THE MINERALOGICAL SOCIETY

OF NEW SOUTH WALES INC

Website: ***www.minsocnsw.org.au***

Field Trip to Mount Hope, Manuka, Nymagee, Mayday, Chesney, Gladstone, Cobar Museum and the Great Cobar Mine slag dumps.

23rd June to 29th June 2019

Descriptive contributions by Brian England, Denis O'Brien and Edward Zbik, plus additional specimens and photos by Haley Bambridge, Ken Mitchell and Brian Holden

A day was spent travelling to Condobolin then the next six days were spent travelling to mine sites along the Kidman Way between Cobar and Mount Hope. The group had been split into two as the numbers attending, some eighteen members, was too many for some sites. All members visited the Manuka Pit, being the highlight of the trip but other sites also produced a number of exceptional specimens.

All sites visited in this trip required permission from a number of companies holding mining or exploration leases across the Cobar region. Permission was also obtained from all landowners that the sites are located on. All members participating in this field trip had been Certified under the Society's Safety Work Practices and had complied with requests made by the various companies. Members had on-site inductions at Manuka and at Chesney, including a breath test (zero-tolerance) before entering the sites. The Chesney Mine site and Cobar Slag Dumps are high security fenced areas and required supervision while on these sites as they are still commercially active.

The following is a description of some of the minerals found, all are subject to confirmation. Identification was made by sight, consensus of members contributing to the id's and micro crystallographic examinations. Descriptions of specimens and locations are as follows:

Mayday Opencut

Figure 1. Mayday Opencut – Denis O'Brien descending to base of Mayday. (Black dot on far left). Photo by Ed Zbik

Figure 2. Mayday Opencut, Mimetite or Stolzite, & Mica. (To be confirmed). Specimen and photo by Denis O'Brien

Figure 3. Mayday Opencut , (same as Fig 2).

Small orange to yellow prismatic mimetite crystals. Mimetite is also associated with yellow to khaki green, microcrystalline coatings of beudantite

The crystals are golden yellow with a pearly lustre, the crystals are mixed in with a reddish-brown matrix.

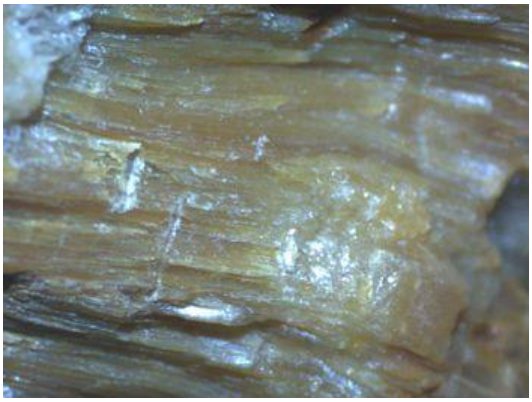

Figure 4. Talc, Mayday Opencut.
Specimen and photo by Denis O'Brien

Figure 5. Cerussite.
Specimen and photo by Denis O'Brien.

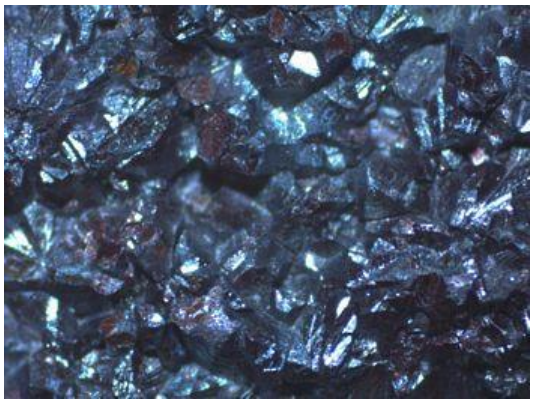

Figure 6. Cuprite. Gladstone Mine .
Specimen and photo by Denis O'Brien.

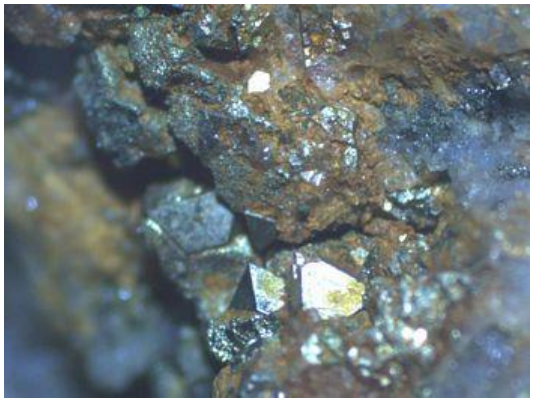

Figure 7. Magnetite. Specimen and photo Denis O'Brien.

