Australia and New Zealand Micromineral News

Issue 12 – January 2016

Editor: Steve Sorrell – steve@crocoite.com

Cover photo:

Pseudocubic Peatite-(Y)
Poudrette Quarry, Mont Saint Hilaire, Canada
7 images stacked using Zerene Stacker
Taken with Canon 750D through microscope
Photo width 2.5mm across

Photo and Specimen: Steve Sorrell

In This Issue

Introduction

Happy New Year to you all! Omitted from the last issue (apologies) – "Many thanks to the NSW Micromineral Group for their research and interesting article with photographs on the Woodlawn mine in Issue 10".

The inaugural Australian Fine Mineral Show happened in early December. Yes, there were micros available!

And of course, the famous Tucson show is about to start. Unfortunately, I won't be there this year. Probably a good thing the way the Australian dollar is going!

Contributions – We Still Need Your Input!

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

Contacts

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

- ⚒ New South Wales: George Laking – bglaking@tech2u.com.au
- ⚒ New Zealand: Jocelyn Thornton – sodalite@paradise.net.nz
- ⚒ Queensland: Russell Kanowski – kanowfam@icr.com.au
- ⚒ South Australia: Peter Keller – gondwanaminerals@yahoo.com.au
- ⚒ Tasmania: Ralph Bottrill – rbottrill@mrt.tas.gov.au
- ⚒ Victoria: John Haupt – john.haupt@bigpond.com
- ⚒ Western Australia: Susan Koepke – minsocwa@hotmail.com

Forward Diary

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

- Arthur Roe Memorial Micromount Symposium, Tucson, Arizona – Friday 12th February
- See inside for New Zealand Mineral Interest Group meeting schedule.

Table of Contents

A Point to Ponder

Noel Kennon (annoelk@gmail.com)

Here is a question for all micromounters. “How many mineral species do you have in your collection?”

If you are a beginner you may have a several dozen, and rather more – perhaps into the 100’s - if you have been collecting for a few years. If you try to collect the full suite of minerals from various localities, your collection could be quite limited but if you collect everything that comes your way, the number could be quite large.

You might be interested to ponder how many it would be if you had a specimen of every species listed in Fleischer’s Glossary of Mineral Species – the globally accepted authority for known mineral species as well as the spelling of the names. The latest edition (the eleventh), prepared by Malcolm, E. Black and published in 2014 lists 4,776 species. Curiously, the book does not state that number anywhere, so I counted them – you can check my accuracy if you wish. Only a few hundred of those 4,776 species occur as cabinet sized specimens. More occur as miniatures and thumbnails – but all occur as micros.

The number of accepted species is increasing each year as possible new species are found, analysed, examined and the relevant data submitted to the International Mineralogical Association for adjudication. Upon approval of a single submission, the number of accepted species is increased by one. Clearly, there are undiscovered mineral species out there awaiting a collector with curiosity and a geological pick. Are we nearing the end of the new discoveries or have we barely scratched the surface? The latter seems more probable and so the question arises – “what is the total number of mineral species that could conceivably exist on the accessible part of the crust of this planet?”

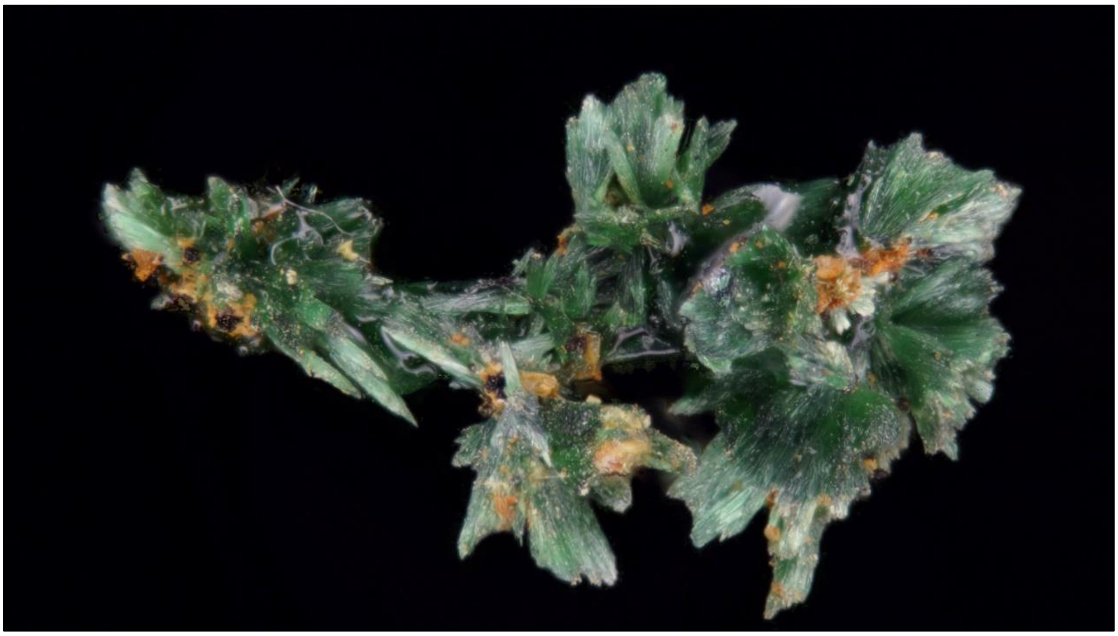
Surprisingly, it is possible to derive an answer to this question. To get that answer it is necessary to accept that the crust of the earth is nature’s massive chemical laboratory and the naturally occurring chemical compounds made in this laboratory are, of course, our minerals. That laboratory contains every naturally occurring chemical element and the existing physical conditions embrace very large ranges of composition, temperature, pressure and all of the other system variables. All possible combinations of these factors result in nature experimenting with every possible combination of chemical elements. Favourable thermodynamic and kinetic conditions, which will inevitably occur, will ultimately lead to the formation of every chemical compound that could be synthesised in the best man-made laboratory – if it could be made by man it certainly can be made by nature. And how many compounds could mankind conceivably synthesise. The best estimates given to me by chemists such as Pete Williams at The University of Western Sydney and the late Leon Kane-Maguire of the University of Wollongong is about two million‼ And so that is one assessment of the number of potential mineral species.

The majority of newly discovered minerals are microscopic although every now and then a bigger type specimen turns up. We can expect this trend to continue so look hard at your micros – you could just be the person to find one of that massive number of so far undiscovered species.

New Zealand Symposium Competition Winners

Rod Martin

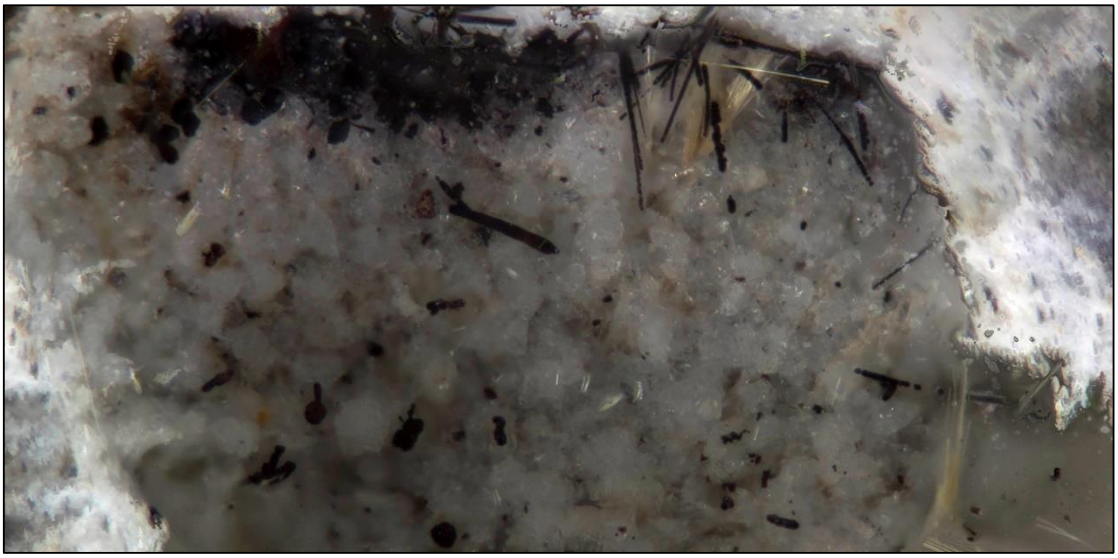
A number of competitions are held each year at the New Zealand Micromount Symposium. Here are photos of last year's winners. All photos were by Chris Fraser and the owners and trophies are as follows:



Best digital photo of a NZ mineral (Comb. Min. Soc's. of Aust Photographic Trophy): Chris Fraser with brochantite from Champion Mine, Nelson.

Best New Zealand (Tetrahedron Trophy): Sue Wearden with double terminated calcite on thomsonite from Aranga Quarry, Northland. Runner Up Trophy: Alun Baines with natrolite from Blackhead Quarry, Dunedin.

Best overseas (Stan Rowe Trophy): Sue Wearden with tuperssuatsiaite from Aris Quarry near Windhoek, Namibia. (self-collected June 2014).



Best find from 2014 field trip (Ruth Jacobson Trophy): Sue Wearden with edenite spray from Hendersons Quarry, Rotorua.

What's New in Old Collections

Steve Sorrell

The Australasian Joint Mineralogical Societies Seminar was held in Tasmania last November. I gave a presentation entitled What's New in Old Collections, and focused on Australian specimens that I have acquired over the years from various collectors.

