

Mineralogical Society of Western Australia Inc.

OCTOBER 2017 Newsletter

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Editorial

Greetings.

Welcome to the fourth and final MinSocWA newsletter for 2017. The last few months have been relatively busy with talks, activity nights and a field trip to Greenbushes lithium pegmatite. There have been some significant changes to the make-up of the new Committee voted in at the September Annual General Meeting.

At all meetings the Society's microscope and UV lamp are available for use by members. The Society has a library from which members may borrow free of charge. This is currently stored with Ida Newton whilst awaiting a permanent new home. The Society has requested the use of a lockable cupboard at the premises of the Rivervale Lapidary Club that will be used to house the library and some of the equipment.

The policy that members may submit short advertisements free of charge will remain. Additionally, commercial advertisements will be accepted for a nominal charge.

Thank you to Craig Bosel for giving his time as acting Newsletter editor and acting Treasurer.



New Members

Welcome back Nimal Perera.

Recent Activities

The General and Annual General Meetings of the Mineralogical Society of Western Australia Incorporated are now held at 7.30pm on the **second** Wednesday of every odd month at the WA Lapidary Club rooms located at 31, Gladstone Road, Rivervale (corner of Newey Street).

General Meeting: Wednesday, 12th July 2017 at 7:30pm

The door prizes, a Broken Hill rhodonite/garnet specimen plus a cerussite, generously donated by Craig Bosel were won by Angela Riganti and Jason Bennett.

After the General Meeting, Brad Underwood, a Senior Project Geologist working for Mark Creasy gave us a talk on "The Mt Thirsty Cobalt Deposit – WA".

Brad commenced by outlining the reasons for the recent and sudden increased demand for cobalt (and lithium) which was primarily caused by the requirements for rechargeable batteries driven by the automobile industry. Efforts to reduce air pollution are spearheaded by attempts to replace conventional petrol and diesel vehicles with acceptable (speed and distance) electric or, to a lesser extent, hybrid vehicles. Batteries now consume 41% of produced cobalt, with the market growing at 5% annually.

The Mount Thirsty cobalt deposit lies towards the southern end of the Norseman-Wiluna Greenstone Belt and occurs as nickel/cobalt clays overlying a thick package of peridotite/pyroxenite rocks. The cobalt is contained within the saprolite, defined as containing greater than 20% altered minerals. The saprolite itself is divided into an upper and lower unit with the boundary marked by a recognisable change in magnesium content. Lower grade material contains around 0.4% Ni and under 0.1% Co whilst medium grade material contains around twice the cobalt and nearly 0.6% nickel.

Because of the friability of the saprolite, diamond drilling proved unsuitable for obtaining sample material for detailed specific gravity measurements. Sonic drilling methods had to be utilized for this.

Manganese and cobalt form together as asbolite (or manganese wad) which is a typical feature of many of the nickel laterite deposits in the world and generally marks the boundary between the lower silicate saprolite and the upper iron-rich saprolite. High grade pods are related to underlying structure and to the water table.

Further planned exploration follows a well-established route; mapping and soil sampling, aircore and RC drilling for geology and grade, sonic drilling for in situ recovery and metallurgical test work.

Brad concluded with a short comment about new technology driving mineral demand. A potential great demand for cobalt.







Brad Underwood talking about cobalt (photo. Sue Koepke)

Greenbushes field trip: Monday 7th August

Lee Hassan (Acting trip leader) provided the following report on the Greenbushes field trip on Monday 7^{th}

13 Minsoc members were met outside the discovery Centre on the main street of Greenbushes at 8.50 am and a bus picked us up from there and took us to the Talison mine site. First up we were treated to morning tea and provided with high vis vests, hard hats and safety glasses. Daryl Baker advised what to do in case of emergency and gave a short presentation about the mine geology. The pegmatite was initially mined for tin and later for tantalum. The lithium clinopyroxene, spodumene is now the main commodity. As the pegmatite was intruded syntectonically along the Donnybrook–Bridgetown Shear Zone, most of the minerals are fine-grained or have been shattered. However, there are places where coarser grained material is present.

Following Daryl's presentation, the bus then took us to the internal mine lookout where we could see the complex relationship between the pegmatite and the wall rocks and intruding dolerites.

Whenever the geologists come across zones of interesting minerals, they arrange for a front end loader to collect some of the material and place it in fossicking dumps where visitors can safely look at it. This is wonderful as otherwise the material would go to waste and we should all be very thankful that Talison allows this.



