



Mineralogical Society of Western Australia Inc.

Nov-Dec 2015 Newsletter

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Editorial

Hi Everyone!

First of all I'd like to apologise for the lateness of this newsletter. I was aiming to get it out at the beginning of November, but that didn't happen. But never mind though, as this bumper edition now has some excellent content that should wrap up the year nicely.

Secondly I would like to thank Vernon Stocklmayer for his hard work as Editor over the last few years. Vernon and Susan have also kindly provided a summary of Tom Kapitany's talk that I was unable to attend, filling what was going to be an awkward hole in the newsletter. So again, you have my thanks. And I should also thank Sue and Geert for a report on the Joint MinSoc Seminar in Tasmania this year. I look forward to seeing some of the goodies they brought back, along with the other delegates from MinSoc WA.

Thirdly, I have created a quick survey on the newsletter to understand what content it should/shouldn't have. I brought it to the last meeting, but due to the Tassie seminar there weren't enough members present. Thanks to those of you who did fill it out, the preliminary data already show some things I wasn't expecting. I will bring along another few paper copies to the next general meeting, but [here is a link to complete it online if you wish to do so](#). It will close 1 week after the next general meeting. Please fill it in, it's only one page and shouldn't take more than a minute or so.

Merry Christmas/Seasons Greetings/Happy New Year/Cheers,

Jason

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.



Recent Activities

Talk Summary: Lee Hassan – “Tellurides and other minerals in the Yuinmery and Austin VMS (volcanogenic massive sulfide) deposits”

Summary by Jason Bennett

Following the General and Annual General Meetings on the 9th September 2015, Lee Hassan piqued the interests of members of the MinSocWA, and provided a welcome respite for the unfortunate guests that survived two consecutive meetings. Lee’s talk was titled “Tellurides and other minerals in the Yuinmery and Austin VMS deposits”.

Lee completed her PhD on “Mineralogy, geochemistry and origin of the Kalgoorlie gold deposits, Western Australia” in 1978 under her maiden name of Lee Golding. Lee then worked as an exploration geologist for 10 years for EZ Industries and the Sons of Gwalia Group of Companies before her daughter was born. Once her daughter started school, Lee joined the Geological Survey and has been with the Survey for 21 years. Since the beginning of this year Lee has been in a managerial role but prior to that spent several years researching VMS (volcanogenic massive sulfide) deposits including Yuinmery and Austin.

The Yuinmery and Austin volcanogenic massive sulfide (VMS) prospects are in the northwestern part of the Youanmi Terrane of the Yilgarn Craton in Western Australia. Just Desserts is the main deposit at Yuinmery and is copper-rich, whereas the Austin deposit is zinc-rich.

Lee provided an overview of the geology of the terrain, before progressing to a description of the mineralisation and alteration mineralogy. For the grand finale, Lee delivered the pièce de résistance of the presentation; photomicrographs and descriptions of the varied tellurides between each deposit (an example is shown in Figure 1). The tellurides have been found commonly in association with native gold, but the suite of tellurides at each prospect differs. The full list for each locality is provided in the table below. Despite their small size (a challenge for even the best of our micromounters at around 0.02mm each!) the diversity of gold, bismuth, nickel, copper and silver tellurides shown in these deposits is astounding, and they are sure to keep all of our eyes open. I know I will pay close attention to even the smallest metallic-looking dust speck under my microscope in the future!

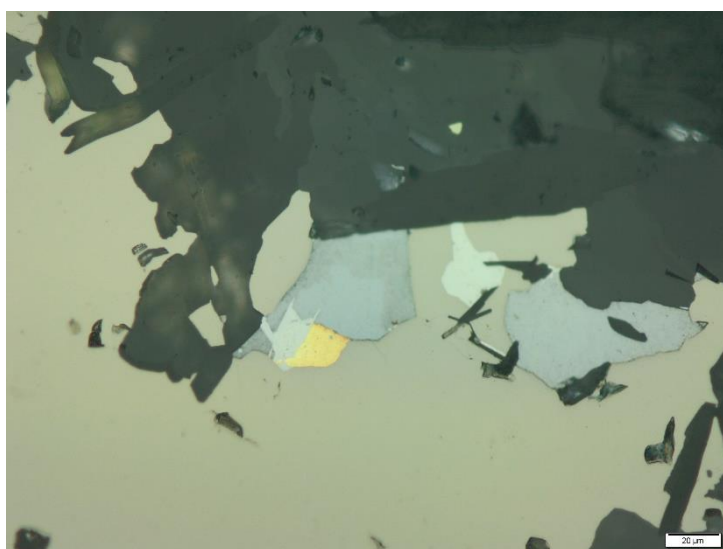


Figure 1: Reflected light microphotograph of tellurides and gold from Yuinmery 2. Photograph courtesy of Lee Hassan. Scale bar is 20 microns.



