



# Mineralogical Society of Western Australia Inc.

## July to November 2016 Newsletter

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### Editorial

Hi Everyone,

Much has happened in the last four months and we have yet to find a full-time newsletter editor. This version has been assembled through the combined efforts of several Committee members and, unfortunately, does lack detail in places.



It does however, provide an auction update. The auction committee has acquired a large number of mineral specimens for sale, as well as books, journals and equipment. The rest is up to you so bring yourself, your relatives, children, friends and even the next door neighbour and lots of money and be ready for some fun and the chance of buying something special for your collection or an early Christmas gift for some lucky person.

## Upcoming talk – Wednesday 9<sup>th</sup> November 2016

**Lena Hancock will be giving a talk on “Gold provenance fingerprinting”**

at the November general meeting. Lena Hancock obtained her PhD in 1994 in Moscow on mineralogy of lode and alluvial gold deposits in the Far East of Russia. As a mineralogist, she used to work at Curtin University and WA Museum before joined GSWA in 2008 as a HyLogger Geologist.

## New Members

The committee would like to welcome Graham Sweetman, Tony Gates, Jim Richards, Chris Reindler, Mike Freeman and Rob Sielecki as new members.

## The 6<sup>th</sup> Frank Radke Memorial Mineral Auction

The Mineralogical Society of Western Australia (Inc.), (MinSocWA), will be conducting its biennial mineral auction on Sunday, 20<sup>th</sup> November 2016. The auction will be held at the premises of the WA Lapidary and Rockhunting Club, 31 Gladstone Road, Rivervale and it will be an all-day event, with two live auction sessions, in the morning and afternoon, with a lunch break, during which bids for the silent auction can be made. Herewith an update.

## MinSocWA Auction Update - 27/10/2016

Hi fellow MinSocWA Members,

Well, the auction is only three short weeks away and the pace and excitement level is picking up. So far we have collected 224 hand specimens, plus many books and instruments as well as numerous micromounts. This week has seen some milestones in the progress of the auction. We are still receiving specimens albeit the rate has slowed somewhat from the frenetic pace of the last few weeks. For details of the images shown in this email please visit our website at <http://minsocwa.wixsite.com/auction> . Images of all items in the auction have now been updated for your enjoyment.

Website.

Our website is up and running. All minerals have been photographed, described and are available for your viewing pleasure. Books and instruments have also been completed. Please visit the website at <http://minsocwa.wixsite.com/auction> for full details of all items for sale. The website has taken a lot of effort and I am sure there are a few mistakes/omissions in it. If you spot anything that you think needs correction, please email John, Vernon or Jason. There are a few deliberate mistakes in the website to see who is really awake!

Advertising.

All interstate MinSocs were contacted earlier this month with a request to advise their members of our upcoming auction and seeking both sellers and buyers. Hopefully this will see some unique specimens entering our auction as well as some keen absentee buyers. In addition, an update went out to all MinSocWA members late last week.

Donations and items for sale.

We have received a mint edition of Simpson's "Minerals of Western Australia" with a foreword by Peter Bridge. This is a fine copy and will be keenly sought. We also received a copy of Simon and





Schuster's "Rocks and Minerals" and six copies of "The MacDonald Encyclopedia of Precious Stones." We are still accepting donations and sale items so please contact John, Jason or Vernon to arrange collection. The close-off date is 14<sup>th</sup> November, so don't be late.

#### Boxes and Containers.

We have received numerous containers and boxes but still need more. Strawberry containers and the bottoms of milk cartons are ideal. If you have any containers, please email John Mill at [millrock@iinet.net.au](mailto:millrock@iinet.net.au) and he will arrange collection.

#### Volunteers.

We still need volunteers to assist on the day. We need people to man the doors and process buyer enrolments, take the money, run the kitchen and assist with the smooth running of the auction. Please contact John Mill at [millrock@iinet.net.au](mailto:millrock@iinet.net.au), Jason Bennett at [orthoclase.feldspar@gmail.com](mailto:orthoclase.feldspar@gmail.com) or Vernon Stocklmayer at [nyanga@icenet.com.au](mailto:nyanga@icenet.com.au) if you can assist. Being a volunteer will not exclude you from bidding for your favourite mineral specimen, book or other item.

#### Registration:

Registration forms for both buyers and sellers are available on the website. They should be downloaded, completed and sent/given to John Mill ([millrock@iinet.net.au](mailto:millrock@iinet.net.au)). While registration will be available on the day of the auction, we encourage everyone to register beforehand to avoid congestion on the day of the auction.

#### Lucky Dip:

We are organising a lucky dip for kids attending the auction. Further details will be announced shortly.

