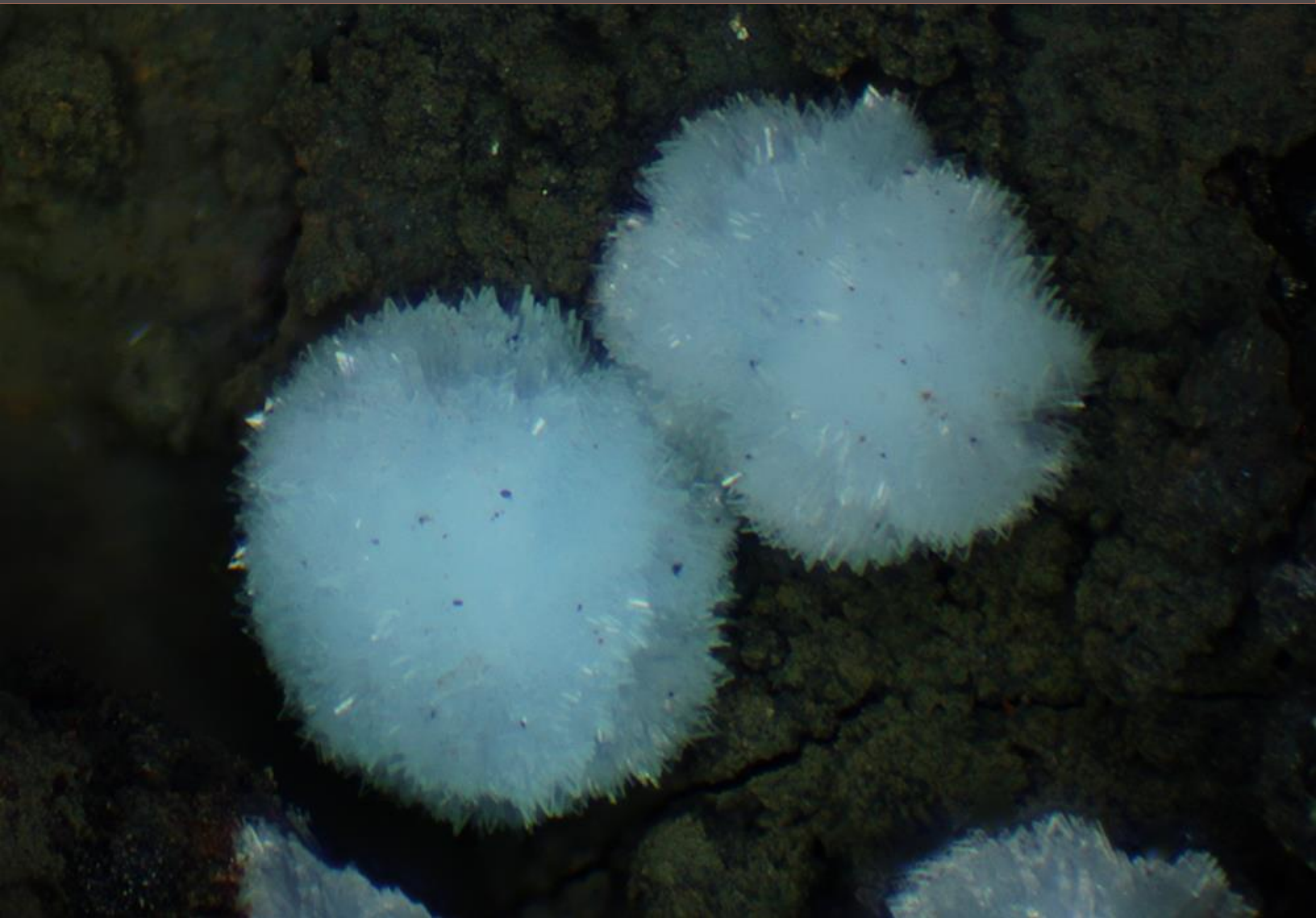
Australia and New Zealand Micromineral News



Issue 8 – February 2014

Editor: Steve Sorrell – steve@crocoite.com

australia and new zealand micromineral news

Cover photo:

Chalcoalumite, Sacremento Pit, Bisbee, Arizona
Specimen acquired from Michael Shannon, Tucson 2014
Photo width 2mm across

Photo and Specimen: Steve Sorrell

In This Issue

Introduction

A house move, xmas, and a trip to the Tucson Show all conspired to slow down the production of the Australia and New Zealand Micromineral News. Nonetheless, here it is. Contributions again from John Haupt and Noel Kennon, but still not enough contributors!

Contributions – We Still Need Your Input!

Articles should be submitted to the editor in Word format, and any photos should be of a sufficient quality for publication. If you believe that you can provide a suitable article for the next issue, please advise the editor as soon as possible. Planning for the next issue begins as soon as the current one is published!

Contacts

If you want to find out what's happening with micromounting or microminerals in your region, get in touch with one of the following:

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Forward Diary

Please send details of micromounting or micromineral upcoming events (up to six months ahead would be good) for inclusion in the next issue of the Australian and New Zealand Micromineral News.

October 2014

October 24th to 28th - New Zealand Micromount Symposium, Te Rau Aroha, Waihi Beach on the NZ's North Island.

October 31st to November 1st - 37th Combined Mineralogical Societies of Australasia Seminar at the same venue.

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On Using a Loupe

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A hand lens, often called a loupe (see Figure 1 below), is an indispensable aid for examining geological, biological and other objects in greater detail than can be discerned with the unaided eye. Being small and very portable means a loupe can be carried at all times. Unfortunately, being small also means it can be easily mislaid! Hence hanging it on a lanyard round your neck is prudent. Collectors of micro-mineral specimens invariably use a loupe to examine the fine detail of specimens when in the field or prior to using a microscope for further and closer observation.

Figure 1.

A selection of several loupes comprising clockwise from top left:

- a jewellers 8x loupe,
- a 1 element 5x hand lens,
- a combination 5x or 10x loupe,
- a 2 element (doublet) 10 x loupe.

Over quite some time we have watched many people using loupes for various purposes and a significant number clearly do not use them to gain the maximum benefit from the available resolution and magnifying power. This contribution has been prepared to help all users of loupes gain more from these small and useful instruments.

