

THE LINE FROM THE LODGE



Volume 10, Issue 1

March 2009

The Newsletter of The Broken Hill Mineral Club Inc.

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SUBSCRIPTIONS

2009 Annual Membership to the Broken Hill Mineral Club Inc. is as follows

Full Membership - \$25
Associate Membership - \$15
Family Membership - \$40
Child Under 16 - \$5
Newsletter Subscription - \$5

**For Community Inc.
Membership add an
extra \$3.50 per person**

CLUBROOM READY - WE'RE IN AT LAST

Over the Christmas break we had had a number of working bees and the clubroom is finally ready for use. We still have to build in the work benches for our machinery and do some finishing touches with the arrangement of other fixtures such as display cabinets and such, but otherwise we are ready to go.

While we can still use the main building for our functions if there are large numbers present, we will hold our meetings from now on in the clubroom.

We thank all the members who attended the working bees and a special thank you goes to Terry Weber and Randal Lawrence who gave up extra time to get the room operational and finished.

This coming year, in September, we once again will hold our Rock-On, however this year we have moved back into town and are holding it out at the racecourse. While we had had three successful events at Silverton, this move was decided so that we might encourage more local support for the show. Also with the new function centre being built at the racecourse we have the op-

portunity to set up a display hall and invite some of the better known mineral dealers, many of whom do not usually attend outdoor events.

In saying that we must not forget that one of the main attractions of our show has been the relaxed atmosphere and a lack of restrictions for trading space.

With field trips this year, a calendar has been proposed and forms the last page of this publication. Many of these locations are still to be finalised and as such the list is tentative. Confirmation of the field trip location is made at each monthly meeting while those who cannot attend meetings are always able to contact me via the club email or a quick phone call. While out on field trips all members are expected to follow the safety instructions and wear appropriate clothing, footwear and high visibility vests. Members are also expected to carry with them their club membership and GEMCASA cards issued after processing membership renewals.

Until next time...may you find vughs a plenty...
Trevor

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MINERAL IDENTIFICATION

A GUIDE TO IDENTIFYING MINERALS IN THE FIELD

After many excursions out to fossick for minerals we have all developed skills and techniques in knowing what to look for, but our skills in identifying what we find are yet to be honed. There are simple tests we can do in the field to narrow down the options and help identify what we find.

All minerals have different physical properties. These properties include - visible colour, streak colour, hardness, lustre, cleavage, specific gravity and crystal form. We can test any or all of these properties and use our results to narrow down the possibilities. It is important to note that with some properties, a clean broken surface on the mineral is needed to perform the test.

Colour - is the most identifiable property, however it can also be misleading. Some minerals are noted for their colour and this is often due to the main metal ions present in the crystal.

Greens and blues are usually a sign for copper, pink often denotes cobalt while red could mean manganese. Other metals that give good colour to minerals include chromium, nickel and iron.

Streak Colour - is the colour of the powder and is identified via a simple test of scratching the mineral over a non-glazed white tile, leaving a line. This powder is usually closer to the real colour of the mineral. For example quartz in the variety amethyst has a purple colour however it produces a white streak.

Streak is an easy method to tell apart the iron oxides. Magnetite has a black streak, hematite has reddish-brown and limonite is brownish-yellow.

Hardness - is tested using a scratching method. Where one object of known hardness is scratched over an unknown. If a scratch is left behind then the test object is softer than the scratching object. If no scratch is left then the test object is harder. This property was first analysed by a German mineralogist Freidrich Mohs and a list of ten comparative minerals was compiled as a reference. These are...

- | | |
|-------------|---------------|
| 1. Talc | 6. Orthoclase |
| 2. Gypsum | 7. Quartz |
| 3. Calcite | 8. Topaz |
| 4. Fluorite | 9. Corundum |
| 5. Apatite | 10. Diamond |

While this list is well and good, it is next to useless in the field. Apart from quartz, which is found almost everywhere the other minerals on the list are not common. There are some other common items that most people will have access and can be used to give an approximate hardness. These are...

