



THE MINERALOGICAL SOCIETY OF NEW SOUTH WALES INC

C/o School of Natural Science
B.C.R.I. Parramatta Campus, Western Sydney University
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NEWSLETTER

SEPTEMBER 2016

The September Meeting will be held on Friday the 2nd of September at 7.30 pm in the clubrooms of the Parramatta and Holroyd Lapidary Club at 73 Fullagar Road, Wentworthville.

The program will commence with mini-talks to be given by Peter Williams on : -

Pegmatite Minerals.

and by Jim Sharpe on the : -

Triple Chance, Tess Alfonzi and the NASA Space Program

Members are invited to bring in examples of pegmatite minerals to display, particularly of any beryl specimens from the Triple Chance mine.

The talks will be followed by the **Mineral Quiz** organised and presented by Noel and Ann Kennon.

Members are recommended to **bring pens or pencils** with them to be able to make notes during the Quiz which will involve a Power Point presentation.

FORTHCOMING MEETINGS AND PROGRAMS

- | | |
|--------------------------------|--|
| October 7 th : | Lecture by David Colchester on : - '4.6 Billion Years of Mineral Evolution' |
| November 4 th : | Lecture on 'Meteorites' by Ross Pogson |
| December 2 nd : | Christmas Social |
| February 3 rd 2017: | Lecture on 'Radioactivity and Minerals' by Geoff Parsons. |
| March 3 rd 2017: | Lecture on 'The Milton Lavers Collection' by Paul Carr. |

The SOCIETY POSTAL ADDRESS

Members are reminded that whilst the Society Meeting venue has been changed from the Western Sydney University the Society has to retain its official University postal address which is registered with the Department of Fair Trading. This may be changed eventually but in the meantime and for the foreseeable future all members and other societies, clubs and correspondents are requested to send all mail to the Secretary's home address: -

Secretary, The Mineralogical Society of NSW Inc,
58 Amazon Road, Seven Hills, NSW 2147

THANKS to John Chapman and Ed Zbik for improving the appearance of the Society logo.

NEWS FROM THE AUSTRALIAN MUSEUM

Closure of the “Planet of Minerals Gallery” and Installation of a Combined Mineral Display

After 30 years' faithful service, (from 1986), the “Planet of Minerals” gallery is being dismantled so that the historic “Long Gallery” can be restored to its 1850s/1860s appearance, and for installation of a new “200 Treasures” exhibition.

About 120 of the best specimens will be redisplayed in the currently-vacant western half of the Chapman gallery space, arranged under some of their previous themes and some new ones. Hopefully most of your favourite mineral specimens will still be there, and of course the Chapman minerals will still be on display. The huge amethyst geode is making a comeback, and some displays near the Chapman gallery entrance will be re-arranged. The iconic Broken Hill cerussite will be displayed in the “200 Treasures” exhibition opening at the end of 2017, and the superb Allies Mine, Deepwater molybdenite will be displayed in a special “Highlights” case. The meteorite & tektite cases will be redesigned and updated, and the gemstone display will stay essentially as it is.

The “Planet of Minerals” gallery will close around 10th October 2016, so there is still time to visit your favourite displays. But all is not lost - any specimens not being redisplayed will be stored together in one place, and will still be accessible for viewing by visitors – just contact Ross Pogson.

The combined mineral display in the “Albert Chapman Mineral Gallery” space will reopen around mid-December 2016. This is only a temporary measure until a new “Dynamic Australia” geology gallery is built, under Stage 2 of the museum redevelopment plan, but that may be some years away.

Report on the Australian Museum Long Gallery renovations from : -

Ross Pogson, Scientific Officer, Collection Manager,

Geosciences (Mineralogy & Petrology, Palaeontology) | Geosciences and Archaeology|

Australian Museum Research Institute

FIELD TRIPS

There is the following Field Trip being held in September and trips to be scheduled to the Tolwong area later in the year but in addition any suggestions from members with information, offers to make inquiries about possible sites to visit, or offers to organise or help organise a trip to a significant site would be appreciated.

16/17/18th September, Joint Field Trip with the Illawarra Lapidary Club to Muttama, - between Cootamundra and Coolac, north of Gundagai, For clear quartz crystals. Camping on private property. **OPEN TO ALL MEMBERS**

For information see the report on a previous visit to Muttama in the Oct 2015 Newsletter: - http://minsocnsw.org.au/newsletters/MinSoc_Newsletter_Oct15.pdf

Member's Field Trips:

Ed is going overseas for September and October and so other members have the chance to organise a field trip in October/November for a day or two to any locality of known minerals that you may have access to or have visited in the past. A notice with information must appear in the MinSoc Newsletter with contact details of organizer. Closing date for the newsletter is Friday of the week before the next General Meeting.

The Tolwong Mine and Bungonia State Conservation Area Science License has been extended to June 2017. Plan two reconnaissance trips and possibly three collecting trips between November 2016 and June 2017. This involves backpack bush walking and camping within the Bungonia and Morton National Park. Minerals collected may be consigned to the Australian Museum. Note: It is not permitted to collect minerals in National Parks and doing so may result in fines and other penalties.

OPEN TO ALL MEMBERS.

Contact Ed to be placed on the "Interested list".

2017 Field Trip Program.

If you know a landowner with a mineral occurrence or have contacts with a commercial mining or quarrying company, we would like to hear from you.

To register for any event above, e-mail etzed@optusnet.com.au or phone Ed on (02) 9638 6586 or Mobile: 0401 538 480.

Regards Ed

WELCOME

Welcome to new member John August of North Ryde.

THE ANNUAL GENERAL MEETING AUGUST 5th 2016

The 2016 A.G.M. was held in the clubrooms of the Parramatta and Holroyd Lapidary Club and attended by nearly fifty members comprising a quorum. The Meeting was opened by the Society President, Dieter Mylius.

At the commencement of the Meeting there were a few announcements. The President reported to members that from next October the Australian Museum was undertaking a major renovation of the **Museum Long Gallery** which would involve some of the minerals from the Gallery being moved into the Albert Chapman display area but most would go into storage, 'for a while'.