An elusive mineral from Mayday is rare sky-blue acicular needles identified as agardite. Still looking.

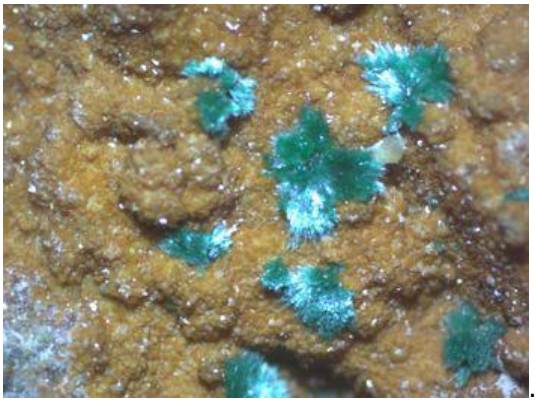

Figure 8. Malachite on Beudantite.
Specimen and Photo by Denis O'Brien

Figure 9. Malachite or Brochantite (to be confirmed) Specimen and photo by Haley Bambridge.

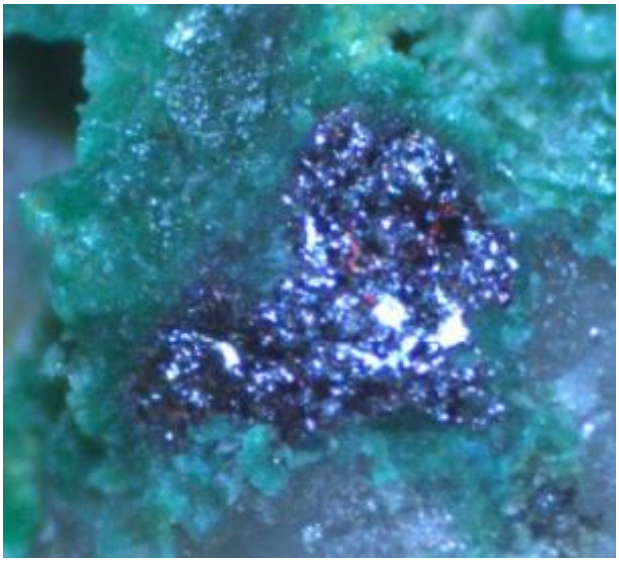

Figure 10.Micro cuprite Mayday FOV 5mm Specimen and photo by Denis O'Brien.

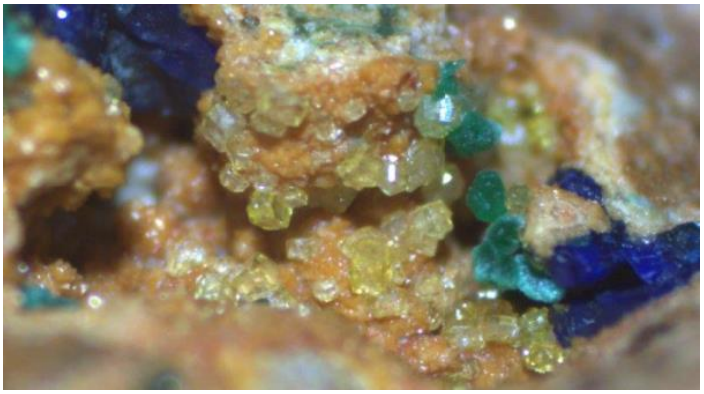

Figure 11. Small orange to yellow prismatic Mimetite crystals with Azurite and Malachite. Mayday mine. Specimen and photo by Denis O'Brien

Figure 12. Brownish Bubble in Manuka Quartz. Cavity is 5mm long, the bubble moves freely as crystal is rocked. Specimen and photo by Denis O'Brien.

Other bubbles and inclusions found.
The first bubble has a speck of black matter attached to it. The cavity is only a few mm long.
The second bubble is an oily brown colour, visible to the naked eye in a 5mm cavity.
The third bubble is quite small, and the cavity is only a few mm long.
Overall a very successful collecting expedition, more to be found with closer examinations.

Figure 13. Bubble with inclusion in Manuka quartz Specimen and photo by Denis O'Brien.

Figure 14. Cars parked in the middle bench of the Manuka pit. Photo by Ed Zbik.

Great Central copper mine

Figure 15. Great Central mine.
Headframe photo by Brian England.

