THE
MINERALOGICAL SOCIETY
OF
NEW SOUTH WALES INC

C/o School of Natural Science
B.C.R.I. Parramatta Campus University of Western Sydney
Locked Bag 1797 Penrith South DC N.S.W. 1797
Website: **www.minsocnsw.org.au**

NEWSLETTER

OCTOBER 2013

MEMBERS PLEASE NOTE: The Society October Meeting will be held on the SECOND Friday of this month because the first Friday is before a long weekend.

The Meeting will be held on Friday the 11th of October at 7.30 p.m. in the LZG14 lecture theatre on the ground floor of Building LZ in the Science campus of the University of Western Sydney on the corner of Victoria Road and James Ruse Drive in North Parramatta.

The program will include a short talk by Jim Sharpe and illustrated with a number of specimens which he will bring to display on : -

Cassiterite Fossils from Doctor's Gulley.

The talk will be followed by a lecture to be given by Professor Peter Williams on : -

Bronze Age Minerals and Metallurgy'

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FORTHCOMING MEETINGS

Subject to circumstances some changes to the following schedule of program subjects and speakers may have to be made in due course.

November 1st: The program will be a **Member's Display of Their Favourite Fluorites**, - A discussion led by Gary Sutherland.

December 6th: **Annual Christmas Social and 'Swap n' Sell.**

2014: The Society does not hold General Meetings in January. The first Society Meeting in 2014 will be on February 7th. Meetings will be held on the first Friday of each month throughout the year except before the long weekends of June and October when it will be held on the second Friday.

February 7th 2014: Talks by Dieter Mylius and Noel Kennon on :-
'Some British Mines & Minerals. Part I'

March 7th 2014: Lecture by George Stacey on
'My Recollections of Mt Isa – The Mine in the Spinifex.

April 4th 2014 Program to be confirmed but may include a lecture on
Skarn Type Mineral Deposits.

May 2nd 2014: **Member's Mini-Auction**

June 13th 2014: (Second Friday of this month). Program to be confirmed.
Lectures possibly on Ultra-Small Minerals and How We Can See Them;
or 'The History of Broken Hill'.

July 4th 2014: Talks by Gary Sutherland and John Rankin on : -
Some British Mines & Minerals: Part II.

August 1st 2014: Society A.G.M. and Betty Mayne Memorial Lecture.

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The SOCIETY COMMITTEE

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MICROSCOPE For Sale

Bob Meyer-Gleaves' microscope is still for sale for $400. It will be available for examination at the next Society meeting or inquiries could be made to Bob on telephone number 6721 3333, mobile 0419 866 133 or Secretary George Laking on 9636 7145, mobile 0468 387 899.

The 2013 TAMBAR SPRINGS FIELD TRIP

Another great field trip organised again very competently by Ken Mitchell was held over Friday to Sunday, the 19th to 22nd of September to the Garrawilla Volcanics zeolite locations visited last year. This time over thirty keen fossickers assembled at the Tambar Springs Royal Hotel, some camping alongside the hotel and others again accommodated quite comfortably inside. In addition to Society members the party included a number of people from Queensland and northern NSW mineralogy and lapidary clubs. Many of the party in taking their evening meals at the hotel would surely have been impressed as also last year with the commendably high quality of the catering provided in the only restaurant in a very small village which whilst not particularly remote will have only a small local population.

Starting off fairly early on the Friday morning the party was taken by Ken Mitchell to the Glendowda farm which features a seam of stellerite stretching probably for kilometers along hill slopes just a few meters above the level of the surrounding fields. Before the people started working Brian England provided a brief but detailed and informative explanation of the geology of the Garrawilla Volcanics and specifically of the area being visited that day and the minerals to be found there. As always, the best specimens would have come from the most work being put in, digging into the hill-sides and whilst the mineral present was in the great majority stellerite there were small amounts of heulandite, laumontite, chabazite and some drusy quartz found. The weather was fine although with a stiff and therefore at times fairly cold wind. Fossicking continued for most of the day to about 4.00 p.m.