Ed Zbik reported on the **Field Trip** program noting that a party had a successful visit to the Apsley Copper mine and Lowes Mountain State Forest sites over the 30th and 31st of July weekend. The trip had involved some resourcefulness by the members in dealing with and negotiating a major blockage on the Lowes Mt forest road with a large tree fallen across it. The next trip to Mt Tennyson had been re-scheduled for the 27th to 29th of August and Muttama had been brought forward to the 16th to 18th of September. The State Conservation Area Science License had been extended to June 2017 and Ed was looking for two parties to perform reconnoiters.

The next **Micro-Mineral Group** meeting would be held on the 20th of August and the topic would be 'Minerals That Have an Obsolete Name'.

Reminders were provided by members about the forthcoming **Roselea Mineral Show** and the **Sydney Crystal Show** at Marrickville.

With no further announcements to be made the President turned to the official proceedings of the A.G.M. and delivered his Report for the previous year.

Presidents Report 2015-2016

Well, another year has passed, and it has been quite eventful and very enjoyable. We have had great talks and social evenings, lots of field trips, celebrated our 40th year and moved to a new location.

This annual report gives me a chance to reflect a little on the past year, summarize the events and happenings and to thank the many people who contribute to the Society.

Entering our 41st year, our meetings are still well attended, with overall membership being fairly steady, although staying current with membership fees appears a struggle for some. Regardless, financially we are in great shape, which will be born out in the financial report prepared by our Treasurer, Graham Ogle. Although we now need to pay a small amount for the use of these premises, our expenses are still low, and we have two substantial bequests earning interest.

As usual the programs during 2015-16 have been fantastic, and once again our thanks go to Jim Sharpe for keeping the programs fresh and interesting.

Starting with last year's Betty Mayne/Harold and Edna Walker talk Noel Kennon took us through the History of Broken Hill. In September an interactive night on microminerals seemed to be well received, and then we found out a little more about Mudgeeite and how to establish a new mineral. In November John Rankin gave us the history of the Block 14 mine. February saw Ross Pogson discussing some of the interesting calcites from

Cliefden Caves, then Peter Buckley illustrated why a field trip to collect diamonds in Liberia is not a good idea. Our 40th Anniversary evening had many members and past members reminiscing about the good ole' days, and after the May Auction we had another terrific interactive night focusing on Kingsgate. The year was rounded off with Adam talking about the Hera Gold mine at Nymagee.

Our traditional February sale of donated minerals saw over \$1600 going to Kids with Cancer. Congratulations to everyone - a wonderful result. And the May Auction saw over 90 mineral specimens falling under the hammer and finding new homes.

As already mentioned the talks program has been managed by Jim Sharpe, as are the February sales and the May auction. Jim has decided he'd like to pass the Friday program baton on, so we are pleased that John Chapman has taken on the task of keeping our Friday night program full and interesting. Jim we all thank you for the years of enjoyable talks you have organised.

Christmas was again our best attended evening with everyone squeezing into the old room at WSU. Lots of minerals, delicious food and plenty of drinks made for an enjoyable if cosy night. Thank you to everyone who contributed to the catering, setting up, bringing in specimens to exchange and sell, and cleaning up.

And more broadly, thank you to all who have contributed to the Friday meetings, whether by presenting a talk or mini talk, bringing in specimens for us all to see, and of course John, George and all their helpers who provide refreshments each month for us all to enjoy.

The field trip program has been great, and I have lost track of the places visited. Results have been mixed, but that is normal with fossicking (sorry mineral collecting). The main memory I have is of Tolwong - say no more. The organisation that went into getting seven of us into the National Park to legally look at the mine is amazing, and this is what Ed Zbik does so well. Ed we thank you - an amazing effort. In addition, Ed is continuing to encourage members to obtain their Safe Work Methods certificates. These are useful not only to keep members on field trip mindful of what they are doing, but in the future will help us gain access to active working sites that would in most cases be closed to us. It's a great effort and I am sure we all thank Ed for this initiative.

The Micro Mineral Group continues with a regular attendance of 6-12 people, ably convened by Graham Ogle. The second Saturday afternoon has become a pleasant, relaxing time to look at tiny minerals, and I always look forward to it. The group is still working on the minerals of Tolwong, which seems to have blown out to a much larger project than originally thought. But we plug on and will get there. In the meantime there are so many other tiny but exquisite minerals to look at.

As usual, the Mineralogical Society has the challenges of attracting, finding and encouraging new members, especially younger ones, to join us and in time, perhaps become involved in the running of the Society. We need to be vigilant that we remain interesting, vital and appealing. It's too easy to become complacent. We also need to consider the use of the bequests so they can be used to benefit the Society and/or mineralogy in the future.

A big thank you to the committee for their dedication and work during the last year. It is the committee that keeps the wheels turning. But the job is not onerous, so if you have ever wondered about serving on the committee, please take the plunge. Remember, if you want to see what goes on behind the scenes, anyone is welcome to attend committee meetings.

I'd like to thank our Treasurer, Graham Ogle, for very ably managing our finances and John Chapman for stepping in as vice president when needed.

But in reality, the person that does the most work and is the go-to person is our secretary, George Laking. He does a huge amount of work in the background but you can all see the results – the newsletter, transcripts of talks, minutes at committee meetings, the attendance book, membership lists, deals with correspondence, name

tags, and mail. He's the one that can fill in historical details and what's in the constitution. George, as always, we salute you.

Although we have now moved, I would again like to thank Peter Williams and the University of Western Sydney or WSU, for the free use we had of the room at the university, which was our home for so many years.

Finally, thank you to you all, for being here each month, for being part of the Mineralogical Society of NSW and for sharing your interest, passion and knowledge of minerals with each other.

I wish the incoming committee a successful year ahead.

Dieter Mylius
August 2016

Jim Sharpe made apologies for the Treasurer, Graham Ogle, who had not been able to attend this Meeting but in his place presented and described features of the **Annual Financial Report**, copies of which had been distributed to the members. The Report gave figures for the 2014-2015 financial year alongside the 2015/2016 figures for comparison and could be seen to be very similar.

