



THE MINNESOTA GEOLOGIST

OFFICIAL BULLETIN

OF

THE GEOLOGICAL SOCIETY OF MINNESOTA

VOL. XIX

FALL AND WINTER 1965

No. 2

CLIFFS ALONG THE MISSISSIPPI

Those rocky ranges built against the sky
Of opalescent clouds, that hide the sun
Are set in deep foundation. Reaching high
In cliffs of yellow limestone, every one
Strikes far into the earth. An eagle's nest
Is hid among the crags. Rough, chilly feet
Of hills thin-veiled on naked back and breast
Are bathed in rivers kind in summer heat.
This little part of our Great Builder's task
Is told in reckoning the seven days
That were creation. We, in wonder, ask
How many eons, what computed ways
Accomplished earth and sky and boundless sea.
The answer rings from star-filled space, "Eternity".

Emma Kinney Whaley, South St. Paul

GEOLOGICAL SOCIETY OF MINNESOTA

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MEETINGS: October to May, inclusive, 7:30 p.m., every second and fourth Monday, at 155 Ford Hall, University of Minnesota, 17th and Washington Avenue 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 MEMBER OF: Midwest Federation of Mineralogical and Geological Societies

and

The American Federation of Mineralogical Societies

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

GEOLOGICAL SOCIETY OF MINNESOTA - Bronze Tablet Award

The Mid-West Federation of Mineralogical and Geological Societies hereby grants the meritorious service award to the Geological Society of Minnesota for placing permanent educational bronze tablets at proper sites on highways giving pertinent geological facts of the area.

July 31, 1965

Morton A. Young, President
Helen M. Greer, Secretary

The above Certificate Award was presented to our President, Mr. Clyde Case, on Saturday, September 24, 1965, at the Bloomington Mineral Club Rockrums at the Minnesota State Fair Grounds.

This is a fine public acknowledgment of our activity in placing the informative tablets at interesting points along the highways of our state. In a recent article in the St. Paul Dispatch the statement was made that other states are considering similar projects, but it appears that we have the unique distinction of pioneering in this activity.

ANNUAL PICNIC

The annual picnic was held on Sunday, August 15, at the home of Mr. and Mrs. Lawrence W. King on the St. Croix. They were as usual gracious and generous hosts. Their lovely summer home and surroundings are an ideal place for a picnic gathering, and the weather was perfect. There was a large attendance, and everyone had an opportunity to discuss plans and exchange news.

A MESSAGE FROM YOUR PRESIDENT

An informative and intriguing geological program has been prepared for this coming winter by our program chairman, and I believe we can look forward to it with interest. For all who choose this branch of science as a hobby, it should be an opportunity to bring their knowledge up-to-date with the current findings on world geology.

Our winter program is apt to exclude from our minds the pleasure and profit derived from summer field trips. But these trips are invaluable and provide the spice to cement the geological concepts that we hear and learn about in the lectures. Members have an opportunity to study the dramatic history of rocks and minerals--to see that every mile we travel holds a multitude of different forms that constitute the earth's crust. The study of strata and minerals is challenging as each new rock, crystal or mineral is discovered and identified. The experience stimulates the imagination. It also fosters a common interest and exchange of ideas among the members, thus unifying them in this activity. To me it is important that we make use of the field scouting work done by Elmer Brown, Field Trip Chairman, as well as the fine experience of Dr. Bert Carlson, who has led us on many interesting trips.

At this time I wish especially to welcome the new members, as well as returning old members, whose constancy is appreciated. It all adds up to a pleasant prospect, with lectures for the winter and field trips for the summer, with the happy comradeship of members. It is my hope that each one of you will benefit by the coming activities.