Minsoc group with Daryl Baker (photo L Hassan)



Geert hunting for green tourmaline (photo L Hassan)



Despite the fact that it rained all morning, we all had a fantastic time hunting for minerals on the fossicking dumps. We found green and black tourmaline, holmquistite, spodumene, stibiotantalite, apatite and feldspars.

Susan StockImayer provided the following mineralogical report and photographs.

Within a white coarse-grained host rock that is a mix of spodumene and quartz there was one large crystal (LHS below). Initially put aside in the office as a suspected beryl crystal, its prismatic habit measuring ~10mm vertically and optical tests demonstrate that it is a well-formed spodumene crystal. The pronounced cleavage, showing reflections, is apparent.



The hand specimen (RHS above) shows the typical mineralogy of samples on the heaps where we were collecting specimens; it shows a heavily fractured tourmaline crystal within a matrix of spodumene (pink colour) and alkali feldspar (grey patches).





Single crystal with three rhombohedral faces and a small diameter crystal in parallel growth showing the same orientation.

Above (RHS) is a specimen of the chlorite biotite rock with a large vacant impression and several single tourmaline crystals.



Tourmaline crystals were collected, many were coarse, measuring several centimetres and were found within the pegmatite (as above) and within a chlorite biotite rock matrix where commonly the crystals had fallen out and left prismatic shaped impressions. The tourmaline is a schorl variety and is dark blue-grey when crushed. Loose crystals were easy pickings and many showed one well-formed termination comprised of three rhombohedra.



Spodumene- quartz matrix rock with disseminated tourmaline crystals, many end-on showing triangular form

Alkali feldspars, recognised commonly by their tabular forms and white, pink and grey colours were of interest as it was noticed by Clive that some crystals were displaying iridescent play-of-colour (LHS below). Commonly this variety of feldspar is given the gemmological title "moonstone" which is an intergrowth of orthoclase and albite feldspar; however, other feldspar varieties may also display this effect



One of the special "heaps" where we fossicked contained specimens with holmquistite, a rare lithium amphibole. As a mineral crush under the polarising microscope the mineral is an attractive violet blue colour. Prismatic crystals (longest approx. 15mm) shown in the image (above RHS) are aggregated as rosettes although many single crystals occur throughout the host rock.



Mineral Appreciation Group Meeting: Sunday 13th August from 1 pm to 4 pm

Seventeen members and a handful of visitors spent an interesting afternoon at the Rivervale Lapidary Club rooms comparing mineral specimens, peering down microscopes and offering possible identifications.

The day was rounded off by a short presentation by Susan StockImayer who talked about Iceland with the emphasis on scenery, geology and minerals. Iceland was the first country to produce optical quality calcite (Iceland spar) but current legislation prohibits exportation of this mineral. At least 20 different zeolite species have been identified from Iceland.



Susan discussing the geology and minerals of Iceland (Photo by Sue Koepke)

Annual General Meeting: Wednesday 13th September 2017 at 7:30pm.

The door prize of a copy of the "Gemstones of Western Australia" was won by Clive Daw. After the General Meeting and the Annual General Meeting members and visitors heard Dr. Des Lascelles talk on 'Mineralogy of Banded Iron Formations'.

Des Lascelles has 40 years' experience as an exploration and mining geologist for a wide variety of base metals, diamonds and some industrial minerals. He spent the last 30 years as an independent consultant and was employed by a wide range of mining and exploration companies on a daily consultancy mostly iron ore and other base metals. He semi-retired in 1998 and enrolled as part-time Ph.D. student but is still involved in part-time consulting work. He was appointed as an Adjunct Research Fellow at the University of Western Australia in 1998, a position he still holds. Des has numerous scientific papers to his name and is the author of a book entitled "Banded iron formations to iron ore: An integrated genesis" published by Nova Science Publishers Inc. New York.



At the onset of his talk, Des emphasised that, as a result of his work in the genesis of iron ore, he found many of the current ideas had significant flaws in them that did not fully explain all the observable features. As such, many of the ideas presented contradicted historical views and were his own.

The presentation was all encompassing and far ranging, commencing with the definition of a banded iron formation as alternating centimetre scale iron-rich and iron-poor bands and can occur as four distinct facies viz, oxide, carbonate, silicate and sulphide each with their own mineralogy.