Jim Sharpe suggested that one feature which members might notice and query was the figures for the Increase in Funds of only \$54.47 for 2015/2016 compared to an increase of \$6,050.75 for 2014/2015. He explained that this difference was due to income from sales of the George Smith books accruing during 2014/2015 whilst the cost of printing the books had been paid in the previous financial year of 2013/2014. There was also some extra income during 2014/2015 of residual funds from the Harold and Edna Walker estate whereas during 2015/2016 there had been some extra expenses - for the April commemorative meeting refreshments for which members had not been charged and some library shelving and projection equipment purchases.

MINERALOGICAL SOCIETY OF NEW SOUTH WALES INC.

ANNUAL REPORT 2015-2016

FINANCIAL STATEMENT

| Funds in hand: | 2015-16 | 2014-15 |
|--|---------------------|--------------|
| 1. Balance in Operating account CBA # 06 2016 28023647 @ 30 th June 2016 | \$6,128.41 | \$13,805.90 |
| 2. Funds in CBA Term Deposit 1 – Betty Mayne Bequest | \$31,966.32 | \$31,966.32 |
| 3. Funds in CBA Term Deposit 2 – Edna Walker Bequest | \$63,392.58 | \$55,660.62 |
| 4. Cash in Hand | \$46.00 | \$46.00 |
| 5. Total Funds at 30 th June 2016 | \$101,533.31 | \$101,478.84 |
| <u>Increase in funds</u> | \$54.47 | \$6,050.75 |

Income

| | | |
|--|-------------------|------------|
| Membership subscriptions | \$2,755.00 | \$2,705.75 |
| Supper donations and mineral sales | \$1,096.15 | \$1,248.85 |
| Sale for Kids with Cancer | \$1,600.00 | \$1,793.00 |
| George Smith book sales | \$165.00 | \$1,446.65 |
| Interest on Operating account | \$37.54 | \$68.39 |
| Interest on term deposit into main account | \$990.96 | \$1,838.08 |
| Interest on term deposit into term deposit | \$1,732.06 | \$1,005.65 |
| Walker Bequest | \$0 | \$1,680.36 |

Total \$8,376.71 \$11,786.73

Expenditure

| | | |
|---|-------------------|------------|
| Supper items, 40 th anniversary | \$3,049.79 | \$1,390.51 |
| Rent – hall hire | \$270 | \$0 |
| Transfer of money raised for Kids with Cancer | \$1600.00 | \$1,793.00 |
| Printing, postage, stationery etc | \$567.95 | \$639.39 |
| Subs, PL ins./Dept of Fair Trading/PAI/Speaker/ Website etc, also book case, projector, first aid kit. | \$2,834.40 | \$1,913.18 |

Total \$8,322.14 \$5,736.08

Income – Expenditure **\$54.57** \$6,050.75

Liabilities **\$0** \$0

Other Assets

Estimated value based on 10% depreciation pa.

| | |
|----------------------------------|-----------------------|
| Mineral trimmer | \$23 |
| Display cabinets | \$165 |
| Library | \$729 |
| Microscope | \$77 |
| George Smith books | \$1,800 approx |
| <u>Total fixed assets</u> | <u>\$2,794</u> |

The above statement indicates that the Society is in a sound financial position

The accounts have been examined and confirmed by Jim Sharpe

Graham Ogle

Treasurer

5th August 2016

The President asked that if members had examined the Annual Financial Report and had no queries they should vote to accept it since a copy had to be sent to the Dept of Fair Trading within a month of the A.G.M.

Graham Delaforce proposed that the Annual Financial Report be accepted. The motion was seconded by Ann Kennon with all in favour.

ELECTION OF THE SOCIETY COMMITTEE FOR 2016 / 2017

Dieter Mylius asked Gary Sutherland, Society member and former President, to assume the task of Returning Officer and to take the chair of the Meeting for the election of the 2016/2017 Society Office-Bearers and Committee members.

The Returning Officer noted that only single nominations had been put forward for the Committee positions and was able to dispense with a ballot. He read out the names and positions of the nominated Committee members and declared them elected unopposed.

| | |
|--------------------|------------------|
| PRESIDENT: | Dieter Mylius |
| VICE-PRESIDENT: | John Chapman |
| SECRETARY: | George Laking |
| TREASURER: | Graham Ogle |
| COMMITTEE MEMBERS: | Peter Beddow |
| | David Colchester |
| | Geoff Parsons |
| | Simon Tanner |
| | Edward Zbik |

In re-assuming the position of Society President and Meeting chairperson Dieter Mylius asked if there was Any Other Business relevant to the A.G.M. and there being none, declared the 2016 Society Annual General Meeting proceedings concluded.

The Betty Mayne, Harold and Edna Walker Memorial Lecture

The President next introduced the Memorial Lecture to be given this year by Brian England and as has become customary before the delivery of the lecture provided an explanation to the background.

‘Each year in August, after the AGM, the Society holds the Memorial Lectures which were originally established in 1992 at the suggestion of the late Professor Laurie Lawrence in honour of Betty Mayne who had been an enthusiastic and well-regarded Society President up to her untimely death in 1991. In her will she stipulated that her mineral collection should be sold by auction and the proceeds divided equally between the Mineralogical Society of NSW and the Friends of the Geological and Mining Museum. The Society set up a term deposit with the bequest funds.

Betty Mayne had joined the Society in the mid 1980’s. After only a year or so she was elected to the Committee becoming Secretary and then President in 1989 bringing considerable organizational skills to the position. Her final work for the Society was organising and presiding over the highly successful 1991 Joint Mineralogical Societies Annual Seminar held in Sydney at the Earth Exchange Museum. She sadly passed away only a month after the Seminar.

A few years ago the title of the Memorial Lectures was extended to also honour the names of Harold and Edna Walker who had been very loyal members of the Society attending and hardly missing a single meeting, field trip and interstate Seminar up until the mid-2000s when apparently their health started failing. Edna Walker passed away in April 2012, after her brother a year or so earlier, and in her will she bequeathed a substantial portion of her estate to the Society which has also been used to set up a separate term deposit.

This year the Memorial lecture was to be given by Brian England who over the years has given the Society many enjoyable talks on a wide variety of topics on mineralogy and mineral localities both Australian and overseas. He has published extensively in many publications and his knowledge of Australian minerals is second to none. He has a magnificent mineral collection and the Society Micro-Mineral Group has been invited to his house on several occasions to enjoy his hospitality, knowledge and generosity.'

