

ROCK TRAILS



**Happy Thanksgiving
and
Merry Christmas!**



Newsletter of the StateLine Gem and Mineral Society

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In This Issue:

- 1 Officers and Directors**
- 2 From the Editor**
- 3 - 5 What's Geology Got To Do With It? - Christmas?**
- 4 - 5 14 Facts You Should Know About Minerals**
- 6 The Rockhound's 10 Commandments**
- 7 Upcoming Events**

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Meetings are held the first Sunday of each month
at 2:00 PM
at 201 W. Main St., Morenci, MI 49256

From the Editor

I'm sorry this month's newsletter is so late. I don't know if any of you know, but this last month I was diagnosed with a tumor in my colon. I am scheduled for surgery on Nov. 17th to remove it and repair my colon. So I have been a bit busy spending some time in the hospital and running to the new hospital for doctor visits and tests. Therefore, I will NOT be doing a newsletter for December. This newsletter will be dated both November and December. Depending on how the surgery goes, I hope to be able to do the January issue.

I know that last year when I had my hip surgery, a few of you came to visit me in the hospital. You will not be able to do that this time. The hospital has instituted a rule and hospital patients are allowed one visitor for their entire stay and that has to be the same person the entire stay. However, I WILL take all the prayers you have!

Thank you for your understanding.

Sandy

MEETING

Sunday, Nov. 1

2:00 PM

Family Kitchen Restaurant
Corner of Treat Hwy and 223
Adrian



What's Geology got to do with it? – Christmas!

1. The Gifts of the Three Wise Men

In Christian tradition, the Three Wise Men, known as Melchior, Caspar and Balthazar, visited Jesus after his birth. Each brought a gift from his land: gold (from Persia), frankincense (from India) and myrrh (from Arabia). These gifts were common offerings and presented to Jesus. Gold was seen as valuable, myrrh was used as an anointing oil, and frankincense as a perfume.

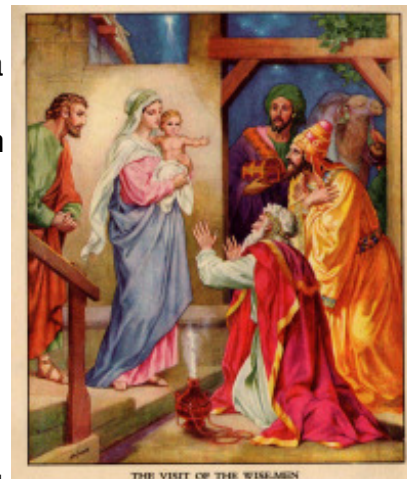
Gold –

Gold is a precious metal and was already used for coinage, jewelry and art before written historical records began. Some of the oldest gold artefacts were found in graves in Bulgaria, dating back to the 5th millennia BC.

Gold is found as ores in rocks, typically as a mixture of gold and silver. It generally occurs as tiny particles embedded in the rock, accompanied by other minerals such as quartz and pyrite ('Fool's gold'), or as grains, flakes or nuggets that have eroded from the rock and can be found in rivers or loose soil deposits.

It is estimated that a total of 165,000 tons of gold have been mined in the world, roughly half of that from South Africa. In 2007, China became the world's largest gold producer.

The gold brought to Jesus by Melchior could have originated from Persia, modern-day Iran. Iran contains several gold-rich regions, and total gold reserves are estimated to be 320 tons. Until 2012, the city of Takab contained Iran's largest gold mine, with over 4 tons of gold reserves. Recently, three new gold mines have been discovered in the city of Saqqez in the West of the country.



Frankincense –

Frankincense is an aromatic resin that comes from four main species of *Boswellia* trees. It is used in perfumes and aromatherapy and is considered valuable for its healing abilities. Frankincense is also used in religious rituals in many Christian churches. It is thought that the biblical frankincense brought by Caspar was extracted from the tree *Boswellia sacra*.

Frankincense can be found in different grades, depending on the time of harvesting of the resin. It is extracted by scratching the bark of the tree so that the resin bleeds out and hardens, forming frankincense 'tears'. There are different sorts of resin, depending on the tree species producing it as well as on the geology of the soil upon which the tree grows and the climate under which it develops.

The *Boswellia sacra* tree is native from the Arabian peninsula and northeastern Africa. It is abundant in Somalia and the arid woodlands of the slopes of the Dhofar mountains of Oman and Yemen. The tree is famous for its ability to grow in very unforgiving environments. It typically develops on calcareous soils (limy or chalky soils mostly composed of calcium carbonate) and is found on rocky slopes and ravines. The trunk is made of disk-shaped bulbs, which ensures that the tree remains firmly anchored in the rock, even in violent storms.

Geology/Christmas

Continued from page 3

Myrrh –

Myrrh is another type of aromatic resin. It was very popular in the ancient world and was used as medicine in ancient China and Egypt, as well as for Egyptian religious rituals and mummification. It was also used in cosmetics, and Greek soldiers used it on the battlefield as an oil to stop wounds from bleeding.

Myrrh comes from the thorny tree *Commiphora myrrha*. The tree is native from the Arabian peninsula (mainly Yemen), Somalia, Eritrea and Ethiopia. Like frankincense, myrrh is also extracted by cutting through the bark and sapwood to bleed the tree. *Commiphora myrrha* grows best in thin soils containing limestone, at altitudes of 250 m to 1,300 m, with a mean annual rainfall of 23 to 30 cm.

2. Christmas Wishlist – Tablets!

Be it standard or mini, Microsoft, Nexus or Apple, the tablet remains a very popular Christmas present. So as we are handling our shiny new toys, let's ask ourselves: what does geology have to do with it?

A typical tablet is made of aluminium, copper, silicon, gold, nickel, glass, steel and plastic. The raw metals used must be mined before making their way to the factory and I will use aluminium and copper as examples.

