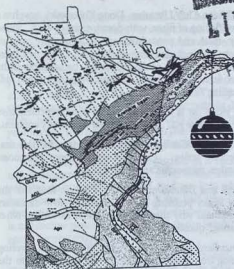


Minnesota Geological Society
LIBRARY



GEOLOGICAL SOCIETY OF MINNESOTA

NEWS

YULETIDE ISSUE—1994
VOLUME XLVIII, NO. 4

CONTENTS

Holiday Gift Ideas	1
Membership Due!	2
Board News	2
Video Sampler	2
Meet the new Officers	2
Radon—What a gas!	3
Songs for the Holidays	4, 5
Rooty Toot Toot for the Moon! 6, 7	
Course: Drifting Continents	8

Newsletter

All You Want For Christmas Is... Suggestions for Great Gifts???

Been wondering lately what to get Uncle Joe or Aunt Em? Can't think of a thing for that co-worker, your sweetheart or those hard-to-buy-for-has-everything folks on your list?

Your newsletter committee gathered over coffee and cookies and came up with the following list. Some items would be welcomed with enthusiasm by your rock hound friends/family and many items would be educational for those who can't understand your ever-obsessive need to stare at rocks as if they were doing something.

Most items can be found at the Nature Stores and out-fitters throughout the Metro Area and other locations in Minnesota. They are all useful if only to hold and to look at. Consider one of these items as a wonderful surprise for someone you care to give the very best!

Rock Books	Field Boots
Rock Pick	Field Vest
Rock Jewelry	Tool Belt
Rock Door Stop	Shovel
Rock Book Ends	Kneepads
Rock Kaleidoscope	Dust Mask
Rock Wind-chimes	Radon Test Kit
Worry Stones	World Globe
Geodes	Geology Wall Charts
Quartz Crystals	Hand Lens
Fossils	Goggles
Amber	Worry Stone Beads

Dinosaurs (Models Only)

Prune Stones (pruned from your collection)

Subscription to:

Earth Magazine
Discover
Omni

Membership in:

The Science Museum
Geological Society of Minnesota
GSM Video Club

Faux Geo: (Last resort!)

Fossil Watch
Acid Rock
Grundge Rock

Heavy Metal
Patio "stones"
Costume jewelry

For the Geological Society of Minnesota, purchase a video for GSM or purchase your personal membership in The GSM video library

And don't forget a special gift for yourself. Sign up for a class! (See article on Drifting Continents on Page 8).

—Newsletter Editors Dwight, Judy and Charlie.

Board Elects 1995 Officers

On November 9, the GSM Board elected officers for 1995. The officers are:

Doug Zbikowski, who takes on a second term as president. It's wonderful to have folks who love their jobs, especially when it's an avocation. Great to have you lead us again, Doug.

Charles Brennecke (Charlie), a newly elected Board member, was elected Vice President. Charlie will not only be of help to Doug, but will be an extra asset to the Board as he recently joined the Newsletter Committee, too. Charlie does scanning, layout and final copy preparation for the News.

Ed Huppler agreed to be Treasurer for another year and Judy Hamilton will continue as secretary for another year. (See **Meet Your GSM Officers** in the next column.)

Highlights of 1994

It was noted at the Board meeting that GSM is still flourishing with a total, as of this printing, of 180 paid members for the 94/95 fiscal year.

The Video Library, proposed by Doug Zbikowski a year ago and developed throughout 1994, is now ready for member subscriptions. A sample list of available videos is listed in the next column on this page.

The field trips were fun and exciting, with a great two-week trip out west, and the State Fair was once again successful, generating much interest in the Society and several new members.

Four newsletters were published (including this issue) and the committee continues to operate with creative enthusiasm.

The lectures, complete now until January 9, have been catastrophic events --no!! no!! I mean, *about* catastrophic events.

The Board wishes to thank all the people whose loyalty and help has made this another successful year for GSM. Without our committees, and other volunteers, we wouldn't be able to do it.

And a special thanks to all you Society members who, of course, make the Society what it is. It's been a good year.

Happy Holidays!

Judy Hamilton, Secretary

Look At Your Address Label!

Your membership expiration date is shown on the address label of this newsletter. If you are not paid up for 94/95, *renew now!*

Video Sampler

Our Video Club Librarian, Doug Zbikowski, now has a complete listing of films, with descriptions of each. Video Library rules and procedures and videocassette care instructions are included with each order. Copies of these documents and some of the videos will be available at the next two lectures starting in January. You can order a video by calling 784-0423.

The video list is long, so here are some representative categories to give you an idea of what the library contains.