On Saturday the party went to the Portobello farm site which as before involved turning off the 'main' country road near the farm buildings and then a 2-3 kilometer drive along a very rough track to the collecting site, basically a field with slabs of drusy quartz on matrix lying mostly on the ground surface amongst low grass. Some party members gradually investigated further afield from the main site and small outcrops of stellerite were found exposed in the sides of nearby creeks. Apart from the quartz and very small amounts of stellerite at least one specimen of analcime was found.

On Sunday the party started to disperse although some members elected to go back to the Glendowda site to work some more. Other members either headed home or took a detour to go first to Coonabarabran and the Warrumbungles. The **Crystal Kingdom Museum** in Coonabarabran is a must-visit for any mineral specimen enthusiasts passing by. The museum comprises the gift shop with a fine array of polished material, ornaments and jewellery and a large display room lined with about two dozen large cases of mineral, rock and fossil specimens. Much of the long geological history of the Garrawilla Volcanics area is illustrated by the specimens in the cases which were divided approximately into the several geological time periods represented there.

About a third of the specimens are entirely of the Garrawilla zeolites, with mouth-wateringly large and high-quality specimens of the majority minerals, stellerite and heulandite and smaller amounts of other zeolites, quartz and calcite. One case featured fine examples of the Mullaley prehnite from the Tarthra farm site in the various colours found there, golden, yellow, buff, green and brown. Other cases illustrated aspects of the fossil history related to the various time periods.

The Crystal Kingdom Museum is for sale as a sign on the door indicates and is also described and advertised in several Websites with an asking price of $1,400,000. It is to be hoped that in the event of a sale the entire museum would be kept intact and in place. www.crystalkingdom.com.au

A visit to the Warrumbungles at this time after extensive bush fires in January would have been of some interest to visitors since removing the vegetation cover has temporarily exposed much of the rock and strata formations. Otherwise the vista of blackened tree trunks may be disappointing. Also due to the

fire damage nearly all of the walking trails are closed until the National Parks maintenance workers have checked all of them due to the danger of damaged trees near the trails abruptly falling over on visitors.

By now however many of the larger trees are sprouting sheaths of fresh greenery and the ground in many areas is covered with carpets of wildflowers, their growth and display possibly enhanced by the availability of nutrients from ash and temporarily greater exposure to sunlight. Happily the **Siding Springs Observatory** complex was undamaged by the fires although these came right up to the boundary fences. At the Observatory there is a Visitors Centre with a comprehensive display of astronomical scenes, models and equipment.

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SEPTEMBER MEETING

At the commencement of the Meeting it was announced that the projected South Coast Geological Field Trip had been cancelled but that the Tambar Springs Trip was definitely in hand with a total of possibly about forty people scheduled to attend. The Society President Dieter Mylius advised that anyone who was intending to go on the Trip should ensure that their names were on the list of those booked in for accommodation or as an alternative could consider camping nearby which the Hotel would allow.

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In the absence of John Chapman who had been scheduled to speak but was unwell and as an introduction to the evening's lecture and display on cassiterite Dieter Mylius provided a short talk on the element and mineral.

Tin and Cassiterite

Tin is element number 50 on the Periodic Table and is the 49th most abundant element in the Earth's crust although contributing only about two parts per million compared to zinc at about 35 ppm and lead at 14 ppm. Tin metal may be found in nature but according to George Stacey this may be a temporary feature due to the reduction of the oxide, cassiterite, by local bush fires. Cassiterite, SnO_2, is the main ore of tin but there are some others, notably stannite, the copper iron tin sulphide which among other places in Australia was found at Tollwong. Cylindrite is the lead iron tin antimony sulphide, frankeite is the same but without the iron and teallite is a lead tin sulphide.

Primary cassiterite is mainly found in high-temperature quartz vein pegmatites associated with granite intrusions although 80% of World production is from placer and not from primary deposits. There are large deposits in Bolivia and China and the historical deposit in Cornwall. Occurrences in Australia are New England and Tasmania. There are a large number of other minerals often found associated with tin deposits, tourmaline, topaz, wolframite, fluorite, molybdenite, arsenopyrite and scheelite. The colour of cassiterite is usually black but may range through red shades to colourless. Cassiterite forms brilliant and highly lustrous crystals and a large number and variety of specimens had been brought in by members to display to the Meeting.