Clyde Case, President

NEW MEMBERS

Mr. and Mrs. E. Earl Baxter, 5115 Drew Ave. S., Mpls. 55410	922-5538
Miss Ethel A. Bergquist, 3427 Halifax Ave. N., Mpls. 55422	588-8809
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Mr. Irving J. Dahstrom, 309 Ontario Ave. S.E., Mpls. 55414	
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Miss Helen E. Harris, 2070 Stanford Ave., St. Paul 55105	698-3453
Mrs. Albert H. Kimball, 1711 Marshall Ave., St. Paul	644-6429
Miss Cecelia M. Lauer, 3111-33rd Ave. S., Mpls. 55406	724-1504
Dr. and Mrs. J. S. Lewis, Jr., 2722 W. River Road, Mpls. 55406	729-9076
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Mrs. Shirley E. Merz; son Jeffrey, 737 Watson, St. Paul, 55102	
Mr. and Mrs. Eugene A. Michaud, 820 Laurel Ave., St. Paul 55104	226-9674
Mr. Harry Pavak, 4825-13th Ave. S., Mpls. 55417	823-8087
Miss Bernice Peters, 525 North Falls, River Falls, Wisconsin	
Mr. John Bruce Rauch, 514-6th Ave. S.E., Mpls. 55414	
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Miss Jean M. Stevens, 135 N. Western Ave., Apt. 308, St. Paul	225-1866
Miss Ethel Miso Swanson, 4944 Girard Ave. N., Mpls. 55430	522-7688
Mr. and Mrs. Oliver M. Swanson, 4951 Emerson Ave. N., Mpls. 55430	529-8814
Mr. and Mrs. Michael Vaclavek, 3904 Joppa Ave., St. Louis Park 55416	926-0185
Mr. and Mrs. Paul J. Vogt, 2853-37th Ave. S., Mpls. 55406	722-8628

IN MEMORIAM

Mrs. Josephine McWethy, wife of our charter member, Hal E. McWethy, passed away on Sunday, September 26, 1965, at the Midway Hospital after a long illness.

Mrs. McWethy was a direct descendant of Commodore Oliver H. Perry, the naval hero of the War of 1812. She was born in Topeka, Kansas, and lived in St. Paul for 37 years. A graduate of the University of Illinois and Kansas State College, Manhattan, Kansas, she belonged to Chapter K of the P.E.O. Sisterhood, the Faculty Wives Club at the University of Minnesota, and the Froula Reading Circle.

Our heartfelt sympathy is extended to Mr. McWethy in his loss.

"ROCKHOUND"

He who stoops to pick up a pretty stone
holds art and history, life and death in one
exciting piece. Trees from an ancient time,
imprisoned in agate bars, are kept at prime
eternally, and in their death remain
with beauty that no green wood can attain.

A fossil creature that once lived in shell
transformed to opal after death befell.
This bit of meteor may reach back as far
in heaven's time as the beginning of a star.

Or choose a nodule with translucent glow.
How many eons did waters come and go
to build this germ? Its cleavage is a thing
as delicate as diamonds, the cut may bring
a perfect picture like three ducks in flight,
a cameo, or an abstract in dendrite.

To hold these in the hand means one can share
art, history, life or death—all may be there.
But if too blind to see, why should one mock
or scorn him who finds beauty in a rock?

Helen B. Young
17021 Grays Blvd.
Wayzata, Minnesota

Notice to members: Because of ill health, Ida Swenson has sold her home and moved into a nursing home. As a long time member of the Geological Society, she would be glad to hear from any of those who have known her.

Address: St. Olaf Residence, Inc.
2912 Fremont Ave N.
Minneapolis, Minnesota 55411

THE MINNESOTA GEOLOGIST RECEIVES BULLETIN AWARD

The 1965 Convention of the Mid-West Federation of Mineralogical and Geological Societies was held in Roberts Municipal Stadium at Evansville, Indiana, on July 29-August 1. The Evansville Lapidary Society was host.

At that convention on July 31 your Bulletin Editor was given special honorable mention on the Spring and Summer Bulletin submitted for the contest. As Mrs. Skahan was unable to attend the convention, the merit award, a beautiful piece of Tri-State Fluorite, was brought to her by Mrs. Jean Dahlberg of the Minnesota Mineral Club. It was a gratifying reward for effort, and much appreciated.

SPECIAL EVLINT--THE ROCKRAMA

An event of special interest to all amateur geologists and rockhounds was the Rockrama at the Minnesota State Fair Grounds, from September 24-26, sponsored by the Bloomington Mineral Club of Bloomington, Minnesota.

Included in the daily programs were very fine lectures and demonstrations in which many took part. There were beautiful exhibits by retail and wholesale dealers from states all over the country--even Texas. Members of the Geological Society of Minnesota attended at a table where a case containing Minnesota minerals was exhibited and current programs were distributed.

