Chippings

London GEM AND MINERAL Society

Newsletter of the London Gem Mineral & Fossil Society London Ontario

Thursday April 4, 2019

Meeting at 7:30 pm

Chartwell Riverside Retirement Residence

201 Riverside Drive, London.

Please Welcome: April 4th

Rick Barnard and Tony Petropoulus

Fossils from the Devonian Sea.

Featuring samples of fossils from the Arkona-Thedford Area and what we can learn from this location.

Upcoming Speakers

May 2nd - Aimee Partlow Will be talking about her visit to the famous Jurassic fossil beds in southern England. She also will mention young Mary Anning who was the original collector of these famous English fossils.

June 6th - Peter Russell Previous curator of the the Earth Sciences Museum at the University of Waterloo. Talk to be confirmed soon.

Presidents Message

Hello Everyone

In order to respect the boundaries at our New meeting place at Chartwell Riverside Retirement Residence at 201 Riverside Drive.

Please keep in mind that our club is only allowed in the Theatre room, and on meetings that have silent auctions we are allowed access to the recreation room.

The washrooms that we are allowed access to are located to the righthand side hallway while exiting the theatre room it's a short distance down the hallway.

We are not allowed to be in the Dining room or other areas.

Thank You for respecting these boundaries.

If there are any questions please see a member of the club executive.

Also, at the present we have 68 paid up members of the London Gem Mineral and Fossil Society and this newsletter goes out to 125 people. There are 57 people who are not paid members and are taking advantage of this newsletter, club trips and guest speakers. If you are not a paid up member please sign up at the earliest otherwise this will be the last Chippings sent to you.

Club News

Fred McPherson, affectionally known as Mick the Meteorite Man by CBC TV and radio, was our speaker for the evening. Along with his vast collection of meteorites to show (and sell), he recounted stories of his adventures in meteorite hunting which began in the desert of Nevada. Invited by the "shady" characters of the Meteorite Man TV series, he was advised to wear boots, leather gloves, and sunscreen and to bring water and a metal detector. They warned him of poisonous snakes, lizards, scorpions, bobcats, searing heat, and getting lost. Nonetheless, he was hooked! Even stories of arrests of meteorite hunters in Oman for illegal mining or being chased by Bolivian soldiers has not deterred him. His ardent search over the years has been for three known types of meteorites: stony, stony-iron, and iron.

These originate from the crust, mantle, and core of planets that failed to form. Orbiting between Mars and Jupiter in the asteroid belt, they can be bumped out of orbit to collide and land on Earth. More rarely, meteorites originate from Mars or our Moon , where rocks from their surface have been ejected into space due to a_giant impact. (These would need to be further analyzed and compared to lunar and Martian Rover samples to prove their origin) Mick gave us hints on how to find meteorites…deserts are the best places to look as they remain untouched and unhindered by vegetation or humidity. Look for rocks with "circles". These could be chrondrites which are stony meteorites containing minerals. Look for magnetic rocks with a detector or with a sled which efficiently scans larger areas and detects even the tiniest pieces. Look for highly shocked rock (as seen in the Sudbury basin) or coloured glass strewn about which indicates that a high energy meteor strike had occurred—honey-yellow glass pieces have been found in Libya, for example, green moldavite in southern Germany, deep black shards in Indochina. However, witnessing a fall is obviously is the best way to pinpoint where to look. Doppler radar and sky/auto cams can provide additional information as to where the bolide fell and at what angle (ie Chelyarinsk, Russia in 2013) The recent meteor strike in Cuba produced many samples but these were rapidly oxidized by rain, making them harder to spot (an alcohol bath followed by baking prevents rusting of your find) . Pitmarks left in the snow from a winter meteor strike make the search much easier. Confirm your find at the local university or at the ROM. Or just buy one from a reputable dealer who is a proven member of the International Meteorite Association. What a thrill to own a meteorite not only for its purported metaphysical properties but to show off your piece of extraterrestrial real estate!

Our thanks to Mick the Meteorite Man to inspire us rockhounds to include meteorites on our hunts.

What Is Geologic Time.