Headframe, gravity jig and Welsh stone chimney (no mortar). This site was of interest mainly for its historical ruins which are extremely photogenic! However, a few samples of azurite were found (see below).

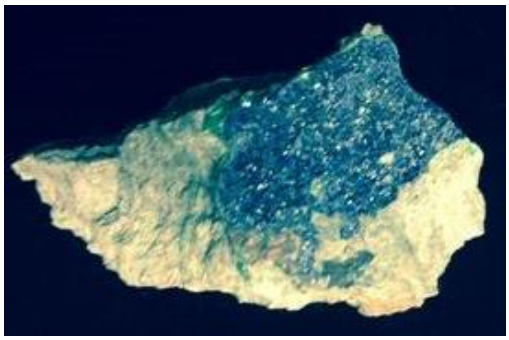

Figure 16 Azurite 7cm across. Great Central Mine.
Specimen and photo by Brian England.

Figure 17. Miniature Azurite suns.
Specimen Ken Mitchell, photo by Brian Holden.

Mount Hope Quartz deposit

Figure 18. Mount Hope - Eubalong Road

A line of pits dug by collectors crosses the Tipping Way a few kilometres east of Mount Hope. Most people found specimens of colourless crystal groups (see below)

Figure 19. Quartz. Mt Hope Eubalong Road.
Specimen and photo by Brian England.

Quartz groups from near Mount Hope. Specimens are around 6cm.

Figure 20. Quartz slab approx. 50cm x 35cm x 30cm (35kg). Clear and milky quartz. Mt Hope Eubalong Road. Specimen and photo by Haley Bambridge

Manuka silver mine

Figure 21 Group 2 at Manuka Plant. Photo Brian Holden

Manuka was the main objective for this trip and for some was the second visit. As well as the abundant crystals of smoky and colourless Quartz scattered over the area of this huge site a few other species were found, mainly in vughs in the brecciated dolomite.

Figure 22. Dolomite breccia 12cm. Manuka Pit. Specimen and photo by Brian England.

Typical specimen of dolomite breccia, size is 12cm. These included dolomite as groups of saddle-shaped rhombohedral crystals to 5mm sometimes sprinkled with stunning "Herkimer diamond" Quartz crystals of unbelievable clarity. Also calcite in a variety of habits making superb micro mounts and thumbnail size specimens.

Figure 23. Dolomite xls, both 4cm. Manuka Pit . Specimen and photo by Brian England.

Figure 24. Calcite in cavity, Manuka pit. Specimen and photo Brian England.

Calcite in cavity in dolomite breccia. Unusual castellated edges on rhombohedra. 6cm across. Superb micro mount. Barite was dense compact masses of radiating white bladed crystals in one area only and as well-formed bladed crystals to one cm scattered on dolomite druses in cavities. Specimens showing masses of lustrous black bitumen filling dolomite-lined cavities were also collected.

Figure 25. Black bitumen on dolomite xls 8cm across. Specimen and photo by Brian England

Bitumen also occurs as small globules (to 2mm) embedded in late stage gypsum cavity fillings. In some cases, the gypsum was well-formed prismatic crystals to mm showing typical morphology for the species.

The following overall para genesis in the dolomitic part of the Booth Limestone was determined from hand and micro specimens collected on the trip and reflects the complex geological history of the deposit.

Brecciated dolostone - galena/sphalerite - dolomite - barite - calcite - Quartz - calcite - quartz - bitumen – gypsum
Note that a few black minerals remain to be identified.

Manuka Quartz

Figure 26. Quartz crystal sized against $2-coin, Boundary Pit, Manuka. Photo and specimen by Brian Holden.

The variety of Quartz habits is astounding and includes sceptres, reverse sceptres, repeated reverse sceptres as well as idiomorphic and distorted doubly terminated crystals, many with extraordinary transparency. Fluid inclusions with moving gas bubbles appeared to be quite common.

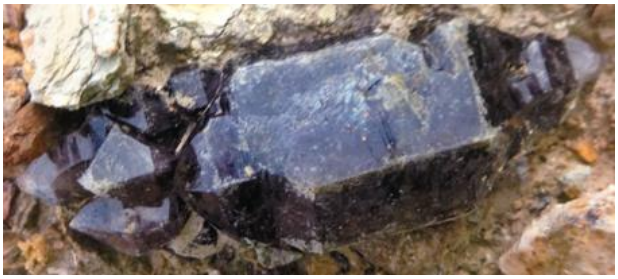

Figure 27. The "octopus" Absolutely perfect quartz xls in every detail. 9cm long. Specimen and photo by Brian England.

