Mineralogical Society of Western Australia Inc September 2011 Newsletter

Editorial

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Speaker: Dr Greg Pooley & John Hillyer

Topic: "Ashes to ashes, dust to dust, if the fibres don't get you climate change must"

GREGORY D POOLEY B.Appl.Sc. (Hons), Ph.D., MBA, MAusIMM.

Gregory D Pooley graduated from the University of New South Wales with Honours in Applied Science majoring in Geology and Engineering, he has a PhD from the University of New South Wales and an MBA from Macquarie University and the University of Western Australia.

Greg has over 40 years experience in consulting in the Resources and Mining sector. He has worked for a number of small to medium-sized exploration and mining companies as an exploration geologist conducted numerous mineralogical and petrological studies for major exploration companies such as BHP Billiton, RioTinto and Western Mining Corporation as well as providing mineral indicator analyses and interpretation of geological environments for smaller Australian and overseas companies.

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Greg has conducted exploration programmes and field investigations throughout Australia and in numerous countries such as Botswana, West Africa, South Africa, Namibia, Southern Spain, Brazil, Irian Jaya, Laos and Papua New Guinea. He has worked in a variety of geological terranes exploring for diamonds, copper, gold, platinum, bauxite, Fe ore, phosphate, rare earth elements, potash, thorium and uranium.

Greg is an expert electron beam microanalyst and mineralogist who has successfully applied techniques using mineral indicators to develop completely new innovations in strategic sampling and drilling programmes in a variety of terrains which have led to the rapid determination of many potential mineral deposits. In addition he has applied his microanalytical skills to the analysis and characterization of fibres and particles from airborne and surface based materials.

JOHN WALLACE HILLYER BSc.

John W Hillyer graduated from London University specialising in industrial and analytical chemistry and has over 45 years experience in the Materials sector. He has consulted on numerous projects initially for GEC in the United Kingdom and later for the University of Western Australia.

He is an expert electron beam microanalyst and analytical chemist and was the principal electron microprobe analyst at the University of Western Australia from 1975 to 2004 where he focused his microanalytical and applied chemistry skills on the analysis of industrial and earth materials. This work included the characterization of fibres and particulate matter from airborne and surface based materials.

John has consulted on projects regarding nuclear power stations, semiconductor and insulator research, industrial radiography and industrial waste management. He has also worked for clients as varied as the Royal National Orthopaedic Hospital and the British Museum.

Visitors Welcome.
Light refreshments provided after the meeting.

2011/12 Future Meetings and other Activity Dates
Please note these dates are the third Wednesday of the month.
Wednesday 19th October (activity) "Frank Radke Memorial Auction"
Wednesday 16th November Speaker(s): Rare Earth Mineral Mini talks part 1
December – no meeting
Wednesday 18th January 2012 Speaker: Margot Willing Topic: To be announced
January – BBQ – date to be announced
Wednesday 15th February 2012 (informal meeting) Rare Earth Mineral mini talks part 2
Wednesday 14th March 2012 Speaker(s): To be announced Topic "Tuscon Mineral Show 2012"
Wednesday 18th April 2012 (informal meeting) Rare Earth Mineral talks part 3
Wednesday 16th May 2012 Speaker(s): To be Announced Topic: To be Announced
June – no meeting

The next Joint Mineralogical Societies of Australasia 35th Annual Seminar will be held in Perth at the State Library (Alexander Building) from 9th to 10th June 2011. The theme will be "Rare Earth Minerals". Additional days before and/or after will be used for a micromounters' session, mineral trading and field trip(s).
More details in future Newsletters.