My definition of what constituted "New" was:

- New mineral species
- Not previously recorded at locality
- Exceptional occurrence – size, rarity, aesthetics
- Combination of species
- "Lost" or unusual locality
- Not seen today, or for a long time

There are a number of constraints around collecting and finding new material such as:

- Current day mining operations – Blast it!
- Litigation-minded people – Access issues
- Mindset: There's nothing left – So why bother?
- Mindset: I've been there lots of times – Ditto
- The Ageing Population (of Rockhounds)
- Younger people not interested

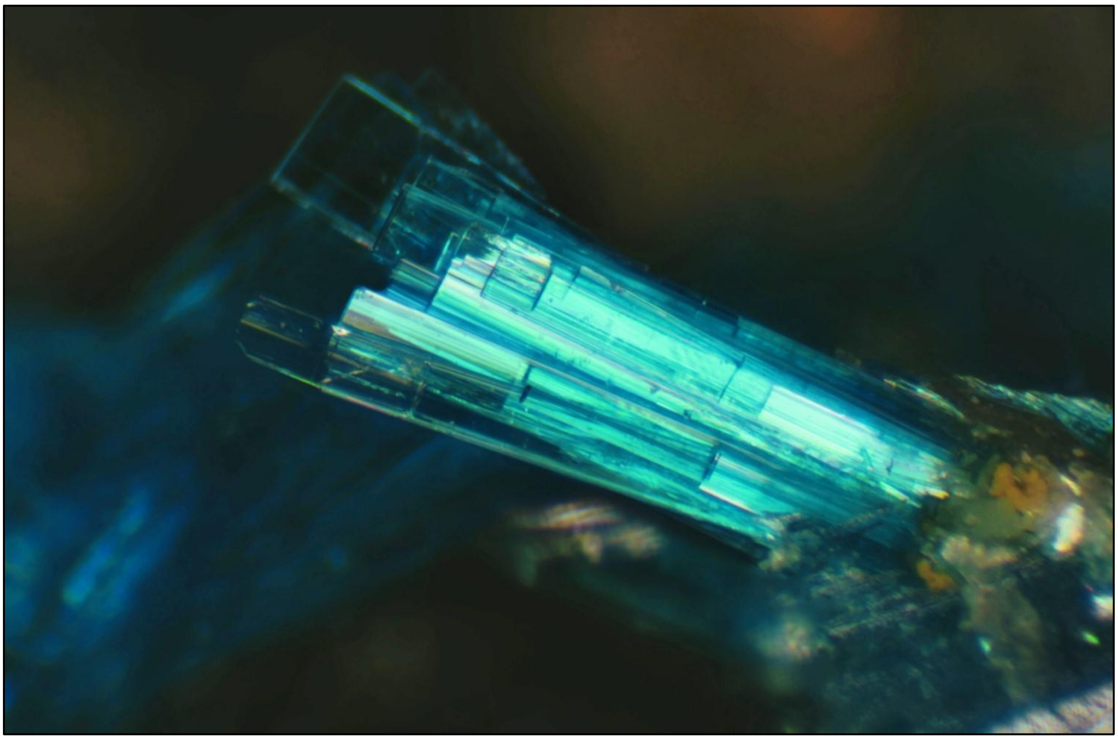
An alternative is to look to old collections. I have been fortunate to become the newest curator (ie: temporary "owner") of specimens from Joan Lamond, Bernie and Margaret Day, Keith and Margaret Brown, Brian Shelton, Bill Henderson, Paul Moxon, Milton Lavers, Roger Colling, Ruth Coulsell, Jim Ferraiolo, Al Kidwell, Neil Kinnane, Keith Lancaster, Jack and Dawn Leach, Al Ordway, Mr Micromounter Neil Yedlin, and many more. And in a number of instances, these collectors were not the first curators. So add to that list Cynthia Peat (see below), many other collectors, and various museums.

There is plenty of opportunity to discover new things. These days, access to the internet (eg: Mindat and other sites), ability to share information globally and almost instantaneously, better microscopes, lighting and cameras, and access to facilities for testing.

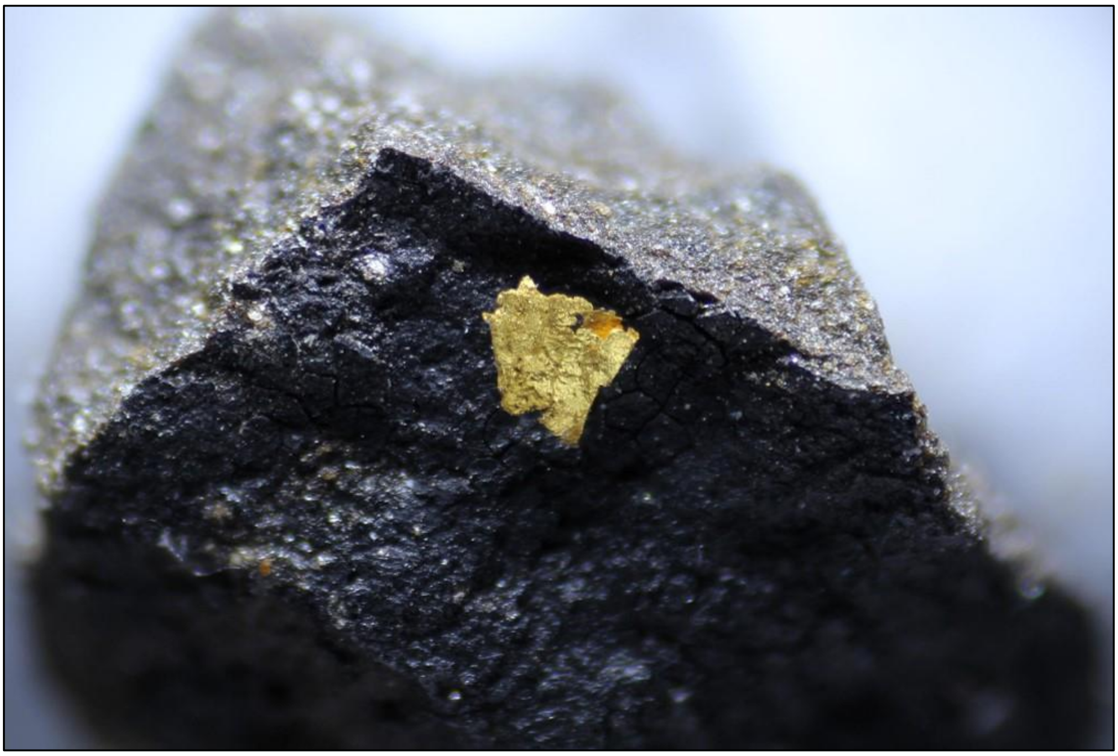
Keith Brown (left), Evan Sorrell (centre) and Margaret Brown (right)

Keith and Margaret Brown's Collection highlights include, amongst other things, Lake Boga minerals, some not previously reported until analysed by Peter Elliot for me:

- Ulrichite and sampleite
- Lakebogaite
- Bleasdaleite
- Pink crust – $NaSO_4$
- Acicular white – BiO or $BiCO_3$
- Clinoatacamite?
- Blue-black rosettes of platy crystals – delafossite?



Sampleite, Lake Boga, Victoria. Ex Keith and Margaret Brown Collection.

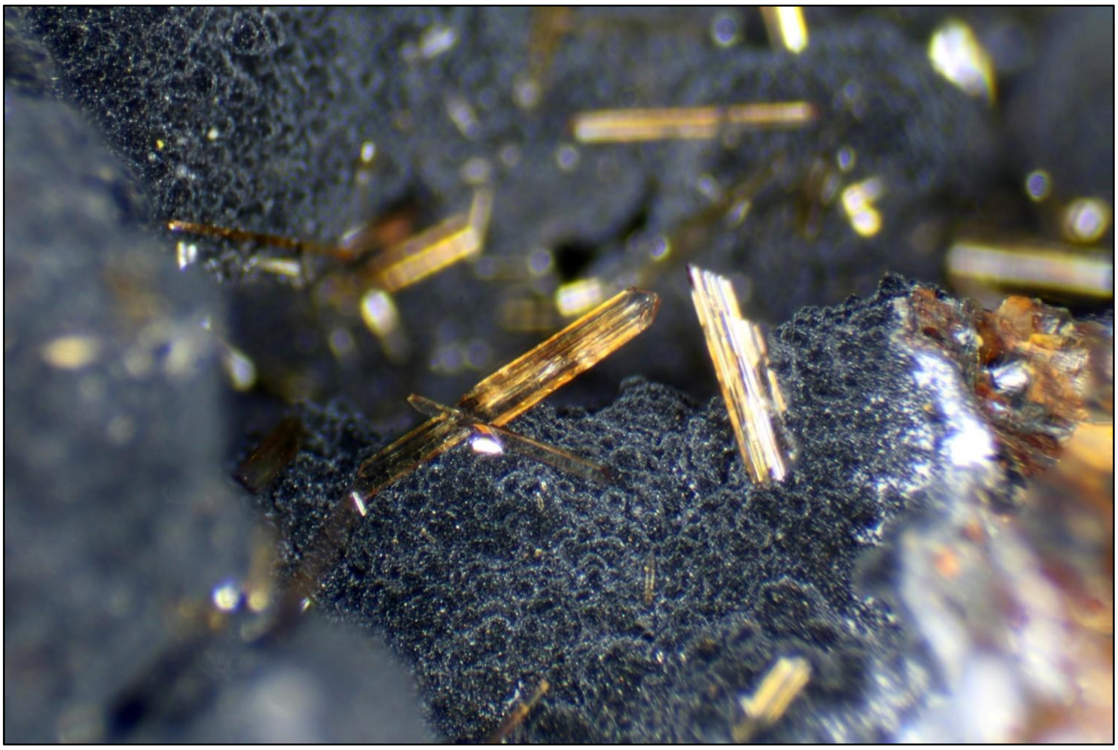


Gold, Dome Rock, South Australia. Ex Joan Lamond Collection.