Among the special outstanding exhibits worthy of notice were the following:

1. A picture of Abraham Lincoln, which is a pietre dure of 500 pieces of gemstones created and exhibited by Joseph Phetteplace, Phetteplace Museum, Wauzeka, Wisconsin.

This picture is made entirely of stone--nothing is painted, not even the delicate shadings and highlights that give it life. Five hundred tiny pieces of stone were chosen for the right color and texture and fitted together to create an effect that is almost photographic yet retains the quality of a magnificent painting.

It took 2700 hours--the equivalent of about one year of eight-hour days--to create this picture; and the materials used are jade, agate, petrified wood, jasper, datolite and sard. Catlinite, which was used for the name, came from Minnesota.

The entire picture was cast in one inch of cement, reinforced with steel and six belts coming out of the back to fasten onto a 3/4 inch plywood panel to give rigidity.

About one month's work went into the making of the eyes alone, of blue-grey agate. White agate was shaped to make the white reflections in the irises, and cream-white datolite was used for the whites of the eyes. After about six weeks, the eyes were completed with the use of three kinds of petrified wood and black jade. The tie is made of green and black jade.

All stones are in the original color and polished as any gem stone. There is no filler between the stones. (cont.)

ROCKRANA (cont.)

An accolade is certainly due Mr. Phetteplace on this exquisite reproduction. The work represents precision, patience and perfection in an artistry of the highest order.

2. Mr. A. L. Glatty's Acorn--this is made of opalized glass and is the only faceted acorn in existence. It required 240 hours to cut the acorn and base. It weighs 1890 carats and has 729 facets. The base is cut from golden sheen obsidian. Truly in the gem category, this exhibit made it obvious that Mr. Glatty is to be commended on the exquisite perfection of his workmanship.

3. A 17th Century Florentine Intarsia by Cocherinji was made entirely of gemstones mounted in a hand-made metal frame. It is from the William Randolph Hearst Collection and is 9 x 12 inches. Every detail of this picture shows rare and exquisite beauty.

GEM NEWS

Ruby Prized for Growing Rarity - New York, N. Y. (UPI)

A jewel that is increasingly prized for its rarity actually is one of the earth's most abundant compounds.

It's the ruby, which experts now say has become so scarce as to be, in many cases, worth more--carat for carat--than the diamond.

And the ruby, it turns out, is nothing other than a form of aluminum oxide, which is aluminum--the most abundant of metals--combined with very plentiful oxygen.

The ruby, according to a new booklet published by the Aluminum Association, is a crystalline form of transparent corundum or aluminum oxide forged in the heat and pressure of the earth's creation.

Minneapolis Sunday Tribune

Big Diamond Wasn't Joke - Chicago, Illinois (UPI)

The world's largest diamond was discovered by a man who thought he was the victim of a joke.

During the early 1900's, Frederick Wells, a diamond mine superintendent in Africa, spotted a large stone imbedded in the side of a pit, reflecting the setting sun.

Even though he suspected a "plant" made of glass, he dug it out and found to his amazement that he possessed a rough diamond weighing 3,106 carats, or one and one-third pounds. He sold it in 1907 for \$750,000.

The Cullinan diamond discovered by Wells was cut into nine major gems, 96 small brilliants, and more than nine carats of polished fragments.

Minneapolis Sunday Tribune

THE 1965 LONG TRIP TO THE WORLD'S FAIR

by Grace Benz

On June 12, 1965, thirty-seven members and friends of the Minnesota Geological Society boarded a chartered bus for New York City and the World's Fair.

The Twin Cities of St. Paul and Minneapolis, as is well known, are in a glaciated region, characterized by moraines, lakes, and outwash plains. But it was not long before the scenery changed. As we approached Camp Douglas, Wisconsin, we could see that we were in the driftless area. Buttes and mesas, erosional remnants which had not been obscured by glacial drift, were in evidence.

The scenic beauty of the Wisconsin Dells--our first stop (other than the lunch stop at Tomah)--is due to the development of this part of the Wisconsin River as a post-glacial channel. The feeder streams on the east side of the Dells have carved deep, narrow gorges along the joints in the Potedam (Cambrian) sandstone. The water initiating the erosion of the strata came from the ice-front whose terminal moraine is about four miles east of the Dells. Differential erosion has, in some places, left harder ledges of sandstone resting upon pillars of softer sandstone.