Figure 28 Quartz Multi-axial pointer, Manuka Pit. Specimen and photo by Haley Bambridge.

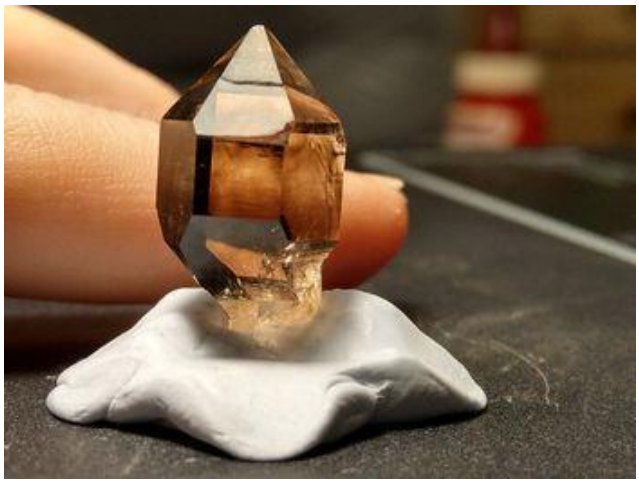

Figure 29 Quartz, 2cm ultra clear, Manuka Pit, Specimen and photo by Haley Bambridge.

Figure 30. Quartz xls, 6cm diameter, Manuka pit.
Specimen and photo by Haley Bambridge.

Figure 31. Quartz multi pointer 10 cm long.
Specimen and photo Haley Bambridge.

Figure 32 Quartz twin,
Specimen and photo by Haley Bambridge.

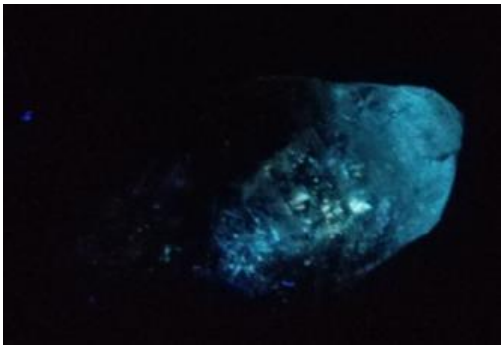

Figure 33. Fluorescence in Quartz,
Specimen and photo by Haley Bambridge.

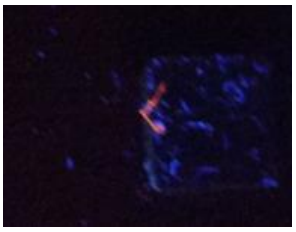

Figure 34. Fluorescence in Quartz,
Specimen and photo by Haley Bambridge.

Figure 35. Repeated reverse sceptre 5cm long. Grew as a sceptre - remains of white stem can be seen at top of specimen. Specimen and photo Brian England.

Several specimens collected on this trip show a single point at one end (top) and multiple fully terminated crystals at the other end (bottom). See photo of "octopus" above (fig 22).
One possible explanation for this strange habit relies on the crystals in question being Brazil law twins (which most Quartz crystals are), in which irregular penetration twins divide the crystals into triangular segments in cross section. The crystals showing this habit invariably formed by nucleation on white or colourless Quartz pedestals (hence they formed as sceptres, with the stem having been broken off, with the attachment point just visible between the base of the multiple terminations). The top of the crystal was able to continue to grow in impeded to form a single point, but the base of the crystal can only grow downwards past the pedestal by each of the twin component sectors forming a separate fully formed crystal. Ideally this would lead to 6 terminating crystals, but offsetting of the twin sectors can lead to a lesser number.

Comments on Manuka geology

The association of bitumen with gypsum in part led to this deposit being classed as Mississippi Valley Type (MVT). The low temperature mineralising brines in MVTs which scavenged the metals are like oil field brines in chemistry, bring typically high in sulphate, CH4, organic compounds and hydrocarbon droplets. These deposits are typically hosted in Dolomites associated with coral reefs - hence the Crinoidal reef limestone exposed in the main pit at Manuka and nearby. Tectonic processes have channelled the brines through the carbonate host along faults, breccia zones, folds and collapse structures. Most MVT deposits are associated with fossil carbonate platforms in foreland basins. Fluid pathways are typically gravity driven from a tectonically elevated region down through a topographically lower host carbonate horizon. The Manuka deposit has been subjected to repeated tectonic episodes which is reflected in the complex para genesis and multiple episodes of Quartz crystallisation.