#### Queries, comments and suggestions:



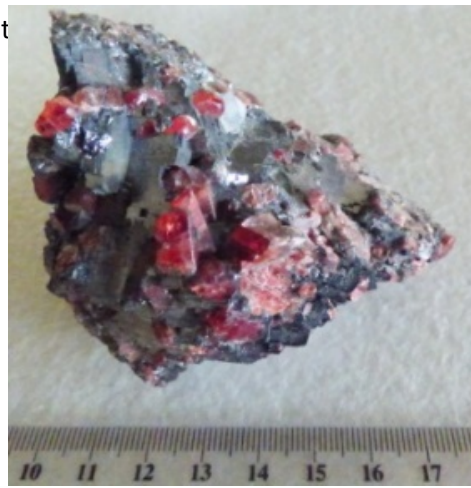
Any queries, comments or suggestions that you think will help make our auction better are warmly welcomed. Please contact John, Vernon or Jason.

Garnets in chlorite schist from Thackaringa





Mineralogical Society of Western Australia



016



Crocoite from Tasmania

Rhodonite and galena from Broken Hill

## Recent Activities

### General Meeting Wednesday 13th July:

**Note:** 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).

Talk by Mike Freeman of the WA Geological Survey entitled “Meteorite impacts in Western Australia and Australia. An overview; a smorgasbord of Earth wounds”.

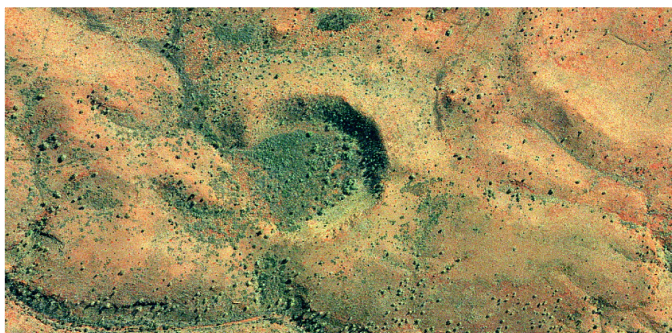
Of the 33 probable and confirmed impact sites in Australia, 15 occur within Western Australia. These comprise four readily identifiable craters, five that are eroded or structurally affected by later tectonics, three deeply eroded craters and three that are buried in sedimentary basins.

Mike then went on to describe the features of selected craters, commencing with the **Dalgaranga Crater** which lies some 60km from the town of Cue. It is the youngest and smallest of the craters; only 24 metres in diameter, 3 metres deep and was formed by the impact of a mesosiderite meteorite weighing an estimated 1 tonne. Stony iron fragments are common although many collected fragments have been subsequently lost.

Age estimates vary from 270,000 to 3,000 years ago with Mike favouring the latter.

Moving upwards in scale, we were next taken to the **Hickman Crater**, discovered in 2007 by geologist Arthur Hickman.

Hickman Crater – aerial photograph.



Hickman Crater

This impact structure, 270 metres across and 30 metres from crest of rim to floor, lies within Paleoproterozoic volcanics and iron formation.

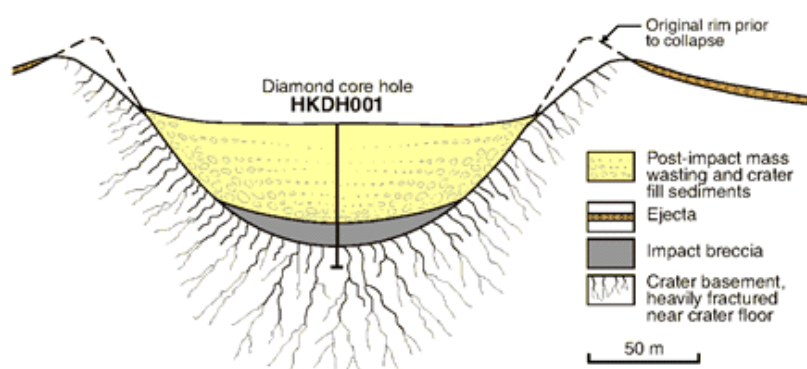
Courtesy of the Western Australian Department of Mines and Petroleum



Numerous weathered fragments have been recovered assaying 57.9% Fe, 3.14% Ni and 0.27% Co. Vesicular glass was recovered as well as suevite, a mixture of rock and meteorite that melted in the instant of impact.

Age of impact estimated to be between 100, 000 and 50, 000 years ago.

An iron ore company, working in the area, agreed to drill a hole that produced data for the following cross-section.



Hickman Crater.

Collaborative drill hole recovered vesicular glass.