As we traveled up and down the river, from our boat we could see cross-bedded sandstone in strata rather close to the water's level. This appears to be at the angle at which it was deposited, since there is no indication of faulting.

At Madison, the first overnight stop, we were again in a glaciated region, as, in fact, we were to be for the rest of the trip.

Our second day of travel took us from Madison, around Chicago, on the freeway to Ann Arbor, Michigan. En route, in the afternoon, we saw the sand dunes on the south shore of Lake Michigan. However, since we did not stop, we viewed them only from the bus.

On Monday, June 14, we kept our 10:00 a.m. appointment with the guide at the Dearborn Ford Plant. We visited the Mustang assembly plant, the hot steel rolling mill, and viewed the coking plant.

To make glass, the Ford Company uses a new method, whereby instead of being rolled and polished, the glass is floated onto a liquid.

The statistics of the company are impressive: 65 parking lots, a 72-acre steel plant building, an electric power plant which could more than furnish all the electricity the Twin City area uses, the largest dial-telephone system in the world, its own bus line on the grounds. The smoke-stack is the type which uses electrical charges to precipitate the smoke particles.

The Ford Plant is on reclaimed swamp land, with salt below. The buildings do not rest on bed rock. Instead, the weight is spread out on many pillars, using the snowshoe principle.

After lunch at the Ford Museum cafeteria, some of our group strolled through Greenfield Village. Here are to be seen Henry Ford's home and workshop, the home and bicycle shop of the Wright brothers, Noah Webster's attractively shuttered two-story house, Burbank's home, the early Edison plant, and many more historic buildings. (cont.)

WORLD'S FAIR TRIP (cont.)

Other members enjoyed the Museum, devoted as it is to automobiles of many vintages, to furniture, glassware and ornaments for the home. Since either the Village or the Museum can very well occupy a full day, there was plenty to see, with much left over for the "next time".

Niagara Falls

After breakfast in our hotel in Detroit, we started out for Niagara Falls. This route took us into Canada, over a great outwash plain, one of the most extensive in North America. From Woodstock, Ontario—the lunch stop—we proceeded on until we could see the Welland canal, where a boat was going through the locks. Also, from a distance we had a view of the dolomite escarpment which marks the higher level of Lake Erie and over which the Niagara River plunges to drop into Lake Ontario. In spite of a light rain, we found the American and Horseshoe Falls an inspiring sight. "Space needles" are available for tourists who really want to "overlook" the scenery.

The evening stop was in Buffalo. In the morning we visited the Buffalo China Company, makers of a great deal of the hotel china one often sees in eating places. We did a good deal of plate-turning-over after this tour to see whether we could recognise the Buffalo Company's product. It was in Buffalo that President McKinley was assassinated and President Roosevelt sworn in to succeed him.

In the afternoon we arrived, as planned, in Corning, to see the Corning Glass plant. The Corning Company gave us a private and privileged showing of a film on glass which showed some of the remarkable and not generally known properties of this substance. Then we toured the historical exhibit of fine and rare glass from many parts of the world and from many eras in man's cultural development. We wandered at will, some spending much time watching the Steuben glass being etched. A salesroom, a card shop, a refreshment center, geared for the traveler's convenience are provided. Also, a replica of the 200-inch glass mirror used in the telescope at Mt. Palomar, California, is displayed.

The Chemung River at Corning is a tributary of the Susquehanna. It was the flooding of this river which jeopardized the annealing of the famous mirror.

The next morning, June 17, we made a brief visit to Watkins Glen. This is a narrow gorge in slaty shale, which has been eroded downward along the vertical joints. The path which one may take up the gorge is about a mile in length and includes 700 steps. (This is a deep cut.) The gorge is post-glacial and is the result of river-drainage in a hanging valley. The many layers of sedimentary rock and the swirling action of the water have made this a scenic spot. There are two large salt companies at Watkins Glen. The salt lies from 1600 to 1800 feet below the surface.

Going northward, we followed along Lake Seneca, one of the Finger Lakes. This body of water is 600 feet deep, the result of the gouging action of glacial ice in a previously-existing river valley. The lake bed is below sea level.

In Albany, our destination for the night, we visited the Education and Science Building and Museum. Here we heard a lecture on the geology of the state of New York, given by a geologist from the state's Department of Geology. (A summary of the report follows this article in this bulletin.)

LONG TRIP (cont.)