The following text of his lecture has been provided by Brian England. The lecture was extensively illustrated by a series of projected images to which the text constantly refers. In preparation for the lecture the images had to be re-arranged to be presented through the Society's projection system. The speaker has asked that an acknowledgment be provided to John Chapman for his help in organizing this.

'The speaker wishes to thank John Chapman for manipulating and greatly improving my digital photos and transferring them to Power Point. This vastly improved the presentation.'

MINERALS OUTSIDE THE BOX

Brian England

'Since ancient times the human race has strived to identify, describe and name everything it encountered and to group these things into boxes defined by accepted limits. However not all things fall within such boundaries. There are things which are so different to what we define as normal in terms of what we know from what we've seen in the past that they stand out as exceptions to the rules of normality.

In his book and Oscar-winning short film 'The Last Thing' Shaun Tan came up with a solution to this dilemma. He dreamed of a government department called 'The Federal Department of Odds and Ends'. It's motto – "Don't Panic. We have a pigeonhole for everything. Just fill out the forms".

I thought in preparing this talk that there may have been a Website with some simple guidelines as to what might be regarded as odd, but no such luck!

So – What do we consider as odd in the mineral world?

There are in fact so many strange phenomena in the mineral world that in this talk I will concentrate on the more obscure, often one-off occurrences, with particular reference to Australian material.

1. MINERALS OUTSIDE THE DEFINITION

Minerals are defined as being inorganic and natural occurrences of chemical elements or compounds. There are a few exceptions.

Whewellite is one of the very few organic minerals being a calcium oxalate, ($\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$). Some of the World's finest specimens came from Bayswater No 2 coal mine near Muswellbrook in the Hunter Valley back in 1992. Originally thought to be aragonite it was found as colourless twinned crystals to over 3 cm associated with barite, Mg-calcite, pyrite and dawsonite lining central syneresis cracks and vughs in siderite concretions up to 3 m across. These were scattered through a tuffaceous siltstone belonging to the Permian Branxton Formation, (Maitland Group), which lies immediately above the Greta Coal Measures. Whewellite has been found outside Australia at several localities including Milan; Ohio (USA); Elk Creek in South Dakota (USA); Havre in Montana (USA); Bohemia; Dresden in Germany; - all in septarian concretions. Also found at Thuringen and other places in Germany, Hungary and at Cavnic, Romania, in ore veins. It occurs associated with Pb-Zn sulphide ores in skarn deposits at the Nikolaevskiy mine at Dal'negorsk in the Russian Far East.

2. UNUSUAL OCCURRENCES OF COMMON MINERALS

Goethite Dendrites on Nobby's Tuff.

Outcrops of Nobbys Tuff at Nobbys Head in Newcastle show unusual and unique lace-like patterns on joint plane surfaces. These were found to comprise a mixture of goethite and chalcedony. These minerals had come from the oxidation of pyrite contained in shaley coal bands at the base of the Shepherds Hill Formation which occur immediately above the Tuff beds. The resultant materials from oxidation and leaching were carried down into the joint planes by groundwater. The host and source rocks lie within the Lambton Subgroup at the base of the Late Permian Newcastle Coal Measures.

The variation in colour is due mainly to differences in crystallite size and packing density of the goethite. The unusual patterns resulted from the joint-filling material being placed under tension while still in the gel state as the joint blocks moved apart under the weight of the overlying rocks.

Quartz Polyhedroids

In the 1970s there was a flood of very unusual quartz polyhedroids from Brazil. Not generally known however is that they have also been found in Australia. In 1975 an occurrence was discovered at Mt Gee on Arkaroola Station in the North Flinders Range of South Australia. In fact it was this occurrence which shed light on the origin of these oddities. Most collectors know Mt Gee as the 'Crystal Mountain' – a mass of crystallised quartz filling fracture zones in quartz/haematite rock within the Precambrian Painter Complex.

The quartz polyhedroids at Mt Gee were found filling a large vugh. Complete exposure of this vugh revealed that the polyhedroids were loosely arranged in an interlocking pattern, much like a 3D jigsaw puzzle. Around the sides of the vugh the polyhedroids were firmly attached to the quartz/haematite wallrock and separated from each other by thin (around 3mm) tabular voids which could be traced across the entire width of the vugh. Trigonal growth markings on the faces of the polyhedroids suggest that the tabular voids were originally occupied by thin calcite blades, since leached out by groundwater. This calcite habit is common World-wide – often called 'Angel-wing calcite'.

Reference:

ENGLAND B.M. (1976). Quartz polyhedroids in Australia.
The Australian Gemmologist, May, 303-306.

Orthoclase crystals in Intrusive Volcanics

Well-formed crystals of feldspars (mainly K-Feldspar) are often found scattered through igneous rock matrices. These crystals grew unobstructed in the magma before its emplacement in dykes, stocks and plugs etc. Examples from Kalgoorlie WA and West Maroon Pass in Colorado USA became available to collectors many years ago.

However virtually unknown to collectors are the idiomorphic K-Feldspar crystals from a coarse-grained intrusive rhyolite outcropping in western Bulgaria on its border with Macedonia near

Bobechino. These crystals reach 10 cm and include single crystals as well as sharp Manebach and Carlesbad twins.

Not unusual in terms of mineral occurrences perhaps! But certainly unusual because of the locality – just metres from the front gate of the Bulgarian Female Lunatic Asylum !!

Copper in Pyrobitumen from Sandy Flat Pipe N.T.

Spectacular specimens of native copper in pyrobitumen were amongst the most attractive specimens from the ecrysta zone of the Sandy Flat Pipe, one of nine collapsed breccia pipes within the Middle Proterozoic Gold Creek Volcanics formed by near-surface explosive release of fluids from a postulated trachitic magma body.

