



# The Rockblast

The Kitchener-Waterloo Gem and Mineral Club Newsletter

December 2010

## President's Message



We continue to have interesting speakers at our monthly meetings! In November **Nick Wagner** gave a fascinating mini-talk on the evolution of minerals, and the interdependence of life and the formation of new minerals. See a summary of his talk elsewhere in the *Rockblast*. **Rob Maric** gave the main talk on groundwater, particularly in the Waterloo region. Water is a natural resource that we too often take for granted. Though Rob assured us that there will be enough to last for many years, he also emphasized that good stewardship will be essential.

Our festive December meeting promises to be a fun time with food, friendship and many activities. The club provides free pizza and pop at 7 PM. Please bring finger 'treats' to compliment the feast. If you wish to participate in the gift exchange, bring a wrapped gift that would reflect the interests of our club — suggested value approximately \$5. The silent auction will be ongoing when you arrive, and

the live auction begins at 7:30 with **Jeff Shallit** as our auctioneer. I hear there will be a few specimens just for kids to bid on. Some excellent specimens will be available, and if you are wise, bargains can be had. And don't forget the annual competition for "Best Self-Collected Specimen" and the "Silver Pick Award" for the best acquired specimen (presumably purchased with some form of silver, a.k.a., money). So bring your best specimen from 2010 and let's have a good competition. Everyone has one vote for each category. The voting criterion is simple. Choose the specimen which you like the best. This can be based on aesthetics, value, rarity, etc., as you feel moved. (I finally have a very competitive specimen from the club field trip in May). The challenge is on!

The club t-shirts have been ordered and will be available at the December meeting. I hope you like your "gneiss club chert" because "in quarrying mines want to know". In case you wish you had ordered one, the club bought an extra shirt to be used in a raffle in 2011. Maybe you will be lucky.

Have you paid your membership for 2010/2011? The club treasurer, **Reiner Mielke**, will accept your dues at a regular meeting. It's still only \$20 for an individual or family. Most of our activities are self-sustaining, such as the show and raffle. The membership fees are used primarily to help bring the many excellent speakers to our regular meetings (and pay honorarium and travel expenses). If it is simpler for you to mail your dues, make out a cheque to the KW Gem & Mineral Club and send it to the Waterloo Community Arts Centre, c/o **Reiner Mielke**, 25 Regina St. S., Waterloo, ON, N2J 1R8. Thanks.

See you at the auction! --- *Gary Partlow*

## **Upcoming Club Meetings**

All meetings start at 7:00 PM for trading specimens at the Waterloo Community Arts Centre, 25 Regina St. South, Waterloo. Typical schedule:

**7:00 - 7:30 PM:** trading and socializing

**7:30 - 7:45 PM:** a “mini-talk” about some aspect of the hobby

**7:45 - 8:00 PM:** announcements

**8:00 - 8:15 PM:** monthly raffle

**8:15 - 9:00 PM:** featured talk

**Friday, December 3, 2010:** The annual live auction, with additional silent auction. Free pizza and pop (from the club). Holiday treats from the members. Best self-collected specimen competition. Silver pick award competition.

**Friday, January 7, 2011:** Soapstone carving workshop with **Kelly Ganci** and **Stan Jones**; mini-talk on soapstone carving by **Stan Jones**.

**Friday, February 4, 2011:** Main talk: “The Franconia quarry”, by Bill Lechner of the Walker Mineralogical Club, Toronto. Mini-talk: “Identifying gemstones from reclaimed jewellery” with **Karen Fox**.

**Friday, March 4, 2011:** Main talk: “Yukon Gold Mining” by **Aimee Partlow**. Mini-talk: “Mineral hunting escapades” by **Robert Land**.

**Friday, April 1, 2011:** Main talk: "Reconstructing Dinosaurs, Paleontological Art for the Museum Industry" with speaker Mark Rehkopf. Mini-talk: “Colourful micro mineral collecting - Smithsonite, Vanadinite, & Wulfenite” with speaker **Peter Russell**.