Phillipsite, chabazite on ferroan calcite, Richmond, Victoria. Ex Joan Lamond Collection.

Wardite on turquoise, Iron Monarch, South Australia. Ex Joan Lamond Collection.


Barite, Broken Hill, New South Wales. Ex Bernie and Margaret Day Collection.


Raspite, Broken Hill, New South Wales. Ex Milton Lavers Collection.

Joan's Micro Collection highlights:

- An amazing array of species
- Older localities
- Aesthetic specimens
- Ugly specimens!
- Some rare, some common
- All interesting…

Bernie and Margaret's Micro Collection highlights:

- Lots of Broken Hill minerals
- Spring Creek rarities
- Queensland secondaries
- Type Locality species
- Lots, lots more…

And of course, Milton Laver's Collection became available starting November 2014, and contained a wide range of Broken Hill material, including plenty with micro potential.

William (Bill) Henderson micros available at Tucson.

Cynthia Peat

Steve Sorrell

I have a few specimens that Joan Lamond traded with Cynthia Peat (Canada) in 1993. After seeing Cynthia mentioned in an old Russell Society newsletter, I decided to try to find out more about her, and in the process, discovered that peatite was named after her.

Roy Starkey provided the following information:

> "I first visited Cynthia in Toronto when we visited my wife's brother there in the early 1980s. She was on the staff of the Royal Ontario Museum and was the X-ray crystallographer. She and Violet Andersen (a micromount photographer who you may also have heard of) were great friends and Mont St Hilaire experts/enthusiasts. Cynthia was also very keen and knowledgeable about Tsumeb and had corresponded with and had exchanged specimens with Sid Pieters (she may also have visited him, but I am not sure about that). Her husband Jim was a really nice bloke, and hugely supportive of Cynthia's mineral interests, but I have lost touch with him now (would be pretty elderly in fact if he is still alive). Jim and Cynthia visited us in the UK and I took them to North Wales collecting – we visited the small antimony mine at Bwlch near Degany, south of Conway, and also the interesting Hendre Quarry at Glynceiriog to collect micro anatase and other species.
>
> She worked closely with Bob Gait and Joe Mandarino in her professional life and was widely known in the mineral club world, and an active member of the Walker Mineralogical Club in Toronto. In 1974 Cynthia was made 'A Fellow of the Royal Ontario Museum' in recognition of services performed".

The British Micromount Society published a note about her passing in 1999. It says, in part:

> "Cynthia became involved in minerals in much the same way that many of us did, by being attracted to their beauty and wanting to know more about them. Her interest was first piqued by visiting a mineral shop in Maine in 1960. Cynthia became an avid collector and involved the entire family in collecting trips. Her knowledge of minerals advanced while assisting Prosper Williams, who some will remember as being the principal dealer of quality minerals in Canada in the 1960's. Cynthia was compensated with mineral specimens and spoke fondly of the excitement of opening consignments from Tsumeb and unwrapping one treasure after another.
>
> Still thirsting for more knowledge, Cynthia approached the Department of Mineralogy at the Royal Ontario Museum (R.O.M.) and asked for a job. Then, as now, the R.O.M. had little in the way of funds but there was a lot of work to be done cleaning and cataloguing specimens.
>
> Cynthia worked at the R.O.M. for over twenty years, learning to use the analytical equipment and becoming an x-ray technician. These were exciting times at the R.O.M. as it was very involved in the analysis of the huge array of both rare and totally new minerals that were being discovered in the Yukon Territory and at Mont Ste. Hilaire

(MSH), Quebec. When Jim retired in 1986, Cynthia was retained on a part time basis as the manager of the mineral exchange collection at the R.O.M.

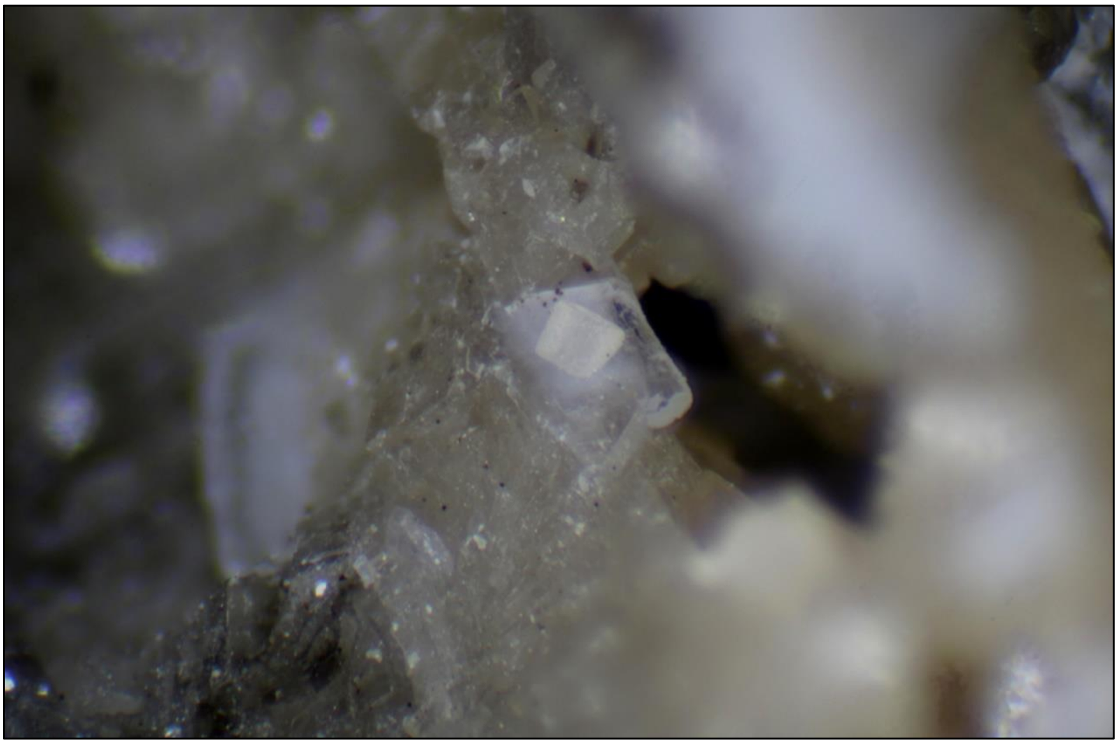
Perhaps because most minerals from MSH are tiny, Cynthia became a collector of micro-minerals. Cynthia missed few opportunities to collect at MSH since her first visit in the mid-1960's and became very knowledgeable about minerals from this location. Cynthia will be remembered by many micro-mounters for the MSH material, most of which contained some of the rarer species or morphologies, that she made available at the annual Canadian Micro Mineral Association conferences, and other workshops".

Subsequently, I found that David K. Joyce had a few peatite specimens for sale on his website (http://www.davidkjoyceminerals.com) and I purchased one from him. David said:

"Cynthia was a good friend, although many years older than me. When I was a kid she was one of my mentors. I still have an African violet that she gave me before she died. It has died three times now and each time, I've managed to re-root a couple of leaves to start new plants. I actually have two violets now, descended from that original plant. Cynthia was from England originally and kept close ties with the UK collectors. She had a sister in Namibia, I think and made several trips there over the years".

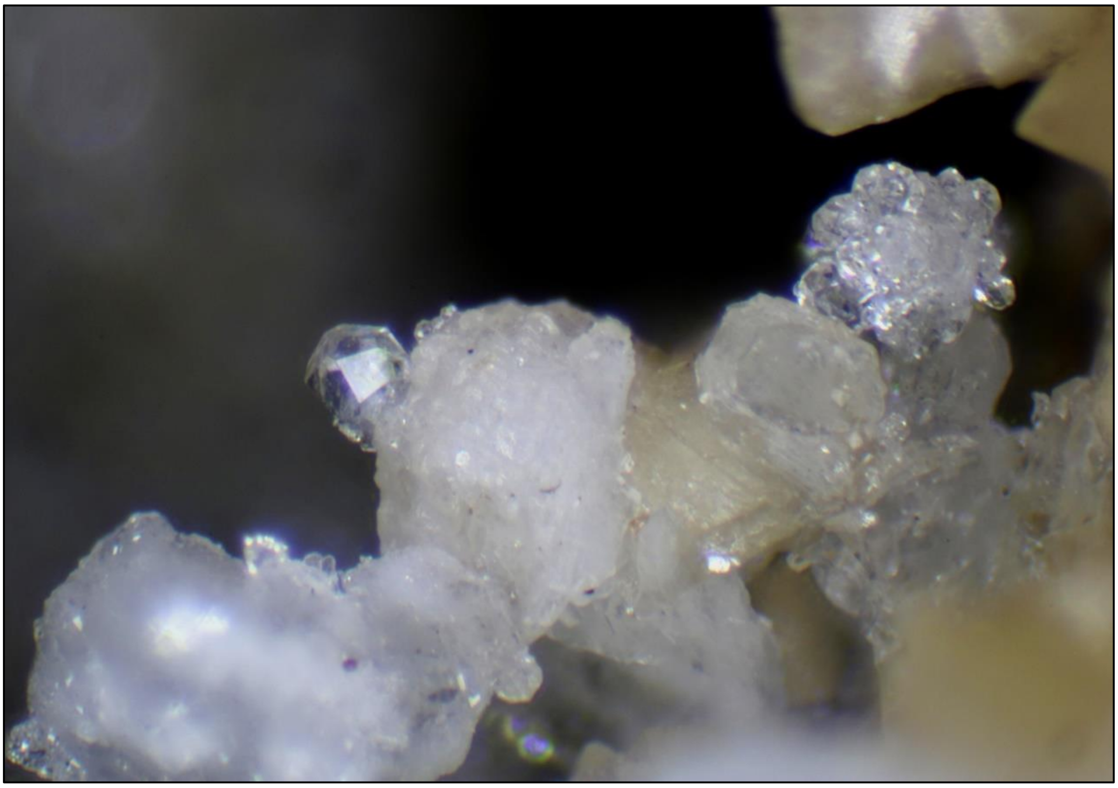
As is the case with many species from Mont Saint Hilaire, the peatite crystals are very small and hard to spot. Fortunately, there are active avid collectors and mineralogists looking closely and analysing specimens.