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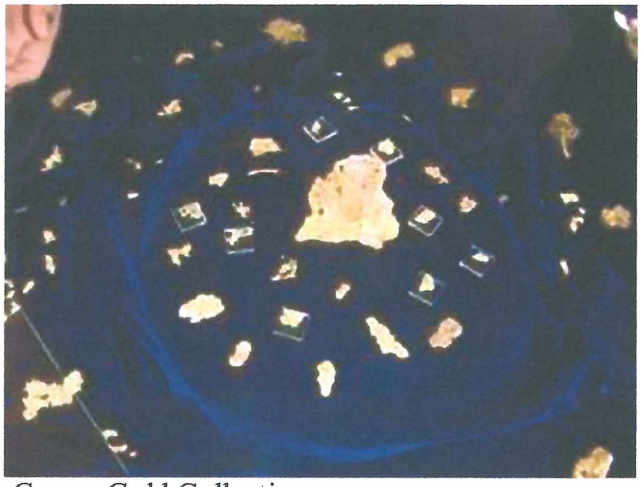
CSIRO Open Day

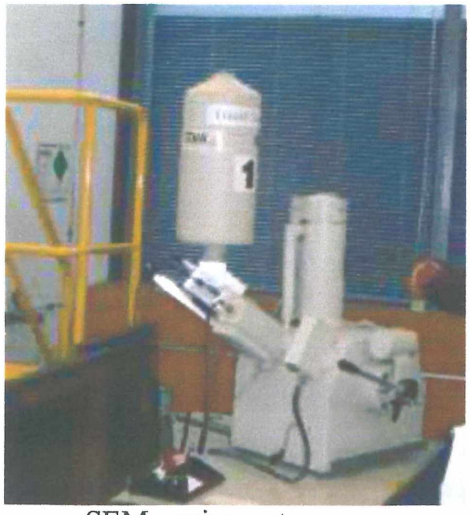
Three members of the Mineralogical Society attended the open day. The event started with a series of short lectures. One of the topics which I found interesting was "Future of geothermal energy and its potential to provide abundant renewable energy" by Winthrop Professor Klaus Regenauer-Lieb. One interesting graph presented in this talk shows that food production will peak before 2050 (possibly around 2035 – my reading of the graph) before rapidly decreasing. Population and industrial output will decrease a few years afterward but still before 2050. The graph also shows that we are rapidly depleting resources with the world having half the resources of 1900 at about the time the population and industrial output peaks.This graph was from the Meadows report. The talk indicates that ARRC Technology Park is a worldwide first geothermal cooling project with Perth, Australia aiming to be the very first geothermally-cooled city. Another intersting talk was on 3D mapping with some impressive pictures viewd with 3D glasses.

After the lectures we were divided into 4 groups where we went on tours to "gold nuggets" (including the chance to hold a 6kg gold nugget), rock mechanics, hydrates loop, SEM, and black smoker. The group that I was in, was very interested in the gold, taking longer than perhaps we should have causing us to be late for the other tours.