- **Catastrophic Geology:** Very appropriate for this season's lecture series. Contains videos about volcanoes, earthquakes, meteorites and great floods.
- **Fossils and Dinosaurs:** Includes films on fossils of the Burgess Shale, puzzling questions about how dinosaurs originated and why they became extinct as well as other "dinosauric" questions.
- **Planet Earth Series:** Seven videos in this series covering everything from plate tectonics to rare space shots to the fate of the earth.
- **Rocks and Minerals:** Videos that examine rocks that form on the earth's surface as well as those that form underground, rock cycles and one on American gemstones that explores how rare crystals are formed.
- **Geologic Time and Life:** These videos portray the immensity and difficult concept of geologic time.

Remember the above listing is just a small synopsis of the many interesting videos available now. Have a look! Or, have a video party and share your geological interest with friends.

Meet Your GSM Officers

Doug Zbikowski, President: A self-employed engineer who recently sold his engineering business to pursue a writing career. Doug and Mary have a toddler son, Conrad, who has accompanied them on several field trips.

Charlie Brennecke, Vice President: Retired. Was trained as an engineer but spent most of his life as a bureaucrat in large insurance organizations, mostly devoted to adult education. He and Patti have a large extended family.

Ed Huppler, Treasurer: Retired Surgeon. Presently keeps the GSM bank accounts clearly visible on his home computer. Ed and Sylvia have been regulars at GSM since 1981.

Judy Hamilton, Secretary: Spends a lot of time looking at and thinking about rocks. Presently inspiring her two oldest grandchildren to develop an interest in geology by showing and telling them about the fossil rocks lying about in her backyard and several rooms of her home. In her spare time she is employed by a Minneapolis law firm.

Radon—What a Gas!

Radon, like carbon monoxide, can be a silent killer. However, radon's speciality is lung cancer rather than asphyxiation. Both are undetectable without special monitors. Radon, like it's parent element uranium, is radioactive. However, uranium has a half life of 4.4 billion years—i. e., after 4.4 billion years, exactly one half of the original uranium will have decayed into "daughter" elements—one of which is radium. When radium decays, an alpha particle (a radioactive particle consisting of two protons and two neutrons) goes in one direction and a radon atom in the other. Most of the atoms stay in the rock.

If the decay occurs near the surface of a rock and the radon encounters "air" it can travel some distance, depending on porosity of the soil, and get into a house before it reaches the end of its 3.8 day half-life. The radon atom then splits into a number of elements one of which is radioactive polonium. Polonium in the lungs can damage tissue and trigger lung cancer.

Uranium is present in nearly all rocks and, as these break down, the uranium is released along with all its radioactive "children" called daughters. Shiela Brunelle, Radon Specialist at the Minnesota Department of Health Indoor Air Division, reports that 68 out of Minnesota's 87 counties are rated "high risk" for radon. All of the 7-county Metropolitan Area falls into the "high risk" category.

The "safe" level is set at 4 picocuries per liter of air by the EPA. [A curie is a measure of the amount of radioactive decay/second: a picocurie is one trillionth of a curie and 4 picocuries amount to about 8 to 9 atoms of radon decaying each minute in a liter of air]. In a house of 1,000 square feet about 2,000,000 radon atoms will be decaying per minute.

Are you at risk? Here's how to find out.

Hennepin County provides a \$7.00 test kit which includes several informative brochures. You can write to Hennepin County Environmental Health, 1011 1st St South, Suite 215, Hopkins, MN 55343; or call (612) 930-2770. Sheila Brunelle also welcomes all inquiries at the Minnesota Department of Health, 925 S.E. Delaware St. (PO Box 590401) Minneapolis, MN 55459-0040; or call (612) 627-5012. Outside the Metropolitan dialing area call 1-(800) 798-9050. Sheila said, although the Hennepin County kit is cheaper, it is intended more for short term monitoring. She advises purchasing a more expensive but more effective long term kit at a cost of about \$25.00. Lists of vendors are available from the Minnesota Department of Health.

—Submitted by *Dwight Robinson*

X-Mas Song Warm-up!

Sing these, then turn the page to get down to Earth!