Fingernail = 2.5	Pocket Knife Blade = 5.5
Coin = 2.5 - 3	Hardened Steel File = 6.5
Clean Nail = 5.5	Piece of Quartz = 7

Most of these items along with a small streak plate can be found at home and put together as a simple testing kit to take on field trips.

While the relative hardness of the minerals on Mohs' scale is incremental, in reality the difference in hardness along a linear scale is quite different. Diamond (hardness 10) is actually 4 times harder than corundum (hardness 9) and 6 times harder than topaz (hardness 8).

It is interesting to note that most minerals with a hardness above seven are classed as gemstones and while they are hard and resistant to scratching many are quite brittle and fracture when hit.

Cleavage - while on the subject of fracturing this is called cleavage. The style and number of planes along which a mineral breaks defines the cleavage. Some minerals such a quartz do not cleave and fracture across curved surfaces. This is called conchoidal fracture and results in sharp shards and edges. Ancient peoples used quartz varieties and this property to make cutting tools and spear heads.

Some minerals such as the mica group have only one cleavage plane along which they fracture. Mica easily peels off along this plane to form thin transparent sheets.

Minerals with multiple evident cleavage planes may change the angle at which these planes intersect. Calcite will break along three planes into rhombohedrons with planar angles of sixty degrees while galena will break along its three planes into small cubes - with the planar angles at ninety degrees.

MINERAL IDENTIFICATION - CONTINUED



Lustre - refers to the reflectivity of the mineral. Those that shine like diamonds have adamantine lustre while those that have no shine may be earthy or dull. Other terms used to describe lustre include pearly, glassy, silky, resinous and opalescent. Metallic minerals can be bright, dull or sub-metallic.

Specific Gravity - relates to density and this is often hard to test in the field. The obvious test is to pick up two equal sized samples and subjectively compare their weight.

Minerals with high specific gravity often contain heavier elements such as lead, tin and gold. It is the specific gravity of gold that contributes to it being deposited in riffles and holes in creek beds, while the lighter material is washed away. It is also the principle behind process of panning the wash to extract gold from such creek beds.

Crystal Form - is exactly what the name suggests, the shape of the crystals. There are seven basic crystal systems into which all minerals form. Only when the mineral has formed crystals or has crystal faces showing, can this property be used, however the crystal form is often the deciding factor to a true identification. Knowing into which crystal system a mineral is supposed to form, may be the key to ruling out other possible candidates.

The near perfect crystals most regularly occur in micro world and micro-mounting is now common among collectors as larger crystalline samples are becoming harder and harder to obtain. We could therefore add to our test kit a good quality hand lens with a power around x10 or x20 magnification as any small vugh on our sample may yield the clues to identifying the mineral.

Left: Examples of minerals from the difference crystal systems.

Top: Pyrite - Cubic system,

Middle Left: Spinel - also Cubic system.

Middle Right: Corundum - Trigonal system.

Lower Middle: Gypsum - Monoclinic system.

Bottom Left: Scapolite - Tetragonal system.

Bottom Right: Rhodonite - Triclinic system.

MINERAL IDENTIFICATION - CONTINUED

So, lets set up a scenario. While fossicking around one of the many silver / lead mines in the Broken Hill district, you pick up a piece of rock that has that slight difference about it and notice that it has some above average weight. One strike with the geo-pick and the rock breaks to reveal a shiny silvery mineral with obvious stepped appearance. On closer inspection the steps are fracture planes and all at ninety degrees.

Our field assessment is...

Due to the higher weight (specific gravity), the shiny silver metallic lustre, the cubic cleavage, and that this location was historically a silver / lead mine, the mineral is identified as galena.



Right: Three different minerals showing good cleavage. Galena with perfect cubic cleavage, Calcite with rhombohedral cleavage and mica with a single cleavage plane causing it to break into sheets.

GEORGE DIAMANTES - 5th September 1938 - 28th December 2008

It is with sadness that we inform members of the passing of our dear friend and fellow member Mr George Diamantes following a prolonged illness.