After Dieter Mylius had introduced the subject two other members also delivered short talks particularly referring to various of the specimens on display.

Allen Arnold described his experiences with tin mining and specimen collecting, first at Silent Grove near Torrington actually mining tin on his own farm for some time. The Silent Grove mining was underground whilst later the speaker moved to the Northern Territory for 2-3 years to mine alluvial tin and some gold and other minerals. Cassiterite has always been one of his favourite minerals and he has seen many spectacular specimens over the years and managed to build up a substantial collection, some of which was on display at the Meeting. Notably he described a specimen which unfortunately he had not been able to obtain to bring to the Meeting. He had seen it at a mineral show in China in May this year and it comprised a 600mm by 600 mm square plate with twelve cassiterite crystals the size of tennis balls evenly arranged on the surface. The specimen had a sale price of 'only' US$5,000! There were several other superlative cassiterite specimens at that show.

In conclusion Allen Arnold drew attention to a particular specimen of a pseudomorph of cassiterite after quartz from Torrington on display and was the specimen which the late Professor Laurie Lawrence had written up for his thesis.

George Stacey spoke next to describe his experiences working with tin. He has had a long history with the metal having worked for the smelters O.T.Lempriere in Sydney for many years first as a trainee metallurgist, sampling tin, analysing tin, analysing the impurities in tin and finally smelting and refining tin. He pointed out a sample ingot of tin brought in to display which he had cast during the 1960s as a souvenir, stamped with the company name and as 99.8% pure. The late Ian Hall had also worked at Lempriere over a similar period to George Stacey and they became good friends. In 1980 Ian had been given the task of importing a Russian vacuum smelter to produce very pure tin and another small ingot had been cast with a purity of 99.99999… % and being so pure had remained bright and shiny to this day.

Over the period of his working at Lempriere the company obtained about a third of its tin ore from Tasmania, a third from northern Queensland, a third from New South Wales and a small amount from Western Australia. George Stacey then pointed out a number of the specimens which he had brought in relating a few points about some of them as he went along and generally praising the qualities and usefulness of tin with which he has had a very long association.

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The main speaker of the evening was John Tottenham who had travelled from his home in Horsham to speak to the Meeting. A CD of the text and photographs illustrating his lecture has been provided by the speaker and the text and some of the images are reproduced following. The CD also carries the text and images of the lecture on Gold Nuggets that John Tottenham delivered to the Society at the September 2011 Meeting. The articles will be added to the Society Website in due course.

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Pine Ridge Cassiterite

John Tottenham

"This is a story about a crystal cassiterite and quartz collecting venture spread intermittently over a ten year period in the Pine Ridge - Copeton area of northern NSW. Hopefully readers will agree it's a story worth telling before it totally fades from my memory. For simplicity, cassiterite or tin di-oxide will be subsequently referred to as tin, which is what the miners called it. And unlike the well known tin crystal groups from nearby Elsmore, the Pine Ridge crystals were scarce and when found were predominantly single simple crystals without matrix. Twins were uncommon. Now to the story.

During the late 1960's whilst working as an engineer on Copeton Dam near Inverell, I was shown some gem quality water-worn smoky quartzes from a locality north of Copeton called Pine Ridge. On enquiring further I was told the quartzes came from alluvial tin workings which had also yielded very large tin crystals. A water-worn 300mm long tetragonal crystal was mentioned as being sold for 3d per pound, the going tin price at the time. Additional information came from Henry Cant, previously a tin-diamond miner from Copeton, who claimed to have a secret tin and quartz crystal spot north of Copeton on the Inverell side of Copes creek. Whilst he would not divulge the location, it became apparent that a little searching was warranted.

A subsequent visit to Pine Ridge revealed alluvial diggings along the base of large bare sloping granite shelves. The alluvials had concentrated in the more erodible sediments along the granite's contact. In these alluvial diggings attractive coarse, multi coloured, abraded alluvial tin could be readily and profitably dished. And unlike other tin alluvials there were no matrix tin specimens to indicate a possible source. So where was the tin coming from? Particularly as there weren't any obvious reef diggings in the adjacent granite.

