



Geological Society of Minnesota

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NEWS



Geological Society of Minnesota

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Oct.-Nov.-Dec., 1977

OFFICERS

PRESIDENT	Allen Lundgren	765 Redwood Lane, New Brighton	633-5442
VICE PRES.	Marlys Lowe	2206 Caroline Lane, So. St. Paul	451-2522
SECRETARY	Myrtle Fore	4356 30th Ave. S., Mpls.	722-5650
TREASURER	Bob Leacock	1235 Brighton Sq., New Brighton	636-2473
DIRECTORS	Barbara Gudmundson	5505 28th Ave. S., Mpls.	722-9132
	Bob Hadschin	2029 Edgerton Rd., St. Paul	774-1431
	Mark Jeffreys	9509 5th Ave. S., Mpls.	888-1274
	Sr. Joan Kain	1035 Summit Ave., St. Paul	225-3000
	John Podolinsky	10226 Mildred Terrace, Mtka.	544-1457

NATIONAL GEOGRAPHIC, THE DOOMSDAY MACHINE

Reprinted from
the Journal Of
Irreproducible
Results, March,
1974

GEORGE H. KAUB

Pollution of many types and kinds is currently paramount in the public mind. Causes and solutions are being loudly proclaimed by all of the media, politicians, public agencies, universities, garden clubs, industry, churches, ad infinitum. Pollution runs the spectrum from the air we breathe, the water we drink, the soil we till, as well as visual and audio pollution, and in recent years, pollution of outer space from junk exploration hardware. These threats to our environment, our health and our mental well being are real and with us, but not nearly as immediately catastrophic or totally destructive as the disaster which imminently faces this nation and which has gone unheeded, unheralded and ignored for over 141 years. The insidious consequences lurking in this menace of monstrous proportion bode national, even, continental disaster of proportions likened only to the entire country resting on a gargantuan San Andreas fault. Earthquakes, hurricanes, mud slides, fire, famine, and atomic war all rolled into one hold no greater destructive power than this incipient horror which will engulf the country in the immediate and predictable future.

This continent is in the gravest danger of following legendary Atlantis to the bottom of the sea. No natural disaster, no overpowering compounding of pollutions or cataclysmic nuclear war will cause the end, instead, a seemingly innocent monster created by man, nurtured by man, however as yet unheeded by man will doom this continent to the watery grave of oblivion.

But there is yet time to save ourselves if this warning is heeded.

**PUBLICATION AND DISTRIBUTION OF THE
NATIONAL GEOGRAPHIC MAGAZINE MUST
BE IMMEDIATELY STOPPED AT ALL COSTS!**

This beautiful, educational, erudite, and thoroughly appreciated publication is the here-to-fore unrecognized instrument of cosmic doom which must be erased if we as a country or continent will survive. It is NOT TOO LATE if this warning is heeded!

According to current subscription figures, more than 6,869,797 issues of The National Geographic Magazine are sent to subscribers monthly throughout the world. However, it would be safe to say that the bulk of these magazines reach subscribers in the United States and Canada, and it is and never has been thrown away! It is saved like a monthly edition of the Bible. The magazine has been published for over 141 years continuously and countless millions if not billions of copies have been innocently yet relentlessly accumulating in basements, attics, garages, in public and private institutions of learning, the Library of Congress, Smithsonian Institute, Good Will, and Salvation Army Stores and heaven knows where else. Never discarded,

always saved. No recycling, just the horrible and relentless accumulation of this static vehicle of our doom! National Geographic averages approximately two pounds per issue. Since no copies have been discarded or destroyed since the beginning of publication it can be readily seen that the accumulated aggregate weight is a figure that not only boggles the mind but is imminently approaching the disaster point. That point will be the time at which the geologic substructure of the country can no longer support the incredible load and subsidence will occur. Gradually at first, but then relentlessly accelerating as rock formations are compressed, become plastic and begin to flow; great faults will appear. The logical sequence of events is predictable. First will come foundation failures and gradual sinking of residences and public buildings in which the magazine has been stored. As these areas

(continued on last page)

Highlights of the BOARD

BOARD ELECTS NEW OFFICERS

The Board of Directors has elected its new officers for 1978. They are President -- Marlys Lowe; Vice President -- Bob Handschia; Secretary -- William Miller; Treasurer -- Bob Leacock.