How to use a Loupe

We suggest the following procedure for using a loupe:

1. Firmly hold the loupe in one hand.
2. Move the loupe so that it is close to your preferred eye (see Note 1)
3. Keep your non-preferred eye open (see Note 2).
4. If you wear spectacles you may prefer to keep them on or to take them off - it is your choice.
5. Hold the object you wish to examine between the forefinger and thumb of your free hand.
6. Move the object to just in front of the loupe at a position where the image is in sharp focus – remembering to keep the non-preferred eye open.
7. Manipulate the object to bring into view the areas you wish to examine.
8. Position yourself so that the area you are examining is as well illuminated as possible under the prevailing conditions. Full sun can be excellent for some specimens but is often detrimental for highly reflecting minerals such as quartz.

The photograph in Figure 2 shows how a loupe is used in this way.

Figure 2 (above). Photograph showing how a loupe is used by the procedure 1 to 8.

Note 1 – Your preferred eye is the one you unconsciously select when you look through a telescope or use a monocular microscope or peer through a knot-hole in a fence.

Note 2 – When using your preferred eye, like most people you probably tend to close your non-preferred eye. This practice causes squinting and tensing of your face muscles quickly leading to facial fatigue thereby distracting your attention. By keeping your non-preferred eye open, your face muscles stay relaxed allowing you to examine your specimen in comfort for as long as you wish. Keeping both eyes open takes practice, so persevere. It may help if you use the hand holding the specimen to partially cover your open eye allowing you to concentrate on what your preferred eye is seeing

How a Lens Works and Magnifying Power

Before we can consider how a lens works, it is important know something about using your unaided eye for examining a small object. As you move an object of any kind closer and closer to your eye, it appears larger and larger and the detail becomes more and more discernible. However, there is a limit to how close you can move it before you lose sharp focus. This limit is called the 'near point' which varies with age. For a young child the distance from the near point to the eye may be as small as 5 cm while for an elderly person it might be as large as 1 or even 2 metres. However, for most scientific purposes it is usually assumed to be 250 mm for a 'normal' eye.

Turning now to understanding how a lens works, it is convenient to consider it to be a single converging 'thin lens'. For this case the geometry is quite simple. When the lens is used as a simple magnifying glass, the object needs to be placed between the focal point of the lens (see Note 3) and the lens itself. For this arrangement, the image is enlarged, upright, and virtual (see Note 4). If the object is moved further away from the focal point, the image becomes inverted.

Note 3 – Parallel rays of light entering one side of a lens are focused on the other side at the focal point (F). The distance of the focal point from the surface of the lens is called the focal length (f) and is a characteristic determined by the shape and material of the lens.

Note 4 – The lens and your eye (another lens) function together to form a magnified image of the object which your brain perceives. This image appears to be located somewhere in front of the lens and because that image does not exist, it is called a virtual image.

The geometry of the relationships between the lens, the object, the image and the eye are shown in the diagram in Figure 3. In this diagram, the continuous lines represent light rays from both ends of the object (an arrow at position P1), passing through the lens into the eye. The broken lines represent the paths of imaginary rays to the virtual image in front of the lens. The dot-dash lines represent light rays to the eye from the same object but located at the near point, P2.

The so-called angular magnification achieved by the lens, is the ratio θ2/θ1, where θ2 is the angular size of the image, and θ1 is the angular size of the object located (in focus) at the near point P2, 250 mm from the front of the unaided eye. If the object is moved from P1 to some other place, the lens and the eye must both be readjusted to achieve focus and the location of the virtual image will change. Thus, the position of the virtual image and hence its angular size θ2 will vary according to where the object (and so P1) is located and this will cause the angular magnification to be variable.

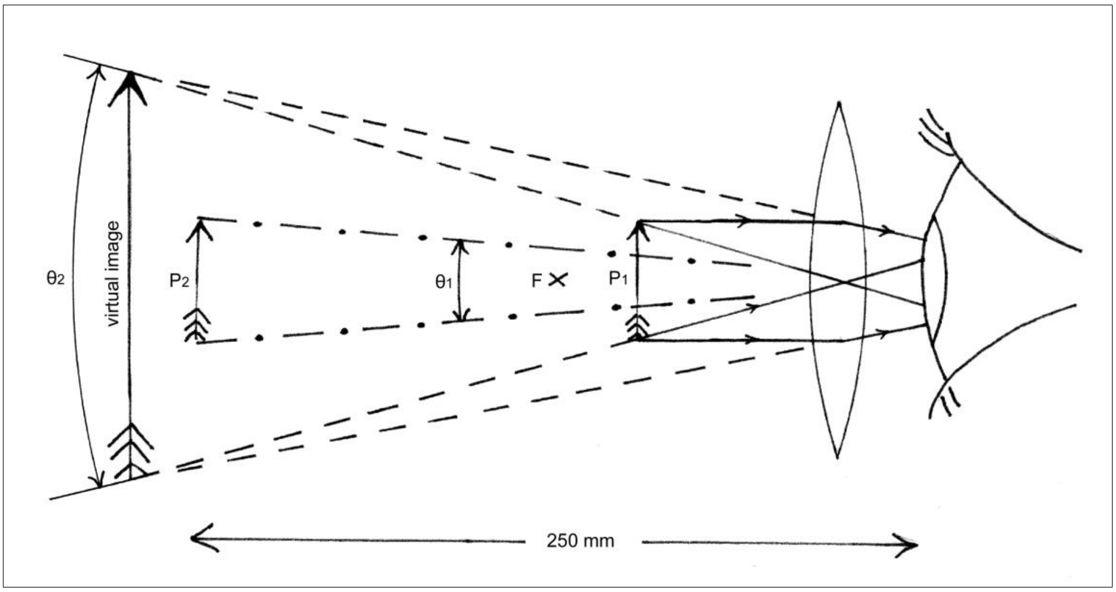


Figure 3 (above). Diagram illustrating how a "thin lens" forms a virtual image of an object.

- F is the focal point of the lens at distance f from the front of the lens
- P1 is the position of the object (an arrow)
- P2 is the position of the object at the near point 250 mm from the normal eye
- θ1 is the angle subtended by the object at P2
- θ2 is the angle subtended by the virtual image

Another, and more convenient measure of magnification of a loupe, is the magnifying power or magnification (M). This power is a constant, defined as the ratio of the size of an image formed at the near point to the size of the object at the near point. It can be shown that this ratio is the same as 250/f where f is the focal length of the lens in millimetres. Thus the magnification of a loupe, M = 250/f.

Most loupes have the magnification stamped on the holders; e.g. 5X, 10X, 15X, for which the focal lengths are 50 mm, 25 mm, and 16.7 mm respectively. If the magnification of a loupe is not known, it is a simple matter to find the focal point (F) and then measure the focal length (f). Simply use the lens to focus a clear image of a light source more than 4 meters away onto a piece of paper and measure the distance of the paper to the lens. This distance (in mm) is the required focal length, f, and so M can be calculated as 250/f.