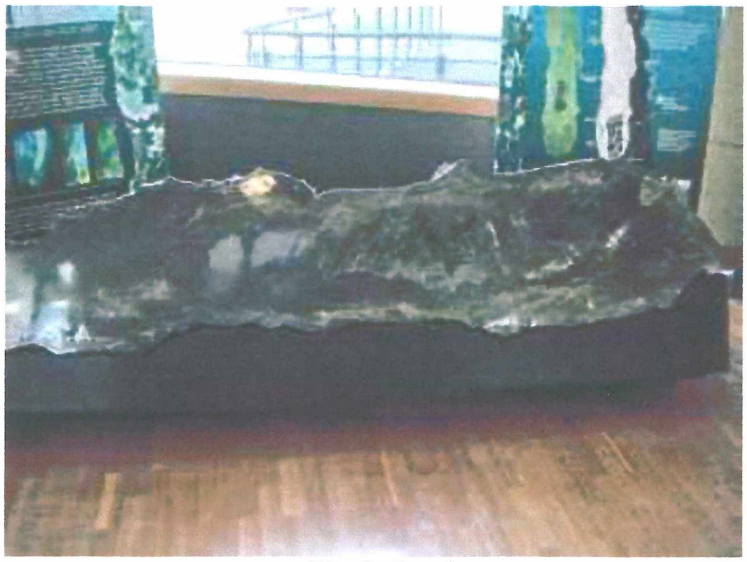
Creasy Gold Collection

Mignonne holding 6Kg gold nugget



SEM equipment

SEM Screens showing enlargement of sample



Black Smoker

Large Diamond

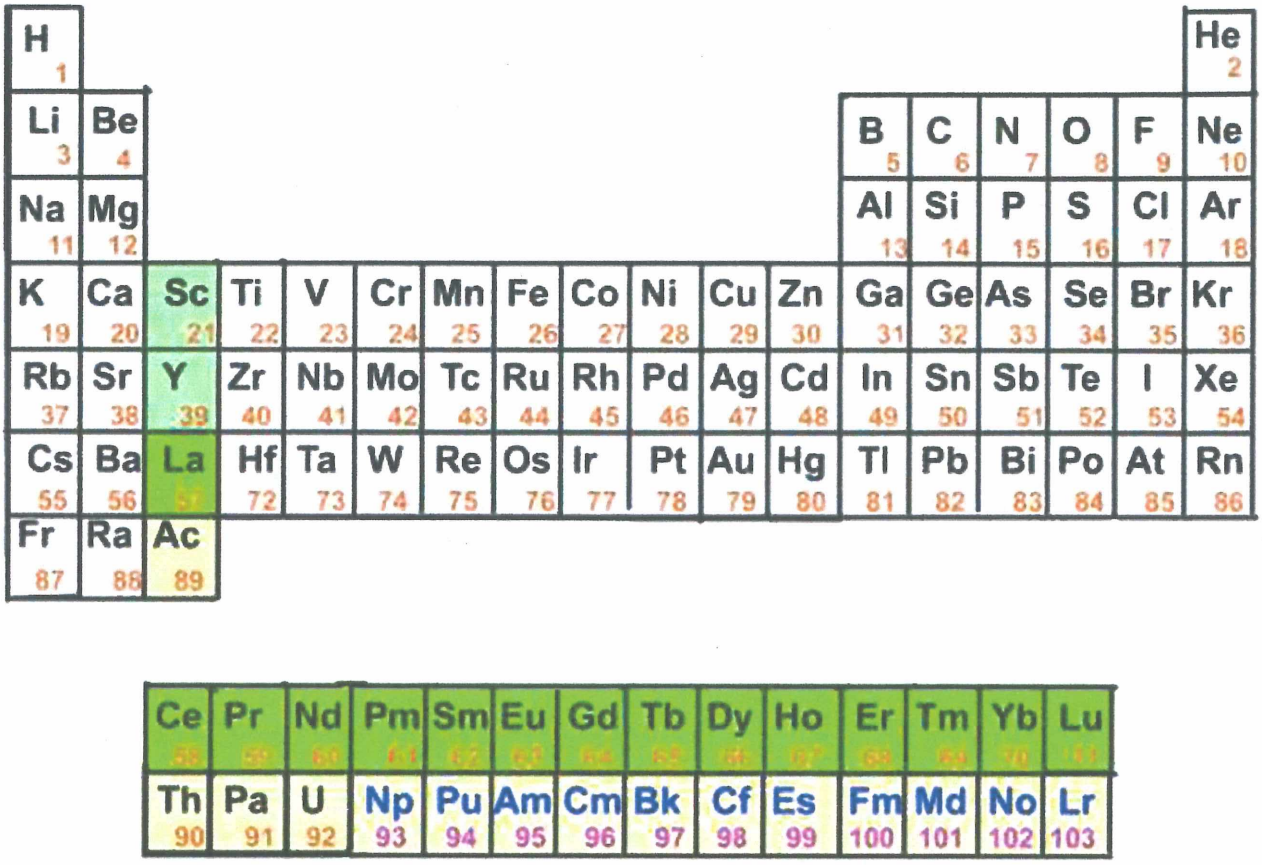
Recently I heard on ABC radio that a planet made of diamond had been discovered. I then decided to search the internet to find more information. My search showed that the planet orbits a pulsar (PSR J1719-1438) 4000 light years from earth (about one eighth of the distance to the centre of the galaxy) in the constellation Serpens (the snake). This planet has a diameter of less than 60,000 km (5 times the earth's diameter) but has more mass than Jupiter. It is speculated that this planet is composed largely of carbon and oxygen with a large part being crystalline with a structure similar to diamond. Readers should note that this is speculation – we don't really know that it is composed of diamond.
If you want to know more you could go to:-
http://www.reuters.com/article/2011/08/25/us-planet-diamond-idUSTRE77O69A20110825
http://news.yahoo.com/surprise-alien-planet-made-diamond-discovered-181402842.html
http://www.eurekalert.org/pub_releases/2011-08/uom-apm082311.php
http://www.physorg.com/news/2011-08-planet-diamond-video.html
ABC news radio – planet made of diamond
http://www.abc.net.au/science/articles/2011/08/26/3302280.htm?site=science&topic=latest