(continued From March Chippings)

Our subjective division of time based on interpreting an incomplete fossil record may be irreproducible as a whole but the geologic time scale does provide a useful device for plotting the order of major events in the history of life and earth. I've written before about the difficulty of defining certainty when it comes to major facts about when animals lived. We readily band about terms like Jurassic, Cretaceous and Miocene here at Lost World's Revisited as a short hand to refer to different times in earth's history but if you start to look for the hard boundaries between these different units you'll find it varies from place to place and also through time itself. For example, the Cambrian period was once thought to have begun 470 million years ago and has been as old as 620 million years, now defined as just over 540 million years old (Gradstein et al. 2004). The Jurassic Period once extended between 145 million years ago and end 108 million years ago, now it ends 145 million years ago and begins just over 200 million years ago. Some of the early attempts at putting time in order were based on isotope decay and measuring the thicknesses of rock. Stable isotopes, statistical and geomathematical, magnetostratigraphy and biostratigraphy methods have refined and expanded the accuracy of timing the formation of rocks and dividing time into units.

Now obviously, the organisms alive during the Silurian period didn't know they were living in the Silurian. They didn't hold a "welcome to the Devonian party" when the clock struck midnight 419.2 give-or-take million years ago and the global events that we've used to mark the end of different units may have taken millions of years not just a moment. However, a calibrated and co-ordinated geologic time scale is needed to try to piece together Earth's history. Without the geologic time scale it would be impossible to compare rocks made at the same time in Wales and the Czech Republic or North America to Russia. That earth scientists have achieved this, with perpetual tweaking, and can condense 4.6bn year's worth of history into a pretty wall chart or bookmark is an impressive feat it's all too easy to take for granted.

The keepers of deep time are the International Commission on Stratigraphy(ICS) an international non-governmental body with the very humble mission of "setting global standards for the fundamental scale for expressing the history of the Earth". The ICS is responsible for agreeing upon Global Boundary Stratotype Section and Points (GSSP), that is rock exposures thought to mark the lowest point of a geological stage, normally defined by faunal events in the fossil record. These GSSPs can then be calibrated with other rock sections and then used to define periods in time. GSSPs, once agreed, are then marked with a 'golden spike' (normally a plaque or marker not an actual golden spike) to indicate their importance as an international boundary marker. The ICS enforce various rules for nominating, agreeing and marking boundaries.

Let's take probably one of the most famous boundaries in the geological time scale as an example. The the well-known boundary between the Cretaceous and Palaeogene,

A.K.A the K-T or K-Pg boundary. This is the one where the non-avian dinosaurs, and many other groups of organisms, bit the dust. The GSSP for the end of the Cretaceous and the beginning of the Palaeogene is at Oued Djerfane, west of El Kef, Tunisia and is marked with a “golden spike” (Molina et al 2006). The rock marking the beginning of the Palaeogene is a humble 50cm thick layer of reddish clay and the boundary is defined by an Iridium geochemical anomaly and the major extinction of “dinosaurs, ammonites, foraminifers, etc.”
Extinctions as well as appearances of species in the fossil record mark many of the boundaries, almost comically so in some instances. So although the Devonian period is often called “the age of fishes” due to the explosion in diversity of fish between 420 and 360m years ago it’s beginning is technically marked by the appearance of the graptolite species Monograptus uniformis, hemichordate animals whose fossils look like little drawings on rocks.
The Triassic, Jurassic and Cretaceous are best known as “the age of the reptiles”, specifically when dinosaurs ruled the Earth. The appearance of tiny teeth elements of an eel-like jawless animal called a conodont, specifically Hindeodus parvus, is the technical herald of the age of the dinosaurs according to the ICS. The appearance of various species of ammonites, belemnites, trilobites, foraminifera, nannofossils and magnetic events mark the boundaries of many of the defined GSSPs although there are still a number of boundaries without a golden spike or defined beginnings and endings.
So it may be the charismatic giants and the catastrophic events that grab the attention when it comes to palaeontology and the headlines when it comes to reporting but it’s the less celebrated but more useful fossil workhorses and the diligent work like the paper I mentioned at the beginning that add the essential punctuation when telling the story of Earth.
Mark Carnall