Rockin' Round the X-Mas Tree (Standard Version)

Rockin' round the Christmas tree
at the Christmas party hop,
Mistletoe hung where you can see,
Every couple tries to stop.
Rockin' round the Christmas tree,
Let the Christmas spirit ring
Later we'll have some pumpkin pie
And we'll do some caroling
You get a sentimental feeling
When you hear the voices singing
"Let's be jolly.
Deck the halls with boughs of holly."
Rockin' round the Christmas tree.
Have a Happy Holiday
Everyone dancing merrily—
In the new old-fashioned way! [X2]

The Christmas Song (Chestnuts Roasting on an Open Fire)

By Mel Torme and Robert Wells

Chestnuts roasting on an open fire,
Jack Frost nipping at your nose,
Yuletide carols being sung by a choir,
And folks dressed up like Eskimos
Ev'rybody knows a turkey and some mistletoe
Help to make the season bright.
Tiny tots their eyes all aglow
Will find it hard to sleep tonight
They know Santa's on his way;
He's loaded with lots of toys
And goodies on his sleigh.
And every mother's child is going to spy
To see if reindeer really know how to fly.
And so, I'm offering this simple phrase
To kids from one to ninety-two.
Altho it's been said many times, many ways;
"Merry Christmas to you."

Rockin' Around The X-mas Tree
(Geo Version)

Rockin' around the Xmas tree at the
solstice geo hop.

Mistletoe hung where you can't see,
but a boulder makes you stop.

Rockin' around the Xmas tree, let the
solstice spirit ring.

Later we'll have some stone fruit pie
and we'll do a group rock sing.

You will get a sedimentary feeling
when you hear, rock picks ringing.

"Roof to hallway. Deck them all ala
geology."

Rockin' around the Xmas tree.

Have a happy holiday.

Everyone dancing merrily [in the new,
old rock hound way!] (X 2)

*Geological Society of Minnesota
Xmas Holiday Celebration Song
Metamorphosed by Dwight Robinson
(11/1994)*

Song of the Molecular Biologists

(Sung to the tune of
"My Favorite Things" from
The Sound of Music.)

Plasmids and cosmids and phages and
vectors,

Introns and exons that split into sec-
tors,

Phenotype changes in Mendel's green
beans—

These are a few of our favorite genes!

Northerns and southerners and chro-
mosome walking,

Clone our dead grandma (she's no
longer talking),

Store her forever in just one test tube,
Primer extension is what we will do.

Oh we'll splice her,
And we'll screen her,
Amplify her too.

So if you want grandma,
(Your very own grandma),

Then we will clone one
For you!

Probing for DNA polymorphisms,
DNA ligase to fill in those schisms,
Plotting a cot curve to see what it
means,

This is called fun with mammalian
genes!

Submitted to *Science* by
Edward F. Hawkins
Beckman Instruments, Inc.
2500 Harbor Boulevard,
Fullerton, CA 92634-3100

The X-Mas Song (Geo Style)
Was it Santa or Something Else?
(Sung with all due feeling)

Lava bursting out in open flames;
Glaciers glide and rivers flow;
Cratons adding exotic terranes;
And fault lines primed to just let go.

Every now and then...a visitor from
outer space;
Makes the atmosphere burn bright;
Whistling down at a terrible pace;
What's there to see won't sleep to-
night.

There are big changes on the way;
Species big and small call it a day;
And later primate eyes are going to
spy;
Iridium in amounts that are way too
high.

Just when all seemed to turn to fire
and steam;
Mammals, birds and insects, too.
If none had survived these bolidic
extremes,
There'd be no me and you!

Geological Society of Minnesota
Xmas Holiday Celebration Song
by Dwight Robinson
(Revised November 1994)

Song of the Young Paleontologists

(Sung to the tune of
"My Favorite Things,"
from *The Sound of Music*.)

Trilobites, burrows, and Cephalopoda
Corals and worms and lamellibranchiata,
Echinoderm skeletons made out of rings
—These are a few of my favorite things.

Asteroid impact and classification,
Isotope dating and bioturbation;
In the Triassic the birds got their wings—
These are a few of my favorite things.

When the clams bite, when the shells sink,
When I'm feeling sad,
I simply remember that most are extinct
And then I don't feel so bad.

Darwin, Lamarck and genetic mutation,
Gradual changes and quick punctuation;
DNA bases all bound up in strings—
These are a few of my favorite things.

Protista and Ediacara fauna,
Eukaryota, Pangaea, Gondwana;
Vema, a monoplacophoran, clings—
These are a few of my favorite things.

When the sharks bite, when polyps sting,
When I'm feeling sad,
I simply remember that most are extinct
And then I don't feel so bad.

Submitted to *Science* December 3, 1993
by Alexander Volokh, an environmental
policy analyst in Washington, D.C.

ROOTY TOOT TOOT FOR THE MOON

Singin' rooty toot toot for the Moon.

It's the biggest star I've ever seen.

It's a pearl of wisdom, a slice of green cheese.

Burning just like kerosene.