Resolution

We use a loupe to see detail (in a specimen) that our unaided eye cannot see. That function is called resolution of detail or simply resolution. The structure of our eye and the way it works means that the detail it can see must be larger than 0.11 mm. We just cannot see anything that is smaller than that without some kind of assistance. The assistance we need is magnification to enlarge small detail to at least 0.11 mm. A lens with high enough magnification to enable us to see much of the fine detail in a specimen is said to have good or high resolution. On the other hand, a lens which reveals little of the detail has poor resolution.

Choosing a Loupe

All lenses have up to seven deficiencies related to the shape and material of the lens. These are called optical aberrations or simply aberrations. The two main ones are spherical aberration (due to the spherical curvature of the lens surface) and transverse chromatic aberration (due to the spectral nature of light passing through the lens). If you use a lens to look at a square grid such as a piece of graph paper, spherical aberration causes distortion of the squares, particularly near the edge of the image. Chromatic aberration causes separation of the spectral colours and may be evident in a highly magnified image. The other aberrations are astigmatism, curvature of field, coma, distortion and longitudinal chromatic aberration. We leave those for you to look up if you wish.

Spherical aberration may be corrected by selective grinding of the edge areas of the lens to a non-spherical shape. Chromatic and other aberrations are usually corrected in a loupe by constructing it from two or more lenses and diaphrams (collectively called elements). As you might expect, the more elements in a loupe, the better it will function and, of course, the more it will cost. A two lens doublet should cost about $20, while a three lens triplet could cost $35 to $40 or more.

When choosing a loupe there are two main properties to consider - the magnifying power and the optical quality. Loupes may be divided roughly into three groups: low power (3X – 5X), medium power (8X – 10X), and high power (15X – 20X). Each group has particular uses.

Low power loupes have a large aperture (field of view) which enables them to be used to examine large areas simultaneously. Additionally, they are relatively free from the influences of aberrations and have a large depth of field (see Note 5). These loupes enable you to see clearly features only just visible to the unaided eye and are useful for scanning the surface of a specimen to locate likely areas of special interest or to observe textual relationships of the minerals present.

By contrast, high power loupes allow you to see features not visible to the unaided eye. However, the small aperture and small depth of field severely limit the field of view and the clarity of the image. As micromounters usually have access to a microscope, high power loupes are of limited benefit for them.

In between these two groups are the medium power loupes. They have adequate field of view and depth of field allowing you to see, in clear detail, features that are just beyond the capability of your unaided eye. It is recommended that a 10x doublet is an adequately useful loupe for a micromounter, but a triplet is better.

Note 5 – when an irregular specimen is examined with a loupe, only those features located at a specific distance from the front lens will be in perfect focus in the image. Other features a little closer to the lens or a little further away from it will be out of focus and appear slightly fuzzy. The degree of fuzziness is higher for features even closer or further away. In examining the image, a small degree of fuzziness usually detracts little from the image quality. The range of distance over which the fuzziness is acceptable for good image quality is called the depth of field.

Diagram and photographs by David Colchester.

A visit to the Munich Show

John Haupt

My wife Lyn and I visited the Munich show during an overseas trip in October 2013. It is the largest mineral show in Europe and held at the exhibition centre on the city's outskirts. Minerals were in one large hall with three adjacent halls containing fossils (and a further few minerals), gem materials, jewellery items and cut stones. I will not cover the range of minerals for sale, as a report on the show, usually with an accompanying DVD, will be published in the Mineralogical Record. In addition, Jolyon Ralph has posted a show report on the Mindat website. Most of the trade appears to be done between the various dealers during the preceding weekdays, with the show being open to the public over the weekend.

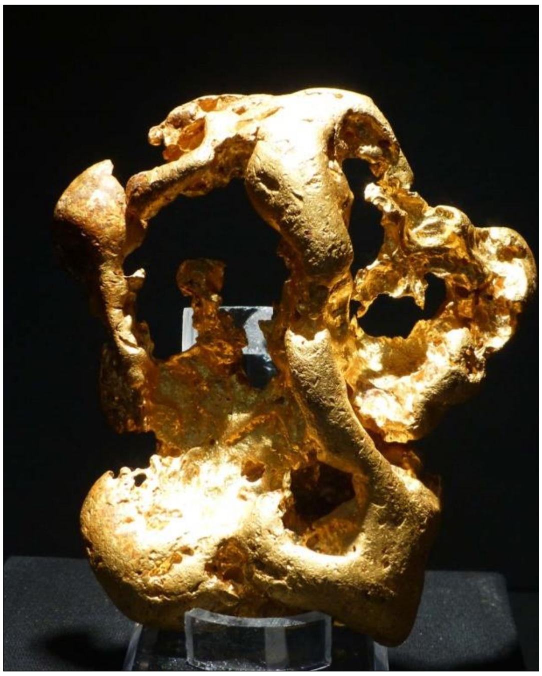
It was their 50th anniversary and the feature exhibit was gold. We were amazed by the number of gold specimens on display, mostly from public museums and private collections. These included the Natural History museum, London, The Harvard University museum, the LA county Museum and the Natural History museum in Paris. Given the amount of gold and number of specimens displayed in the one place, I would like to share some of the specimens that I photographed with you. All have been photographed through the glass using the showcase lighting.

The mineral hall at the Munich show.

The Ausrox nugget, found in the Eastern goldfields of Western Australia in 2010. Weight 23.3Kg (748 oz).

The Latrobe nugget, 717g (25oz) of gold crystals from McIvor (Heathcote), Victoria. Found on the 1st May 1853 in the presence of Charles Latrobe (Governor of Victoria) and sent to England. In the collection of the Natural History Museum, London.