Rare Earth Elements

The rare earth elements are a group of chemically similar elements. There is not 100% agreement of which elements are included. All definitions that I have seen include the lanthanide series (15 elements from lanthanum atomic number 57, to lutetium atomic number 71). Often Yttrium (atomic number 39), and less often Scandium (atomic number 21) are also included. Note that the International Union of Pure and Applied Chemistry includes scandium in their rare earth element definition, while the Mineralogical Society of Great Britain and Ireland restricts the term 'rare earth element' to Y, La and the lanthanides[1]. I have also seen definitions which include the actinide series (15 elements actinium, atomic number 89, to lawrencium, atomic number 103). All of the actinide series are radioactive – the most common being thorium and uranium, the other elements of the actinide series are usually synthetically produced. As the actinide series are chemically similar to the lanthanide series, many of the rare earth ores contain thorium and or uranium hence making them radioactive. Promethium is radioactive with a half life of 17.7 years and is estimated that in nature only 572 grams exists in the earth's crust at any time, consequently promethium is made synthetically when used in nuclear batteries.

[1] *Rare Earth Minerals:Chemistry, origin and ore deposits*. Edited by Adrian P. Jones, Frances Wall and C. Terry Williams. Published in 1996 by Chapman & Hall. ISBN 0 412 61030 2

The rare earths are not as rare as their name suggests, with all except promethium being more common than silver or mercury and some of them being more common than beryllium or molybdenum.



Periodic Table showing the rare earth elements
Lanthanide series - bright green, actinide series – yellow
Scandium & Yttrium – lighter green

While the chemical properties of rare eath elements are similar (making some of them difficult to separate), the magnetic properties vary. Gadolinium is magnetic below 19 degrees C but loses its magnetism above this temperature. One alloy of terbium changes shape in a magnetic field making it useful in loudspeakers. Holmium can increase the strength of a magnet. Neodymium alloys make the strongest permanent magnets. Note that while the chemical properties are similar some are more reactive than others, with a number of them needing to be kept in a vaccum or under oil to prevent them reacting with the atmosphere. Europium is the most reactive.
Uses of rare earth elements include:- magnets, lasers, carbon arc lighting, neutron capture, masers, red, blue, green phosphors, mercury vapor lamps, X-ray tubes, portable X-ray machines, high refractive index glass, high temperature superconductors, microwave filters, in fibre optic cables, colouring glass, polishing powder and chemical oxidizing agent. Scandium which is sometimes included in the rare earth elements is often alloyed with aluminium to form strong light weight alloys used in bicycle frames and aerospace components.

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Publications

Australian Journal of Mineralogy Vol 16 No1 2011

This issue contains three articles relating to Western Australia. The first is "The Fletcher Collection of minerals at the Western Australian Museum: a late 19th century gem." by Peter J. Downes, Alex W. R. Bevan and Geoff L. Deacon. Peter has previously spoken on this topic at our society. The article explains how the museum obtained this collection (in exchange for a piece of the Youndegin Meteorite), gives a complete list of the 84 specimens (plus 2 others not received) in the collection, as well as describing some of the specimens and the locations from which they come. These specimens come from classic locations in Europe, America and British colonies. Given our up coming seminar on Rare Earth Minerals, of particular note is the specimen of Gadolinite-(Y) from the type locality of Ytterby in Sweden.