**Friday, May 6 2011:** Marja Veldhoen, Gecko Beads, St Jacobs, ON “The art of beading”. Mini-speaker: **Reiner Mielke**, "The minerals of Cobalt, Ontario"

**Friday, June 3, 2011:** Club picnic. Tour of Cambridge stone, led by **Peter Russell** and **Stan Jones**.

## **Upcoming Events**

This listing is provided as a service to club members. Events subject to cancellation. As always, double-check dates and times with the sponsors before leaving home!

**March 5-6 2011:** The 18th Annual Peterborough Gem, Mineral, and Fossil Show, presented by the Kawartha Rock & Fossil Club, Evinrude Centre, 911 Monaghan Road, Peterborough, Ontario. 10 AM - 5 PM Saturday and Sunday. Minerals, fossils, gemstones, beads, equipment, books, displays, live & silent auctions. Admission \$3; children under 12 free. For more information call 705-639-2406 or visit <http://www.rockandfossil.com> .

**April 2-3 2011:** The 39th Annual Paris Gem & Mineral Show, presented by the Brantford Lapidary & Mineral Society, Paris Fairgrounds, 139 Silver Street, Paris, Ontario. Saturday & Sunday, 10 AM to 5 PM. Admission: adults \$5, kids 12 and under free. Featuring gem, mineral, fossil, and stone dealers; lapidary equipment; sup-

plies; jewellery; demonstrations; exhibits; silent auction. Free parking. Wheelchair accessible. For more information, contact John Moons 519 752-9756 or Bob Parry at [robert@roberthalloriginals.com](mailto:robert@roberthalloriginals.com) .

**May 7 2011:** Our annual club show, 10 AM to 4 PM, Waterloo Community Arts Centre.

**July 15-17 2011:** The 29th Annual Sudbury Gem & Mineral Show, Carmichael Arena, Bancroft Drive, Sudbury. Friday, 5 PM to 9 PM; Saturday 10 AM to 6 PM; Sunday 10 AM to 5 PM. Featuring jewellery, beads, fossils, minerals, rock craft, dealers, door prizes, demonstrations, displays, ID booth, metal detecting, kids' activities, outdoor vendors (Saturday, 11 AM - 4 PM). For more info, call (705) 522-5140 or visit <http://www.ccfms.ca/Clubs/Sudbury/show.htm> .

**July 28-31 2011:** The 48th Annual Rockhound Gemboree, Bancroft, Ontario. For information about the Rockhound Gemboree contact Joanne Larkman, Tourism & Event Coordinator at [joanne@commerce.bancroft.on.ca](mailto:joanne@commerce.bancroft.on.ca) or call (888) 443-9999.

## Old and New Field Trip Chairs

Thanks to Ray Lehoux, our outgoing field trip chair (centre). Ray took us to many interesting localities to collect minerals, particularly the Guelph Quarry near where he lived. But Ray has now moved up north, so he won't be around the KW area as often. We wish Ray the best of his luck in his ongoing hunt for fine mineral specimens.

Our new field trip co-chairs are Faye Meadows (left) and Katherine LaHay (right).



Photo by André Mongeon

# The Evolution of Minerals

by Nick Wagner

Based on the article by Robert Hazen in the March 2010 issue of *Scientific American*.

## Overview

*Over the past 4.6 billion years Earth has passed through a series of geological stages, with novel phenomena emerging at each stage to dramatically alter and enrich the mineralogy of our planet. Traditionally, the mineral kingdom was considered dissociated from life on Earth. However, evolution affected mineralogy and minerals affected life. The two are strongly intertwined.*



## Planet Formation

Only a dozen, or so minerals are known to have existed among the ingredients that formed the solar system 4.6 billion years ago. However, Earth today has more than 4,400 mineral species.

Very ancient chondritic meteorites, still arriving today, give us an insight to kind of materials originally formed our planet. The materials originate from the times before large-scale planet formation occurred. Embedded are pre-solar grains, which predate the Solar system.

Perhaps 250 mineral species were formed during the early planet building process. These are the same raw materials of all rocky planets as they were being created.



LEPIDOLITE, Minas Gerais, Brazil.

## Early Earth

In the first 2 billion years after the formation of Earth only about 1500 mineral species evolved. Repeated partial melting of rock concentrated scarce, dispersed elements, such as lithium (in lepidolite), beryllium (in beryl) and boron (in tourmaline).