The next day we drove along the Hudson River, not intending to make any stops until we reached New York City. However, our route took us through Hyde Park; so we decided to detour to the Roosevelt home, the burial place of Franklin Roosevelt, and the Memorial Library. The view across the Hudson River is delightful, although not breath-taking, at this location. The Roosevelt home is comfortable and gracious, rather than extravagant or pretentious.

Farther on, we toured the entrance portion of West Point. (Buses are not allowed on the grounds.) We lunched in a park on Bear Mountain. This area of New York State is quite rugged. The igneous rock of the Palisades gives character to the river and contributes to the mountainous "feeling" of the terrain.

After passing in view of Sing Sing Prison, and seeing hundreds of somber grey battleships in the Naval Reserve Yard, we reached Lincoln Tunnel. It was not difficult to find our hotel, but the driver had to park our bus 13 miles away.

New York City

In New York City, the members of our troupe scattered to sight-see as each one pleased. Visits to the Fair, a boat ride around the Island, a conducted tour which included a stop at the Lincoln Center—all of these interested almost everyone. And by pre-arranged agreement, we were the guests of the New York Life Insurance Company for cookies and coffee, and free mailing of postcards from their promenade deck. From this high point we had an excellent view of the city in all directions.

After four evenings and three days of individual sight-seeing and travel in New York City and at the World's Fair via subway and taxi, we re-assembled as a group and left for New Jersey. At Trenton, we visited the Lenox China Display and salesrooms. From there, we took the highway to Philadelphia. This well-traveled road is hideous with junk yards, filling stations, row houses, all an insult to America the Beautiful. Philadelphia, with the classic charm of Independence Hall, Carpenters Hall, and its old homes as well as an attractive downtown area, dispelled to a degree the unpleasantness of the day's ride.

The next day we had a "bonus" in the form of a tour of Valley Forge. We enjoyed the quiet greenery of a rolling countryside and the charming stream which flows in front of the stone house which was George Washington's winter headquarters. For an hour a competent woman guide directed our bus over the grounds and explained the plan of battle which depended in part on the topography of the land. This visit to Valley Forge was a moving experience for all—even those who had been there before.

The Lancaster area to Reading is Amish, with many hex signs on the barns. The turnpike is fast and unblemished, with many tunnels to take the road through the folds of the Appalachian Mountains.

Pittsburgh, our destination, was dreary because of a light rain, which continued into the next morning. (Perhaps it should be said that the weather during the next two weeks was almost perfect!) Our scheduled visit to the Jones-Laughlin Steel Plant and the U.S. Steel Plant was cancelled because we had seen the one at the Ford plant. Instead, we made a stop at the Heinz Chapel on the University grounds. This Gothic church has the tallest stained glass windows in the United States. They were lovely, with themes of tolerance, wisdom, courage, and knowledge,

LONG TRIP (cont.)

incorporating American figures such as Washington, Franklin, and Emily Dickinson. The Chapel merited the unplanned stop we made to see it.

Next we drove to the Mt. Washington Park to see the confluence of the Monongahela and the Alleghany Rivers, which from there on are the Ohio River. The main business area is the renewed Golden Triangle, the land at the river level between the two joining rivers. The University, by contrast, is at the top of one of the hills.

In Pittsburgh at the Washington Observation Point two of our Ladies had the amusing experience of being escorted back to our parked bus by the Pittsburgh police--in two squad cars--at the Ladies' request. They had been retracing their steps to find a lost pair of glasses, and in walking up hill and down hill on the mountainous terrain for over an hour, they lost the bus. It was a long wait before they returned to a rousing welcome with such excellent chaperones, but as 'tis said--all's well that ends well!! The glasses were found in a corner of a seat in the bus.

By the time we reached Cleveland the sun was shining. Some of our group went to the baseball game where the Twins were playing. The next day, June 25, the rock hounds took over in a quarry near Woodville. Here the Silurian rock is very near the surface, the soil varying in depth from six inches to four feet. The particular quarry we visited was the property of the Ohio Limestone Company. The rock is 90% pure dolomite which goes down 360 feet, although only the top 150 feet are being worked. There are still 22 acres of untouched land. Following the glacial epoch, a 100 mile square swamp covered this region; hence, the surface is very level. Large clams, called megaloma, are typical of this dolomite formation. It was through the courtesy of our member, George Rickert, at one time a salesman for the company, that arrangements were made for us to visit the quarry.