The specimen that I acquired from David is complex. The peatite-(Y) crystals have a core of ramikite-(Y), there is calcite after an unknown species, synchysite-(Ce) after rémondite-(Ce), siderite, albite, anatase, and analcime. Phew! Interesting stuff!



Pseudocubic Peatite-(Y), Poudrette Quarry, Mont Saint Hilaire, Canada. Photo width 2.5mm

Pseudocubic Peatite-(Y), Poudrette Quarry, Mont Saint Hilaire, Canada. Photo width 2.5mm



Analcime, Poudrette Quarry, Mont Saint Hilaire, Canada. Photo width 2.5mm

New Zealand Northern Region Mineral Interest Group 2016 Dates

Rod Martin

Interested in minerals?

The Northern Region Mineral Interest Group meets every month and provides a venue for collectors to view and discuss their common interests.

The meetings are held on the last Sat of the month in the new North Shore Rockhounds workshop at Marlborough Park (off Chartwell Av in Glenfield) on Saturdays from 10 am to 2 pm and each meeting has a theme. This is usually a NZ mineral locality but often we will review popular overseas localities.

Meetings for 2016

Jan 30	Workshop fieldtrip
Feb 27	Parnell Grit minerals
Mar 26	Waitakere Ranges
April 30	Lake Taupo
May 28	Workshop fieldtrip
Jun 25	Mayor Is
Jul 30	Minerals of Victoria
Aug 27	Henderson's Quarry
Sep 24	Broken Hill
Sep 30-Oct 2	Joint Soc Conference, Brisbane (TBC)
Oct 21-25	Micro-Mineral Sym, Marsden Point
Oct 29	Symposium/Seminar field trips follow-up
Nov 26	Shared lunch – Unknown specimens

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NB Spare microscopes are available for visitors

Queensland Micromob Report – June 2015

Russell Kanowski

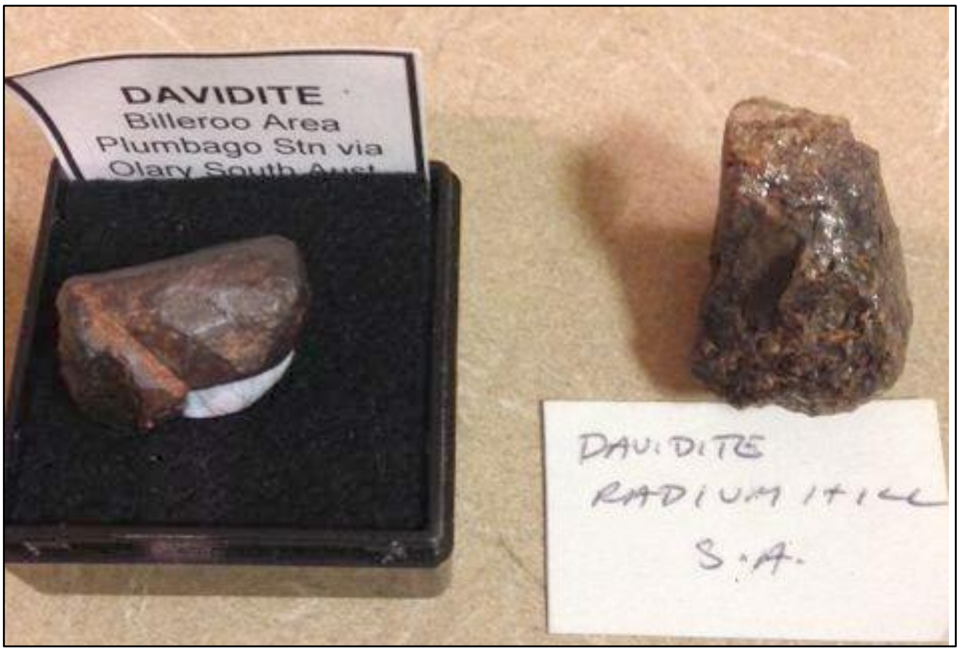
The June gathering of the micromob was again held at the Mt Gravatt clubrooms and was attended by ten enthusiastic members. Five other members extended their apologies. As usual the meeting started with general discussion about forthcoming events (including the Gold Coast show to be held on 27 June) before the discussion centred on the theme for this month which was radioactive minerals. We were fortunate to have on loan a Geiger counter from Tony Forsyth which helped to confirm whether specimens were in fact radioactive – thanks Tony.

Russell shared his research on the principal radioactive minerals containing uranium and thorium and touched on some of the significant Australian localities from which radioactive minerals have been recorded. These areas included Mt Painter (torbernite), Billeroo and Radium Hill (davidite), Lake Boga (ulrichite), Mary Kathleen (various minerals), Rum Jungle and Jabiru (saleeite, autunite).

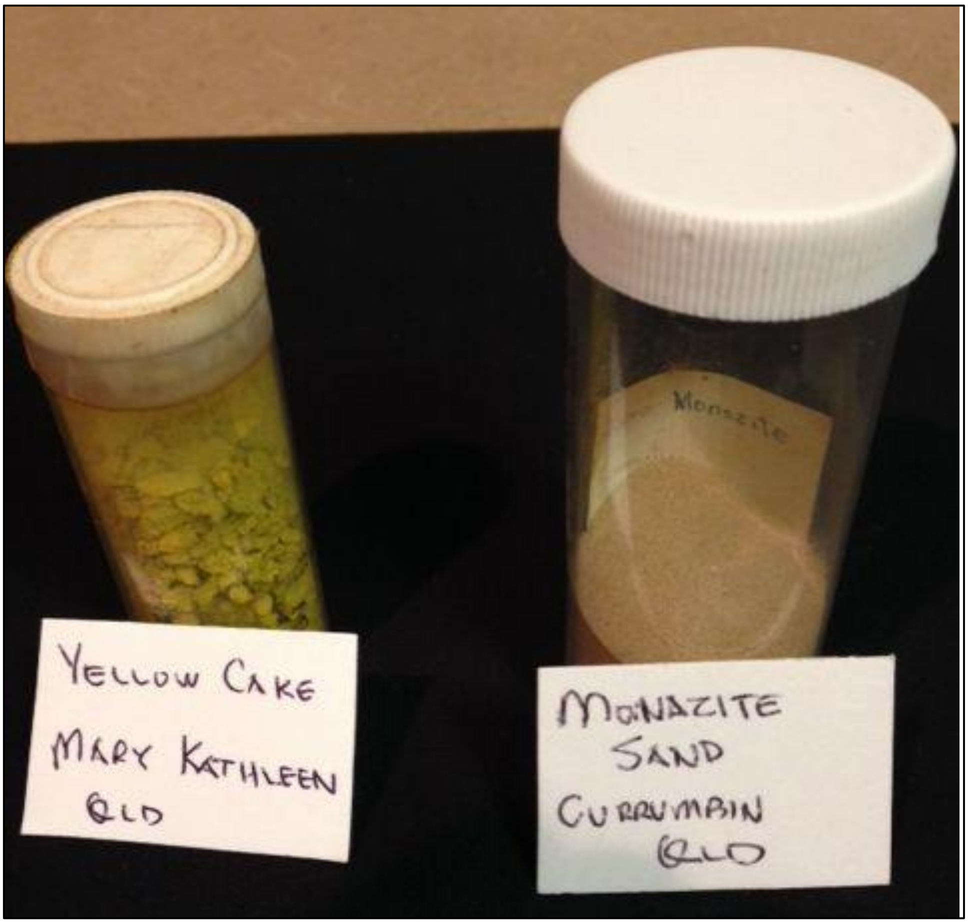
Information was also provided regarding the early controversy surrounding the validity of davidite as a new mineral when it was first reported by Douglas Mawson in about 1907. It was not until 1960 that the American mineralogist J.D. Hayton confirmed that this was in fact a new mineral and belonged to a group of multiple oxides which also included arizonite and brannerite thus vindicating Mawsons claims and adopting the name davidite as proposed by him.

Russell also had a small vial of yellow cake which he ‘collected’ from a container which was spilling onto the footpath at Mary Kathleen township in the late 1960’s. This was collected during a youth group tour around Australia after the mine had closed but before the township was de-commissioned and moved away. This specimen was carried in a plastic film canister probably in hand luggage for the remainder of the trip!!!

Also of interest was a small container of monazite sand obtained from sand mining operations on the Gold Coast near Currumbin in the 1960s. During this period several companies were extracting various minerals including rutile, ilmenite, garnet, zircon, and monazite from the beach sands along the east coast of Australia.