Other significant points covered included:

- the destruction of banded iron formations subsequent to the late Archaean to Proterozoic eras by subduction of the ocean floor beneath the continents by plate tectonics.
- sea floor mounds developed around hydrothermal vents slump and form turbidity and density currents that carry material for thousands of kilometres across the seafloor to deposit finely laminated sediments.
- seawater itself cannot be the source of Fe and SiO₂ in BIF
- chert in banded iron-formations derives from Al-poor iron silicates that dissociate during diagenesis to release colloidal silica
- high-grade ore is identical to adjacent cherty BIF in mineralogy, chemistry and texture apart from the absence of chert bands
- high-grade saprolite iron ore deposits form from chert-free BIF with only minor modification from supergene processes and do not form by supergene, hypogene or metamorphic leaching of microquartz from cherty BIF

Several specimens of various BIF and iron ores were available for inspection.



Des' latest book, not yet available



Banded ironstone gorge at Karijini (Photograph Susan StockImayer)



Upcoming Meetings and Activity Days

Next Activity Meeting: Sunday 29th October at 10.00am

Stepping Stones activity

WHERE

Perth CBD and Queens Gardens

WHEN

Sunday 29 October 2017

Start 9.50 for 10am Ritter's Pole/Kangaroos Drinking at Stirling Gardens (corner of St Georges Terrace and Barrack Street)



Photo by Lee Hassan

Finish12-12.30pmSomewhere along the Terrace

For those interested, the party will then travel by bus to Queens Gardens for a bring-your-own picnic. The gardens have drinking fountains and toilets, but no barbecue facilities. Some park benches are available.

<image001.jpg>

WHAT WE'LL DO

We'll look at some of the rocks cladding the buildings of our city, with particular emphasis on locally sourced rocks.

Bring your hand lens if you want to learn more about the mineralogy and history of sedimentary, igneous and metamorphic rocks (no hammers allowed!)

Stops will be as long or as short as needed ... depending on your curiosity and how many questions there are!

As the walk is along one of Perth's main street, please pay attention to traffic.

WHAT TO BRING

Hat, sunscreen, sunglasses, water, comfortable shoes, hand lens. An umbrella if it looks like rain...

DOWNLOAD THE BROCHURE and SEE IT ON YOUR PHONE

GSWA's Stepping Stones brochure (copies will be available on the day)



http://dmpbookshop.eruditetechnologies.com.au/shop/productSearch.do?contributor=&title=&cod e=stepping+stones&all=stepping+stones&keywords=&sort=&searchBy=all&txtQuery=stepping+ston es

Follow the instructions below to download the finding Geology in the City app

Download Everythere from iTunes App Store

- 1. Open app, click on the Tours tab and swipe left on the Finding geology in Perth city banner. Tap on Download to pre-download all media.
- 2. Start the interactive tour by tapping on the Finding geology in Perth city banner followed by the Explore button.
- **3.** Begin walking or cycling around Perth, visiting the six sites. As you pass each location coordinate, the digital media will activate on your device.

For Android phones

- 1. In the Google Play Store search for 'Everythere' and download the app.
- 2. Open the app and search the tours.
- 3. Tap on the hexagon on 'Finding Geology in Perth City' to download all the media ready for your tour.
- 4. Tap on the photo to see where the interactive tour commences (Introduction, Setting off, Discover).
- **5.** Begin walking or cycling at Site 1, Queens Gardens and follow the tour. As you near each of the location coordinates, the digital media will activate.

Please note that the locations will not be visible until you are within range.

PARKING

For those not using public transport, pay parking is available at reasonable rates at the Queens Gardens carpark, and the starting point of the tour is only a short bus ride up along the Terrace (buses are free in this zone).

WANT TO CHALLENGE YOURSELF?

A quiz will be available during the walk for those wanting to challenge their knowledge of Perth. Don't forget to have a pen with you. There might even be a prize or two...

Please respond directly to <u>angela.riganti@dmirs.wa.gov.au</u> to indicate your participation in this activity.

Next General Meeting: Wednesday, 8th November 2017 at 7:30pm

TBA

Activity Meeting December: Date TBA

Mineral Market

Australian Journal of Mineralogy

A reminder that back issues of the AJM are still for sale at a sizeable 30% discount for a limited time. See Geert Buters at the next MinSoc meeting if you have any interest.

The Committee of the AJM generously donated a set of available back copies of the journal to MinSocWA.



Contacts

The new Committee for 2017/2018 is shown below. Please note that the positions of Secretary and Treasurer have been joined again into a single position.

President	Stewart Cole	0414 904 169
Vice President	Sue Koepke	0417 990 688
Secretary/Treasurer	Lee Hassan	93975197
Field Trip Leader	Rodney Berrell	0407081025
Committee Members	Vernon Stocklmayer	92919043
	Angela Riganti	92437472