Younger Dryas Impact Hypothesis

When UC Santa Barbara geology professor emeritus James Kennett and colleagues set out years ago to examine signs of a major cosmic impact that occurred toward the end of the Pleistocene epoch, little did they know just how far-reaching the projected climatic effect would be.
“It’s much more extreme than I ever thought when I started this work,” Kennett noted. “The more work that has been done, the more extreme it seems.”
He’s talking about the Younger Dryas Impact Hypothesis, which postulates that a fragmented comet slammed into the Earth close to 12,800 years ago, causing rapid climatic changes, megafaunal extinctions, sudden human population decrease and cultural shifts and widespread wildfires (biomass burning). The hypothesis suggests a possible triggering mechanism for the abrupt changes in climate at that time, in particular a rapid cooling in the Northern Hemisphere, called the Younger Dryas, amid a general global trend of natural warming and ice sheet melting evidenced by changes in the fossil and sediment record.
Controversial from the time it was proposed, the hypothesis even now continues to be contested by those who prefer to attribute the end-Pleistocene reversal in warming entirely to terrestrial causes. But Kennett and fellow stalwarts of the Younger Dryas Boundary (YDB) Impact Hypothesis, as it is also known, have recently received a major boost: the discovery of a very young, 31-kilometer-wide impact crater beneath the Greenland ice sheet, which they believe may have been one of the many comet fragments that impacted Earth at the onset of the Younger Dryas.
Now, in a paper published in the journal Nature Scientific Reports, Kennett and colleagues, led by Chilean paleontologist Mario Pino, present further evidence of a cosmic impact, this time far south of the equator, that likely lead to biomass burning, climate change and megafaunal extinctions nearly 13,000 years ago.
“We have identified the YDB layer at high latitudes in the Southern Hemisphere at near 41 degrees south, close to the tip of South America,” Kennett said. This is a major expansion of the extent of the YDB event.” The vast majority of evidence to date, he added, has been found in the Northern Hemisphere.
This discovery began several years ago, according to Kennett, when a group of Chilean scientists studying sediment layers at a well-known Quaternary paleontological and archaeological site, Pilauco Bajo, recognized changes known to be associated with YDB impact event. They included a “black mat” layer, 12,800 years in age, that coincided with the disappearance of South American Pleistocene megafauna fossils, an abrupt shift in regional vegetation and a disappearance of human artifacts.
“Because the sequencing of these events looked like what had already been described in the YDB papers for North America and Western Europe, the group decided to run analyses of impact-related proxies in search of the YDB layer,” Kennett said. This yielded the presence of microscopic spherules interpreted to have been formed by melting due to the extremely high temperatures associated with impact. The layer containing these spherules also show peak concentrations of platinum and gold, and native iron particles rarely found in nature.
“Among the most important spherules are those that are chromium-rich,” Kennett explained. The Pilauco site spherules contain an unusual level of chromium, an element not found in Northern Hemisphere YDB impact spherules, but in South America. “It turns out that volcanic rocks in the southern Andes can be rich in chromium, and these rocks provided a local source for this chromium,” he added. “Thus, the cometary objects must have hit South America as well.”
Other evidence, which, Kennett noted, is consistent with previous and ongoing documentation of the region by Chilean scientists, pointed to a “very large environmental disruption at about 40 degrees south.” These included a

large biomass burning event evidenced by, among other things, micro-charcoal and signs of burning in pollen samples collected at the impact layer. “It’s by far the biggest burn event in this region we see in the record that spans thousands of years,” Kennett said. Furthermore, he went on, the burning coincides with the timing of major YDB-related burning events in North America and western Europe.

The sedimentary layers at Pilauco contain a valuable record of pollen and seeds that show change in character of regional vegetation — evidence of a shifting climate. However, in contrast to the Northern Hemisphere, where conditions became colder and wetter at the onset of the Younger Dryas, the opposite occurred in the Southern Hemisphere.