Courtesy of the Western Australian Department of Mines and Petroleum

The very much larger and well known **Wolfe Creek Crater** is located in the Tanami Desert some 2,000 km north east of Perth. At 880 metres across it is the second largest crater on earth; it is currently only 50 metres deep and the rim is 35 metres above the surrounding sandplain.

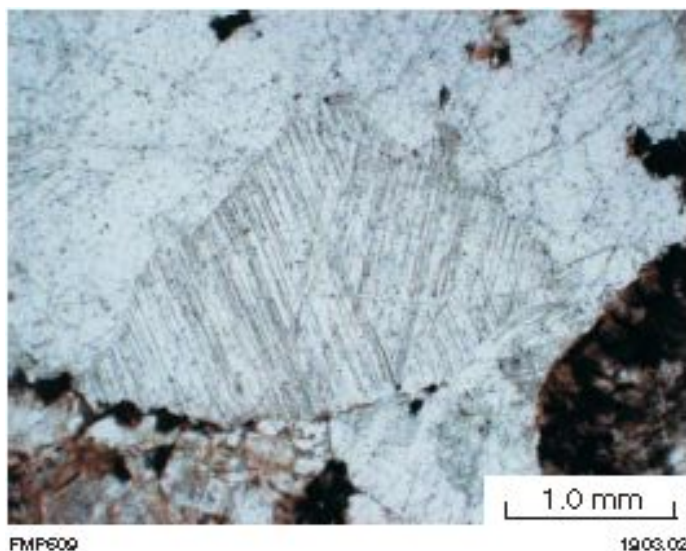
The asymmetry of the rim and distribution of ejecta suggests that the bolide was travelling from the northeast. Isotopic dating gives an age around 300,000 years.

The **Yallalie Impact Feature** is a buried feature, 12 km across, in Perth Basin sediments some 200 km north of Perth. Oil drilling showed sediments from 1200 metres below surface to be flat lying but were disturbed above this level producing a series of concentric magnetic highs and lows centred on a high. From a similarity in appearance to the Yuty Crater on Mars it was considered that Yallalie could have been formed by a meteorite hitting into a shallow sea, forcing unconsolidated sediments outwards and producing waves of diamictite. The age of impact would then have been contemporaneous with sedimentation ie Cretaceous.

The **Yarrabubba Impact Feature** is a deeply eroded feature with present erosional level well below original crater floor. Magnetics suggest that the original crater was some 50 km in diameter.

An outcrop in the area was originally mapped as the Barlangi Granophyre but this was subsequently considered to be the remnant of impact-melted Yarrabubba Granite. Evidence for this includes the noticeable absence of any veins, dykes or cross-cutting features as well as the presence of numerous xenoliths and of large quartz and feldspar grains.

Shatter cones of up to 50 cm occur within the granite and thin sections reveal multiple deformation planes in quartz (see below).



Yarrabubba Impact Feature

Multiple deformation planes in quartz.

Photograph by F.Parajino

Courtesy of the Western Australian Department of Mines and Petroleum

The **Shoemaker Impact Structure** on Cunyu Station was formerly known as the Teague Ring; the name was changed in honour of Gene Shoemaker who found shatter cones there in 1995. It comprises a large circular folded structure of some 26 km in diameter with an Archaean core and Proterozoic rim. Defining characteristics include such micro/meso-scale features as shatter cones, planar deformation fabrics and pseudotachylite veins; macro-scale features such as central rebound uplift and hydrothermal alteration features.

The Teague Granite in the core is shattered and fractured.

Mike then left Western Australia and went on to discuss a few other significant Australian impacts.

These included the deeply eroded **Akraman Impact Structure** in South Australia some 1900 km east of Perth. This huge structure is of indistinct size with estimates ranging from 20km to 150km. Ejecta has been found in drillholes collared up to 550km away and it is estimated that the bolide was some 4.7km in size; potentially of global environmental significance with exciting but controversial links to life evolution.

The date of impact is given at 580 Ma.

The **Henbury Meteorite Craters** in the Northern Territory comprise 13 recognisable craters of 6-180 metres diameter scattered over an area of 25ha. They were formed when the bolide fragmented on entering the earth atmosphere. The age of impact was 4200+/-1900 years ago.

Finally, we had a quick look at **Grosses Bluff** situated about 175 km west of Alice Springs in the Northern Territory. This takes the form of an annulus of sandstones, 1.2km wide with a 1.75 km central hollow. The crests stand about 180 metres above the surrounding plain and the feature is about 5km across though there is evidence to indicate that the original crater was up to 24 km across.



Shatter cones up to 1.4 m, impact melt rock and the structural and geophysical signatures confirm impact dated at  $142.5 \pm 0.8$  Ma (Ar-Ar on melt rock).