The problem was eventually solved by myself and John Hume, a now sadly deceased MINSOC member from nearby Bingara. As we had both studied reports on American gem tourmaline pegmatites, we postulated the existence of similar pegmatites. However careful searching the exposed granite showed no pegmatites. This was surprising as very coarse grained schorl-rich granite pegmatites are common in the nearby Copeton Dam area. Nor was there any exposed granite showing tin in-situ, hydro-thermal bleaching, greisenisation, chloritisation or significant quartz veining, all typical of tin mineralisation in the Tingha tin fields. But inexplicably the odd free speck of unworn tin was visible in loose surface debris. So back to square one.

Expanding our search area well back from the granite contact we came across three small pits which had intersected lead zinc sulphide mineralisation in a chlorite rich quartz pipes. But, no coarse tin was obvious. These circular quartz rich pipes were about 1.2 m in diameter and were surrounded by un-mineralised granite. The pipes were on a linear trend and were connected by a vertical thread of quartz. So perhaps similar pipes or what we called vughs located nearer the contact could be the source of the tin.

A renewed search of the bare granite shelves closer to the contact showed up a small surface hole about 50 mm in diameter in hard un-weathered un-mineralised granite. After painstaking excavation with lengthened tea-spoons and scratchers, out came a succession of clay, quartz rubble, green-head biting ants, smoky quartz crystals, and finally small unworn tin crystals. We were getting closer, but a few small vughs could not have produced the extent of the down-slope alluvials.

Now joined by other Bingara based collectors, Bill and Barry Reece, we then found a 150 mm diameter vugh which I foolishly enlarged with explosives. All this proved that tin could be exquisitely shattered in larger vughs by explosives. So where were these larger vughs to be found and how were they to be excavated?

Then we noticed that away from the bare granite near the contact, there were islands of shrubby vegetation. Excavation of these islands showed basins up to 600mm deep in hard granite. These basins were filled with weathered granite debris, sometimes quartz crystals and occasionally abraded tin.

A few of the basins had a vertical pipe like hole (we called a vugh) at their base. These vughs varied in diameter from 75mm to 200mm and were as deep as 1.2 metre before ending in solid granite. Some, but not all vughs contained well formed individual tin and gemmy smoky quartz crystals.

Jackpot, as we now had found the multiple sources for the tin. Indeed there were more vughs to be found further upslope where the shrubby vegetation was continuous. Here, after a lot of native vegetation and topsoil stripping, which would now be called environmental vandalism, more tin bearing vughs were found. Later as the depth of stripping nullified the occasional rewards, we concentrated on digging out small trees which we correctly assumed had their tap roots into vughs. Often we were

successful, but the tin yield decreased as we moved further away from the contact. At about this stage Bob Smith from Inverell known for his Elsmore greisen tin crystal collecting joined us for heavy and not particularly rewarding stripping.

Then we reasoned that perhaps there would be other granite shelf areas along the contact which would yield tin and search we did. Eventually two other areas adjacent to alluvial workings were found but were less productive because of deeper overburden. However, one vugh yielded to John Hume a magnificent crystal group. On John's death, this crystal group was donated to Sydney's Australian Museum. Unfortunately the specimen is not on display for it would rival many of the museum's Emmaville and Gulf tin crystal groups.

Coarse alluvial Pine Ridge tin

John Hume's tin specimen (width 100)mm

Working the vughs led to the development of specialised tools to first remove overburden from the top of the vughs, then to reach down to separate and extract the crystals in what was a very tight knuckle abrading space. Unfortunately there was no surface indication whether a vugh would yield tin or quartz or both, so all potential vughs were dug. Typically, if crystals were encountered, then all removed material was sieved and where there was an excess of fine grained tin, dished to retain the sellable tin. Eventually our reject tin crystals and fine grained tin were sold to a Tingha tin buyer at $3/pound. This proved to be a huge mistake, for the word got around to the cocky leasing the property that valuable tin was being found. And further that a specimen, (John Hume's now donated specimen), extravagantly valued at $20,000, had been found. Hence all the gates were locked and even today with changes to the lessee, there is still no access. Recently my Inverell mate Bob Smith has tried to get access but, to no avail, as the lessee has issues with unauthorised shooters.

It appears that the still hard vugh walls were originally lined with a mix of separate orthoclase, quartz, and occasionally tin crystals. Recovered crystal clusters were uncommon.

