman of the Minnesota Geological Survey Department.
- 11:00 A.M. Lecture on Lapidary by Kenneth Russell.
- 1:00 P.M. - 6:00 P.M. Field trip by bus to Taylors Falls.

THURSDAY, JULY 3.

- 9:00 A.M. - 9:00 P.M. Exhibit open to the public.
- 9:00 A.M. - 10:00 A.M. Midwest Federation business meeting.
- 10:00 A.M. - 12 noon. Auction.
- 12:00 noon. Luncheon.
- 1:00 P.M. - 6:00 P.M. Field trips by bus.

COMMITTEE REPORT.

The committee on "Community Service Program" is not able to report any special results, except that the following lectures with colored slides have been given.

March 1951 - lectures on two consecutive Sundays at Veterans Hospital on Grand Canyon National Park, Zion Park and Mesa Verde.

October 1951 - to a group of High School YMAA boys on Yosemite Park, Lassen Volcano Park and Mount Ranier Park.

November 1951 - to the Boys Club at Murrey High School St. Paul on the Colorado Plateau.

December 1951 - to the "Over Sixty Club" at the Minneapolis Public Library on the Colorado Plateau.

December 1951 - to the National Secretaries Association in St. Paul on the Colorado Plateau.

March 1952 - to the Sertoma Club, a group of Minneapolis business men, at the Radisson Hotel on the Colorado Plateau.

The remarks usually made after a lecture indicate that people are not aware of the processes and time which have made the part of the Earth that we live on. To give a simple geologic significance to the scenes as they are projected on the screen makes them more meaningful and interesting. Judging from the interest shown, it will be worthwhile to give more of these lectures; and anyone who can spare some time for this pastime please contact the chairman.

Chairman,

Bert R. Carlson.

REPORT OF SPECIAL COMMITTEE ON FIELD TRIP EXPENSES.

(Editors note: This report was accepted and approved by the board of directors.)

The committee recommends as follows:

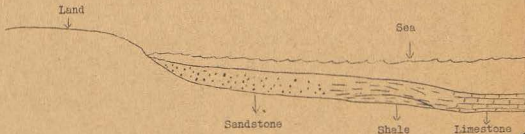
1. That the board authorize the treasurer to pay in the future 3 cents a mile for mileage used on authorized scouting of field trips and also the necessary telephone expense incurred in their arrangement, as reported to him by the Field Trip Chairman.
2. That the Field Trip Manager be responsible for the collection of the per capita charge on each field trip and for the sending of the same to the Treasurer together with the name of the trip leader and his scouting mileage and necessary telephone expense. We recommend that a mimeographed form be furnished the Field Trip Committee Chairman for this purpose.
3. That the per capita charge be kept for the present at 15 cents for each day of the trip and that this per capita charge be mentioned on every field trip notice.
4. That the Treasurer keep a separate Field Trip Record of all receipts and the authorized disbursements of the money collected on field trips, together with the name of the collector and the trip on which each sum was collected, this record to be reported regularly to the board.

Respectfully submitted,
Helen J. Sommers, Chairman.
Elmer Brown, Helene Becker,
Elsie Hinchley.

A SLIGHT CASE OF PLAGIARISM

It occurred to the editors that many people unable to be present at our March 18th meeting—due to the weather and/or the primary election—would like to hear something of Dr. Thiel's lecture on "Sand in Time and Space". Those of us who were able to be present were highly rewarded. We make no pretense of reproducing his entire lecture but simply to present one or two concepts from it.

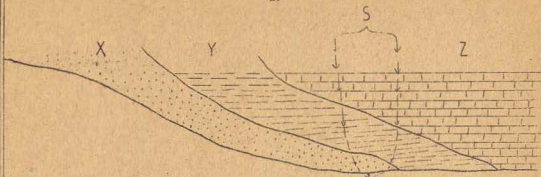
The simple principle of the sorting of water-laid deposits is familiar to all of us. As sediments are carried out into deep and quiet water by currents, the larger particles are dropped near the shore and the finer ones carried farther out. When they become consolidated into sedimentary rocks, they would be named and distributed as shown in the sketch below.



This diagram over-simplifies the real situation in that it neglects the conglomerates often found near the beach line, and it neglects to show the gradual transition from sandstone to shale and from shale to limestone. However, it is sufficiently accurate for our present purpose. Since most of the sediments forming sandstones and shales are derived from previously existing rocks, transported as fragmental (or clastic) rocks. On the other hand, most of the sediments forming limestones do not come from the land but originate on the spot by precipitation of calcium carbonate and from skeletons of marine animals. They are classed as non-fragmental or (non clastic) rocks.

It is interesting to note the effect of sorting of sediments as noted above, during times when the seas are transgressing onto, or regressing from, the land. And, of course, we realize that wherever we find sedimentary rocks, the sea has, in times past, done just this - often several times. Whether this is due to a rise or fall of sea-level or to sinking or rising land, the effect is the same.

The following diagram is an attempt to show how sandstone, shales and limestones would be caused to overlap by the simple case of a sea which has transgressed (once), from right to left, onto the land.



In this diagram we imagine the beach line to have gradually and continuously migrated from point "a" to point "b" and finally to point "c". A fact of importance to note is that with the water at any level we would have deposition of sandstone, shale and limestone beds, simultaneously, in nearly horizontal layers. If we were to draw lines (not shown here) separating the sandstone (x) from the shale (y) and the shale from the limestone these lines (not drawn) would be steeper than found in nature but the relationships are the same. The exaggerated slope of these lines actually helps in pointing up two important questions soon to be raised. We leave to the reader the construction of the more complicated diagram showing the combined effects of a transgression followed by a regression and/or the reverse of this which was shown on Dr. Thiel's slide.