Mike concluded his talk with the statement that, in time, more impact structures will be discovered.

Thank you Mike for a very interesting smorgasborg.

## Annual General Meeting Wednesday 14th September:

The Annual General Meetings of the Mineralogical Society of Western Australia Incorporated was held at 7.30pm at the WA Lapidary Club rooms located at 31, Gladstone Road, Rivervale.

**This was followed by Professor Andrew Putnis presenting a talk on "Pseudomorphism: from simple mineral replacement to large-scale metamorphism."**

In this talk Professor Andrew Putnis explained how the interaction of aqueous solutions with minerals controls how rocks react to changes in pressure and temperature and hence the importance of fluids to the dynamics of the Earth's Crust. Simple laboratory experiments to demonstrate pseudomorphic replacement of one mineral by another will be the basis of understanding large-scale processes of metamorphism and metasomatism. Examples of such processes were given from his field work in Western Norway.

## Activity Days

## Gem Identification Workshop – August and September

Two one day- courses were held for MinSocWA members at the Gemmological Association of Australia's premises in August and September 2016. The sessions were run by Susan Stockmayer with seven members attending each session.

The basis for the sessions was to familiarise members with some of the standard equipment that gemmologists use routinely for gem identification techniques. Many of the instruments can be used for mineral identification purposes.

Although gemmologists would usually be dealing with cut gems and materials that have some polished faces on them because these are usually used for ornamentals, mineralogists can adapt and utilise several of the instruments to gather information on their "unknowns".

The instruments and their intended purposes demonstrated included: Long and short wave ultraviolet lamp for fluorescence responses, specific gravity determination using hydrostatic methods, hand- held spectroscopes used to examine absorption spectra within the visible spectrum range, table model polariscopes with conoscopic lenses for testing anisotropy and optical figure determinations, refractometers for refractive index determinations, two models of dichroscopes to determine pleochroism schemes and the use of standard microscopes to examine mineral inclusions and other features of minerals at high magnification. Although not an instrument generally used by gemmologists, the petrological microscope was also shown and the Becke line test for the determination of refractive indices using mineral crushes and a series of refractive index oils was introduced.





If a mineral specimen is sufficiently transparent and of a suitable size, many of the optical instruments used for gemmological determinations can also provide important information to aid identifications and a flow chart was provided to set out how test results can be used for this



purpose. Following the demonstrations all members participated in using all the instruments and techniques to determine two “unknowns” ; spodumene and an apatite crystal.

MinSoc members at work using polariscopes and

refractometers

Photo by Sue Koepke

The main purpose of running the course was to demonstrate some of the equipment that is routinely used by gemmologists, who, within the world of ornamentals, are identifying a small numbers of minerals. The budget required to cover a collection of these instruments is low compared to high tech laboratory methods and also provides the satisfaction of being able to achieve an intelligent mineral determination at home. Gem testing techniques have also now moved into advanced instrument science but it remains worthwhile to be able to examine an unknown material or mineral and make preliminary identifications using its appearance characters and the results of a few simple tests.

## Short Talks Wednesday 12th October:

We were given two short talks, one by Craig Bosel on the formation of azurite suns and the other by Jim Richards on gold and diamond rushes in Guyana, South America.



Diamond crystals from Guyana; many showing strong blue white fluorescence

Photo by Sue Koepke





Craig Bosel describing the formation of azurite suns.

Photo by Sue Koepke

## The AJM Saga

The Editorial Committee of the Australian Journal of Mineralogy, based in Victoria, announced that they were intending resigning and folding up production of the journal. The WA Committee decided that the Journal could not be allowed to die and the MinSocWA would canvass support to take on production. The following persons were nominated for the vacant positions on the committee of AJM Publications Incorporated:

President/Editor: Peter Downes

Vice President/Assistant Editor: Vernon Stocklmayer

Secretary/Treasurer: Geert Buters

Marketing: Sue Koepke.

MinSocWA were successful and necessary paperwork is now well under way.

Francine Payette agreed to offer editorial support whenever required.

## Reminders

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. The library is housed at Stewart's office in West Perth, and the catalogue is available from the Secretary.

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

## Contacts

The committee members for FY16 are:

<b>President</b>	Stewart Cole	0414 904 169
<b>Vice President</b>	Vernon Stocklmayer	08 9291 9043
<b>Secretary</b>	Sue Koepke	0417 990 688
<b>Treasurer</b>	John Mill	0411 420 921
<b>Field Trip Leader</b>	Vacant	
<b>Member</b>	Ida Newton	
<b>Member</b>	Angela Riganti	
<b>Member</b>	Lee Hassan	