## Granitization

Initially, the land was covered by black basalt and was irradiated by intense ultraviolet light. Clearly, this environment was hostile to life. The Earth's mineralogy developed as new mineral-generating processes came into play. Repeated partial melting of granites concentrated crystallographically "incompatible" elements. About 500 distinctive minerals, including giant crystals rich in lithium, beryllium, boron, cesium, tantalum, uranium, and a dozen other rare elements were formed.

Chemical reactions and weathering by early oceans and the anoxic atmosphere also contributed. Meanwhile, deep underground, minerals were formed under high pressure from concentrated materials, which include jadeite. These were brought to the surface by plate tectonics.

Neither Mars, nor Mercury has yet revealed significant surface granitization.

On Earth, immense quantities of wet, chemically diverse rocks subducted from the crust were partially melted, causing further concentration of scarce elements. A further 1,500 different minerals were generated by dynamic crust and mantle processes.

### Life Under the Sun (the Biosphere)

More than half of the mineral species owe their existence to life, which began transforming the planet's geology more than two billion years ago.

#### Red Earth



RHODONITE, Broken Hill, Australia

Two billion years ago, photosynthetic living organisms in the seas gave Earth's atmosphere a small percentage of oxygen, dramatically altering its chemical action. Ferrous ( $\text{Fe}^{2+}$ ) iron minerals common in black basalt were oxidized to rust-red ferric ( $\text{Fe}^{3+}$ ) compounds. This Great Oxidation Event paved the way for more than 2,500 new minerals, including rhodonite (found in manganese mines) and turquoise.

Green micro-organisms lay down sheets of stromatolites in shallow seas, made of minerals such as calcium carbonate. Stromatolites can be found north of Lake Superior and near Banff. In fact, stromatolite production is still going on today in highly saline waters, or in the presence of high concentrations of magnesium. Freshwater stromatolites are being formed in B.C. lakes even today.

Geosphere and biosphere continued to co-evolve. 600 million years ago high levels of oxygen in the seas allowed evolution of marine animals which learned to build shells, external and internal skeletons of calcium carbonate. Massive limestone deposits were formed by the layers of these skeletons. Subsequent deep burial of these layers metamorphosed them to highly crystalline forms, such as marbles and calcite crystals. Colored marble varieties are usually due to various mineral impurities such as clay, silt, sand, iron oxides or chert. The layered deposit structure is largely obliterated in the crystallization process.



Polished STROMATOLITE section - Jakutia-Saha, Torgo, Russia

### Life on Land

For the most part of the Earth's history, the land was uninhabitable. In the seas cyanobacteria photosynthesised oxygen, which accumulated in the early atmosphere.

Oxygen in the atmosphere allowed ozone to be formed in the upper atmosphere, which then protected the land from the sun's UV rays. This made land more habitable to mosses, the first land plants, 460 million years ago. Weathering of rocks was speeded up by plants and fungi through their biochemical processes, which created abundance of clay minerals. Clay minerals provided expanding habitat for further colonization by ever larger and more complex plants and later animals.

In the Carboniferous era (360 – 300 million years ago) a lot of today's coal beds were laid down dead trees and vegetation. Anthracite was formed by deep burying some of this coal and exposure to elevated temperatures and pressures. In some mines anthracite and graphite are found together, indicating a common biospheric origin.

## **Life without the Sun**

Life needs energy to sustain itself. In the absence of external energy it ceases to exist.

The previous part of this discussion dealt with life "under the sun". In other words the basic energy source for life is photochemical energy conversion, which follows the simple rule: photons plus CO<sub>2</sub> in – carbohydrates out. One has to add a few other ingredients to make it work, but that is for others to discuss.

There are, however other forms of life, which do not depend on sunlight. In deep South African mines phosphide minerals are slowly consumed by bacteria liberating unwanted microscopic gold particles. Since gold is very inert, it gets left behind in the process. Sulphur, tied up in the metal sulphides, is the source of energy for these bacteria. The presence of water is required.