	<i>Yuinmery</i>	<i>Austin</i>
<i>Tellurides:</i>	Altaite PbTe Co-melonite? (Ni, Co)Te ₂ Hessite Ag ₂ Te Melonite NiTe ₂ Ni-bearing attagamite? CoTe ₂ Petzite Ag ₃ AuTe ₂ Rucklidgeite (Bi,Pb) ₃ Te ₄ Stützite Ag ₅ Te ₃ Tellurobismuthite Bi ₂ Te ₃	Altaite PbTe Poubaite? (Bi,Pb) ₃ (Te,Se,S) ₄ Rucklidgeite (Bi,Pb) ₃ Te ₄ Low-Pb Rucklidgeite (Bi,Pb) ₃ Te ₄ Stützite Ag ₅ Te ₃ Tellurobismuthite Bi ₂ Te ₃ Tetradymite Bi ₂ Te ₂ S Tsumoite BiTe Volynskite AgBiTe ₂
<i>Sulfides:</i>	Pyrite, pyrrhotite, chalcopyrite. Minor sphalerite, galena, molybdenite.	Pyrite, pyrrhotite, sphalerite, chalcopyrite. Minor galena, molybdenite, aikinite.
<i>Alteration minerals:</i>	Talc, chlorite, cordierite, anthophyllite, cummingtonite, silica. Minor carbonates, biotite, white mica, stilpnomelane, hisingerite, apatite, tourmaline, hypersthene.	Talc, chlorite, anthophyllite, cummingtonite, hornblende, silica. Minor carbonates, apatite, Wagnerite.

Thanks Lee! For those of us who are interested, Lee's report on the geology and mineralisation at Yuinmery is available for download from the DMP website: [Hassan, LY 2014. The Yuinmery volcanogenic massive sulfide prospects: mineralization, metasomatism and geology. Geological Survey of Western Australia, Report 131, 65p.](#)

Lee is currently working on a report for the Austin prospects (similar to the one above), as well as a paper describing the tellurides. I will include these in a future edition when they are available.





Talk Summary: Tom Kapitany – “A Brief Tour of Deep Time Geology”

Summary by Susan and Vernon Stocklmayer

On the 22nd October, Tom Kapitany kindly presented a talk to MinSocWA members and guests entitled “A Brief Tour of Deep Time Geology”.

Tom Kapitany completed his BSc. in Geology and Botany at the University of Melbourne and has business interests both as a miner and a horticulturalist. He holds numerous mining tenements around Australia and is a director of National Dinosaur Museum Canberra, Crystal World, Collectors Corner Garden World, and Australian Mineral mines. Tom has made very significant donations to the Museum of Victoria. An avid traveller, he regularly visits geological sites and mines around the world and has a large network with staff and personnel in many Museums and Institutions worldwide.

Tom commenced by defining Deep Time Geology as the period in the early history of the Earth from the Hadean through to the Archaean and spoke of some of his experiences whilst on sample collecting trips all relating to Deep Time. Firstly, we visited the Jack Hills region of Western Australia where zircons within schists of the Jack Hills Greenstone Belt have produced ages of 4.404 to 4.030 Ga, making these the oldest recorded ages to date. Zircons within the host rock are of various ages, representing multiple sources and events and pin pointing the oldest within the rock is not straightforward. The striking image of a zoned euhedral zircon is a reminder of what can be learned from a single crystal.

The next part of the excursion took us to the far north of Canada and the site of the 4.03 Ga Acasta tonalitic gneisses. The setting where these oldest rocks on Earth are located was picturesque with the autumnal colouring of the low growing vegetation and the nearby lake systems and in stark contrast to the Jack Hills site of WA. Access to the gneisses is possible only by seaplane followed by a short walk, keeping a keen lookout for bears of assorted sizes and colours. The gneisses are strongly banded attractive rocks. Samples collected have been sliced and distributed to many institutions worldwide.