The principal ore horizon lies within massive saprolite clay stone formed by intense acid leaching of the dolostone by acids released by the weathering of pyrite.

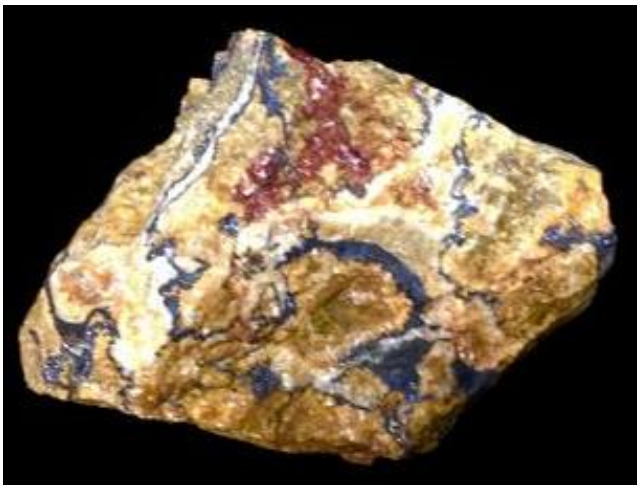

Figure 36. Specimen from the carbonate ore horizon showing the full mineral para genesis prior to leaching. Grey is galena. Specimen is 11cm across. Specimen and photo by Brian England.

Fort Bourke Lookout

Figure 37. View into the New Occidental pit from the Fort Bourke Lookout.

Chesney mine

Figure 38. Chesney mine. Photo by Brian Holden.

Gladstone mine

Peak Gold, who holds the lease, had rehabilitated this and other sites to maintain as much as possible of the mining site within the environmental bounds now set in rehabilitating mine sites. Their effort to retain a historical footprint and manage the site for future interpretation is commendable.

Figure 39. Gladstone rehabilitated mine site.

Brain England had last visited this site in the early 1960's before rehabilitation and remembers azurite and malachite being common on the dumps. It was disappointing to find the area radically altered by rehabilitation, although at least the location of historic shafts had been marked. At first there seemed no hope of finding anything, but diligent searching revealed massive cuprite and a little fibrous malachite. One large "azurite-coated" cobble turned out to be blue paint!

Figure 40. Decoy - commercial paint. Specimen abandoned. Photo by Edward Zbik

However, on leaving one member of our group handed me a small section of vuggy White Quartz with a few patches of green showing. The green crystals appear to be atacamite to 3mm in length, although the observed crystal shape is not conclusive, and this identification needs to be verified. Later crystallographic examination showed it most closely resembles azurite, so it is malachite after azurite.

Figure 41. Malachite after azurite, Gladstone Mine, Specimen Glenn Brown, photo by Brian England.

Vein Quartz with cavities lined with globular calcite and possibly atacamite. Size is 6cm long. Specimens showing masses of radiating fibrous crystals filling cracks (see photograph below) were initially thought to be cuprite but the morphology more closely resembles goethite with an unusually high lustre. Again, verification is needed.

Figure 42. Specimen initially thought to be cuprite but probably goethite. 9cm. Nymagee Mine. Specimen and photo by Brian England.

Nymagee mine

Members spent some time on the dumps of a small back filled shaft up the hill from the open cut breaking up boulders of copper stained Quartz to reveal lines of small vughs to 1cm adjacent to one wall of the vein. These cavities provided nice azurite and malachite micros, the latter as unusually stout transparent needles, in one case forming a radiating group nestled between bladed azurite - a superb very tiny micro almost thrown out with the reject fines! When fresh and unaltered the azurite here shows astonishing lustre and transparency but obtaining even micro specimens was difficult. The top dumps provided a few small micro specimens of fibrous malachite with small areas of massive copper sulphides.

Figure 43. Members at Nymagee Queen Cross mine Photo by Brian Holden

The smelter site provided some historic interest and good photos of old machinery too heavy to cart away for scrap, plus a great garden rock consisting of beautifully patterned slag carried back to the car by hand!

Shuttleton

Visited by Geoff Parsons and Brian Holden

Figure 44. Shuttleton, Crowl Creek Mine. Photo by Brian Holden.

Figure 45. Nymagee Slag specimen 40cm across. Specimen and photo by Brian England.

Cobar Slag Dump

Figure 46. Gypsum balls growing on slag stalagmites. Specimen and photo by Edward Zbik.

Manuka Pit

Figure 47. Manuka Pit.