Wire gold from Yarrambat Victoria, Ex B. Shelton collection



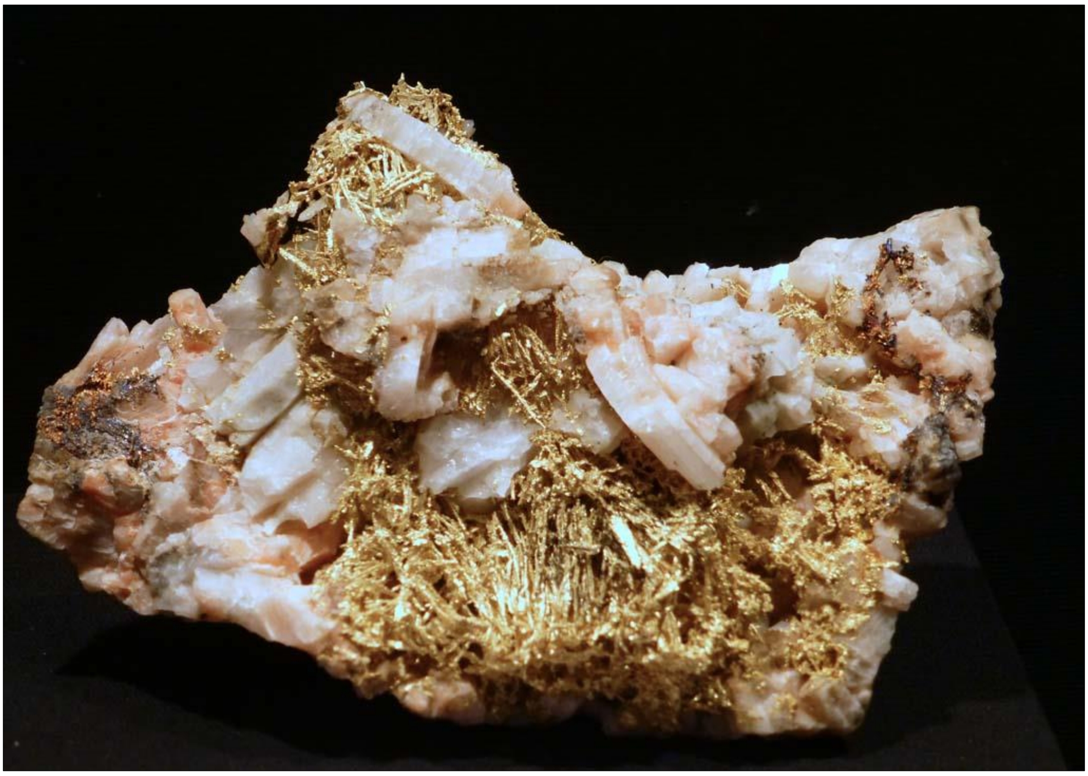
A 936g gold nugget from Maryborough Victoria. Specimens: Rob Sielecki collection.

Specimens of Australian gold in the collection of the Natural History museum in Paris.

Above: Wire gold from Breckenridge, Colorado, USA. Specimen: Private Collection.

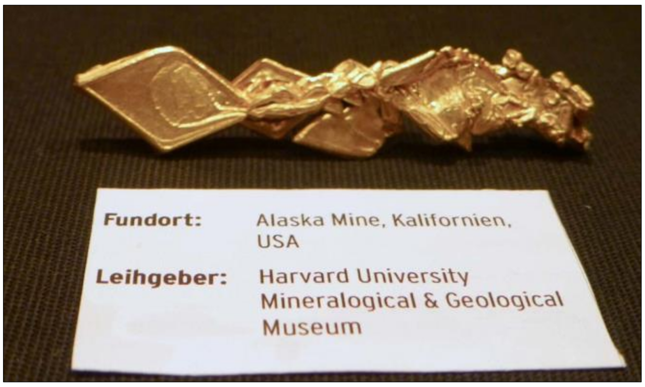
Right: Gold nugget from Kurnapli, near Kalgoorlie, W.A. Specimen: Private collection.

Dendritic gold specimen from Hope’s Nose, Devon, England. Specimen: Swiss private collection.



Finely crystalline gold from the Nugget Point Mine, Newfoundland, Canada. Specimen: Spann Minerals.

Gold sheets from the Shore Mine, California, USA; Specimen: Spann Minerals.