The second article is "Mafic-hosted secondary mineralisation from the Shangri La Pb-Ag-Au-Cu mine, Kimberley, Western Australia" by Peter J. Downes, Alex W. R. Bevan and David Costeo.This article describes the geological setting of the area and the mineralisation, followed by a list of the minerals (48 minerals) and then a more detailed description of these minerals as they occur in this area.

The third article relevant to WA is "Chromian Clinochlore from Coobina, Pilbara Province, Western Australia" by Ben A. Grguric, Sarah Jones and Sebastian Gray. This article discusses the geology, chemistry and genesis of chromian clinochlore at Coobina.

Other articles include:- "Quartz and associated minerals from the Pilot Range, Beechworth, Victoria" by Pat Sutton and David Roberts, "Mineralogical Note: Georgeite from Burraga, New South Wales" by Erin Lans, Simon L. Hager, Peter Leverett, Jason K. Reynolds & Peter A. Williams, "Remembering Ron Young – a lifelong passion for mineral collecting" by Steve Dobos and Tony Forsyth. "Museum News" (Museum Victoria, Melbourne), "New Australian Minerals" (Australian Type Minerals), and "Obituary" (Bernard Ernest (Bernie) Day).

Australia and New Zealand Micromineral News Issue 1 September 2011

This has been received by email. Anyone interested in receiving this should contact Steve Sorell (steve@crocoite.com). This issue contains three main articles, plus a section "Around the Region".

The first article is "Some minerals from the Dome Rock Copper Mine, South Australia." by John Haupt. This impressive article starts with a short introduction followed by a list of the 50 minerals (including 3 type locality minerals) found at Dome Rock. There are then 2 photos of the Dome Rock Copper Mine, followed by a more detailed description of the minerals including chemical formulae and excellent photos of them (any book would be proud to have these photos included). A total of 26 photos of minerals are included in this article. Most of these photos state the field of view which ranges from 2mm to 15mm (mostly in the range 2mm to 5mm). Given our upcoming seminar of Rare Earth Minerals I draw members attention that this list includes 1 rare earth mineral - *Agardite-(Y)*.

The second article is "Twinning in Pseudobrookite" by Donald G. Howard. This article discusses twinning in pseudobrookite from 3 locations (Big Lue Mountains, Greenlee Co., Arizona; Lemolo Lake Quarry, Douglas Co., Oregon; and Middle Hill, The Anakies, Geelong, Victoria). This article includes 6 photos.

The third article is "MICROMOUNTING for BEGINNERS" by Noel and Ann Kennon.

The Australian Gemmologist April – June 2011 (Volime 24 number 6)

A copy of this issue was handed to all members who were present at the last meeting (many thanks Francine for this).

There were 2 very interesting articles in this issue. The first is "Alexandrites from Novello alexandrite-emerald deposit, Masvingo District, Zimbabwe" by Dr Karl Schmetzer, Susan Stocklmayer, Dr Vernon Stocklmayer and Anna-Katherine Malsy. This article gives an introduction describing the location and mentioning the similarity of the alexandrite crystals from Zimbabwe with those found in the Russian Ural Mountains, together with photos of the alexandrite in both daylight and incandescent light. This is followed by a discussion of the geology of Zimbabwe and a more detailed discussion of the Novello alexandrite-emerald deposit. The genesis of emerald and alexandrite are described explaining how both emerald and alexandrite require beryllium from a granitic pegmatite and chromium from ultramafic rocks such as dunite and peridotite or their metamorphic equivalents (serpentinite and talc

schist). Deposits in Russia, Brazil, Tanzania, Western Australia (Poona), and Spain are also described. Morphology of single crystals and twins, gemological properties such as refractive index, chemical properties such as the presence of vanadium, iron, chromium, gallium, germanium and tin, and microscopic features such as inclusions and zoning are also discussed. The second article is "The 'hill of the precious stones', Rattanak Kiri, Combodia" by Francine Paynette and Grant Pearson. The location and geology are discussed followed by more detail about Rattanak Kiri where zircons, amethyst, peridot, black chalcedony, and tectites are found. More details are given on peridot, amethyst and the thermal treatment of zircons.

MINSOCWA Field Trip – 25th – 29th May 2011 by Paul Winthrop.