After leaving Fort Wayne, Indiana (on Saturday morning), we gathered corals, pyrites, and bivalves, smaller than the megaloma, at the Monon quarry. In the evening we had the customary banquet, arrangements having been made by telephone with the Black Hawk Hotel in Davenport, Iowa. We had an excellent dinner and expressed our appreciation to Dr. Alexander and his daughter, Vida, for the literature and their talks on the geology of the several states through which we traveled; also to Mrs. Skahen for her hours of arduous work in completing plans for the trip following Mr. Schroeder's death, making appointments with various industrial plants and educational organizations for tours and lectures; and to Martha Peterson, the navigator on the trip, for carrying through in a manner which made the long tour a pleasant experience for all.

On Sunday morning, on reaching Independence, Iowa, we were met by Louis Eggerichs and George Rickert, who came down in Mr. Eggerichs' camper and led us to the Patton quarry. This is a Devonian quarry where the large pointed bivalve, the spirifer, is typical. Later we made a stop at the Rockford quarry, which consists mostly of shale in which many brachiopods were to be found.

After a safe trip of over 3,000 miles we arrived in St. Paul at 6 p.m.

On the day following our return from the New York World's Fair field trip, our leader, Mrs. Marion S. Skahen, was taken seriously ill with virus pneumonia and hospitalized for over four weeks. She is making a good although slow recovery.

THE GEOLOGY OF THE STATE OF NEW YORK

by Grace Benz

Except for the recent frosting of glaciation, New York State, geologically speaking, is fairly old. Pre-Cambrian, Cambrian, Ordovician, Silurian, and Devonian formations underlie 95% of the state. There are no Permian, Jurassic, or Tertiary rocks, and but little of Mississippian, Permian, Triassic, and Cretaceous age.

The pre-Cambrian rocks are exposed in the Adirondack Dome and in the Hudson Highlands, en route to New York City. These exposures are the metamorphosed roots of mountains. At the New York-Pennsylvania state line, these pre-Cambrian formations are 11,000 to 13,000 feet below the surface. Storm King Mountain is pre-Cambrian granite.

It is estimated that material amounting to 10 miles in thickness has been eroded away from the dome.

Encircling the Adirondack Dome are the scattered outcrops of Cambrian age. Fossils are rare, but those that are found are of two kinds: the shelf deposits of shallow water and the basin deposits, the first being around the dome and the second along the east side of the dome. Near Saratoga is a reef of cryptozoans, algae in Cambrian limestone.

The Cambrian and Ordovician together in Eastern New York were folded and faulted in the Taconic orogeny. The Ordovician is found extensively in the counties which border Lake Ontario and in scattered areas around the dome.

The erosion of the Taconic Mountains resulted in shale deposits which extend westward into Minnesota, where they are called the Maquoketa shales.

South of the Ordovician formations which border Lake Ontario are rocks of Silurian age. These extend to Niagara Falls on the west and eastward nearly to the Adirondack Dome. Unlike the Cambrian and the Ordovician, the Silurian does not encircle the Dome, although there is a thin tongue of Silurian rocks in the southeastern part of the state, west of the Hudson River.

Niagara Falls is of pre-glacial origin but was out of existence for a time. In Niagara gorge can be seen the escarpment of Lockport dolomite, and below that, shale, limestone and sandstone occur.

The first coral reefs are found in the Silurian. The Trenton limestone of Middle Ordovician age is exceedingly fossiliferous. These deposits were laid down east of their present position and as a result of the Taconic orogeny, were greatly folded, faulted, and shifted.

Almost all of New York State south of a line drawn eastward from Buffalo to the Hudson River is Devonian. The Finger Lakes are in this belt. So, also, is Watkins Glen, in the vicinity of Corning. The Middle Devonian included the Arcadian orogeny, which resulted in the development of mountains east of the present boundary of the state. The Later Devonian saw the growth of the Catskill Delta, which was formed from the erosional debris of the Arcadian mountains flowing into a westerly sea.

The Devonian in New York State is noted for its fine fossils. In fact, the

THE GEOLOGY OF THE STATE OF NEW YORK (cont.)

New York Cambrian, Ordovician, Silurian, and Devonian formations are taken as the standard types because of their very complete sequence of rocks.