—Greg Brown, from "Rooty Toot Toot for the Moon"

One of the more remarkable monuments to time stands ponderous and mysterious on the Salisbury Plain of southwestern England. No less distinguished visitors than Charles Darwin, Egyptologist Flinders Petrie and Winston Churchill have stopped to ponder the remains. Its latter day name is "Stonehenge" which derives logically enough from Saxon roots meaning "place of hanging stones." However, its builders would never recognize it by that name. Despite every effort to link it to the great civilizations of the Mediterranean, it remains stubbornly Neolithic and prehistoric.

While the voices and oral traditions of the builders have disappeared with the wind, the stones out of which it is composed can still speak to us of their origins. Even more is revealed by their shapes and configurations and organic remnants such as antlers underground. From the outer circle moving inward are first a circle of sarsen stones (sedimentary sandstone) with continuous lintels, a bluestone circle (igneous rock), a sarsen horseshoe of trilithons, a bluestone horseshoe and an Altar Stone (red sandstone).

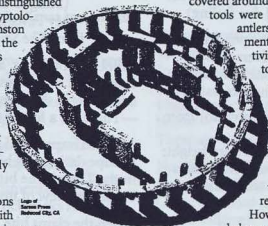
The sarsen stone formed as sedimentary sand deposited over chalk at the bottom of a Tertiary sea and is several times harder than granite. The most likely source was found some 15 to 20 miles to the north. The three varieties of bluestone included spotted dolerite (preselite), rhyolite

and volcanic ash from a source over 100 miles away to the northwest. It is likely that even without Archimedes, the builders discovered the power of levers, sledges and log rollers and rafts to move such mammoth blocks of stone.

Just as only diamond can cut diamond, only sarsen could cut and shape sarsen. Small rounded hammerstones and heavy mauls of sarsen weighing 40 to 60 lbs were discovered around the bases of fallen stones. The main tools were strictly Neolithic: stone, wood and antlers. Radiocarbon dating using fragments of antler digging tools indicate activity at the site dating from about 2600 to 1400 BC spanning some 55 human generations.

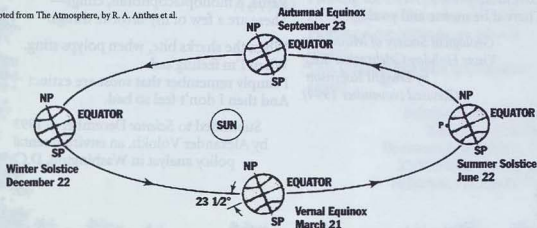
Stonehenge obviously had a reason for being and when human beings begin piling and aligning rocks into megalithic structures there are usually astronomical connections. Was the Moon behind the megaliths? The Sun? There is reason to suspect both and neither. However, any human group within tribal memory span of the Ice Age and living in a northern region had plenty cause to be concerned with the ways of the Sun.

As any Minnesotan knows this whimsical giver of heat and light peaks midsummer and threatens to disappear midwinter. This happens because Mother Earth rides through her orbit with axis tilted about 23.5 degrees, i.e., the plane of the equator is tilted 23.5 degrees off the plane of the earth's orbit. This means that during each annual orbit, the northern hemisphere will be tilting toward the sun for half a year and tilting away from the sun for the other half.

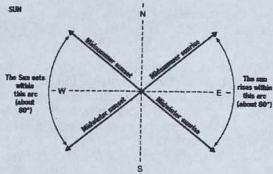


View of Stonehenge from Salisbury Plain, Wiltshire, England, U.K.

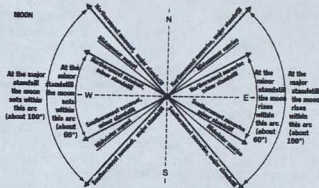
Adapted from *The Atmosphere*, by R. A. Anthes et al.



Orbit of the Earth in perspective, showing seasons. Note that the plane of the equator is not parallel to the plane of the Earth's orbit. Point P is where the sun is directly overhead.



The four defining limits of the sun's annual movement, and the two solar directions at the equinoxes.



The eight defining directions of the moon's movement over its 18.6-year cycle.

The halfway points are marked by days of equal length of night and day, the equinoxes March 21 and September 23. The sun peaks at the summer solstice (meaning Sun stands still) June 22 when it appears to hesitate and plunge back down to its nadir December 22 where it again "hesitates" only to "rise" again. All this apparent motion is really a result of the tilt of the planet. The Moon offers many more angles to measure (see diagram above) and any structure as complex as Stonehenge will measure some of these whether the builders meant to or not.