Another mineral forming process is in the deep sea geothermal vents. The super-hot waters bubbling up through these vents carry, again, metal phosphides. Here also, the sulphur supports bacteria, which in turn feed larger creatures, such as mussels. Most of the metal component of these phosphides are heavy metals which settle out around the vents, forming new minerals.

Sulphur-based life is significantly slower paced than carbon-based, as the energy provided by sulphur-cycle is at least an order of magnitude lower.

## **The Effects of Tides**

In addition to providing light, the sun has another effect through its gravitational force. The sun and the Moon together create tidal forces. Tide not only occurs in the oceans, but also in the "solid ground" beneath our feet. The solid crust also follows the tidal forces. We move up and down about 3 feet with the tide every 12 hours, unnoticed by us. As a contributing factor, the tidal motion helps churn the mantle, which in turn causes continental drift, subduction and upthrust as part of the tectonic processes.

These processes bring surface materials deep underground, exposing them to heat and pressure and later bring the resulting crystals back to the surface.

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## Kids' Club News

The next meeting for the KW Gem and Mineral Kids' Club will be held on Saturday December 4 at 2 PM at the Waterloo Community Arts Centre. We hope to see you there!

This month we are going to be playing the game of ROCKO!

Come out and win some wonderful mineral prizes.

— Rob Maric

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## Pink Diamond Sets Auction Record

According to the [Associated Press](#), Laurence Graff, a London jeweler who earlier paid US \$24.3 million for a blue diamond in 2008, has now set a record for the most expensive diamond ever sold at auction: US \$46 million.

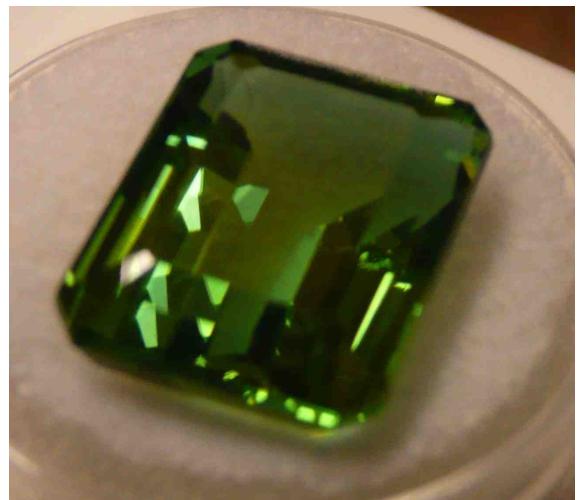
He paid that price for a 24.78 pink diamond in Geneva, outbidding three other buyers. The diamond was last sold 60 years ago by New York dealer Harry Winston.

## Yet Another Ebay Fake

This 16-carat octagon was sold as “Green Kunzite” recently on ebay by seller “jinda\_siam”. It is a fake. The refractometer indicates quartz, and the colour means it is almost certainly synthetic.

“Kunzite” is the variety name for pink spodumene, a lithium mineral that is found in gem quality in California, Brazil, and Afghanistan. Spodumene can also be green, in which case it is sometimes called “hiddenite”.

Hiddenite was discussed in the November 2010 *Rockblast*, and is found in Brazil and North Carolina, as well as Afghanistan.



## **'Feds Stole My Alien Meteorite', Yukon Prospector Claims**

It's a headline right out of the *Weekly World News*, but that's essentially what the [CBC recently reported.](#)

Dan Sabo, of Mayo, Yukon



Territory, has filed a suit against the Geological Survey of Canada, claiming that in 1998 he submitted a meteorite specimen to the agency for analysis, but it was returned to him with parts missing. He says "green crystals" from outer space were growing in the specimen and is asking \$12,000,000 in damages.

But Richard Herd of the Geological Survey reportedly took issue with Sabo's claims. He was reported as saying, "He wanted \$10,000, and I was getting tired of being accused of theft and fraud... We're honest brokers. Why would I risk my reputation?"

One perceptive commenter at the CBC site suggested that perhaps "the green crystals were made of Kryptonite and they were stolen by Lex Luthor's henchmen."

Superman was unavailable for comment.

## **Kitchener-Waterloo Gem and Mineral Club**

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