Two specimens of Davidite



Left, Yellow cake; Right monazite sand

Sue Wearden spoke on the occurrence of radioactive minerals at Buller Gorge in New Zealand South Island where metaautunite and meta-torbernite have been found. Sue later showed micro specimens of both of these minerals.

John Hayward spoke briefly on the latest extraction methods for uranium minerals where pH corrected water is pumped into the uranium mineral bearing aquifer to dissolve the uranium minerals present in the host rock and the resultant liquid pumped to the surface and chemically treated to recover the uranium. This method is used at the Beverley Mine in South Australia.

It is interesting to note the nonchalant attitude towards radioactive minerals in the 1960-70′s where the health hazards from these minerals were not fully understood. Radioactive materials were used in many different products including make-up and toothpaste.

Many radioactive minerals also exhibit fluorescence as was demonstrated at the meeting (ie saleeite, liebigite, autunite and phurcalite.

After the discussion finished we moved to the microscopes to view micro-specimens of uranium and thorium minerals. Some of these included ulrichite, boltwoodite, torbernite, saleeite, uranophane etc.

Meeting concluded at 3:30pm.

If anyone is inclined to do any illegal mining or prospecting in Tasmania…

Geer, David (StateGrowth) via Ralph Bottrill

For everyone that deals with legislation, the following notice was published in the Tasmanian Government Gazette on 27 May 2015 and sets the new value for a penalty unit to $154 from the 1 July 2015.

> Notice Under Section 4A of The Penalty Units and Other Penalties Act 1987
>
> For the purposes of section 4A of the Penalty Units and Other Penalties Act 1987, the value of a penalty unit for the financial year commencing 1 July 2015 is specified to be $154.00.
>
> The Hon DR VANESSA GOODWIN MLC, Minister for Justice.

This will lift the following fines under the MRDA (just to name a few):

- 30. & 60C. Exploration without a licence 100 penalty units [i.e. $15,400.00]
- 69. Mining without a lease 500 penalty units [i.e. $77,000.00]
- 107. Prospecting without a licence 100 penalty units [i.e. $15,400.00]

It also lifts the fine for all those 'inspector impersonators' out there to $7,700.00, i.e. 50 penalty units [10(e) MRDA].

Crystallography for Micromounters, Part III – Crystal Geometry

Noel Kennon (annoelk@gmail.com)

In Part II of this series we saw that a crystal is a pattern in three dimensions and comprises two parts. The first part is the motif which can be one or more atoms or molecules and the second is the scheme of repetition which describes the way in which the motif occurs by repetition in three dimensions. In this Part III, we are concerned with the geometry of crystals and the fundamental concepts here relate to the properties of the space lattice of points showing the sites where the atoms or molecules are located in a crystal.

It was established that a basic property of a space lattice is that the array of lattice points is the same everywhere in the lattice and this means that the points are indistinguishable from one another. In turn, this means that every lattice point has identical surroundings. And again in turn, the lattice must extend to infinity in every direction otherwise a point at or near a surface would have different surroundings and so be distinguishable from one far removed from that surface.

The regularity of the points in a space lattice means that the points occur regularly in lines and each different line occurs in a particular direction. In any set of parallel lines, the points have identical spacing which is called the unit translation for that set. Figure 1 shows part of a plane lattice and the unit translations for a number of different sets of lines. For both plane lattices and space lattices, the number of different sets of lines is infinite so that there is an infinite number of different unit translations and an infinite number of different directions in any lattice.

In addition to the occurrence of lattice points in lines, in a space lattice, they also occur in planes. A plane can be defined as any flat two-dimensional surface of points of a space lattice. For any plane in a space lattice there is an infinite number of identical planes parallel with it. And since there is an infinite number of different planes in a space lattice there is an infinite number of sets of planes as well. Figure 2 shows parts of four sets of planes in a space lattice.

The planes in any set are equally spaced and the perpendicular separation of adjacent planes is called the d-spacing.

So far in this Part we have looked at the directions of lines of points and the unit translations and the planes of points and the d-spacing. We can now use those ideas to answer the question – how can a space lattice be described? First let us see how a plane lattice can be described using the same ideas.

Figure 3 shows two sets of lines drawn through the points of a plane lattice. The lattice points lie at the intersections of the two sets. It is evident that as a result, the plane is divided into (an infinite number of) small identical parallelograms. Each parallelogram has a lattice point at each corner and is absolutely characteristic of the space lattice. Should we be given that parallelogram, we could reproduce it over and over to regenerate the (infinite) plane lattice. Such a parallelogram is called a unit cell. By choosing different pairs of sets of lines, different unit cells will be generated as shown in Figure 4. There is in fact an infinite number of possible unit cells and each one is equally acceptable for describing the lattice.

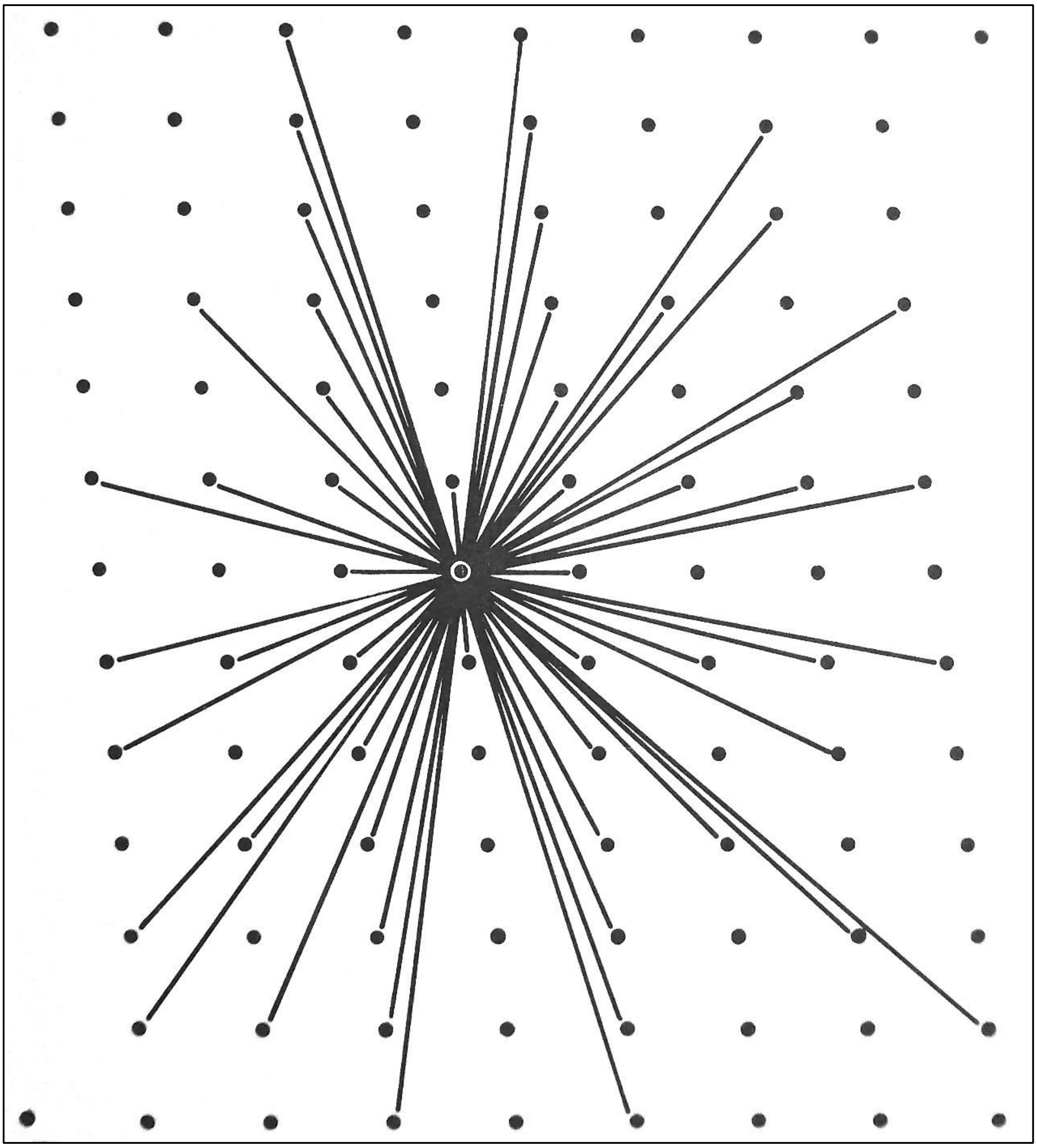


Figure 1: Part of a plane lattice showing a few of the unit translations.