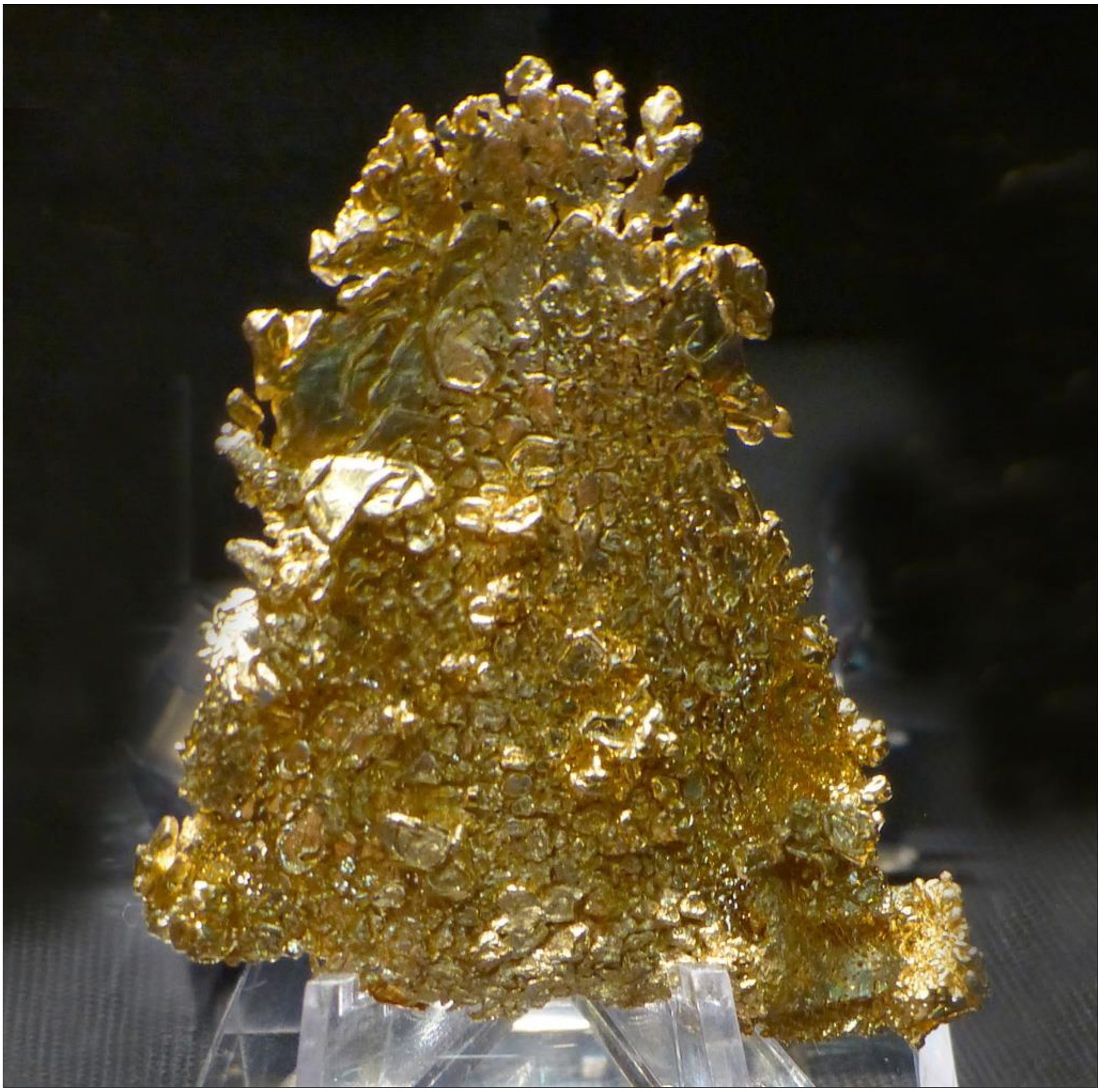


Above and top right. Gold crystals from various localities.

Right: Colorado Quartz Mine, California, USA. Specimens: Harvard University Museum.

Left: Crystalline gold from Alta Floresta, Mato Grosso, Brazil; Right: Unusual gold specimen from Wright Creek, British Colombia, Canada. Specimens: Natural History Museum, L.A. County.

Left: Crystalline gold from the Round Mountain mine, Nevada, USA; Gold crystals from Right Peak Tank Goldfield, NSW. Specimens: Miners Lunchbox.



A plate of gold crystals from Farncomb Hill, Breckenridge District, Colorado, USA. Specimen: Mineral Classics.

Above. Bendigo gold specimen presented to Queen Elizabeth during her royal tour in 1954.

Crystalline gold from Rhodesia. Specimens: Natural History Museum, London.

Micro Group Report

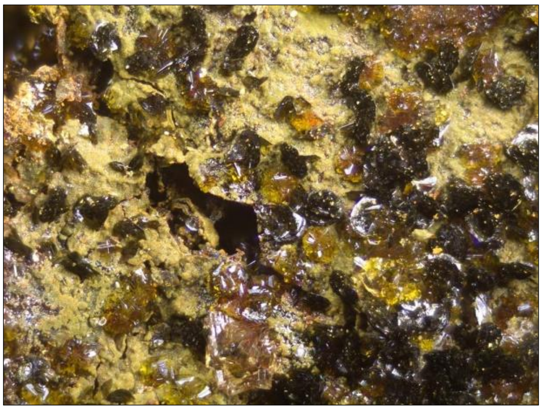
by Jo Price & John Haupt (photos by John Haupt)

The November topic was minerals from Tom's Quarry. There was much discussion about difficulties in identifying many of the minerals found at that quarry, and we look forward to reading Peter Elliott's article on this subject in the next AJM.

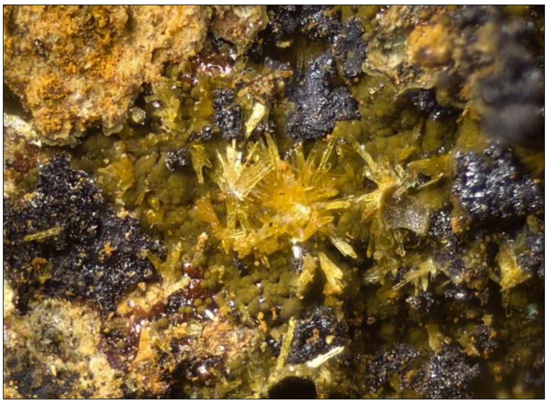
Amongst specimens already identified we saw a not-so-micro kingite rather like a cauliflower; a peisleyite; a thumbnail covered with dazzling lustrous minyulite crystals; fluellite; and wavellite sprays with a fluellite crystal on the end of each wavellite crystal. There was nice meurigite-Na, some with pink to reddish leucophosphites scattered among them. Kapundaite was one of the minerals once mistaken for cacoxenite, and some good examples were tabled. Wafers of pale yellow saleeite could be clearly seen under the microscope.

Others seen included fluorapatite, aldermannite coating fluellite, tinsleyite, good crystals of natrodufrenite, and one example of pale yellow xanthoxenite which can be more challenging to visually identify.

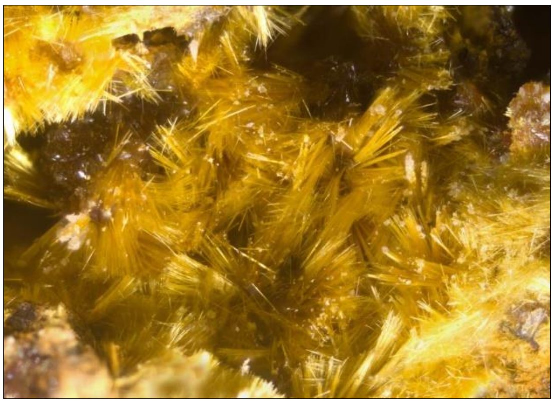
Aldermanite on fluellite, 15mm across.



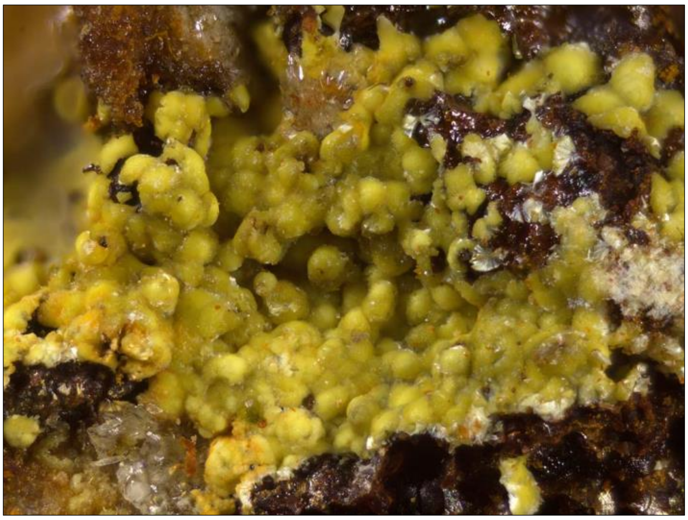
Leucophosphite (lusterous pinkish crystals) with dufrenite (dark green to black). 2mm field of view.