Marlys Lowe served on the Board last year as Vice President. Bob Handschia also was a member of the Board last year. He has agreed to become the chairman of the 40th Anniversary History Project. Bill Miller is a newly elected member of the Board. Bob Leacock is continuing as Treasurer for another term.

The new officers will assume their duties January 1.

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BOARD APPROVES A G.S.M. HISTORY FOR 40th ANNIVERSARY NEXT YEAR

After discussion at recent meetings, the Board at its November meeting voted to prepare a history of the Society as part of the forthcoming 40th Anniversary of its founding October 28, 1938. Most of the Society's early members have passed away, and action to interview those still living is urgent, in the judgement of the Board. Bob Handschia was asked by the Board to form a committee to help on this project. Any one with ideas on what should go into the history should call him, 774-1431, daytime or evenings.

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IMPORTANT

MEETING ROOM CHANGED

Beginning with the next lecture January 9, meetings will be held in a new room. The G.S.M. has been assigned Room 210 Physics Building on the U. of M. Campus. This room is directly upstairs from the old lecture room.

The meeting will begin at 7:30 p.m. Dr. Henry Lepp, Macalester College, will begin his five-lecture series on the Earth and Earth Processes.

Remember

ANNUAL DUES

Annual dues are due January 1. We need your support. Dues may be paid at the next regular meeting or mailed to the Membership Chairman, Marjerie McGladrey, Rt. 1, Box 17F, Elko, MN 55020.



welcome

NEW MEMBERS:

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The following people have joined the G.S.M. recently. We would like to welcome them into our membership.

Douglas and Terry Robertson
2165 Commonwealth Ave.
St. Paul MN 55108

Harold O. Richter
2220 E. 6th St.
St. Paul, MN 55119

Charles E. and Margery Matson
2368 Joy Ave.
White Bear Lake, MN 55110

Levi N. Sterner
376 W. 5th St.
Winona, MN 55987

John T. and Amanda Jenkins
1276 Oakcrest Ave.
St. Paul, MN 55113

Mary Enley
2418 Fremont Ave. S.
Minneapolis, MN 55405

Ralph and Marietta Novotny
Rt. 3, Box 104
Hector, MN 55342

Jay Hutchinson
3232 Woodbridge St.
St. Paul, MN 55112

Margaret Novotny
Rt. 3, Box 104
Hector, MN 55342

Mr. and Mrs. F.P. Warner
9745 Bluff Road
Eden Prairie, MN 55343

Marjorie Novotny
Rt. 3, Box 104
Hector, MN 55342

Jim Lundgren
765 Redwood Lane
New Brighton, MN 55112

Steven Bader
2905 Colfax Ave. S.
Minneapolis, MN 55403

In Memoriam

William L. Cavert

William L. Cavert, 1443 Grantham St., St. Anthony Park, died October 15, in St. Paul, at age 90. He was a long-time member of the G.S.M., as was his wife Mary who died in February, 1976. Until the last two years he was a regular attendant at our lectures.

Cavert was an early farm economist, with a PhD from Cornell. He was a farm management specialist with the Minnesota Extension Service from 1914-34, and then Research Director of the St. Paul Farm Credit Banks from 1934 to his retirement in 1957. Thereafter he helped with many community projects, including establishing the Gibbs Farm Museum of the Ramsey County Historical Society, of which he was a past president.

His survivors include two daughters on the staff of the University of Wisconsin, Madison, and a son, H. Mead Cavert, Dean of the U. of M. Medical School. Bill was a man of wide interests and generous in his support of them, including the G.S.M. Those who knew him gained much from his constructive help.

Bob Handschin

BIOGRAPHIES OF RECENTLY ELECTED BOARD MEMBERS

by Bob Handschin

G.S.M. members elected five directors for 2-year terms at the September Annual Meeting.