The pyrobitumen appears to be petroleum-derived, pyrolised during emplacement of the primary minerals. It is a highly altered bitumen and very resistant to weathering, persisting in the oxidized zone with no sign of further breakdown. The deposit was mined in 1994/5

Reference:

McLAUGHLIN, D; RAMSSEN, A.R.; SHARPE, J.L; and WILLIAMS, P.A. (2000).
Minerals from the Sandy Flat Pipe, Redbank, Northern Territory.
Australian Journal of Mineralogy, 6/11, 3-7

Fluorite on Stibnite from Thailand

The occurrence of fluorite on stibnite is unusual mainly because of the significant difference in the temperature range over which each of these species crystallises, which one would think would make them mutually exclusive.

Fluorite forms at between 450 and 550°C while stibnite crystallises at a much lower temperature. The presence of fluorite coating earlier stibnite is indicative of a change from a very low to a very high temperature regime during the paragenesis. This should have destroyed the stibnite. Indeed in most specimens the stibnite shows significant corrosion, or with thicker fluorite coatings is almost completely absent.

Coarsely Crystalline Actinolite

Actinolite belongs to the Amphibole Group and like many other members of this group (most notably tremolite, grunerite and riebeckite) typically occur as groups and masses of very fine acicular crystals or even asbestiform material. Because of their fibrous habit these minerals present a very serious health hazard.

However exceptions do occur. Most notable are the extraordinary crystals of actinolite in coarse calcite from the Tribulation mine near Mt Isa. Identity has been confirmed by XRD and Quantitative EDS – specimens fall in the middle of the compositional range for actinolite.

Mountain Leather

At the other extreme of actinolite habits is the thin flexible sheets made up of interlaced fibres called mountain leather. In the Sub-Polar Ural Mountains around Neroika/Puiva/Dodo in Russia early miners actually fashioned clothing from this material.

The famous Ferroaxinite pocket at Puiva was a huge tension gash cavity in folded metasiltsstones filled with literally tonnes of this mountain leather which was the matrix within which the crystals of ferroaxinite (up to 10 cm across) formed.

3. MINERALS THAT ARE NOT WHAT THEY APPEAR TO BE

Micaceous calcareous siltstone within the highly disrupted Lower Callana Beds of Willouran (Early Adelaidean) age in the PreCambrian of the Adelaide Geosyncline of South Australia contain layers of abundant halite casts, some preserving the hopper shape of the precursor crystals. These beds occur as a large xenoclast within the intrusive breccia of the Beltana Diapir (Preiss, 1987).

These rare pseudomorphs provide direct evidence of periodically exposed shallow water mudflats in the region back in the early PreCambrian.

Reference:

PREISS, W.V. (Compiler) (1987). The Adelaide Geosyncline.
Bulletin 53. Geological Survey of South Australia

Glendonites

These unusual pseudomorphs have been discussed in detail in several talks and published papers so only a brief outline is given here. James Dwight Dana was shown the first specimens from Glendon during a visit to Australia in 1839-40 and described them in his report on the geology of NSW in 1849. The name 'glendonite' was proposed by Edgeworth David in 1905. The identity of the precursor was the subject of much debate and suspects included thenardite, gaylussite, gypsum and most probably glauberite. Synthetic $\text{CaCO}_3 \cdot 6\text{H}_2\text{O}$ had been known prior to Dana's visit to Australia but it was not found in nature until 1963, in the very cold waters of Ika Fjord in Greenland. But it was then 20 years before ikaite was recognized as matching the composition, morphology and distribution required for the glendonite precursor.

Ikaite from all known localities is unstable above 5°C and quickly decomposes to a mush of CaCO_3 and water. It was recognized that the recrystallizing of ikaite was associated with very cold conditions and World-wide occurrences are now used as an indicator of very ancient cold-water conditions.

Reference:

SELLECK, B.W.; CARR, P.F. and JONES, B.G. (2007).
A Review and Synthesis of Glendonites (Pseudomorphs after Ikaite) with new data:
Assessing applicability as recorders of ancient coldwater conditions.
Journal of Sedimentary Research, 77, pp 981-991.

Opal 'Pineapples'

The opal pineapples from White Cliffs are unique and occur nowhere else on Earth. Their appearance is identical to one of the common glendonite habits – not surprising since they have a similar origin, being replacements of ikaite by opal rather than by calcite.

The opal pineapples occur in patches within the upper deeply weathered part of the marine Cretaceous Rolling Downs Group of fine kaolinitic claystone and clay-rich sandstones. The opal was deposited during the Paleogene (Tertiary).

Quartz Epimorphs from Mount Gee, Arkaroola.

Mount Gee has already been mentioned in reference to quartz polyhedroids but there are other unusual occurrences in this hill of crystallised quartz.

Best known is the 'nail-hole' quartz, stalactitic groups of quartz crystals around prismatic cavities formed by the leaching out of an undetermined mineral. The cavities were thought to have been originally occupied by slender crystals of gypsum but a find made in the 1970s showed the cavities to be moulds after crystals of the zeolite laumontite.

This fits with finds made around the same time including moulds after stilbite and quartz pseudomorphs after chabazite, both also zeolites.

Quartz pseudomorphs after barite have also been found.

Dolomite Epimorphs after Calcite

Changes in the chemistry of mineralizing solutions and/or the physical environment can result in earlier-formed minerals becoming unstable and so returning into solution, while new minerals which are in equilibrium under the new regime crystallise out in their place or as overgrowths.

In the case of dolomite epimorphs after calcite, the calcite probably provided the Ca^{2+} necessary for the formation of the overlying dolomite in the new growth environment.

4. MINERALS WITH UNUSUAL PHYSICAL PROPERTIES

Late in 1971 specimens of pyrite crystals associated with muscovite, quartz and kaolinite were found in a large fissure-like cavity in granite intersected by the construction of the Hydro tunnel near Moina in Tasmania, built to supply water to the Wilmot power Station, part of the Mersey-Forth Power Development Scheme.

Crystals ranged in size to 4 cm and showed a combination of cube and pyritohedron faces. Also present were what appeared to be octahedral faces but surface features were not characteristic of a crystal face. It was then discovered that one crystal readily broke apart along these octahedral planes to produce thin plates, all of which were bound by octahedral faces. It seemed obvious that what I had was pyrite showing octahedral cleavage!! A short paper was prepared for Mineralogical Magazine but was rejected on the grounds of disbelief!