(photos supplied by Allan Hart)

With a long drive and some minor excursions planned for the first day we left Perth early and headed towards the Goldfields. Two cars with Bert and Allan were travelling together, while Paul and Sue kept each other company in a second vehicle. Our mini convoy was to meet Geert in Kalgoorlie that afternoon. The first fossicking spot was east of Bullabulling to search some old dumps for Emerald fragments. After driving in and out of several likely tracks off Great Eastern Highway Sue's memories from a previous trip got us there. Recent rains had washed away the dust of summer and we jumped in and started hunting for those little green gems. It was my first field trip so I was quite excited. Sue quickly found some small fragments and pointed out likely spots for me to search. We found an old sorting area and quickly had some more luck though the fragments were quite small. Sue turned her attention to other spots nearby that showed evidence of sorting and found two small Helvite specimens. She reckoned they came from another locality and that the material was brought to this location for sorting.

We drove on to Kalgoorlie where we met Geert and after a sandwich we headed north. We were booked in to stay at Morapoi Station near Kookynie for the night but wanted to visit a few old goldmines along the way. We stopped in the Comet Vale area to look for the Happy Jack abandoned gold mine. It was getting close to dark when we found it. After a look around with nothing much of interest we headed off again to Morapoi. These days the station owners caters to tourists rather than tend livestock. The accommodation was a set of old fibro buildings that were old staff quarters, pretty basic but clean enough (but the shower was FREEZING!)

The next day was our primo visit to Lynas Corp near Laverton. We headed off early as we had several hundred kilometres to drive and refuelled at Laverton along the way. We arrived at 9 ready for our site tour by the resident geologist. Our timing was perfect as Lynas had just finished their mining campaign and were preparing to commission the processing plant so the site was quiet and the geologist was available to show us around. We donned hard hats and fluoro vests and descended into the pit. While there were no exciting gemstones or crystals to fossick for it was an interesting tour listening to the geologist describe the area and the mining approach followed by a tour of the stockpiles before returning to the office. Visiting a pit allows you to observe a section through the earth and the geologist was happy to explain it all and answer our questions. Back in the office we had coffee and tea and took turns at observing mineral samples through a microscope. After thanking our hosts we left close to lunchtime to head south past Sunrise Dam and Granny Smith mines. We stopped at the causeway across Lake Carey for lunch before coming to Lindon where we fossicked on the old dumps.

The pit at Mt. Weld

The group at Mt Weld

Sue examining a core of the ore

The monazite ore at Mt Weld

In the afternoon we went to the old chrysophrase mine at Eucalyptus and then continued to Yundamindra but by then it was getting too dark, so we headed back to Morapoi station for the night and a big stirfry cook up.

Friday morning we headed to Yerilla Station and found a lovely spot on a rise with great views of the surrounding district, and plenty of interesting rock samples all round. In the afternoon we were supposed to visit the disused Carr Boydd nickel mine, but no one was quite sure how to get there. A great debate ensued and in the end Geert convinced us to try the back way via Pianto Road and Donkey Rocks Road. Well, we had a great time bush-bashing, and Allan deserves an honourable mention for taking his Subaru where most real 4wd's fear to tread, but unfortunately, though we got close, we never actually quite made it to Carr Boyd. Maybe better luck next time. We made it to our hotel in Kal well after dark, where we rendezvous'd with Francise. Then it was off to a terrific dinner at one of the local Thai restaurants.

After breakfast at the motel we headed to the Rock Shop at Coolgardie to meet the shop owner, Owen who was to be our guide for the morning. Our Host took us to his lease where he has a great "humpy" camp set up in the bush, a beautiful spot, with gullies and breakaways. We visited two areas. At the first we rummaged around and found some small tourmaline samples which we were allowed to keep. We also found chiastolites (andalusite with maltese crosses in them). We then returned to the shop to pick up Allan's car then headed to the Londonderry to get some Lepidolite and fossick. We also found some columbite samples on a pile of rubble. At the end of the afternoon we returned to the Rock Shop and several of us bought some specimens from Owen's wife. Tben it was back to Kal and dinner at an Indian Restaurant to round off the day.