“The plant assemblages indicate that there was an abrupt and major shift in the vegetation from wet, cold conditions at Pilauco to warm, dry conditions,” Kennett said. According to him, the atmospheric zonal climatic belts shifted “like a seesaw,” with a synergistic mechanism, bringing warming to the Southern Hemisphere even as the Northern Hemisphere experienced cooling and expanding sea ice. The rapidity — within a few years — with which the climate shifted is best attributed to impact-related shifts in atmospheric systems, rather than to the slower oceanic processes, Kennett said.

Meanwhile, the impact with its associated major environmental effects, including burning, is thought to have contributed to the extinction of local South American Pleistocene megafauna — including giant ground sloths, sabretooth cats, mammoths and elephant-like gomphotheres — as well as the termination of the culture similar to the Clovis culture in the north, he added. The amount of bones, artifacts and megafauna-associated fungi that were relatively abundant in the soil at the Pilauco site declined precipitously at the impact layer, indicating a major local disruption.

The distance of this recently identified YDB site — about 6,000 kilometers from the closest well-studied site in South America — and its correlation with the many Northern Hemispheric sites “greatly expands the extent of the YDB impact event,” Kennett said. The sedimentary and paleo-vegetative evidence gathered at the Pilauco site is in line with previous, separate studies conducted by Chilean scientists that indicate a widespread burn and sudden major climate shifts in the region at about YDB onset. This new study further bolsters the hypothesis that a cosmic impact triggered the atmospheric and oceanic conditions of the Younger Dryas, he said.

“This is further evidence that the Younger Dryas climatic onset is an extreme global event, with major consequences on the animal life and the human life at the time,” Kennett said. “And this Pilauco section is consistent with that.”

More of Mick's Meteorites

Why we should stop ignoring the life stories of minerals

The crystals shouldn’t just be classified by shape alone, one scientist argues

WASHINGTON, D.C. — Every rock has a story. Understanding how it formed can tell scientists about the environment that surrounded the rock at its birth. But when scientists classify the minerals that make up rocks, they leave out the details of how those minerals formed. One scientist wants to change that. He wants to give minerals back their biographies. Knowing that history, he says, could help scientists understand more about our planet — and many others.

Minerals are solid substances that occur in nature. Up close, their molecules form regular, three-dimensional crystal patterns. A diamond is one example. Diamonds most often occur as cubic crystals. This means their atoms are stacked in repeating cube shapes. The whole rock (which can be made of one or more minerals) may end up with sharp edges too. It might be a cube, or it could be an octahedron, a shape with eight flat faces.

Diamonds are a good example of how minerals with the same name can have different histories, says Andrew Christy. He’s is the curator of minerology at Queensland Museum in Brisbane, Australia. The big diamonds found in jewelry formed more than 160 kilometers (100 miles) below Earth’s surface, in the mantle. Heat and pressure there smushed carbon atoms together into cubes. That created diamond crystals. The ones we dig up today have been pushed to the surface through violent volcanic eruptions.

But diamonds can form elsewhere in the universe, as well.

Tiny diamonds, for instance, form in meteorites crashing to Earth from space. Some of those meteorites have carbon atoms in them, Christy explains. When a meteorite blasts through Earth's atmosphere, it can generate shockwaves of heat and pressure. "Those shockwaves passing through that carbon [in the meteorite] will create tiny, tiny diamonds," Christy explains.

Both of these rocks are diamonds. Based on their crystal structure, mineralogists would classify them the same. But Robert Hazen says scientists lose a lot when they take away the story of a mineral's birth. "Natural minerals are storehouses of information," he says. "They're time capsules with vast amounts of information we have not yet explored." Hazen is a mineralogist at the Carnegie Institution's Geophysical Laboratory in Washington, D.C.

Stories minerals could tell

Right now, every mineral has a "species." Diamond is one species, for example. A group called the International Mineralogical Association (IMA) makes sure that mineral species names are consistent. But a rock's species doesn't tell you anything about how the minerals in it formed.