Myrtle Fore was reelected for a second 2-year term. She is a home economics teacher at St. Paul Highland Park Junior High who had science courses at Gustavus Adolphus, followed by her Master's at the U. of M. She is a part-owner of the home farm in the Minnesota River Valley near Renville, close to some of the G.S.M.'s field trip stops for glacial evidences. She has been G.S.M. Social Chairperson, and during the 1977 year, Board Secretary.

Mark Jeffreys, who filled out the term of Les Collins this year, has been in the G.S.M. for the past four years with his wife, Dorothy. For some 15 years before that, they were active in the Bloomington Mineral Club, but wanted to know more about how rocks were formed. Both are from Toledo, but have been in Minnesota for 20 years. Their daughter was a 1976 graduate of Carleton and now works with retarded persons in Chicago after graduate training at Notre Dame.

Bob Leacock was reelected, and promptly was asked to continue as G.S.M. treasurer! He and his wife have been in G.S.M. for 9 years, and he served on the Board some years ago. Together they put out the G.S.M. Newsletter for two years. Bob is a man of many accomplishments, including some fine rock sample mountings. He says a 2-year class which G.S.M. offered soon after he joined gave him a firm foundation for lots of geological understanding since then.

Allen Lundgren, who served as president this year, was reelected to a second term on the Board. He hails from Glenwood, Minnesota where he developed an interest in forestry, and with 3 degrees from the U. of M. in Forestry, he has done research for the Forest Service, mostly in Minnesota. With an interest in ecology, geology was a natural when he found out about the G.S.M. at our exhibit for a local rock show. He and his wife, Barbara, served on the G.S.M. Planning and Evaluation Committee for several years, and she writes book and magazine article reviews for G.S.M. News.

William E. Miller was elected a new member of the Board for a two-year term. Bill is a native of Louisiana who is a forestry entomologist for the North Central Forestry Experiment Station located on the St. Paul Campus of the U. of M. His work takes him into several nearby states. His hobbies are moths and butterflies. In recent years he has become interested in geology and has been a member of the G.S.M. for the past four years. He is attempting to tie his study of these two fields together by looking for fossils of moths and butterflies, which can be found in peat, coal, amber, and other rocks. Let's hope his success, so members of the G.S.M. can learn from his explorations.

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Members who have not seen the November issue of Scientific American will be interested in the article on "An Early Energy Crisis and Its Consequences" by John U. Nef. The author traces the shortage of wood in Great Britain, which forced the first wide use of coal, with attendant development of new technology leading to the Industrial Revolution there. The article is rich in details, the result of a half-century study of the subject by Nef.

Bob Handschin

THE BEAUTY OF SUPERIOR'S NORTH SHORE IS ROOTED IN ITS PAST,

AS EXPLAINED ON LAST SUMMER'S G.S.M. FIELD TRIP

by Marcia Gunville

The time: some time during the Late Precambrian Period, probably 1200-1000 M.Y. Before Present. The place: a long, narrow zone of the early continental crust which was slowly splitting apart, according to the speculations of geologists today. The result: a voluminous outpouring of numerous lava flows forming a linear belt of massive igneous rocks extending from today's Canadian border to Kansas.

The volcanic and intrusive rocks of this ancient rift zone were the subject for study on the G.S.M.'s North Shore field trip last June. These distinctive rocks border Lake Superior along one of Minnesota's most spectacular highways.

Dr. David Southwick, Macalester College, showed us how events during the Keweenaw (Late Precambrian) Period caused the formation of these rocks and helped to create today's exceptional scenery. He taught us some of the ways geologists read earth history from rock records like these. We came home with a little better understanding of the kind of place this was so long ago.

Dr. Southwick also showed us rocks which were even older than the North Shore Volcanics, predating them by some 500 million years. We began our field trip by looking at these earlier rocks. They were formed during the Middle Precambrian Period when this area was covered by a vast sea. We saw them at the dam on the St. Louis River near Thomson, just southwest of Duluth. Outcropping here are the various slates, siltstones and metagraywackes of the Thomson Formation. A large sea, present on this part of the continent during the Middle Precambrian Period, collected the sediments eroding off the land masses then present. These were the sediments which became the Thomson Formation.