Subsequent weathering allowed the orthoclase to largely, but not always break down into clay, with the more resistant quartz and tin eventually detaching from the vugh wall and gravitating to the bottom of the vugh. We assumed that as the tin was always found at the bottom of the vugh with the quartz overlying, that gravity affected their vertical separation. However, it also may be that the tin crystallised at the bottom of the vugh. Occasionally well formed remnant orthoclase crystals were found, along with the occasional rutilated quartz and the odd flake of molybdenite. Like the lead-zinc rich pipes further away from the contact, the vughs appear to be joined by a thin vertical seam of quartz. I seem to remember the vughs may have also been at intersections of these 2mm wide quartz seams.

Each tin bearing vugh had its own style of tin and quartz crystallisation, usually completely different to adjoining vughs. For tin crystals, parallel growth along C axis was common and often their pyramidal terminations were preferentially corroded. There was much variation in the crystal tin's

pyramidal terminations. The accompanying photos show examples of these differences. Two attractive tin crystals with their C axis crossed to form a crucifix were found by Bill Reece.

The whole Pine Ridge- Copeton area is mineral rich with several separate tin, silver-lead-zinc-copper prospects. The prospect locations are typical for the thermal gradients near granite contacts. There is also minor tin mineralisation in the sediments along the granite contact. Nearby there are deep leads worked mainly for tin, but the odd diamond and a little gold was recorded. Also in the sediments away from the granite contact manganese oxides were mined until the rhodonite appeared.

With the exception of Elsmore, the encompassing Tingha tin field, whilst extensive and in places extremely rich, was not known for its well crystallised tin specimens. Yes, while large nuggets and crystalline specimens were found, it appears that Pine Ridge was unusual for its large lustrous single crystals. Indeed reference to the 1911 **Mineral Resources no 14**; 'The Tin Mining Industry" by JE Carne elicits on page 221 : -

Pine Ridge & Pride of the Ranges Mines;

In 1875 C.S Wilkinson described large crystals of ruby, red, amber and other coloured tin oxide from the surface of these mines, but beyond small nests of crystals in the granite no defined lodes were found.

Whilst on earlier page 216 referring to the nearby large **Leviathan Lode**, MR14 elicits:

As the granite range known as Pine Ridge trends south of west of Gilgai to Copes Creek…….the ridge is also noteworthy for loose crystals of tinstone of high lustre.

With reference to Wilkinson's report about the different colours in the Pine Ridge tin, all our vugh tin crystals were dark amber to black. However, the worn tin crystals in the nearby alluvials exhibited a range of colours consistent with Wilkinson. Presumably, the weathering process and possibly sun or bush fire exposure gave the alluvial tin its ruby, red and yellow colours.

Experience gained in finding and working these vugh like pipes then proved useful at the Little Henry River east of Glen Innes and at Blatherarm Creek near Torrington to find schorl, quartz and rarely topaz vughs. Later in searching for topaz near Tocumwal, I worked a 1 m diameter granite vugh down 1.5 metres for large individual well formed smoky quartz crystals impregnated with very fine hairs of schorl. I never bottomed the vugh as there was no topaz and I had my fill of non gemmy smoky quartz crystals. Incidentally, I have seen similar well formed smoky quartz crystals up to 750mm long from the Tocumwal area.

Unfortunately in preparing the attached locality maps I was not able to confirm by GPS the Pine Ridge tin localities, because as mentioned earlier, there is no current access. Instead I relied on Google Earth to locate what I hope are the relevant granite shelves and access tracks. Indeed the mineral deposit coordinate data contained in the 1997 Mineral Resources Inverell Metallogenic Map SH/56-5 were of little assistance. The mine data sheets do not define the coordinate datum and my attempt identifying nearby mineral deposits in Google suggest that a datum between ADG 66 and GDA 94 has the best fit."

John Tottenham
17/04/2013

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Most of the photographs and all of the maps referred to in the preceding text have not been reproduced in this Newsletter due to space considerations. In particular the maps are large-scale and quite detailed and much of the detail would be lost in reducing the size of the images to fit on an A4 sheet. The images and maps are all on the CD and will be entered into the Society Website in due course.