George had been an active member of our club for the past seven years, holding the position as treasurer from 2002 - 2007. During this time he showed great generosity towards our club in allowing us access to his mine - The Black Prince - on Purnamoota Station and hosting several club functions at his home. He would regularly be seen at the BBQ, tongs in hand, turning the sausages while cheerily knocking down a few ales...and he always had a good story to tell.

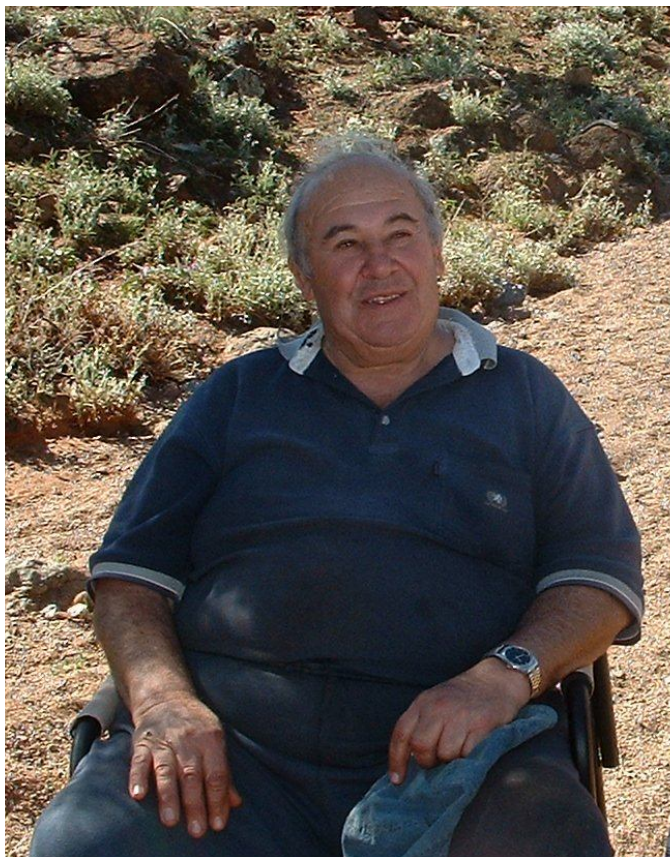
Many a time George would delve into the fountain of knowledge he had accumulated over the years about mining practices and histories of the many visited mines. He would quote tonnages, the main ore minerals and names of people who had worked the mines, much of which he learned during his years as a mines inspector.

If there was one mineral George loved most, it was gold. He could always find an excuse to hop into his 4x4 and head up to the Tibooburra gold fields for some detecting. There he would pass the hours swinging the detector back and forth waiting for that all important tone.

George was well known throughout the district as

a gentleman and a reliable friend. He had a big heart and his enthusiasm for life was never ending. Our sympathy goes to Wendy and the rest of his family.

He will be sadly missed.



SORTING SILICATES - (BY PETER BLACK)

Most collectors face at one time or another difficulty in classifying silicates; a large majority however can be determined by reference to their chemical formula. The silica complex found within the chemical formula is the key to sorting the silicate mineral into its class or division.

A good mineral reference such as *Fleischer's Glossary of Mineral Species* will allow you to obtain the formula and charge of the silica complex.

The table below shows the relationship between the class of silicate and the chemical formula of the silica complex.

CLASS / DIVISION	COMMENT	FORMULA OF SILICA COMPLEX
9A - NESO	Singular silica tetrahedrons	SiO_4^{-4}
9B - SORO	Might also contain SiO_4^{-4}	$\text{Si}_2\text{O}_7^{-4}$
9C - CYCLO	3 - ring, eg: BENITOITE	$\text{Si}_3\text{O}_9^{-6}$
	4 - ring, eg: AXINITE	$\text{Si}_4\text{O}_{12}^{-8}$
	6 - ring, eg: BERYL	$\text{Si}_6\text{O}_{18}^{-12}$
9D - INO	Straight chain	$\text{Si}_2\text{O}_6^{-4}$
	Double chain	$\text{Si}_4\text{O}_{11}^{-6}$
9E - PHYLLO	Aluminium may replace Silicon	$\text{Si}_2\text{O}_5^{-2}$
9F - TECTO	Framework structures	SiO_2
	Replacement of Silicon by Aluminium	$\text{AlSi}_3\text{O}_8^{-1}$

EXERCISE: (Blacky's Brainbuster)

Try to classify the following minerals into their class / division using their chemical formulae.