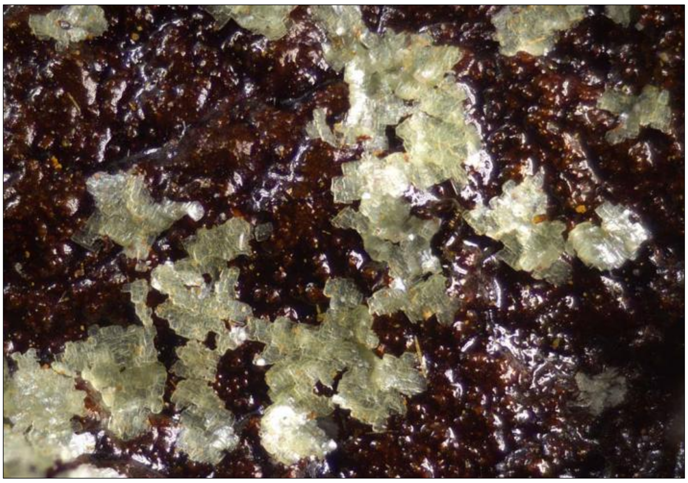
Group of jahnsite-(Na,Fe,Mg) crystals, 2mm field of view.



Fibrous sprays of kapundaite, 4 mm across, from the Day collection.



Meurigite-Na 2mm field of view, from the Day collection.



Pale yellow saleeite crystals, 2mm field of view.

A 2mm spray of minyulite crystals.

Minerals from Tolwong, New South Wales

Steve Sorrell

A micromineral session was held in conjunction with the 36th Joint Australasian Mineral Societies Seminar held in Sydney, June 2013. There were lots of give-aways, and material for trade or sale at the session. One small tin contained material from Tolwong in New South Wales, courtesy Paul Moxon of the New South Wales Society. Paul told me that he hadn't got to Tolwong himself, but that the specimens he brought in were collected by a Mr John Riley, who he thinks etched them out of calcite. He gave them to Paul about 12 years prior and he had collected them quite a while before that.

The Tolwong Mineral Company was formed in 1907 to work a mine for copper and tin. Mining production was spasmodic, and the mines had a limited life. The Tolwong mines are on both sides of the river in the steep Shoalhaven Gorge, near Marulan. Due to the difficulty in accessing the mine, some workings are still intact (such as the chimney stack shown here: http://www.panoramio.com/m/photo/52763826). The Bungonia State Conservation Area is now on the west side, and Morton National Park on the east side of the Shoalhaven River, so collecting is probably restricted.

The ore was considered important from an early stage. The Goulburn Evening Penny Post (NSW : 1881 - 1940), on Thursday 6 October 1910, page 4 reported:

> "REMARKABLE ORE FROM MARULAN. There is now on view at the Tourist Bureau, Challis House, Martin-Place, Sydney, some remarkable specimens of Stannin ore, containing copper, tin, and arsenic, all in large quantities. The assay values of these specimens, which are from the Tolwong Mineral Company, near Marulan, show a face value of £20 a ton. The metal contents pan out as follows:--Copper, 14.6 per cent. ; tin, 12.27 per cent.; arsenic, 20 per cent.: silver, 3oz per ton; gold, a trace. For richness this ore is said to be a record of its class so far as Australia is concerned and probably so far as the world is concerned. Its face value is equivalent to a return of 7oz of gold to the ton. The size of the blocks of ore suggest that the lode must be of very large formation; several of them weighing over a cwt. The lode is worked from the two faces of a deep gorge. So much impressed is the Department of Mines with these specimens that an application has been made for the supply of a few of them for exhibition and use at the Museum.--E. News."

In 1911, a rare mineral was widely reported – bournonite. The front page of the Barrier Miner (Broken Hill, NSW: 1888 - 1954), on Friday 4 August 1911:

> "While engaged in making a mineralogical collection from the heaps of ore at Tolwong, near Goulburn, Mr. W. O'Neill, a resident of the Bungonia district, and Mr. A. Combs, a student at the Sydney Technical College, discovered (says the Australian Mining Standard) an exceedingly rare specimen of the ore known as bournonite, or cogwheel ore. There are only a few places in the world where this mineral has been discovered. Although expert geologists and mineralogists have visited Tolwong, they did not recognise this mineral. The name is derived from Count Bournon, who first discovered the ore in Cornwall."

Another New South Wales Mineralogical Society, Dieter Mylius, visited Tolwong in 1968 or 1969. He recalls:

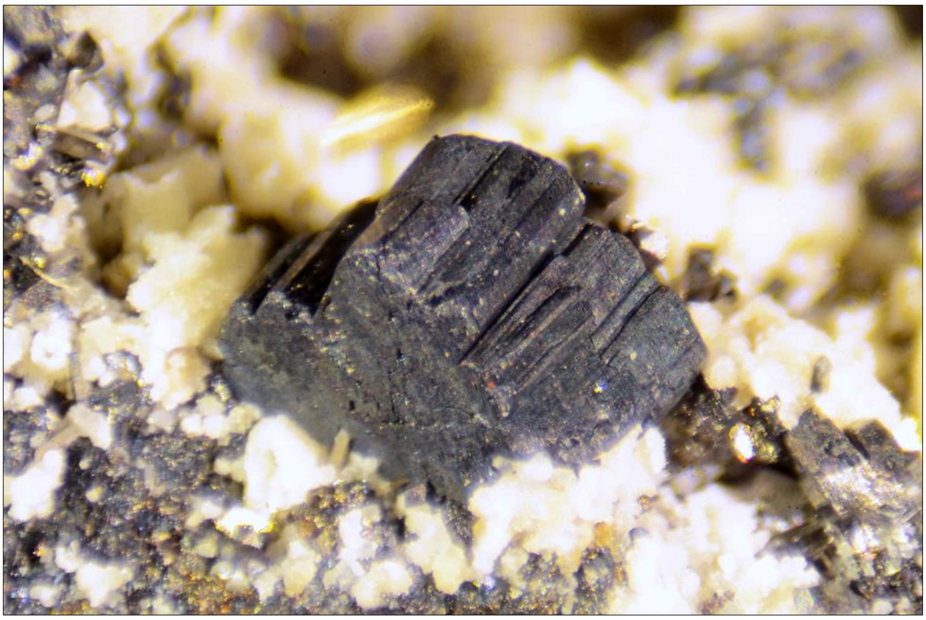
> "I was doing Level 1 Geology in the HSC at Jannali Boys High School. Our teacher was keen on field work (an inspiration), so we did several trips to look at rocks and minerals. This particular trip started with a day of caving in the Bungonia Caves which are extensive, great for exploring, but have few formations.
>
> The second day was an early start with a walk to the Bungonia Lookdown (not look out), followed by a steep descent down to Bungonia Creek. Then followed a scramble over boulders the size of small houses and cars downstream until we reached the Shoalhaven River. Near the junction I remember collecting (and still have) a few rust coloured graptolites in the black slate.
>
> From here we basically bush-bashed and rock-bashed our way up the Shoalhaven River Gorge to where the Tolwong Mines are located. The memories here are of traversing wide expanses of slate scree, which seemed to my mind to be dangerously steep, plunging down hundreds of feet to vertically dipping slate bedrock in the river. After a few hours of this, we reached the ruins of Tolwong, which were basically the chimneys. I do not remember any other machinery.
>
> We worked our way up Tolwong Creek and collected pieces of ore which were mainly arsenopyrite, but I also remember carrying back a 200mm or so specimen with blue and green fluorite (pretty ugly from memory) and calcite. I cannot find this specimen, so it must have been left behind in one of my moves over the years.
>
> The walk out was crazy. Tolwong was serviced by a flying fox from the opposite side of the gorge and this was the way out. That meant sliding down to the Shoalhaven (several hundred feet), crossing the Shoalhaven (not exactly a small river), then climbing up the other side. The track is so steep, it was said that the best place to collect Tolwong minerals is up the line of the flying fox on the other side of the river, where collectors gradually discarded specimens as the climb got too steep and strenuous.
>
> From the top it is a march of several kilometres back to Bungonia.
>
> Visiting Tolwong Mines involves walking in what must be some of the roughest and most rugged country in NSW - it's a place for the young and fit."