To prove the point I made polished sections on (001) and (110). The (001) section showed cleavage cracks intersecting at 90° and aligned at 45° to the cube faces. A section parallel to (110) on the same crystal showed cleavage cracks intersecting at 109.5° . This proved the presence of octahedral cleavage and my second paper submission was accepted.

EDS microprobe analysis showed only Fe and S with no impurities co-precipitated along the (111) planes, which could have caused parting on those planes. A literature survey showed while a (100) cleavage was possible. The presence of a (111) cleavage in pyrite was very unlikely.

So the Wilmot pyrite crystals represent the first authenticated occurrence of octahedral cleavage in pyrite.

Reference:

ENGLAND, B.M. (1979). Cleavage in pyrite from Tasmania.
Mineralogical Magazine, 43, 183-4

Iridescence (Interference) Colours

The colours are due to a process of reflection, refraction and interference as shown in the photographs, first considering a single ray of light (Photo 26) and then multiple rays (Photo 27).

When the emergent light rays are resolved in the same plane by the eye, waves in phase reinforce each other while those out of phase cancel each other out. When multiple waves of each wavelength (colour) are involved with some in phase, some out of phase and others only partly out of phase, the process becomes extremely complex with different colours reinforced or cancelled out. The effect is repeated over the surface until intensity falls to zero.

The colours seen depend on the thickness of the film and the angle of viewing. Film thickness must be less than 7,000 Angstrom. The same effect is commonly seen in an oil film on water.

Reference:

ENGLAND, B.M. (1979). Colour in Minerals. Australian Gems and Crafts Magazine.

Examples of interference colours discussed included iridescent goethite from Cobar. Interference is due to a thin transparent layer of goethite on the surface of each rock fragment. An image shown was of a magnificent specimen which was once Albert Chapman's front door stop!

Also mentioned and illustrated was a specimen of iridescent haematite from Koolan Island, W.A. Again the effect is produced by a very thin film of goethite coating each grain in this granular hematite. One wag offered to buy this material from BHP Iron Ore with the intent of producing a psychedelic paint!

Pseudochromatism in Labradorite

Specimens of labradorite from Madagascar (and several other localities including Labrador, Russia, Finland and a number of places in the USA) are well-known for their brilliant play of colour when sawn and polished. The effect is seen at its maximum intensity on surfaces cut at $\pm 14^\circ$ on either side of the (010) plane.

Most authors on the subject provide only indefinite explanations for the observed colours, simply defining them as 'labradorite colours'.

Probably partly responsible is Tyndall Scattering from very small inclusions. Thin section studies by J.Ostwald revealed that specimens showing pseudochromatism contain abundant rod-like inclusions and voids aligned on the (010) plane. Tyndall scattering may be the cause of the steely-blue colour flashes while other colours may be interference colours caused by the same rod-like bodies.

Reference:

OSTWALD, J. (Undated). Schiller and pseudochromatism in minerals and gemstones. Journal of Gemmology.

Mineral Kaleidoscopes

Viewed from the side, one quartz crystal in a group from Dal'negorsk in the RFE shows a single dark inclusion. However when viewed down the vertical or c-axis SIX dark inclusions are seen, one for each of the equally-developed r and z terminating rhombohedral faces.

Quartz crystals collected back in 1958 from hydrothermal quartz veins traversing rhyolitic lavas at Diamond Head near Taree NSW commonly showed thin brown phantom layers parallel to the r and z rhombohedral faces. In only one crystal out of several hundred collected this internal phantom lay in exactly the right position to be reflected in all six termination faces when the crystal is viewed down the c-axis.

5. STRANGE HABITS IN CRYSTALS

We might think that people have strange habits.
Well, so do some minerals.

Bent Stibnite Crystals from Hillgrove NSW

At Hillgrove, east of Armidale NSW, stibnite has been mined from quartz veins occupying steeply dipping fissures in folded and metamorphosed siltstones as well as in an adamellite which intrudes those sediments.

Hillgrove is well-known amongst collectors for the curiously bent stibnite crystals that characterize the deposits. These crystals are found in vughs lined with quartz crystals.

When placed under compression in the direction of the c-axis the stibnite crystals accommodate the resultant strain by forming kinks in the crystal structure. The (100) planes in the crystal lattice act as glide planes so that a force applied to them induces en-echelon movement and the crystal dramatically shortens in length as a result, without breaking. At Hillgrove the applied force was probably due to tectonic movement in the host rocks post-recrystallizing of the stibnite.

Reference:

SUTHERLAND, G (1998).

Antimony Minerals, Australian Journal of Mineralogy, New England Issue 4 (2), 89-92

Twinned amethyst Crystals

At the 1993 Tucson Gem and Mineral Show Arthur Roffey showed me an unusual amethyst specimen he had just acquired from one of the Brazilian dealers for the princely sum of \$US19!

I immediately thought it was very likely a multiple Japan-Law twin, with a central (vertical) prismatic crystal rimmed by three other crystals meeting the vertical crystal at an angle of 84.5° at each alternate prism face. This results in a group of three crystals on the horizontal plane meeting at 120° .

This is not an accident! There are four similar twins on this specimen. Arthur and I examined the stocks of every amethyst dealer in detail but found no other examples of this exceedingly rare habit.

Definitely an odd specimen!

Distorted Quartz Crystals

Crystals of any mineral can show symmetrical or asymmetrical distortions in shape, and so seldom match the drawings of perfect crystals seen in Dana or Goldschmidt.

The Kingsgate Mo-Bi mines east of Glen Innes are well-known for spectacular specimens of quartz crystals. Crystal-lined vughs in the quartz/silexite pipes yielded crystals to over 2 metres in length.

Dumps of the Giant Blow (Pipe H) produced small fully-faced quartz crystals showing extraordinary distorted habits including almost single rhombohedra.

However a quartz crystal from a miarolitic cavity in silexite from the dumps of the Old25 perplexed the speaker for some time. EDS analysis showed only Si (O undetectable) but eventually the morphology could be reconciled to a very unusual grossly distorted quartz crystal!