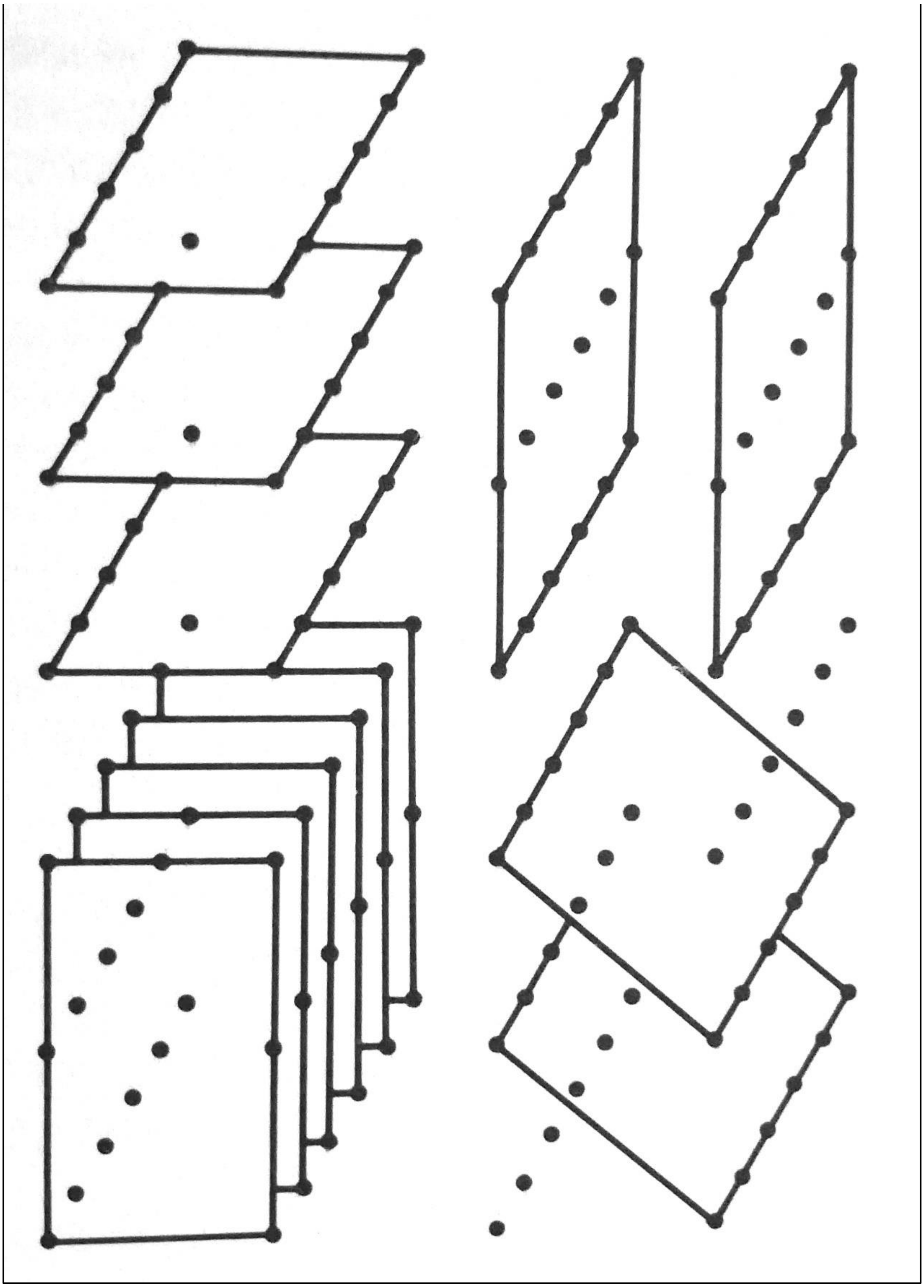


Figure 2: Part of a space lattice showing small parts of four different sets of planes through the lattice points.

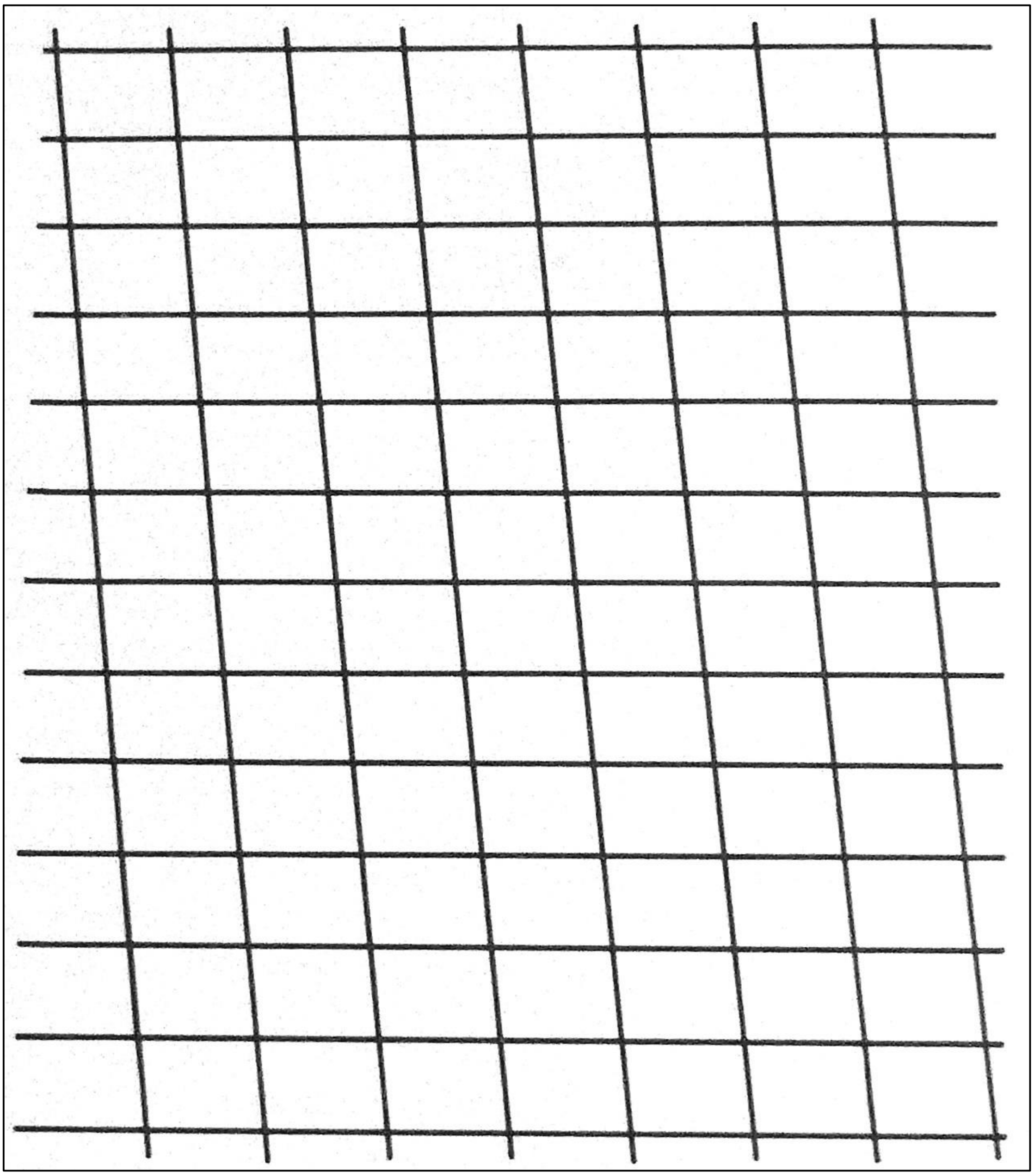


Figure 3: Diagram showing that two sets of lines through the points of a plane lattice divide it into identical parallelograms.

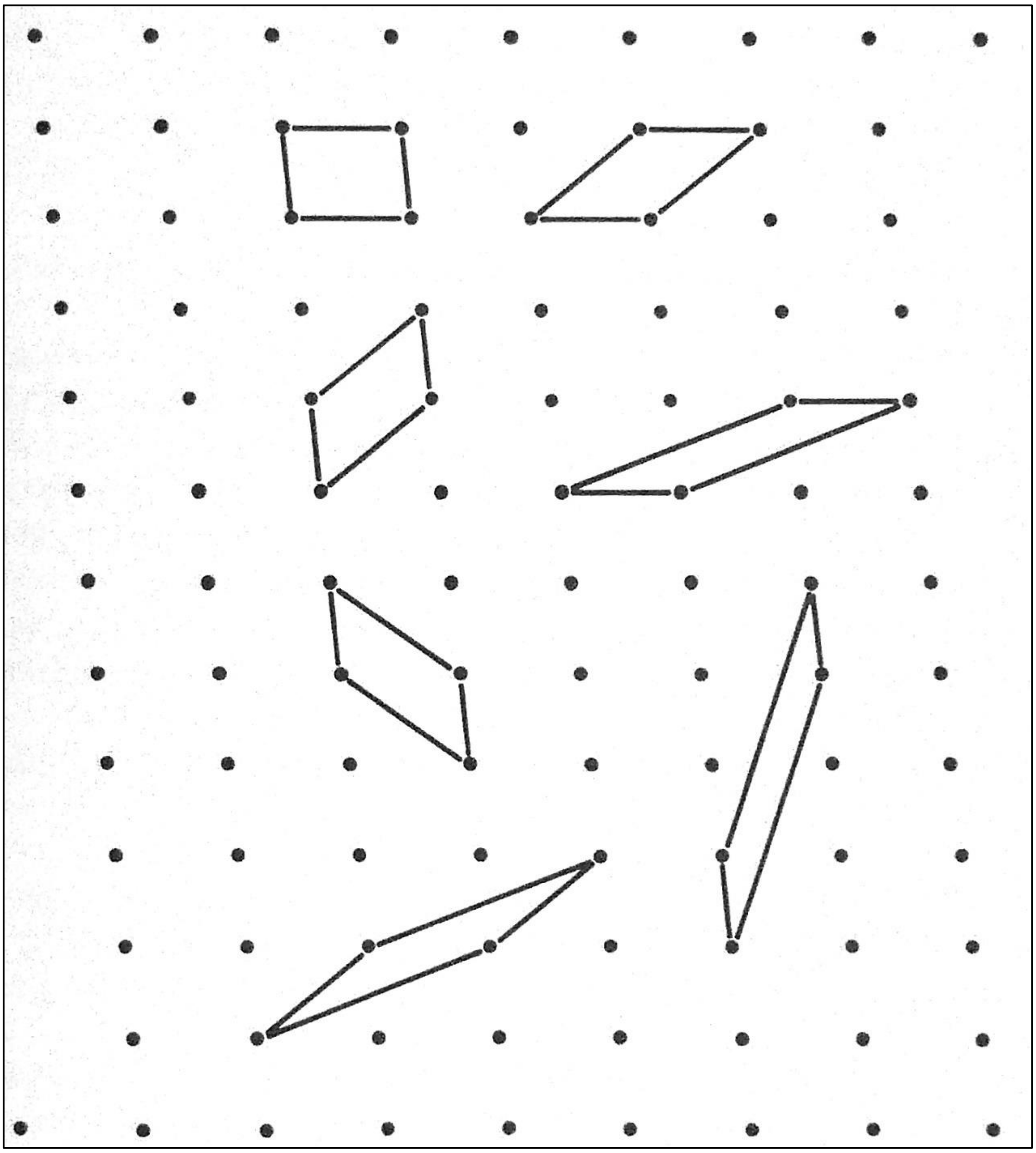


Figure 4: Seven different unit cells of a plane lattice obtained from seven different combinations of two different unit translations.