Suppose that a stream should carve out a valley below "s" in the diagram and expose the three kinds of rocks in its walls. (Incidentally, the relationship of limestone, shale and sandstone shown here is exactly what we find along the Mississippi River gorge in the Twin Cities area.) We would immediately say that the limestone is the youngest of the three layers because it is at the top. And, indeed, we are right - at this particular place. What we should observe from the diagram, however, is that if we trace any given limestone layer to the left, we encounter both shale and sandstone layers which are the same age.

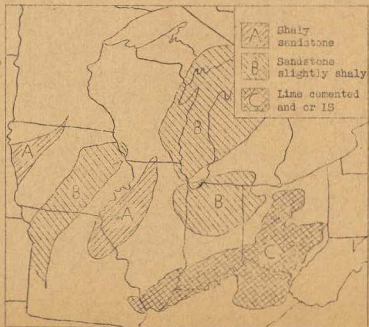
Consideration of the relationships shown in this diagram causes us to ask such questions as: (1) What do we mean by a rock "formation"? and (2) What can we say about its "age"? The answer to the first of these had to be arbitrary. The question boiled down to this: should the word formation be applied to rock layers which were deposited at the same time or to rock units of the same kind? The latter concept has been agreed upon. A geologic formation is defined as a mappable rock unit based on physical (and chemical) characteristics recognizable (presumably) in the field. In our diagram, then, we have three formations, the "x" sandstone, the "y" shale and the "z" limestone. In naming them, the x, y and z would normally be replaced by a geographical name from the locality where that particular formation was first studied - the "type locality" - as for example, the Plattville limestone or the Decorah shale. The answer to the second question follows easily now that we know the answer to the first. We see from the diagram, that different parts of the same formation may vary considerably in age. To a certain extent we have "always known this. If we have at hand a 4-foot layer of sandstone, we recognize that the upper few inches are younger than the lowest few inches. But the above diagram brings out a much broader concept. Here we see that certain parts of the upper (limestone) formation are older than certain parts of

the lowest (sandstone) formation. True, these "certain parts" may be widely separated geographically, but the fact remains as stated.

Two important facts for the stratigrapher emerge from what we have just discussed. In the first place, he must realize that in tracing a given formation cross-country that formation may change in age. Only if the traverse is made parallel (roughly) to the beach-line at the time of deposition will a given layer keep the same age. The second point is that if he is tracing a layer all of which was deposited at the same time, he must expect it to change its character (perhaps become a different formation) as he goes farther from, or closer to, the original land mass.

Since the word formation has been defined as given, we may wish to ask whether there is a name for rocks deposited at the same time. The answer is "yes". All the rocks deposited during a given geologic period are referred to as a "system" of rocks. A system is sub-divided into "series" and still further into "stages". These names, it should be remembered, do not refer to any particular kind of rock.

When we come down to actual cases in the field, we must expect the distribution of formations to be more complicated than is indicated by the preceding diagram. From paleogeographic maps we are already conditioned to realize that ancient seas, like present ones, are often very irregular, and that sediments may be brought to them from more than one direction at the same time. We must also realize that even if we take into consideration the drainage patterns and even less about the ocean currents of that time which would also influence the proper environment for this or that kind of sediment to come to rest. Then too, erosion has certainly chopped away and erased parts of the original pattern, in many cases.



With this amount of warning let us look at an actual field example which should be of especial interest to Minnesotans. The preceding map was "lifted" and adapted from a paper by Dapples, Krumbein and Sloss published in the Bul. A.A.P.G. Vol. 32, # 10, Oct. 1948. It may be thought of as a very specialized type of paleogeographic map - specialized in the following ways: (1) it is limited to a smaller area than is generally shown on such maps, (2) it shows the land-sea distribution for a limited portion of time (not generalized for an entire geologic period) and (3) it indicates the kinds of sediments that were deposited in different parts of the sea during that limited time. This map indicates the conditions prevailing in several midwestern states during a portion of lower middle Ordovician time, namely the time of deposition of the St. Peter sandstone here in Minnesota.

One cannot help but wish that the map covered a wider area so there would be a better chance to see the large-scale operation of the simple principles discussed above. In all probability the reason the map is so limited is that field work has not yet gone far enough to permit a wider coverage.

However it is clear enough from what is shown that the sediments deposited in some other parts of the sea were quite different from the "ivory" pure St. Peter sandstone we know in Minnesota.

REMEMBER THE DATES OF THE ANNUAL MIDWEST FEDERATION CONVENTION - JULY 1-2-3.
THE PLACE - MACALESTER COLLEGE. IT WILL BE WELL WORTH YOUR WHILE TO SEE
WHAT OUR MEMBER SOCIETIES ARE DOING IN THE FIELD OF GEOLOGY, MINERALOGY
AND LAPIDARY. BRING YOUR FAMILY AND FRIENDS.

GEOLOGICAL SOCIETY OF MINNESOTA
John O. Engen, Treasurer
5317 Chouen Ave. So.
Minneapolis 10, Minn.

APPLICATION FOR MEMBERSHIP

NAME : _____

ADDRESS : _____

PHONE : _____

BUSINESS : _____

I ENCLOSE HERewith MEMBERSHIP FEE OF \$ _____

Mrs. Marian S. Shanon
500 Ridgewood Ave.
Minneapolis 4, Minn.