Our final excursion was back to WA and the Dresser Mine area where baryte has been mined from the 3.5 Ga Dresser Formation, Warrawoona Group, Pilbara Craton. The area is one specially preserved with access limited for scientific research. Signs of life are present as stratiform, columnar, domical, and coniform stromatolitic laminates at various levels throughout the unit that represent Earth's oldest fossiliferous sedimentary rocks.

Throughout his presentation, Tom discussed the problems of collecting and marketing fossils in Australia specifically of stromatolitic rocks. He also emphasised the importance of allowing people, including children, to handle rocks especially those with biological origins.

Following the tour of Deep Time was a lively exchange of questions and comments. Particularly interesting is the ongoing debate about attitudes on commercial trading of fossils weighed against the policies of most Museums where research and collections are the prime focus, and there is little ‘hands on’ products such as fossils, crystals and rocks with which the general public can experience geology and Earth Sciences.

Thanks Tom!



Talk Summary: Vernon Stockmayer – “The Enigmas of the Zimbabwe Diamond Deposits”

Summary by Jason Bennett

At the last general meeting for the year on 11th November, Vernon Stockmayer presented a talk on the alluvial diamond fields in Zimbabwe. Vernon started by describing the geology of Zimbabwe, which sounded familiar to many members. Much like WA, Zimbabwe is dominated by a central Archean TTG craton, with some other bits slapped onto the edge, such as the Limpopo Mobile Belt to the south. Kimberlites have been found all throughout Zimbabwe, Rio Tinto are currently mining Murowa, and River Ranch was mined in the past but currently closed (Figure 2). Vernon then described two major alluvial diamond mines: Somabula and Marange (Figure 2).

Somabula was discovered in 1903, and another nearby deposit Ngamo was found a few years later. Both are hosted by conglomerates at the base of the Karoo Sediments. Associated with the diamonds in the conglomerates at Somabula are a suite of heavy minerals (Figure 4): Staurolite, Chrysoberyl (including Alexandrite), Topaz, Aquamarine, Sapphire, Garnet, Tourmaline, Kyanite, Platinoids, Chromite, Ilmenite and phosphates have all been recorded from the gem-bearing gravels. Some of these gems are in the collection of the Natural History Museum, London. This wide variety of minerals suggests multiple sources of original material. The current hypothesis is that the diamonds and these varied minerals were scoured from their source rocks via glaciation, and that the deposit at Somabula is the result of further transport of glacial tills. The primary source is unknown.