Dieter also obtained a great little bournonite specimen from Tolwong, from Gerry Morvell in April 1998. The cogwheel is 3mm across.

Now back to the material at the seminar. Being unfamiliar with the location, we checked the list of minerals recorded in Mindat. Under the microscope, it was easy to identify well-crystallised specimens of arsenopyrite, galena, chalcopyrite, fluorite, and some cogwheel bournonite. In addition, there were a number of other species present. These were tentatively visually identified as tetrahedrite, stannite, cerussite, and polybasite. The theory for tetrahedrite over tennantite was due to the highly lustrous faces, and the fact that there was so much arsenopyrite, that little arsenic would be left over. The "polybasite" was guessed at based on morphology, and the right elements are present.

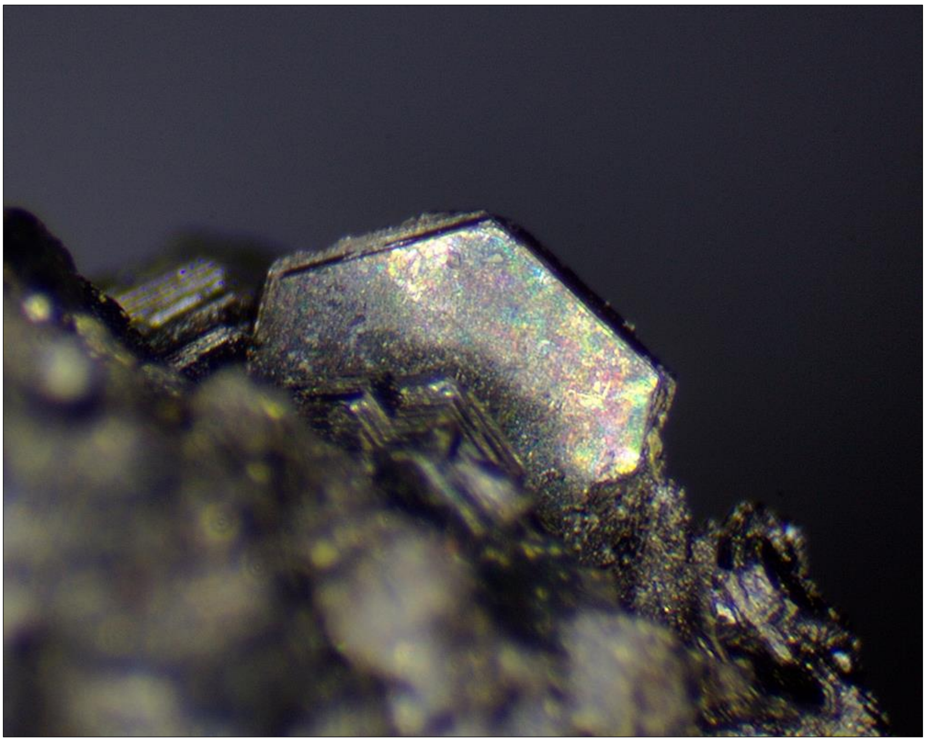
Samples were selected and sent to Peter Elliot at the South Australian Museum. Peter confirmed tetrahedrite, bournonite and stannite. The “cerussite” turned out to be muscovite. But perhaps the most interesting result was that the “polybasite” contains no silver, and is in fact, the zinc sulphide, wurtzite, probably wurtzite-6H. Wurtzite is rare in Australia, and although very small crystals, the wurtzite from Tolwong is quite spectacular.

There was an article in the Australian Gems and Crafts Magazine, Aug/Sept 1974 which is quite good. Interestingly, it mentions tetrahedrite and freibergite.



Above: Cogwheel bournonite, 3mm crystal. Photo and specimen, Dieter Mylius.

Below: Wurtzite, photo width 2.5mm. Steve Sorrell photo and specimen.



Tucson 2014

Steve Sorrell

Many of you will know that there is a micromount symposium, the Arthur Roe Memorial Micromount Symposium, held as part of the Tucson Gem and Mineral Show (aka TGMS, aka the Main Show). But there is so much more in micros to see across the four weeks of the Tucson experience.

But first, back to the TGMS. This year's symposium was held on the traditional Friday. There were three guest speakers and the usual trading session afterwards. Speakers and topics:

- Maureen Campeau - Micromounts - pulchritudo in parvitas - beauty in smallness. From the naked eye to .25mm.
- John Koivula - The MicroWorld of Diamonds.
- Van King - Microminerals of Franklin-Ogdensburg, New Jersey.

In addition to the symposium, for the first time, a Micro-Mineral room off the Galleria was set aside with microscopes to be used during the other three days of the TGMS. Micro specimens were available for sale or to be traded and it was open to all. I thought this was a good idea, but I don't know how much interest it spawned. I do hope it was enough to become a permanent future fixture.