QUARTZ	SiO_2
EPIDOTE	$\text{Ca}_2\text{Al}_2(\text{Fe}^{3+}, \text{Al})\text{Si}_3\text{O}_{12}(\text{OH})$
ALBITE	$\text{NaAlSi}_3\text{O}_8$
ALMANDINE	$\text{Fe}_3^{2+}\text{Al}_2(\text{SiO}_4)_3$
SPODUMENE	$\text{LiAlSi}_2\text{O}_6$
TOURMALINE	$\text{Na}(\text{Fe}^{2+})_3\text{Al}_6(\text{BO}_3)_3[\text{Si}_6\text{O}_{18}](\text{OH})_4$
CUMMINGTONITE	$\text{Mg}_7\text{Si}_8\text{O}_{22}(\text{OH})_2$
MUSCOVITE	$\text{KAl}_2\text{AlSi}_3\text{O}_{10}(\text{OH})_2$



Above: A collection of silicate minerals all in the one piece. Muscovite, albite and smoky quartz sitting on orthoclase. From the Lake Boga granite quarry - 5km south of Lake Boga in Victoria

ROCK SWAPPING RETURNS AT OUR NEXT MEETING

At our April meeting there will be a "Rock Swap". Bring along a selection of mineral samples or cutting material to swap with other members. As this is our first rock swap we will limit the selection to no more than 20 samples each member for swapping (or small bags of tumbled material - that will each count as one sample) .

A BIT OF HISTORY - ERN FREYER & HARRY HORE

Ern Freyer and Harry Hore were together two of the best known and most industrious prospectors in Broken Hill's latter history. Over the course of their lifetimes in Broken Hill they prospected numerous metalliferous deposits throughout the district and developed several mines.

Ern Freyer arrived in Broken Hill from Germany in the 1920's. Harry Hore was a local and together they recognized that the district had the potential for other minerals besides silver, lead and zinc.

Both men re-opened the tungsten mines on Mount Gipps station that now bear their names, mining wolframite and scheelite. First discovered around 1915, Freyer operated his mine sporadically from 1935 through to 1975 at the time of his death. Named the Broken Hill Wolfram Co Mine, it was the only payable tungsten mine in the area, producing

around 1800 kg of concentrates containing between 55 and 75 % tungstic oxide. Hores' mine was around 2km north of Freyers and was primarily scheelite. It produced around 740 kg of concentrate averaging 65 % tungstic oxide.

These two men were very familiar with the Yanco Glen, Poolamacca and Byjerkerno areas and were instrumental in the redevelopment of the tin fields around Euriowie and Waukeroo. Freyer was known to have washed many kilograms of cassiterite from the creeks, while Hore operated the Trident and Lady Don mines up until his death in 1963.

In the 1960's and early 1970's Freyer partnered with T. Williams and then W. Gava in the development of the Paragon Copper Mine on Poolamacca Station, investing over £30 000 into infrastructure for copper recovery via acid leaching.



The Broken Hill Mineral Club Presents...

BROKEN HILL GEM & MINERAL SHOW "ROCK-ON" 2009

When : 24th - 28th September 2009

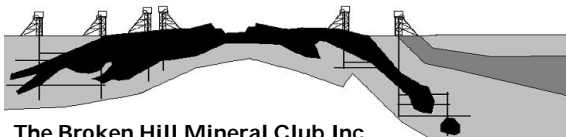
Where : Broken Hill Events Centre,
Racecourse Road, Broken Hill NSW.

An invitation to all mineral, gemstone, or lapidary enthusiasts to come to Broken Hill in the Australian outback...

- ◆ To set up a stall, to buy, sell or trade minerals, gemstones and lapidary items.
- ◆ To see the sights of the historic Silver City and the surrounding district including Silverton with its focus on the arts and crafts of the outback.
- ◆ To meet up with old mineral and gemstone collector friends or make new ones from clubs Australia and World wide.
- ◆ To go on organised mineral fossicking trips within the mineralogically diverse Broken Hill district.