New MINERAL SHOP in SYDNEY

Rock n Crystals are delighted to announce the opening of their Mineral Shop in Sydney!

"For the first time ever you can view our entire range in one place. Come on in and see our amazing mineral specimens from all over the planet, including Australian, World & Fluorescent items. Plus a large and growing collection of metal specimens & crystals. We also have levitating displays, UV lights and posters available to buy. Plus Minsoc members get a 15% discount in store or online (excluding sale items) - using code minsoc13".

At 330 Illawarra Road, Marrickville. (300m from the train station).
Hours: Monday and Tuesday = Closed
Wednesday, Thursday and Friday = 10:00am to 6:00pm
Saturday = 10:00am to 5:00pm
Sunday = 10:00am to 4:00pm
Phone: 02 9599 6737 or Mobile Stu:0404 470 494. Enquiries@rockncrystals.com.au .
Website : - www.rockncrystals.com.au

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FORTHCOMING EVENTS

GEMKHANA 2013

In the Showground on Duoro Street in Mudgee over the October long weekend from Saturday October 5th - 10.00am-5.00pm; Sunday October 6th - 10.00am-5.00pm; & Monday, October 7th - 9.00am to noon.

'The Annual Gem & Mineral Show and Competition of Lapidaries from across NSW. Presented by the Gem & Lapidary Council of NSW Inc'
'The competition brings entries from all across NSW and quite a few from interstate. Dealers and tailgaters will have jewellery, tools, books, machinery, minerals, cut stones, opal and findings.
We will have children's activities. Refreshments will be available.
There is wheelchair access and plenty of parking. On-site camping is available
Contacts are Arthur 02 4572 5812, Marilyn 02 9635 8218,
www.gemlapidarycouncilnsw.org.au for info and link to secretary.'

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CANBERRA LAPIDARY CLUB

SPRING GEMCRAFT & MINERAL SHOW

Sat 2nd & Sun 3rd November 10.00am to 5.00pm
In the Parkes Room, Exhibition Park, (EPIC), on Northbourne Avenue, Canberra
$5 adults, $9 family,$2 children/concession.
Gem & lapidary dealers, Minerals, opals, beads & supplies, rough & cut gemstones,

lapidary equipment & supplies, fossils and jewellery. Displays of members' collections,
free sessions on fossicking & gold detecting, cabbing & faceting.
More information on www.canberralapidary.org.au ; or Phone: 02 6281 3312

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FESTIVAL OF MINERALS AND GEMS by the ILLAWARRA LAPIDARY CLUB

Saturday & Sunday 2nd & 3rd of November, 10.00am to 5.00pm
at the Ribbonwood Centre, Princes Highway, Dapto.
http://www.illawarralapidaryclub.com.au/

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PARRAMATTA-HOLROYD LAPIDARY CLUB ANNUAL EXHIBITION

Friday 8th, Saturday 9th and Sunday 10th of November. From 9am to 4pm each day
At the Club Rooms at73 Fullagar Road, Wentworthville, Sydney.

'Competition, sales, demonstrations, children's activities, sand sieve,
fossicking heap, refreshments. Wheelchair access and plenty of parking
Contact the Club on 02 9636 7843 or http://www.freewebs.com/parraholroydlapidaryclub/

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ANNUAL JEWELLERY SHOW by the NEWCASTLE LAPIDARY CLUB

The Newcastle Lapidary Club will be holding their annual jewellery show
on the weekend of 9th & 10th of November 2013.
The Show is in the club rooms at 2 Dora Rd Adamstown, Newcastle, NSW.
Starting times on both days are 9.00am and finish at 4.00pm.
Rocks, tools and jewellery will be for sale.
There will be a sausage sizzle, devonshire tea, coffee and drinks.
Parking is available and admission is free.

For more information contact the club 0249529611 or email newlap@gmail.com.

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GEMBOREE 2014

Australia's 50th NATIONAL GEM, LAPIDARY, JEWELLERY AND MINERAL SHOW.

GEMBOREE 2014 is to be held in Gatton, Queensland, over Easter, the 18th to 21st April 2014.

Presented by the Australian Federation of Lapidary & Allied Crafts Associations Inc. (AFLACA).

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