The Pennsylvanian and Mississippian periods are represented by a very few exposures of conglomerates and sandstones in a non-glaciated section on the Pennsylvania state line, in an otherwise Devonian area.

At West Point, Rockland County has red rock of Triassic age, but there are not many dinosaur remains in the New York Triassic.

The Palisades are also of Triassic age. On the west side of the Hudson River this intrusive forms a dark and easily observed sill of igneous material.

During the Pleistocene period glaciation was widespread, covering almost the entire state. The non-glaciated part is, indeed, negligible, being that portion shown by the Pennsylvanian and Mississippian outcrops mentioned above.

Striae on the top of the Adirondacks indicate that the ice must have been from one to two miles thick. Ice gouged out the bottom of Lake Seneca to a depth below sea level. These north-south lakes were river valleys, flowing to sea level, but have been glacier-deepened to their present below-sea-level depths.

The east-west flowing rivers in New York State are the result of hanging valleys and were not gouged deeper. Hence, they produce such features as Watkins Glen where the water flows into the lake valleys.

Long Island is a terminal moraine.

Following the glacial episode, northern New York was a depression which remained for a time after the ice melted. The sea invaded this depression. The marine fossils which can be found on the Adirondack Dome date from this invasion.

**From notes taken at the lecture given in the Science Museum and Education Building in Albany by a geologist from the State Department of Geology.

JUST GIVE US TIME

There was life on the planet three billion years ago, according to a Harvard botanist. Man hasn't been around that long, of course. If he had been, there wouldn't be much left put parking lots.

Minneapolis Morning Tribune, November 13, 1965

LONG FIELD TRIP PICTURES

The pictures which supplemented Miss Benz's review of our field trip East and to the World's Fair were taken by Mr. and Mrs. Michael Vaclavek, who are now members of our Society. Their thoughtfulness in taking the pictures and generosity in offering them for showing is much appreciated. We again wish to express our thanks.

ST. CLOUD FIELD TRIP

Led by Professor Gerald Ahlquist
July 25, 1965

On this field trip the group first made a stop at Anoka, where Mr. Frank Heilman led the members to the home of an early day pioneer. The wall and side-walks about the large lawn consisted of broken hard heads of rock, twenty-three varieties of which were identified by members.

Professor Ahlquist joined the group at Elk River. The Geological Society informational tablet in the park was read, and Professor Ahlquist called attention to the damage to trunks of trees in the park caused by the ice during the Spring floods of 1965.

The tour group then went north of Elk River where a sand dune nearly covered the trees. The area near there contained many little hills of pebbles and sand called "drumlins". These were formed in the water as it carried debris down through the cracks and crevasses of the glacier. It is the same way the long thin banks of drift were formed. These are called "eskers" and "kames" by geologists.

Below the pebbles there is a dark shadow, which grows in all directions. It is a vast graveyard of rock and sand spread far and wide. This is an ancient ice moraine. Big Lake is an ice block lake with "cusps" dividing it. A cusp is a land form characterized by a projection with indentations of crescent shape on either side, as along a shore line.

We viewed the Becker Moraine and a tree farm as we drove along. Soon we left the Anoka sand plain and the Grantsburg Lobe and came upon granite at St. Cloud. The granite south and west is pink, while that north and east is grey. At this point the ice came from Western Canada and had very little igneous rock in it, but much limestone.

St. Cloud is built on five deltas. The low land is part of old river valleys. Professor Ahlquist said that Water is our most important mineral. He explained that a swamp is a cemetery of a lake that "once was". A lake dies in two ways: (1) by drying up and (2) by being filled in.

We viewed a basalt dyke in granite at Waite Park, also the St. Croix moraine at the right. Big boulders indicate that swift rivers once flowed here and carried them along on the ice, then deposited them when it melted.

At Cold Springs we saw old terraces of the Sauk River. Two of the terraces have local names: "Jack's Prairie" and "Jacob's Prairie". We viewed several old tamarack trees which are glacier relics. They once grew in cold water.

We visited the "Diamond Pink" quarry. "Diamond Pink" is a trade name for pink granite. We saw rotten granite, and over this cretaceous shale and then drift. Professor Ahlquist said that better corn is grown in the old grey drift because of the lime and other valuable minerals. He also told us that polished granite resists erosion and oxidation because it resists penetration of water.