*The Whole Kit and Kaboodle is in disrepair,
There's no where to gold: it's not here.*

But if what you see is what you get was true for the keepers of Stonehenge, it has been even more so for those who have come to Stonehenge armed with the tools and sophistication of modern astronomy. Stonehenge has been shown to measure almost anything the researcher was looking for. There are at least four different Stonehenge astronomies, none conclusive, and when taken together they do not add up to any general idea. It is most certain that the main axis of the structure aligns with the summer (and winter) solstices. Certainly marking the seasons is critical for any farming culture and for whatever ritual functions there may have been, Stonehenge seems more calendar than Neolithic computer or astronomical observatory.

It is gratifying to reflect that our own holiday occasion, whatever its contemporary clothing is rooted in this deep solstice tradition of ages past. And, as we once again prepare to celebrate the return of the Sun, we should at least pay equal respects to the Moon. Astronomers at the Bureau of Longitudes in Paris have given plenty of reasons to cheer our nearest neighbor in space. Computer simulations of Earth without Moon reveal a world without life as we know it. Whatever destabilizing impact it might have on a mind here and there is more than balanced by its stabilizing effect on the planet. The 23.5 degree tilt called the obliquity of the spin axis has remained steady through the

eons thanks to the Moon. Granted it does change over time but only by 1.3 degrees instead of the 85 degrees predicted for Earth without the Moon.

At an obliquity of 90 degrees, each pole would experience extreme heat and total darkness each year. For all our complaints about winter, our seasonal variations are trifles by comparison. In fact, researchers at MIT indicate that the obliquity of Mars probably swings between 0 and 60 degrees and recent Viking photos of Mars polar regions show ice and dust stacked in uneven layers. These suggest repeated advance and retreat of the polar ice caps over hundreds of millions of years. Mars' tiny moons and their Lilliputian gravity effects are not enough to offset all the other planetary influences so Mars wobbles like a top.

These findings suggest that while planets like earth may be fairly common throughout the universe, those with such big moons are likely to be rare. And if large moons are the prerequisite for advanced life forms, then thinking creatures such as ourselves may be equally rare. Lest we become too smug, the researchers add that our stability will last only as long as the Moon is nearby. It is receding to a higher orbit at a rate of about an inch a year. That should give us about a billion years before the chaotic fluctuations really take hold. *Rooty toot toot for the Moon!*

*Hang your hat on your nose; don't hide in your clothes.
Smile at someone. Begin to begin.*

—Submitted by Dwight Robinson

Illustrations are from the book *Stonehenge Complete* by Christopher Chippindale, Thames and Hudson, Inc. 1994 Edition unless otherwise noted. For an entertaining account of the many who went to Stonehenge to see what they wanted to see from "the first accurate sex machine" to levitating rock forces, giants and devils, *Stonehenge Complete* is highly recommended.

Drifting Continents/Expanding Oceans: An Introduction to the Dynamic Earth

Although geology is truly an ancient science, our understanding of the forces and processes that have shaped the earth over its 4.5 billion year history is a recent revelation. Learn about milestones in geologic thought that ultimately led to the breakthrough theory of plate tectonics just 30 years ago, and how this unifying theory explains the ever-changing landscape of the Earth's surface and the diversity of life that inhabits it. Learn why the Himalayas are the highest mountains in the world, why the Pacific Ocean is surrounded by volcanoes called the "Ring of Fire," and why California is so prone to earthquakes and Minnesota is not. (Limit 30) CSch 0552. \$58 (age 62, \$52.20). Sec. 1; Th. 6:30-8:30 p.m., Jan. 12-Feb. 2 (4 meetings), Minnesota Geological Survey, 2642 University Ave., St. Paul, Jim Miller, Senior Geologist, MGS.

For Registration Information:

Telephone (612) 624-8880

The University of Minnesota, Extension Classes

Reprinted from: *The Complete & Practical Scholar*

Look for more exciting new features in upcoming issues of your newsletter.

The purpose of this newsletter is to inform the members and friends of the activities of the Geological Society of Minnesota. NEWS is published four times a year—February 15, May 15, August 15, and November 15. Deadline for article submission is the first day of the month of publication.

Officers: Doug Ziskowski, President; Tom Casey, Vice President; Ed Huppeler, Treasurer; Judy Hamilton, Secretary.

Directors: Marty Collier, Tom Lonsky, Susan McGuire, Conrad Nelson, Galen O'Connor.

Membership Chair and Information: Fran Corcoran 724-2101



Judy Hamilton
1439 Sargent Avenue
Saint Paul, MN 55105



FIRST CLASS

PLEASE FORWARD

Geological Survey of Minnesota
2642 University Ave.
St. Paul, MN 55104