Pyrite Bars

Amax Homestakes Buick mine at Bixby in Missouri USA provided exceptional and unusual specimens of pyrite back in 1975. An ore pass on the 1250A level intersected a lens of pyrite sand containing unusual bars of pyrite.

The morphology appears to be the result of twinning on c (001) and termination faces show a central pinhole cavity which extends through the entire bar.

Reference:

HOLLOMAN, E. (1975). Letter to the Editor. Last Word.
The Mineralogical Record, 6(4) 216

Chiastolite Variety of Andalusite

Early in 1902 the Australian Museum noted the discovery of this unusual mineral in the Olary area of South Australia. A veritable carpet of these rough cigar-like crystals had been stumbled on by George Howden while prospecting in this remote and poorly explored area. In 1906 Howden contacted Douglas Mawson, then a young Adelaide geologist. Chiastolites were not new to Mawson. He knew that Dana had reported several localities overseas in his System of Mineralogy.

Mawson wrote of the Mount Howden occurrence – 'On account of the size and abundance of the crystals and also on account of the characteristic internal feature (i.e. the cross) these rank amongst the most notable in the World. The Olary occurrences (including Alconie Hill and Dome Rock – also on Bimbowrie Station) remain the most prolific and produce the largest chiastolite crystals known.'

Chiastolite is a special variety of the mineral Andalusite [Al_2SiO_5] formed in the solid state by specific pressures and temperatures during low to medium grade contact or regional metamorphism of aluminous rocks such as shales. The chiastolite crystals grow by pushing the other minerals in the recrystallizing rocks aside. Their growth required considerable enrichment in alumina, from a typical 25% in the precursor rock to about 63% in andalusite. This required migration of alumina through the rock matrix to the growth centres. Growth of the crystals occurred more rapidly at 90° to the

orthorhombic crystal faces to form 'fins'. Small crystals of graphite forming in the rock matrix were pushed to the regions between the fins to form the cross.

Other explanations for the formation of the cross include dendritic growth, and the preferred absorption of the graphite flakes against the prism faces. Most authors agree that once the graphite flakes had begun to concentrate they would have prevented further growth of the andalusite crystal in those areas. The cross is not due to twinning.

But the story does not end there. Most South Australian chiastolites are no longer entirely andalusite, with partial to complete replacement by the mica minerals muscovite (pinite) and margarite (a brittle mica) brought about during retrograde metamorphism of the enclosing graphitic schist between 1,580-1,500 Ma (Carr, 2003).

References:

ENGLAND, B.M. (1978). Andalusite variety chiastolite – one of Australia's unusual minerals. Australian Gems and Crafts Magazine. April/May 27-30.

McCOLL, D. (1983). Australian lucky stone. The chiastolites. Australian Gem & Treasure Hunter Yearbook, 63-65.

CARR, P.F. (2003). Chiastolite – Andalusite or pseudomorph after andalusite. Australian Journal of Mineralogy, 9(2), 91-96.

6. WEATHERING EFFECTS

Thunder Egg Cores

Thunder eggs are formed in volcanic rocks high in silica such as rhyolite and are the result of spherulitic crystallization in the lava as it cooled and solidified. As the lava cooled feldspar fibres formed and aligned in radial fashion around vesicles to form spherical bodies (spherulites) of varying size. Sudden expansion of trapped gases (water and CO₂) at the centre of the spherulite structures caused the development of stellate central voids which later filled with agate, chalcedony and/or quartz.

When the thunder eggs weather out of the enclosing rhyolite and remain in the soil for some time the spherulitic outside is chemically weathered to clay and eroded out, leaving a rough core of chalcedony enclosed by a surface composed of radiating deep conical pits.

Reference:

BEASELY, A.N. (1976). The Origin Of Thunder Eggs. Australian Gems & Crafts Magazine, Feb/Mar, 19-20.'

Brian M.England
August 2016

FORTHCOMING EVENTS

The 2nd CENTRAL COAST CRYSTAL FESTIVAL

Being held over Saturday and Sunday the 3rd & 4th of September in the Gosford Showground from 9.00am to 5.00pm on Saturday and 9.00am to 5.00pm on Sunday. Entry \$5.

Featuring : - 'Crystal Exhibition and Sale. Jewellery, silver rings, findings, beads, rocks, precious gem beads, minerals, fossils, crystals, gems, Australian geology and lots more'

For information telephone Rob on 0405 904 881 or e-mail : - thelittlerockshop123@gmail.com

GEMKHANA 2016

Being held over the October long weekend at Clarendon

The Annual Gem & Mineral Show and Competition of Lapidaries from all over NSW will be presented by the Gem & Lapidary Council of NSW Inc. at the Hawkesbury Showgrounds on the Windsor Road at Clarendon, directly opposite the RAAF base, approximately mid-way between Richmond and Windsor, turn-off on to Racecourse Road.

To be held over the Labour Day weekend, Saturday to Monday, the 1st, 2nd and 3rd of October 2016 from 10.00 am to 5.00 pm on Saturday & Sunday, and from 9.00 am to 12 noon on Monday.

Quoting from the G&LC Website:

'Sales and Displays, Demonstrations, Jewellery, Gem Faceting, Gemstones, Gem Identification. Minerals, Gemstone Carving, Crystals, Fossils, Beads & Equipment. Local and interstate Gem, Jewellery and Mineral Dealers. Demonstrations by experienced club members, activities for children Raffle, Wheelchair access, Refreshments, Plenty of parking'.

As a special treat the Museum of Comparative Zoology will provide for display a model of the fierce Albertasaurus, along with other pre-historic models.

'We hope to see a good number of tailgaters again this year but please note some changes to insurance requirements. We cannot offer insurance at a daily rate, tailgaters now need to arrange to have their own Public Liability Insurance. The new arrangements are described on the Council website:-

gemlapidarycouncil.org.au/gemkhana/

Further information on insurance may be obtained from the Council's brokers, - Webster Hyde Heath at (08) 8362 5553 or *www.whhib.com.au*

THE 39TH JOINT MINERALOGICAL SOCIETIES OF AUSTRALASIA SEMINAR.

From the 30th September to 4th of October 2016 with the formal proceedings being held over Saturday, Sunday and Monday the 1st to 3rd of October 2016.