Aluminium is a silvery-white metal. It is tough, conducts electricity and is resistant to corrosion. Most metallic aluminium is produced from an ore called bauxite. Bauxite is formed in tropical climates when rocks containing little iron and silica are weathered by the elements. This ore is primarily mined from Australia, China, Guinea, Brazil, India or Russia. Other possible sources of aluminium include rocks such as shales or clays.

The production of aluminium takes place in three stages. First, the ore is mined, then it is refined to recover alumina (aluminium oxide) from bauxite, and finally it is smelted to produce aluminium from alumina. The ore is mined by what is called open cut mining, i.e. surface methods of mining where the soil is removed by bulldozers and scrapers. The bauxite lying below is then removed before being loaded into trucks or conveyor belts to be transported to refineries.



Copper is a soft and malleable red-orange metal. It conducts heat and electricity and is used in many metal alloys. It has been used as a material for thousands of years but nearly all of the copper ever extracted has been mined since 1900.

Most copper is extracted from large open pit mines in geological deposits containing up to 1% copper. The largest producers of copper are Chile, the United States, Indonesia and Peru. Although the Earth contains large amounts of copper, only a small fraction of this is economically viable and extractable.

The ores containing copper are known as porphyry copper deposits. Porphyry is a type of igneous rock – a rock that is formed through the cooling and solidifying of magma – that forms from a column of hot magma rising from inside the Earth to the surface. It is characterized by the fact that it contains larger crystals in a much finer surrounding.

Geology/Christmas

Continued from page 4

The size of crystals in a rock is determined by how fast the rock cools down and solidifies. If the rock cools slowly, the crystals have time to grow from the liquid magma, forming large crystals that can be seen with the naked eye. If the rock cools quickly, the crystals do not have time to grow and solidify as tiny grains that are only visible under a microscope. Porphyry deposits must therefore have cooled in two stages, first very slowly deep in the Earth's crust, and then very rapidly as the magma reaches shallow depths and rises to the surface very rapidly, for instance in a volcano. As the magma cools, fluids are driven off and carry with them dissolved metals such as gold, lead, tin, zinc, and of course copper.

3. Reindeer

When they are not driving Santa's sleigh on Christmas night, reindeers live in different regions of northern Eurasia, including Scandinavia.

Over the past few decades, reindeer activities and reindeer farming in specific areas have had important ecological impacts. Reindeer graze and trample the vegetation covering the ground and the release of faeces and urine provides specific nutrients to the soil. This has damaged the lichen and moss-rich vegetation originally present, slowly replacing it with 'lawns' of nutrient-rich and digestible forage. The new vegetation type leads to what is called a positive feedback, where reindeer grazing leads to more digestible foliage, which enhances reindeer grazing, and so on. The loss of lichens also enhances the growth of coniferous trees.

These on-going disturbances have ultimately created a new stable ecological state in regions of reindeer herding. But they also have consequences for local climate, through changes in the surface properties of the land.

When radiation from the Sun reaches the surface of the Earth, it can be both absorbed by the land or reflected back to the atmosphere – generally a mixture of the two. The proportion of energy absorbed versus reflected depends on the properties of the ground, including its colour. This is what is called albedo. Ice, for example, reflects a majority of solar energy and has a high albedo. Darker surfaces such as oceans absorb more energy and have a low albedo. The more energy is absorbed, the warmer that particular region (although water and land will warm up differently).

The loss of lichen cover in reindeer herding areas has slowly reduced the whiteness and therefore the albedo of the land surface, changing the balance of solar energy reflected and absorbed in these regions. Reindeer can therefore have both ecological and climatic consequences, and studies have only recently started to investigate the potential positive or negative impacts of these changes in northern Scandinavia.



On these geological notes, a very merry Christmas to all!

By Marion Ferrat

Marion is a postdoctoral researcher at Imperial College London, embarking on a science communication career and about to start an MSc in Science Communication. She holds a PhD in Paleoclimatology and Environmental Geochemistry and has worked in China as a climate modeller. She is particularly interested in climate change research and environmental policy

The Rockhound's 10 Commandments:

Thou shall not touch thy neighbor's minerals unless he places them in thy hands.

Thou shall not test the strength of crystals by pushing, squeezing or biting.

Thou shall not drop thy neighbor's fossils, for many do not bounce properly.

Thou shall not place thy neighbor's specimens in thine own pocket.

Thou shall not collect at a neighbor's land unless unless thy neighbor knowst he's there.

Thou shall not argue names of minerals too violently; for sometimes thou couldst be wrong.

Thou shall not climb above thy neighbor's head when on a field trip, lest thou art willing to spend the rest of the day digging him out.

Thou shall protect thine eyes, hands & feet, so that they mayst enjoy many future field trips.

Thou shall not encroach upon thy neighbor's diggin's, lest thy neighbor's hammer be dropped upon thee.

Thou shall not break uncollectable specimens.



Upcoming Events

MEETING

Sunday, Nov. 1

2:00 PM

Family Kitchen Restaurant
Corner of Treat Hwy and 223
Adrian



Ongoing - Currently canceled

Richard Brzezicki is at the clubhouse on Thursdays 1:00 pm - 6:00 pm. It is best to check with him first before you go. Cell (269) 267-7666

Sherm Kardatzke will be holding cabbng classes on Thursday evenings, 6:00 pm - 9 pm.

Wire Wrapping Sessions at Hobby Lobby in Adrian on Fridays 11:00 am - 3:00 pm.

Linda Miller (419) 923-2090 and
Judy Snyder (517) 902-3990

(check to verify there will be someone there)



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Sandy Gerhart, Editor
704 W. US Hwy 223, #205
Adrian, MI 49221

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