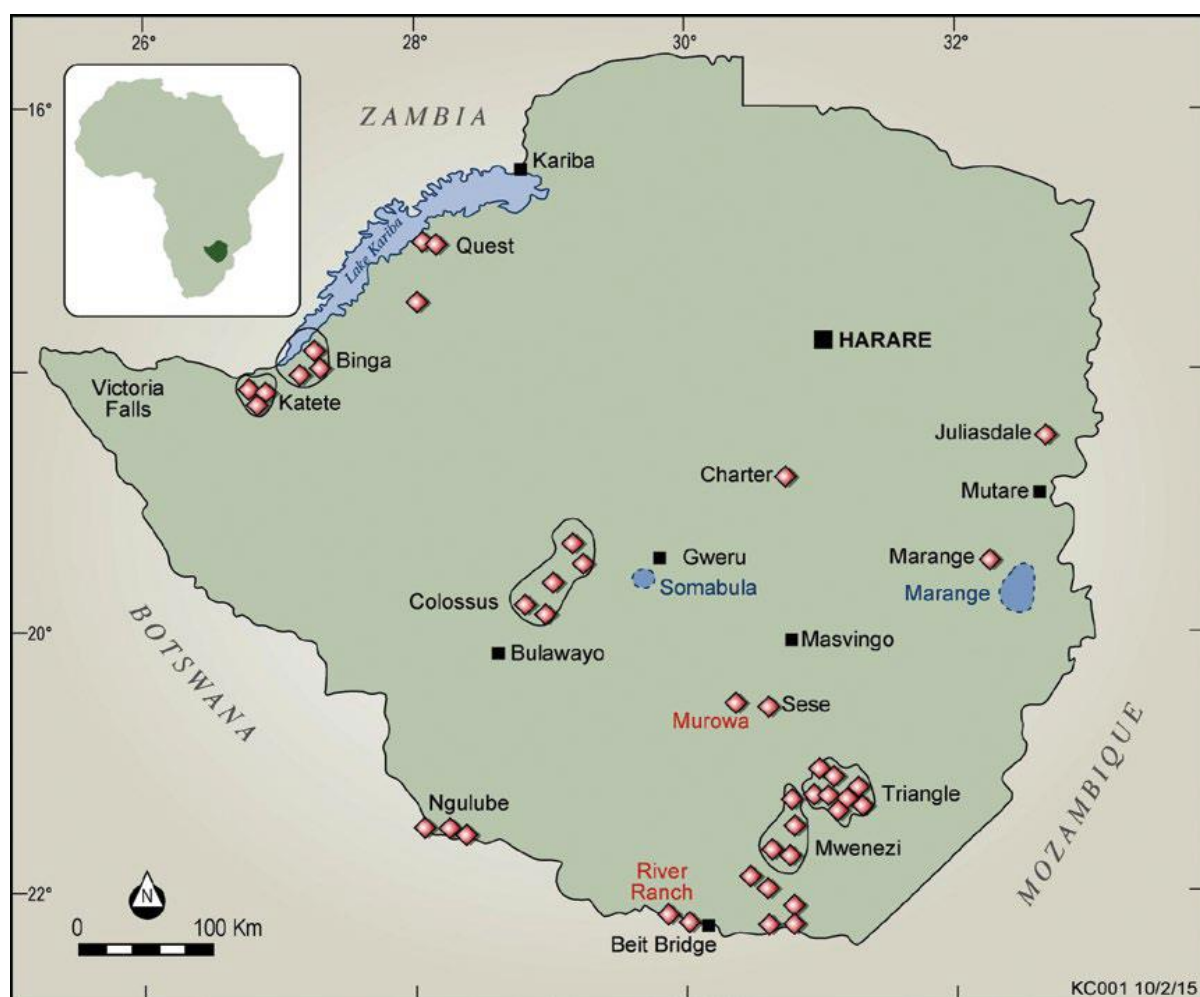


Figure 2: Known kimberlites (pink diamonds) and the location of the two alluvial fields discussed (blue areas).

Marange was initially discovered in 2001, but it was not until early 2006 when a high grade deposit was discovered that a mining rush started. In the beginning it was mined illegally (up to 20,000 small scale diggers) but by the end of the year the Government of Zimbabwe took control. The Diamonds at Marange are hosted by the Umkondo Group of sediments, and are distributed throughout three horizons: in the conglomerates of the Basal Formation (Figure 5), another layer of conglomerates at the base of the Lower Argillaceous Formation halfway up the sequence, and in the surface colluvium. Interestingly, there are no heavy minerals associated with the diamonds in the Basal Formation, however they are abundant in the Lower Argillaceous Formation. This suggests that the two horizons have different sources. The primary source for these diamonds also remains undiscovered.

Thanks Vernon for an interesting talk! For more detail, the majority of Vernon's presentation is published in *The Australian Gemmologist*: Vol 25, No. 9.



Figure 4: Heavy minerals from Somabula. Diamond in the centre, with (clockwise from top) garnet, sapphire, gold, chrysoberyl, alexandrite, topaz, aquamarine and ruby. Photographed at the Natural History Museum, London.



Figure 5: Diamond in Marange conglomerate. Sourced from Mugumbate, 2012 ([Geological Society of Zimbabwe Summer Symposium 2012 Field Notes](#)).