Hosted by The Mineralogical Society of Queensland.

Subject: **"Mineralogy - Science and Passion"**

Venue: In the theatrette of the Queensland Museum on the corner of Grey and Melbourne Streets, South Brisbane, (Southbank).

Quote from the Queensland Mineralogical Society Inc Website:

'The Mineralogical Society of Queensland is pleased to announce details of their 2016 seminar and invite you to attend in Brisbane, Queensland, on the Queen's Birthday weekend, Sept-Oct 2016.

The theme is **Mineralogy - Science and Passion** - giving guest speakers leeway to speak on almost any subject that they are passionate about. We are presently finalising our program of guest speakers and this will be publicised on the website *www.mineral.org.au* and through state and affiliated societies and clubs. We are sure that the variety of topics and our presenters will have

something for everyone. As well as the seminar we are conducting field trips and a microscopy session in the days before and after the formal proceedings for those who can attend.

Seminar Registration: Adult \$85 per person, student \$40 per person.
Seminar Dinner is \$50 per person.

In addition to the formal proceedings on Friday the 30th September there will be an informal Micromount session and on the Monday morning after the Seminar there will be a mineral bazaar. The venue for both the Micromount session and mineral bazaar will be the Mt Gravatt Lapidary Society Club rooms approx. 12klm south-east of the Brisbane CBD. There will also be optional field trips, half a day on Monday the 3rd and the full day of Tuesday 4th October.'

The BROKEN HILL GEM & MINERAL SHOW: 'ROCK-ON 2016'

The Broken Hill Mineral Club is presenting the 2016 'Rock-On' Gem & Mineral Show over Friday to Sunday, the 30th September to 2nd of October in the Adkins Pavilion and Memorial Oval in the Broken Hill Showgrounds.

Information from the Club at P.O.Box 747, Broken Hill, NSW 2880,
from Jason McArthur on (08) 8088 7303 or mobile 0427 743 940
or from the Website: <http://brokenhillmineralclub.wikispaces.com>

EMMAVILLE GEMFEST AND SWAP MEET

Being held over the OCTOBER long weekend, Saturday 1st to Monday 3rd of October in the Emmaville caravan park on Park Road, Emmaville.

Stall-holders and tailgaters in the caravan park, two full days for fossicking trips visiting sites for topaz, sapphires quartz, tourmaline, tin and copper. Lunches provided subject to booking and paying each morning.

For information and booking accommodation in the caravan park phone Donna on 02 6734 7240 or 0429 347 249.

Accommodation also available at the Tattersalls Hotel, Emmaville. Phone Rob or Dot on 02 6734 7309 or the Riley's Club Hotel, phone Barry and Dot on 02 6734 7304.

'The Emmaville Gemfest is sponsored by the Emmaville Community Centre. All proceeds go towards the upkeep of the Old Court House.'

GEM SHOW AND LAPIDARY EXHIBITION 2016

Presented by the Northern Districts Lapidary Club.

To be held over Friday 28th to Sunday 30th October 2016 in the Beecroft Community Centre, on the corner of Copeland and Beecroft Roads, Beecroft.

'Lapidary Competition & Display of Gemstones, Sale of Minerals, Slabs, Jewellery, Books, Plants, Enjoy Club Tours, Light Refreshments. Kid's fossicking area. Entry \$4, children free.'

<http://ndlapidary.org.au/gem-show-at-beecroft/>

CENTRAL COAST GEM & MINERAL FESTIVAL

Presented by the Central Coast Lapidary Club in the Mingara Recreation Club, Wyong Road, Tumbi Umbi over Saturday from 9am to 5pm and Sunday 9am to 3pm on the 8th to 9th of October.

Free entry. For further details please phone 02 4362 2246.

Or Festival organizer Rob Scott, - phone number 0405 904 881

GEM & MINERAL SHOW

Gem and Lapidary Exhibition Beecroft presented by the Northern Districts Lapidary Club
In the Beecroft Community Centre, on the corner of Beecroft and Copeland Roads,
Beecroft, over Friday to Sunday the 28th to 30th of October

'Gem show and exhibition, lapidary competition and display, gemstones, minerals, slabs, jewellery, book stall, plant stall, some machinery, club tours, refreshments. Kid's fossicking area.'

Further information from the website : - *<http://ndlapidary.org.au/gem-show-at-beecroft/>*

CANBERRA SPRING GEMCRAFT & MINERAL SHOW

Presented by the Canberra Lapidary Club in the Mallee Pavilion in the Epic Showground, Northbourne Avenue, Canberra, + over Saturday and Sunday the 29th & 30th of October. Entry \$5 adults, \$10

'Minerals, fossils, jewellery, rough & cut gemstones, opals, beads, lapidary equipment & supplies.

Other : Sieve for sapphires Displays of members' collections, free sessions on fossicking & gold detecting, cabbing, faceting & jewellery making demonstrations.'

Information from : - *www.canberralapidary.org.au* Email : *canberralapidary@gmail.com*
Phone: 02 6260 5322

ANNUAL EXHIBITION

By The Parramatta And Holroyd Lapidary Club

Over Friday to Sunday, the 11th to 13th of November from 9.00 am to 5.00 pm each day
in the Clubrooms at 73 Fullagar Road, Wentworthville.

'Demonstration of Club Activities; Rocks & Minerals for Sale; Members Work for Sale; Activities for the Kids.
In case it is possible this year we are Featuring Fossils. We will have a sausage sizzle with onions
and plenty of rocks and minerals and fossils for sale as well as jewellery.'

WINDSOR GEM & MINERAL FAIR

Over Saturday and Sunday November 26th and 27th, of November at the Windsor Function Centre,
Dight St, Windsor, on the corner of George & Dight Streets, Windsor.
Entry fees \$7 for adults and children under 18 accompanied by parents are free.

Gem, mineral, jewellery & lapidary dealers. Minerals, fossils, jewellery, rough & cut gemstones, opals,
beads & supplies. Lucky door prize as well as the club raffle held by the Hawkesbury Valley Lapidary
Club. Displays of member's collections, cabbing, faceting and jewellery-making demonstrations.

For more information email Peter Beckwith at *peterrare@optusnet.com.au*