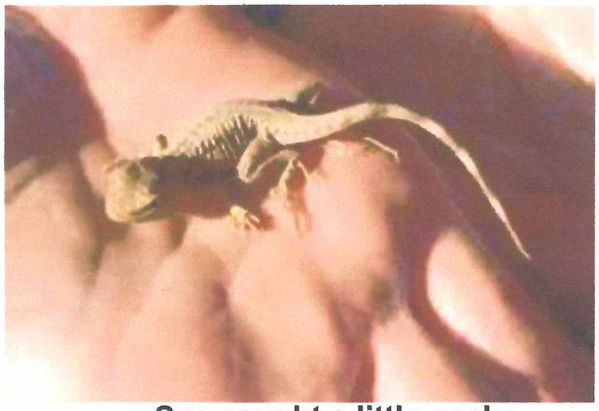
Chiastolite crystal in situ

Chiastolite cross section showing cross

Rose Quartz

Pegmatite

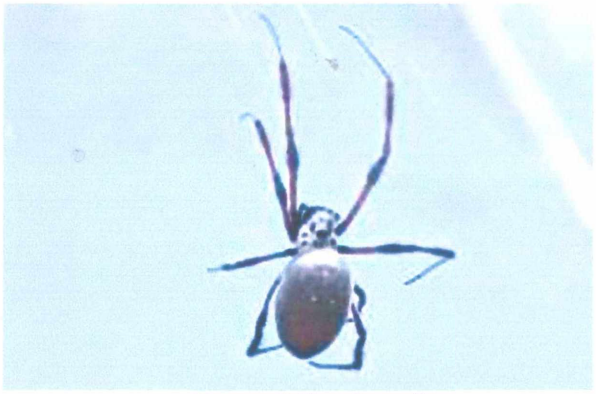
Beryl



Sue caught a little gecko

On Sunday morning we vacated our rooms at Kal, and said goodbye to Francine who was catching the train to Perth. We then headed back to Coolgardie and then south on the Norseman Rd to visit the Giles Pegmatite where we found garnet, beryl, columbite etc. Around 12 it was time to say goodbye to Geert who was stayed behind in the goldfields, while the rest of us did the long drive back to Perth. For a newbie like myself it was a great trip, nearly 3,000km driving and exploring from dawn to dark for 5 days, many thanks to Sue and Allan for organising the trip. Weather was perfect as well.

Garnets



One of the locals

Field Trips 2011

By arrangement members of the Mineralogical Society are able to go on field trips organized by the Western Australian Lapidary and Rockhunting Club inc.
If you are interested in attending these field trips please put your name on the notice board at the Lapidary and Rockhunting Club for the relevant field trip.
Please register with MINSOC Field Trip organizers prior to attending any of the following events, but only if you are a current (financial) MINSOCWA member to confirm event details.

THE WESTERN AUSTRALIAN LAPIDARY AND ROCKHUNTING CLUB INC. 31-35 Gladstone Road, Rivervale, 6103. Rivervale W.A.
PROPOSED 2011 ACTIVITIES & EVENTS
Sept 18th Hobbs Farm rocks and minerals
Oct 1,2,3 Hyden Area for wildflowers
Nov date to be announced bus trip to Kemerton Refinery
Further 2011 activities and events will be published during the year

OS&H – Yes, occupational, safety and health applies on field trips
Please make sure you have the normal safety gear – field boots and hard hat Plus carry extra drinking water. Take sun screen and fly repellant. Drive safely

Particularly important for group field trips:-
Please register your details with excursion organizer – name, car rego, mobile telephone
Please follow instructions by excursion organizer and if you need to leave a field trip early, advise organizer.

"Frank Radke Memorial Auction"

This will be held on Wednesday 7:30pm October 19th (set-up from 7:00pm). Limit 5 lots per person. Members may donate additional lots to the Society.
Could members wishing to put lots in the auction please email a description of the lot and the reserve to Deborah Barnes. Email address:- deborahsenrab @ gmail.com

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Mignonne Clark	Paul Winthrop - Librarian
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