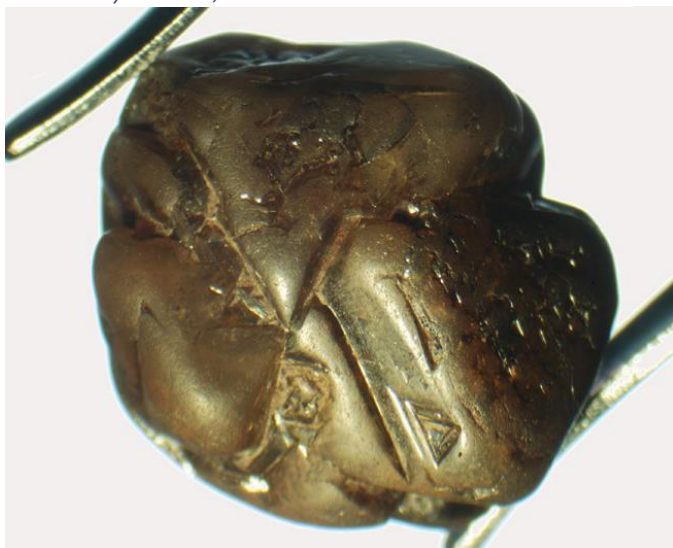


Figure 3: Uncut 15mm Marange diamond. Photographed by Francine Payette

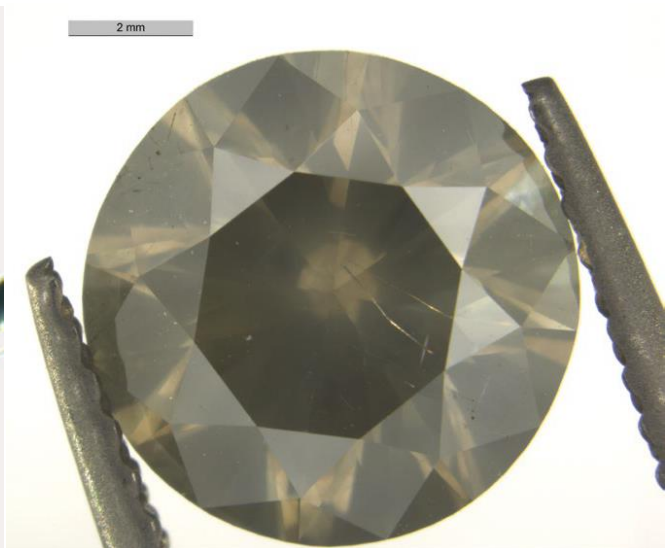


Figure 6: Faceted 8.14mm Marange diamond. Photographed by Stewart Cole.



Report: The 38th Joint Australasian Mineralogical Societies Seminar

Report by Geert Beuters

The annual MinSoc Seminar (JAMSS 38) was held on the 4th and 5th of November at the Tamar Valley Resort near Launceston, Tasmania. The theme for this year was “What’s new in Australian Minerals”. The program included fourteen speakers, covering a range of minerals, localities, and academic research, ensuring there was something of interest for everyone. We listened to lectures about Australian Rubies, the Areyonga azurites, and phosphate minerals from the Mt Wills (Vic) pegmatites, and were taken on historic journeys to the Biggenden mine, and Mt Cameron (Tas) and its giant quartzes. Ralph Bottrill updated us on new Tassie finds since the publication of the Catalogue of Tasmanian Minerals in 2008, while Steve Sorrell spoke about finding new things in old collections, and Paul Carr “spilled the goss” on the back-story of the dispersal of the Milton Lavers Collection. WA was represented by Murray Thompson and Allan Longbottom, who talked about Degruessa minerals, and putnisite and other micros (no prize for guessing who covered which topic).

Of special interest to WA collectors was Professor Pete Williams lecture about the atacamite family. While atacamite, botallackite and paratacamite have very different structures, and can be visually distinguished from each other, paratacamite and clinoatacamite have similar structures, and cannot be identified without x-ray studies and chemical analysis. Moreover, through substitution paratacamite gives rise to the herbertsmithite group. When next we look at our 132 collections, and think we can tell the gillardite from the paratacamite or clinoatacamite, we are kidding ourselves. Time to rewrite those labels!

The interface between biology and geology developed as a bit of a theme in some of the lectures. Emeritus Professor Ross Large, the patron of MinSoc Tasmania, talked about pyrite and its ability to incorporate a wide range of elements in its structure. Pyrites that are formed in black shales on the ocean floor capture a record of trace elements in the ocean at the time of crystallisation. Changes in oceanic trace elements are governed by mountain building and erosion, and can be correlated with mass extinction events and periods of diversification of life. Pyrite analysis indicates that plate tectonics, and not survival of the fittest, is the major driver of evolution.