Maybe the name of a mineral could say more. Organisms are organized into genus and species. A tiger, for instance, is Panthera tigris. "Panthera" is the genus and "tigris" is the species. Species that belong to the same genus are closely related. Panthera tigris is a tiger, but Panthera leo is a lion. Hazen wants something like that for minerals.

In Hazen's system, a mineral would still have its species — diamond, for example. But it would also have a "kind" — a way to describe how the mineral formed. Diamonds would no longer be just diamonds. Instead, a diamond formed in a meteorite would be an impact diamond. A diamond in the mantle of the Earth would be Type I or Type II.

That doesn't mean the IMA would go away. "I'm not trying to overthrow the system," Hazen says. Instead, he wants to add a "kind" to each mineral. That "kind" would be like a note telling the story of where the rock came from.

This might seem like a small change. But "adding that formation footnote to a mineral opens up new worlds of information," Hazen explains. "It will allow us to look at ancient minerals and pinpoint more precisely the environment in which they formed."

If a scientist finds iron with rust inside it, it's no longer just iron. The rust is important, too. Rust indicates there was oxygen present when the iron formed. So there had to be something like microbes or plants around to fill the air with oxygen. These kinds of details tell scientists more about the world in which the mineral formed. Hazen presented his idea of mineral "kinds" at the American Geophysical Union fall meeting on December 14, 2018.

"I think it's a good idea" to add these "kinds" to a mineral, says Edward Grew. He's a mineralogist at the University of Maine in Orono. "It's no good to consider minerals in isolation — to have a pretty quartz crystal on your table, and not think about how it formed."

Of course, minerals form in many different places on Earth and in outer space. Hazen hopes that telling the life story of minerals might help scientists learn more about our planet — and other planets, too. "Why is Earth special? Is it special?" he asks. "What's different about Mars or Mercury or the moon? Minerals are in some cases the most robust lines of evidence we have of the 4.5-billion-year history of our solar system." He thinks that by noting how minerals formed, scientists might have a better chance of understanding how the solar system — and the rock we call home — came to be.

Save The Date

All dates are pending – Confirm all sites and dates

The Brantford Lapidary & Mineral Society's show at the Paris Fairgrounds is Saturday April 6 and Sunday April 7, 2019.

The Kitchener-Waterloo Gem & Mineral Club's Annual Show will be held on Saturday, May 4, 2019 from 10 AM to 4 PM at the "Button Factory', 25 Regina St, Waterloo.

Niagara Peninsula Geological Show Sat. June 8, 10-5 Fireman's Park 2275 Dorchester Rd. Niagara Falls Ont.

Sudbury Gem and Mineral Show July 19, 20, 21 Carmichael Arena Bancroft Drive, Sudbury Ont,

The CCFMS's recurring spring field trips are posted at their website but could be advertised. http://www.ccfms.ca/clubs/NPGS/show.htm

The Beryl Pit (Quadville), and Schickler Fluorite Mine (Wilberforce) are among several other collecting sites that will open to the public by May.

Where to Shop & Be Seen

Gem and Mineral Sale

Saturday May 25th, 2019

9:00am – 4:00pm

831 Tracey Street, St. Thomas ON (Central Elgin)
Close to intersection of Elm and Centennial Ave

Calling all collectors, hobbyists, children, geology students, artisans and teachers!

A major portion of Allen Alward's rock collection is up for sale. Anyone who knew Allen, knew of his love of rocks. Allen's family is looking forward to sharing his collection through the sale.
We have:

- Garden rock ~ including Amethyst, Quartz, Pinite and Hematite
- Rare and uncommon minerals
- Unique samples of silver, copper and loads of amethyst
- A selection of micro-mounts
- Magazines and reference books
- An assortment of Crystal and Rock Figurines
- Gemstone Jewellery

For more information:
Please feel free to call Pat Alward at 519-633-3775 or email patalward@yahoo.com

London Gem Mineral & Fossil Society

Meetings: Usually 1st Thursday of each month 7:30 – 9:15 pm (September to June but not in January)
Meeting Place:
Chartwell Riverside Retirement Residence
201 Riverside Drive
London Ontario

Membership: Single $20, Family $30, Student $10

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