So what else could you find?

A number of dealers cater for the rare species collectors, and of course, many such specimens often occur as microminerals. You can find these dealers at many of the satellite shows. For example, Excalibur Mineral Corp, Jaroslav Hyrsl and Gunnar Färber were set up at the Inn Suites, Michael Shannon at the Pueblo Show and elsewhere, and Mikon at the Executive Inn and the Tucson Electric Park.

Many other dealers have material that can be micro in nature, or capable of producing good micros. Some that come to mind include KARP, Lehmann Minerals, and Great Basin Minerals (some exquisite Rowley Mine wulfenites!), as well as many region-specific dealers (Russia, South Africa, etc.), all from the Inn Suites. Chris Lehmann (Lehmann Minerals) usually has something interesting, and this year, it was woodhouseite specimens from the Type Locality, the Champion Mine, Mono Co., California. JaM's Rocks at the Mineral and Fossil Marketplace always has something of interest, and this year was no exception. And there are more at other shows (eg: 22nd Street Mineral, Fossil and Gem Show, the Globe-X along the side of the I10, and so on).

Back at the TGMS, Keith Williams (Williams Minerals Company), had a number of boxes of some of the best micros from Will Henderson's micromount collection. These yielded some interesting specimens for me, including a willhendersonite! Will Henderson used to write regular articles on micromounting in Rocks and Minerals and Mineralogical Record.

As with previous trips, it is going to take some time to sort through everything…

Front cover: Chalcoalumite, Sacremento Pit, Bisbee, Arizona. Specimen acquired from Michael Shannon, Tucson 2014.

Above: A selection of the best micros from Will Henderson's micromount collection. Steve Sorrell photo.

Above: Van King regales a decent-sized audience. Steve Sorrell photo.

Above: Rounded aggregates of mimetite on wulfenite, Rowley Mine, Maricopa Co., Arizona. Photo width 5mm. Steve Sorrell specimen and photo.

Classifieds

Want to advertise something related to micromounting or microminerals? You can do so here. Willing to trade or sell, want lists, etc. Simply email the editor: steve@crocoite.com to get your listing in the next issue. Please keep ads as short as possible.

Mineral Paradise – Richard Bell

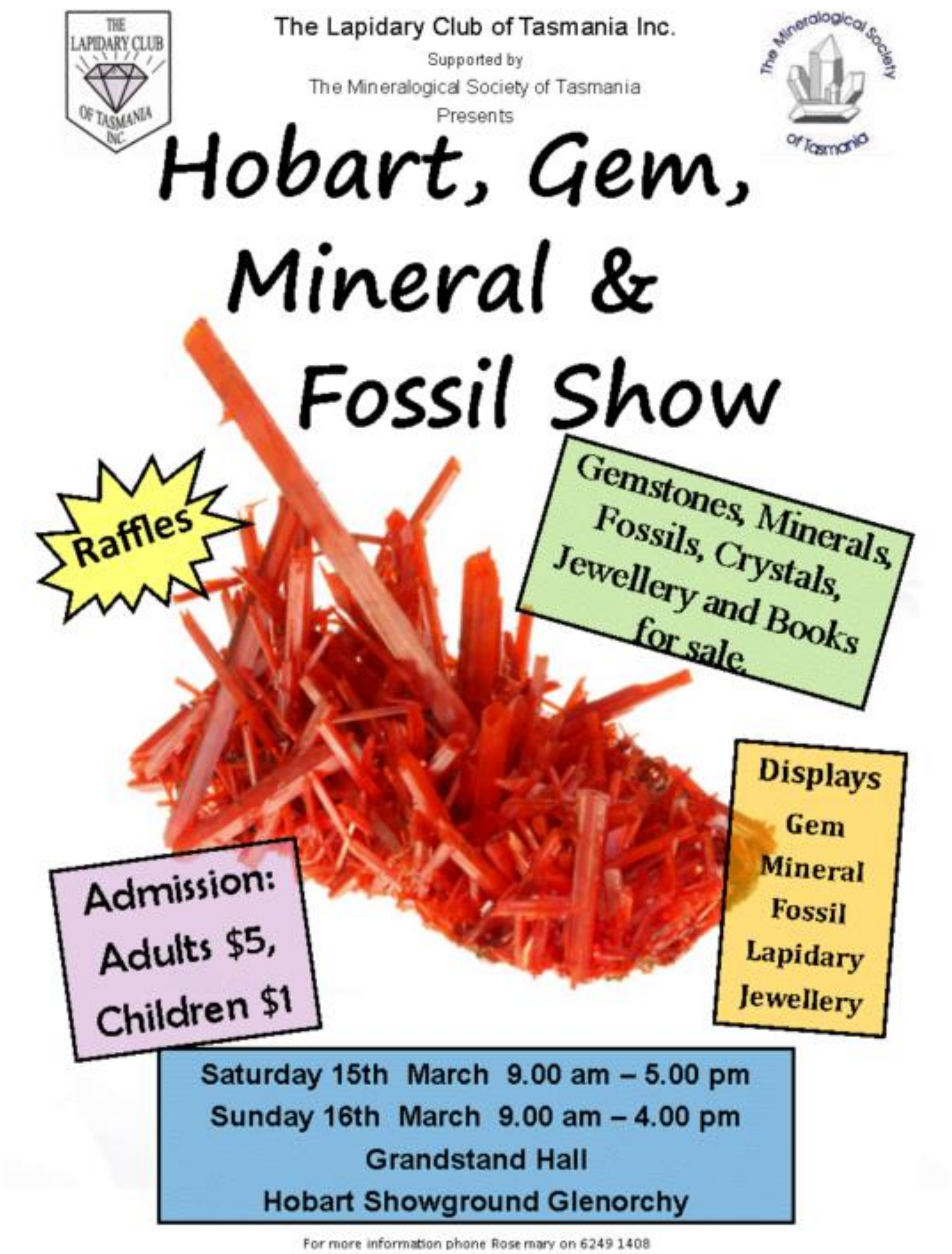
Periodic listings of mainly British micro and thumbnail-sized mineral specimens made available for sale or swap. To view, go to http://www.mineral-paradise.net

Sauktown Sales – Jim Daly

Periodic listings of micro mineral specimens for sale. Jim also sells micromounting supplies. To view, go to http://www.sauktown.com

DarkArtsMinerals – Steve Sorrell

Minerals for sale by auction, many micro-material specimens regularly listed. To view, go to http://www.darkartsminerals.com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