Camping facilities available on site.

Caravan Parks, Motel / Hotel
accommodation available in Broken Hill.



The Broken Hill Mineral Club Inc.



Below: Old hand windlass over the south shaft at Freyer's Wolfram Mine.



This investment was without success and little product was obtained.

Ern Freyer was a member of the Geology, Lapidary and Field Naturalists' groups present in Broken Hill during the 1960's and held prominent positions in each. He was a wealth of information about prospecting areas in the district and was known to never withhold information regarding collecting localities. He was a keen gemstone polisher who wilfully taught others the skills needed and it is possible that he was the first to build a polishing machine in Broken Hill.

Harry Hore also had an interest in gemstones and is credited as one of the discoverers of the Huonville Sphene deposit.

BROKEN HILL MINERAL CLUB - 2009 CALENDAR

MONTH	FIELD TRIP	MEETING
February	No Field Trip	AGM Monday 4th - 7:30 pm
March	Thackaringa Station Sunday 22 nd – 8:00 am. (40km) Bring Hammers, Chisels, Carry Bags, etc. Meet – Adelaide Road Info Bay	Monday 2nd - 7:30 pm Mineral - Staurolite
April	Gemboree – Horsham Victoria Friday 10 th – Monday 13 th April (Easter Holiday Weekend).	Monday 6th - 7:30 pm Mineral - Bustamite ROCK SWAP
May	Ascot Vale - Copper Blow / Sphene Pit Sunday 17 th – 8:30 am. (30km) Bring Hammers, Chisels, Carry Bags, Sieves, etc. Meet – Wentworth Road in front of the Zinc Lakes.	Monday 4th - 7:30 pm Mineral - Titanite Presentation - T Dart BROKEN HILL'S GEMSTONES
June	Kings Bluff - Olary Sunday 21 st – 7:30 am. (130km) Bring Hammers, Chisels, Carry Bags, etc. Meet – Adelaide Road Info Bay	Monday 1st - 7:30 pm Mineral - Quartz Crystal Demonstration - TBA CABOCHON CUTTING
July	Woolcunda Station – Desert Rose Sunday 20 th – 7:00 am (140km) Bring Shovels, Hammers, Chisels, Carry Bags / Boxes, Buckets, etc. Meet – Wentworth Road in front of the Zinc Lakes.	Monday 7th - 7:30 pm Mineral - Calcite Presentation - TBA
August	Kalabry Station Sunday 17 th – 7:00 am. (170km) Bring Hammers, Chisels, Carry Bags, etc. Meet – Adelaide Road Info Bay	Monday 4th - 7:30 pm Mineral - Epidote Demonstration - H Murray & T Dart - TRIMMING MINERALS
September	Gem & Mineral Show: ROCK – ON 2009 Thursday 24th - Monday 28th Broken Hill Racecourse & Event Centre	Monday 1st - 7:30 pm Mineral - Rhodonite ROCK SWAP
October	Plumbago Station – Overnight Camp Weekend 19 th / 20 th / 21 st – 4:00 pm. (220km) Bring Hammers, Chisels, Carry Bags, Packing Boxes, Sleeping gear, Food, Water, etc. Meet – Adelaide Road Info Bay	Monday 6th - 7:30 pm Mineral - Magnetite Presentation - T Dart BHP & THE LINE OF LODE
November	Nadbuck Copper Mine Sunday 16 th – 8:00 am (20km) Bring Hammers, Chisels, Carry Bags, etc. Meet – Corner Brown St and Silverton Road	Monday 3rd - 7:30 pm Mineral - Chalcopyrite Demonstration - TBA THE ART OF GEMTREES
December	No Field Trip	End Of Year Christmas Party Monday 1st - 6:00 pm Mineral - Find of the Year

PLEASE NOTE: These field trips are tentative – pending final negotiations with land / lease holders.
Demonstrators and Guest Speakers are also tentative, pending final confirmation of availability.