Professor Erik Melchiorre from the California State University, San Bernadino, updated us on his research on stichtite. This mineral is a purple hydrotalcite that forms in fore-arc serpentinites at relatively low temperature and shallow depth from the interaction of chromite and abiogenic methane, at the same time as lizardite and chrysotile. Like other hydrotalcites it consists of positively charged hydroxide layers with interlayers containing anions and variable amounts of water. Hydrotalcites have a high specific surface area, allow anion exchange, and can trap small organic molecules and known catalysts. Repetitious ordering of such trapped organic molecules may serve as scaffolding for the transfer of information, similar to genes. Serpentinite may have been a suitable environment for the origin of life, both on Earth and on Mars. Dr Melchiorre is on a NASA funded research sabbatical to study serpentinite astrobiological indicators, including Tasmanian stichtite.

Dr Frank Reith continued the topic of the interaction between biology and geology by lecturing on the role of biological cycling in the formation of secondary gold and iridium. In his research he examined small nuggets of gold and osmiridium, and found them to be covered with biofilms of metal-resistant bacteria. These bacteria excrete gold, or iridium, causing it to be deposited on the nuggets on which they live. Experiments both in the lab and in the field have shown that under favourable conditions





sizable gold nuggets can be grown by bacterial action in only a few months. How long will it be before we see old mine dumps being turned into gold farms?

After the lectures were over the chairs were cleared, and for a few short hours the room was given over to a micro session with ancillary freebies, organised by Noel Kennon. There were also some very reasonably priced specimens for sale, courtesy of delegates from the UK, Canada, and the US.

Following the seminar most delegates made their way to Zeehan for the Annual Gem and Mineral Show, held over the weekend in the local sports hall. I was amazed how a small isolated town can put on such a well organised and well attended mineral fair. The hall was filled to the brim with dealers selling jewellery, fossils, and minerals - the last ranging in quality from entry level to top shelf - while outside shows, rides and food stalls kept the spill-over crowds entertained and fed. If a little place like Zeehan can support such an event, how come we don't have anything like it in Perth?

The extended program featured fieldtrips both before the seminar, and during and after the Zeehan Show. Trips covered a variety of geological environments, targeting a number of different minerals. We visited a Flowery Gully dolomite quarry for calcite and cerussite, then went to Rossarden for cassiterite and wolframite, and the final destination in the NE was a Weldborough basalt quarry to look for zeolites. In Zeehan there were trips to Stichtite Hill, and to the Adelaide Mine, where we were able to admire crocoite in situ underground, and to fossick on the dump.

Five WA delegates attended Launceston, and I think they all had a great time. The seminar was well organised with a good choice of venue, excellent speakers, and an attractive choice of field trips. Thanks must go to Marnie Pope and Ralph Bottrill and the team for doing such a great job. Organising the event must have taken a lot of blood, sweat, and tears, but it sure paid off. Thank you guys, you did well.

Sue Koepke has uploaded some photos from the trip to Facebook, and the album has been shared with our [Facebook group](#) if you wish to view them!





Future Activities

Activity Days

Sunday 13th December:

A micromounting workshop is being planned for Sunday 13th December, 10am to 4pm. The Lapidary Clubhouse is about to undergo renovations, and may not be available on this date. We should have confirmation of availability soon, and alternative venues are being investigated.

Please pay attention to emails and the Facebook page in the coming week for confirmation of details.

Many of you will be aware of the newsletter [Australia and New Zealand Micromineral News](#). As we usually have a theme to our micromounting workshops, and we have fixed the bugs with the camera on the club microscope, it's about time we got together and produced something similar to the excellent locality reports that some of the eastern societies have written. For our first report, we could take advantage of our recent Degruusa trip to bring in our favourite samples (and excess material for sharing/swapping) and catalogue and photograph what we have found. We can discuss further details and plan for future localities on the day.

General Meetings

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 second month at the WA Lapidary Club rooms located at 31, Gladstone Road, Rivervale (corner of Newey Street).

Wednesday 13th January:

The next general meeting will be held on Wednesday 13th January at the WA Lapidary Club rooms. Speaker TBA.

Contacts

The committee members for FY16 are:

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