Similar rocks also outcrop in widely different places. They appear near the Mesabi Iron Range (Virginia Formation), and again near the North-east Minnesota-Canadian Border (Rove Formation). Geologists have established a correlation between them, even though they are separated by long distances on the map. They were laid down in the same sea and are considered essentially the same formation. Over then the next rock layer is a thin unit of Late Precambrian sandstone and conglomerate, the Nopeming (S) - Puckwunge (N) Formations. Some time after these younger rocks were formed and worn down the North Shore Volcanics were extruded upon their eroded surfaces.

Late Precam- brian	Mesabi Iron Range	E. Minn. at Thomson	N.E. Minn.- Canada Border
		North Shore Volcanics	
Middle Precam- brian		Nopeming Formation	Puckwunge Formation
	Virginia Formation	Thomson Formation	Rove Formation
	Elwabik Iron Fm.		

At the dam near Thomson we saw evidence in the rocks for turbidity currents in the waters of the Middle Precambrian sea. Dr. Southwick showed us typical turbidite deposits in the Thomson Slate. These turbidites appeared as peculiarly striped rocks. They contained rhythmic interbeddings of lighter (graywacke) and darker (slate) bands with sharp lines of contact above the darker bands only.

He explained how turbidites are formed. Sediments along continental margins become shaken loose, perhaps by an earthquake, and move rapidly down continental slopes into the deep sea. A single turbidity current comes charging along the sea bottom. This swirling mass of turbid water travels at a high speed through the quieter sea waters. It picks up more sediments as it rolls along, moving downslope as a submarine landslide. As it begins to lose speed it finally spreads out and comes to rest, and the sediments it carries settle out. Larger particles, the sands,

settle out first. Then successively smaller particles settle out in a graded, even a laminated succession. Finally the muds slowly settle on top. Later the next turbidity current lays down another series of sediments from sands to muds, and the succession continues to build up in the turbidite deposit.

The turbidites we were looking at once were such ancient sea sediments. The alternating patterns in the rocks appeared as graywackes, formerly sands, gradually grading to finer and finer rock types, and finally slates (formerly muds). The sharp lines of contact above the slates mark the end of one turbidity current episode and the beginning of the next.

We could imagine how these sea sediments were distributed, probably by rolling in a mass down what was then a continental slope. We could also imagine how, as time went on, they became buried and lithified (hardened) into sedimentary rocks. Such sedimentary rocks would be likely to have mineral-rich waters circulating through them. We could see that this, too, had happened long ago. Holes in the rocks for concretions were the evidence.

Circulating waters once carried minerals in solution through cracks and pore spaces in these rocks. Some of the minerals were precipitated out. In favored locations they formed nodular shapes, or concretions. We could see the sites of many such concretions, even though the concretions themselves have been dissolved away. They appear as strings of holes running along certain rock layers, almost as though some peculiar woodpeckers had attacked the rocks and "eaten up" the collections of concentrated minerals once present here.

We could see that these rocks also had been bent and twisted into synclines and anticlines. Mountain building activity had caused this bending. During this process metamorphism changed the shales into slates and the graywackes into meta-graywackes. Such mountain building pressures caused minerals in the rocks to become reoriented and recrystallized. They lined up along new planes, called foliation planes, in response to such squeezing and reheating.

Lines of foliation are so steep here that they are almost vertical. They give these rocks a dramatic appearance. Foliation lines mark the planes along which minerals tended to adjust themselves during metamorphism. They are different from bedding planes, which we also could see. Bedding planes are represented by the lines of concretion holes in these rocks. Foliation planes also are different from joints, which were formed as fractures. We could see joints crossing both bedding and foliation. Knowing the difference between all these lines is important in interpreting what happened here.

Dikes of dark basalt, with glasslike margins, cut through the Thomson Slates. These glasslike margins were unusual. At some time hot magma had been injected into cracks in the rocks as dikes. It had cooled very rapidly as it contacted the cold wall rocks (slate). It did not have time to grow crystals, and these very fine, glasslike margins resulted. We made note of the direction these dikes traveled. Since they crossed both the bedding and foliation planes in the slates, they must have been emplaced more recently than the time when mountain building processes were active. They probably were part of the plumbing system for the Late Precambrian North Shore Volcanics nearby. The rocks here also are cut by white quartz veins. Some of these veins are very prominent, and probably were formed at a somewhat earlier time.