By convention the cell that is chosen to represent any plane lattice is the one that is geometrically the simplest in that lattice. This criterion leads to five and five only different cells with simple but different shapes. What does this mean? As each cell is a parallelogram it can be described completely by the lengths of the two unit translations (a and b) and the angle between them (α - alpha) as shown in Figure 5. The relative values of a, b and α determines the shapes of the unit cells as follows:

- $a = b$, $\alpha = 90^o$ the shape is a square
- $a \neq b$, $\alpha = 90^o$ the shape is a rectangle
- $a = b$, $\alpha = 120^o$ the shape is part of a hexagon
- $a = b$, $\alpha \neq 90^o$ or 120^o the shape is a rhombus
- $a \neq b$, $\alpha \neq 90^o$ or 120^o the shape is a general parallelogram

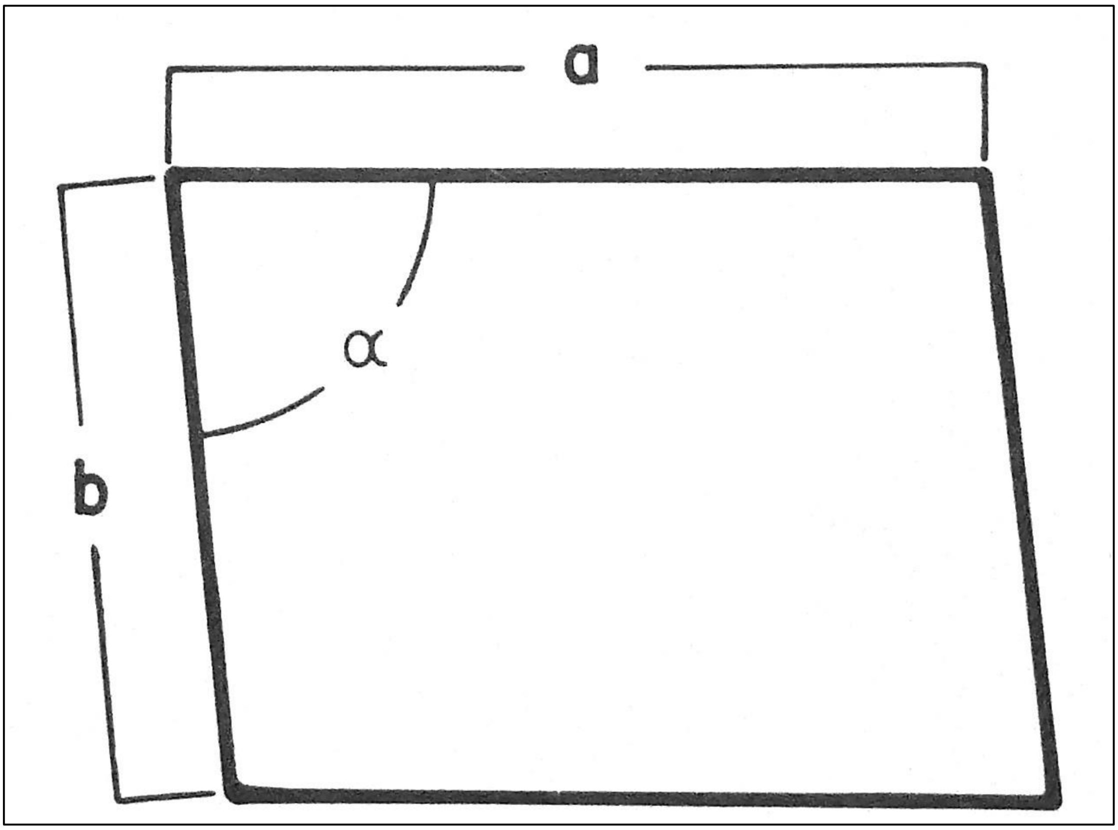


Figure 5: Diagram showing that the lattice parameters a, b and α define the size and shape of a parallelogram unit cell.

Every parallelogram must be one of these five kinds and so they are the only shapes the unit cell can have and so represent the five possible schemes of repetition. Consequently, while plane patterns can have an infinite number of motifs but there are only five possible schemes of repetition.

Turning now to space lattices. The three dimensional array of identical points can be divided into identical six sided volumes by any three sets of non-parallel planes. Every side of any one of those volumes is a parallelogram and opposite sides are identical. The volume is called a parallelepiped. Five possible unit cells for an arbitrary space lattice are shown in Figure 6. As there is an infinite number of ways the three sets of planes can be chosen, there is an infinite number of unit cells. Just as the unit cell of a plane lattice is fully described by the two unit translations and the angle between them, (Figure 5), so the unit cell of a space lattice is fully described by the lengths of the three unit translations and the angles between them as shown in Figure 7. These three lengths (a, b and c) and three angles (α, β and γ) are known as the lattice parameters. Additionally, the faces of the unit cell may be labelled A (containing b and c), B (containing a and c) and C (containing a and b) to serve any useful purpose.

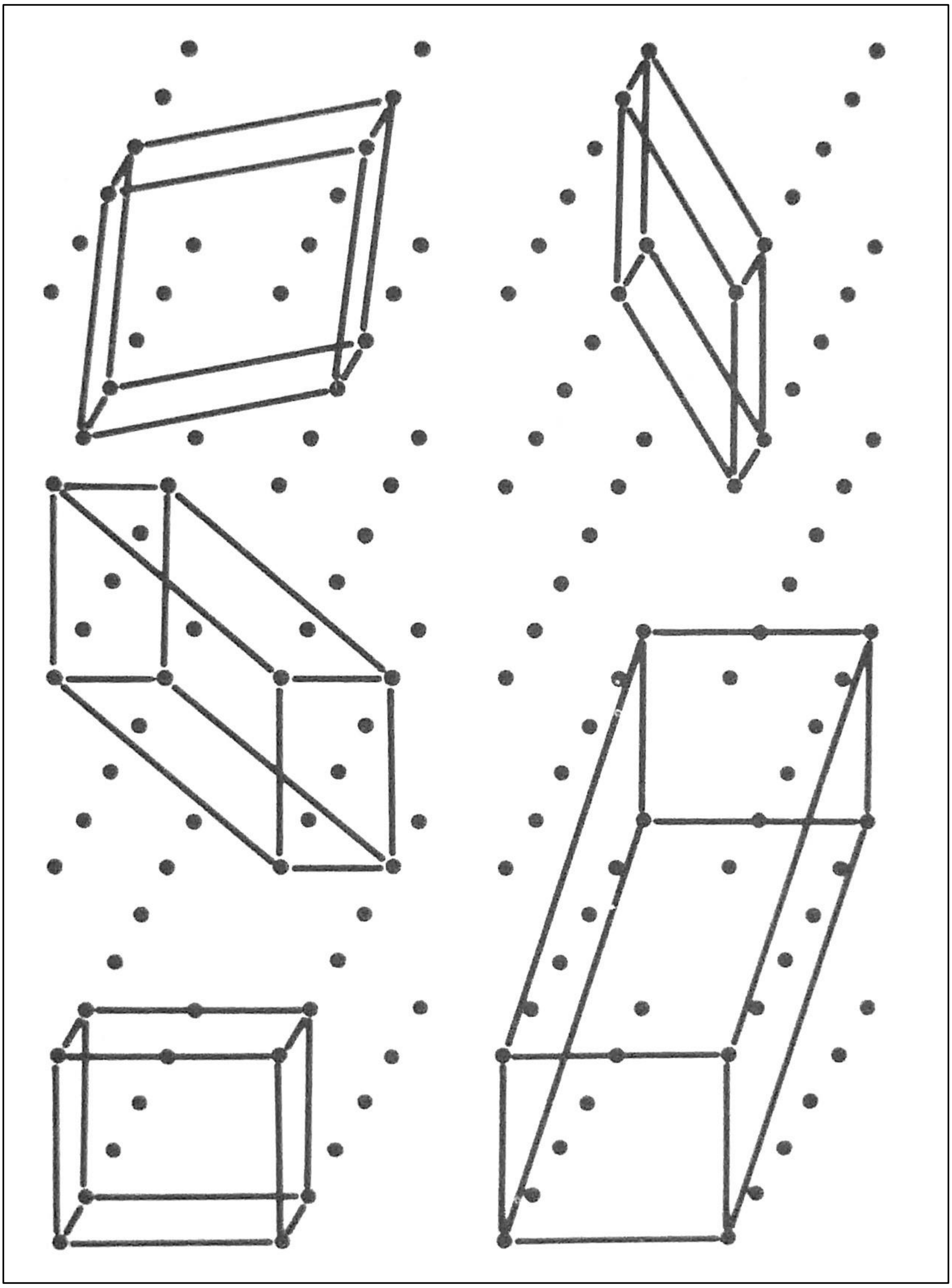


Figure 6: Five different unit cells in a space lattice.