Professor Ahlquist also informed us that the high hills west of St. Cloud are a part of the St. Croix Moraine, but are called the Monticello Moraine. As Professor Ahlquist had scouted the entire trip, he gave us a very instructive and interesting story of the geology of the region.

Review by George Rickert

EGGERICHS-RICKERT FOSSIL SAFARI

by George Rickert

Louis Eggerichs and I took a fossil hunting trip to Wisconsin in his camper in September. We stopped at Potawatomi Park in the Deer Peninsula south of the Fox River, and at Sturgeon Bay, which is a virgin forest where there is a very fine camp ground. Then we drove north to Sister Bay and east to Lake Michigan and found a lot of chain corals that had been polished by the water so that chains were hardly visible.

In driving over nearby country roads, we found a lot of favosite coral, but were disappointed along Green Bay because of the pollution in the water. We camped at beautiful Peninsula State Park, and on the following day drove south to Eden to the quarry of Western Lime and Cement Company, where we found quite a few pentamerus fossils.

After driving south to Mayville, we camped at another fine place, the Dodge County State Park, near the famous Horicon Marsh, a federal wild life refuge, obtained through the efforts of the Isaac Walton League and Mr. Rudkey, a member of the Horicon Chapter. West of the camp grounds was a high escarpment, a part of the Niagara cuesta (a hill or a ridge with a steep face on one side and a gentle slope on the other). The marsh is located in a deep valley west of the cuesta. A visit was then made to the Mayville Lime Company quarry, where we found many beautiful pentamerus.

On our way home we saw many new rest stops being built by the State Highway Department for the comfort of tourists. Fine tables, garbage containers, stoves, rest rooms, and parking places are being made available. We were disappointed to be barred from quarries at Oshkosh and at Racine, Wisconsin, owned by the same company. They explained the reason was because of vandalism and careless disregard of property by rockhounds as well as hunters. Rock collectors will have to be more careful of their conduct. As their numbers increase, they will be prohibited from entering many of the fine quarries in the future.

PARTNERS

Who digs a well or plants a seed,
A sacred pact he keeps with sun and sod,
With these he helps refresh and feed
The world, and enters partnership with God.

Edwin Markham

It was said of one of the most intelligent men who ever lived in New England, that when asked how he came to know so much about everything, he replied, "By constantly realizing my own ignorance, and never being afraid or ashamed to ask questions.

Tryon Edwards

LECTURE PROGRAM * * * 1965-1966

Program Chairman--Mr. Fred W. Hallberg

1965

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| Oct. 11 -- Origin and Structure of the Earth | Prof. J. Merle Harris |
| Oct. 25 -- Precambrian Geology--A Study of our Oldest Rocks | Dr. W. C. Phinney |
| Nov. 8 -- Precambrian Rocks and Iron Formations | Dr. H. Lepp |
| Nov. 22 -- Metallic Ore Deposits | Dr. D. Yardley |
| Dec. 13 -- Paleozoic and Mesozoic Geology--Beginning and Development of Early Life | Dr. R. E. Sloan |

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|---|--------------------|
| Jan. 10 -- Mineral Fuels--Origin of Petroleum and Other Fuels | Dr. F. N. Swain |
| Jan. 24 -- Age Determination of Rock Formations | Dr. J.A. Grant |
| Feb. 7 -- Tertiary and Quaternary Geology Development During Recent Geologic Time | Dr. E. J. Cushing |
| Feb. 21 -- Pleistocene Geology | Dr. H. E. Wright |
| Mar. 7 -- Structure of Continents | Dr. J. C. Craddock |
| Mar. 21 -- Limnology--Origin of Many Minnesota Lakes | Dr. J. Schapiro |
| Apr. 11 -- Mineral Collecting | Dr. G. H. Rapp |
| Apr. 25 -- Annual Banquet | |

You need not have any knowledge of earth science to be a member. This is a hobby pursuit--an adventure of the mind. It will sharpen your observation of the wonders of the world around you.

The Society is open to all who are interested. Meet congenial people of all ages and walks of life. Come and join the group for an interesting hobby. Visitors welcome.

TIME'S WORK

Middle Age is when your memory is shorter
your experience is longer
your stamina lower and
your forehead higher.

from Copper's Weekly

UNIVERSITY OF MINNESOTA LIBRARY

Further Additions to the Geology Library

Pillsbury Hall

by Wilma Monserud

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