At another field stop just south of Duluth we saw the Thomson Formation once again. This time it was outcropping in an open field. There was a hill in a woods at the edge of the field. Upon inspection the hill turned out to be an outcrop of basalt with a thin sandstone layer near its base. This hill is the contact of the Middle Precambrian Thomson Formation and the Late Precambrian Nopeming Sandstone,

which was covered by another rock formation, the bottom lava flow in the North Shore Volcanic Group. Many millions of years are represented by these contacts.

The Nopeming Sandstone is a typical stream deposit. It was laid down in an entirely different environment over the upturned and eroded beds of the Thomson Formation. It is a quartz sandstone in places, shaly in places, and also conglomeratic. Here in a tiny layer under the shelf of basalt in this hill, it was sandstone.

Dr. Southwick told us that the Nopeming Sandstone varies considerably, not only in rock type but also in thickness, as would be expected of a highly channeled stream deposit. In some places it may be several feet thick, and absent a short distance away. It may be highly gravelly in one place and extremely fine in another. Streams leave behind their sediments in such an irregular manner. The force of the water and the gradient of the stream determine where and in what amounts sediments will be deposited. Another break in the stratigraphy between the Nopeming Sandstone and the overlying lava flow marks a period of erosion of the Nopeming Sandstone before the volcanic outpourings began.

We did not see Middle Precambrian rocks again until we had traveled 200 miles north to the Canadian border. There along the shore of Lake Superior the graywackes and shales of the Rove Formation are exposed. They are not upturned here as in the Thomson Formation. Their beds are flat, signifying no Middle Precambrian mountain building activity here. We did not see the contact with the overlying Pookunge Sandstone as it outcrops at too great a distance for us to visit.

We did see that the Rove Formation is cut by Late Precambrian dikes, as dikes have cut the Thomson Formation. These dikes are much more impressive, however. Instead of being mere basaltic ribbons, they are huge, massive diabase structures called the Logan Intrusives. Along the shoreline at the Canadian border, Mt. Josephine is one of these diabase dikes.

Dr. Southwick explained that diabase is the intermediate rock type between gabbro and basalt. If a magma is injected deep underground and cools slowly its crystals become large, as they are in gabbro. If the same material reaches the surface and cools quickly its crystals are small, as in basalt. If the magmatic material cools near but not at the surface its crystals are sized in between the two rock types, forming a diabase. These crystals, though quite large, still constitute a diabase simply because they are part of a dike. For convenience, all such intrusives close to the surface are termed diabase.

(The discussion of the North Shore field trip with Dr. Southwick will be continued in the next issue of the G.S.M. News.)

M. G.

(continued from Inside Cover page)

depress the earth, more and more structures will topple and sink until whole towns and cities will submerge, then larger and larger land masses. This chain reaction will accelerate until the entire country has fallen below the level of the sea and total inundation will occur.

The areas of higher subscription density, affluence and wealth will be the first to go, followed by institutions, middle class, urban and ghetto areas in that order, with the relatively unpopulated plains and mountains finally sinking into the sea.

We have been warned of this impending calamity by a seeming increase in so-called natural disasters throughout the country as well as isolated occurrences striking areas heretofore immune to natural destruction.

Increase in Earthquake activity in California has been triggered by population growth and the subsequent increase in National Geographic subscriptions and accumulations of heavy masses of the magazine. This gradual increase in weight has

caused increased activity along the San Andreas fault.

Earthquakes in the Denver area were not caused by pumping of wastes into wells at the Rocky Mountain arsenal, but by accumulation of National Geographic magazines by more and more people as the population increased over the years.

Sinking of several coal mining towns throughout the country can only be attributed to the increase in workmen's benefits and pay increases allowing them to subscribe to and hoard National Geographic.

Mud slides in California which have brought destruction to hundreds of homes built on the hillsides were triggered by the final straw in the form of the last mail delivery into these areas of National Geographic subscribers and hoarders.

The list is endless, the warnings are clear.

The time grows short and we must act at once if this calamity is to be averted. The National Geographic must cease publication at once, if necessary, by Congressional action or Presidential edict.