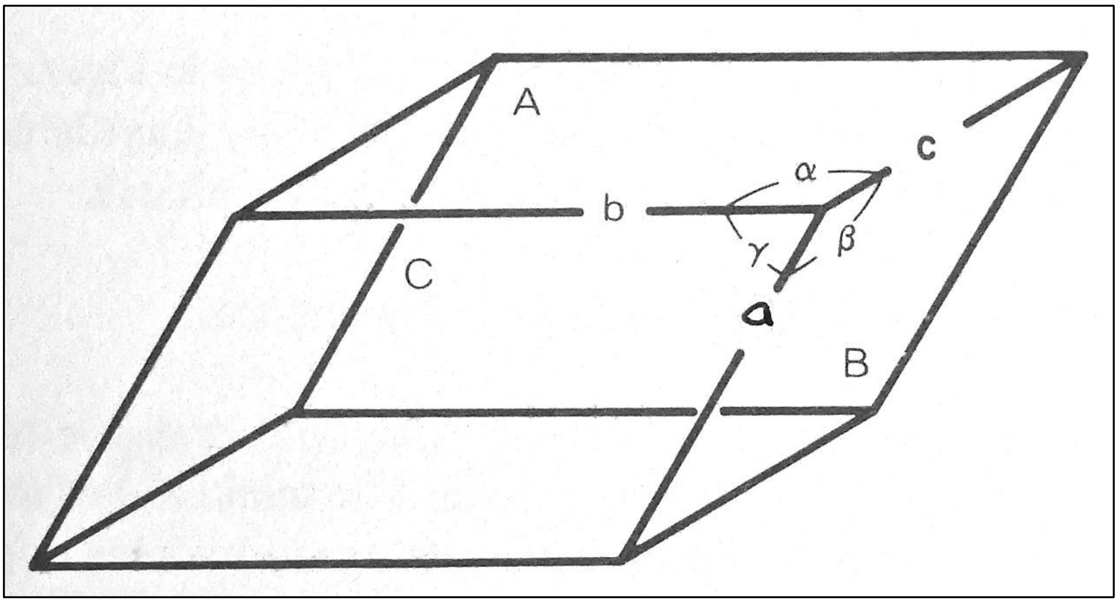


Figure 7: Diagram showing that the lattice parameters a, b, c, α, β and γ define the size and shape of a parallelepiped unit cell.

For most minerals the unit cell is exceedingly small as the lattice parameters a, b and c are usually measured in picometres (1pm = 10-12m or 1 millionth of a millionth of a metre).

For both plane lattices and space lattices, the unit cells can be classified as primitive or non-primitive. A primitive unit cell is associated with a single lattice point while a non-primitive unit cell is associated with two or more lattice points. The unit cells shown in Figure 4 for a plane lattice each have lattice points only at the corners. Therefore, each lattice point is shared between four unit cells and on average contributes ¼ to a particular cell. Since there are four corners, the total contribution is (4 x ¼) = 1 lattice point. The same kind of calculation can be made for unit cells of a space lattice with lattice points only at the eight corners.

Non-primitive cells in a plane lattice are shown in Figure 8. In this Figure:

- cells (a) and (b) have 1 point at the corners + 1 inside = 2 lattice points,
- cells (c) and (d) have 1 point at the corners + 2 inside = 3 lattice points,
- cell (e) has 6 lattice points and cell (f) has 7 lattice points.

Refer back now to Figure 6 showing five possible unit cells for a space lattice. The cell at top right is primitive. See if you can work out which of the others are non-primitive.

You will remember that the lattice points show the locations of the motifs of atoms or molecules in the structure of the crystal. A primitive unit cell has a single lattice point and therefore contains a single motif. Should that motif (sometimes called compositional group) be, for example, two molecules of rutile, TiO_2, then we know that the unit cell will contain two atoms of titanium and four atoms of oxygen. On the other hand, should the unit cell be non-primitive with (say) four lattice points and the compositional group is a single atom of gold we know that the unit cell will contain 4 atoms of Au.

A simple question now arises. Is there any criterion for choosing one of the infinity of unit cells in preference to all the others? This question will be answered in detail in Parts V and VI but in essence, it is usually a geometrically simple cell that is chosen – and in part, just for convenience.

Finally, you may have worked out that the middle left and lower right unit cells in Figure 6 are non-primitive. In case you didn't work it out, for the lower left cell, the two points that appear to be in the centres of the top two edges of the cell are in fact well behind the cell and so it is a primitive.

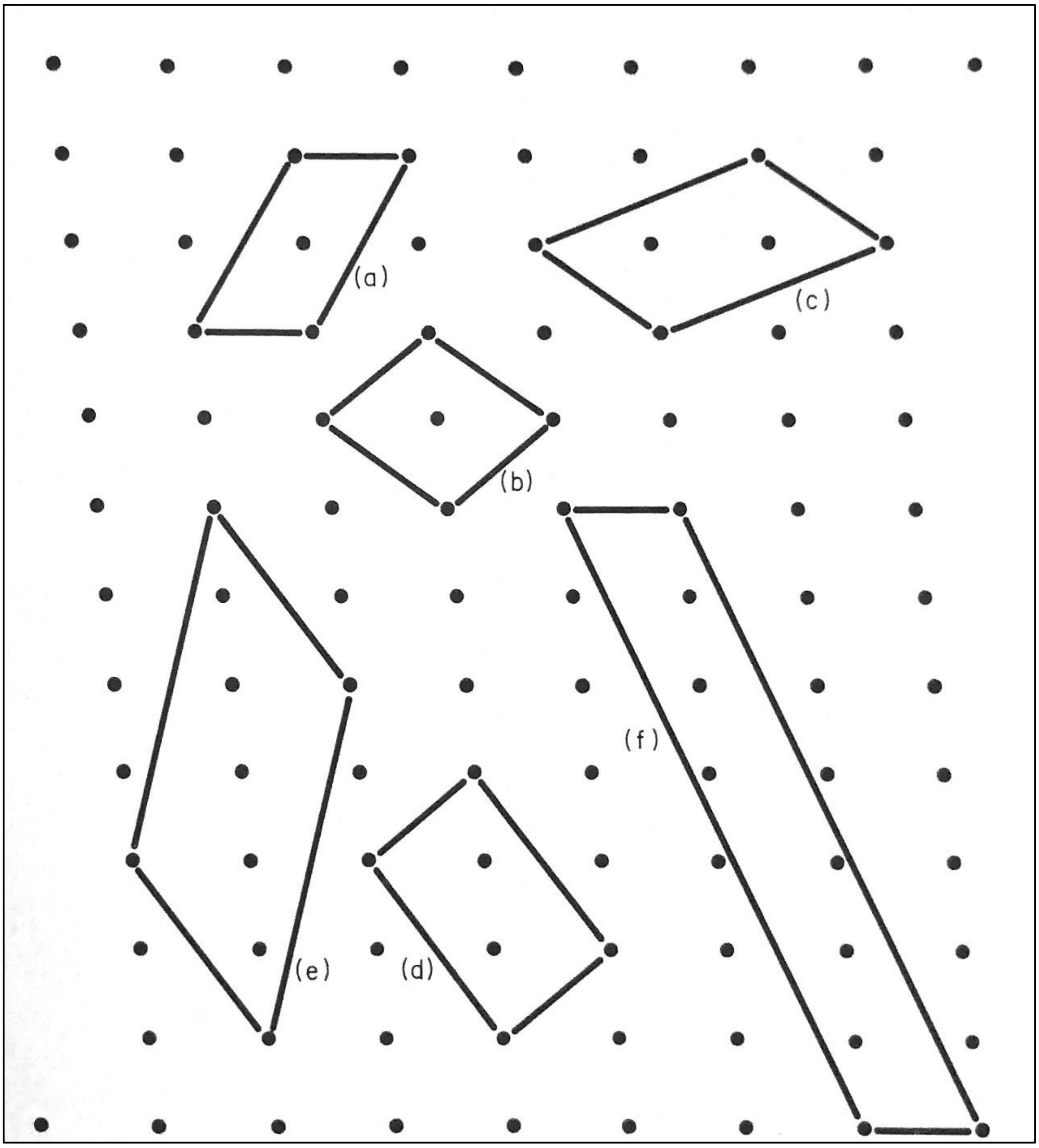


Figure 8: Six different non-primitive unit cells in a plane lattice.

Classifieds

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

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

Sauktown Sales – Jim Daly

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

Comparethemineral – Steve Sorrell

Minerals for sale, many micro-material specimens regularly listed. To view, go to http://comparethemineral.tictail.com/

Purple Sky Minerals – David Hospital

New webshop dedicated to systematic minerals /rare minerals/ micromounts from worldwide for serious collectors. Specimens always with crystals. Have a look! http://www.purple-sky-minerals.com

Facebook Groups for buying and selling minerals

If you are on Facebook, there are a number of options for the buying and selling of minerals. These are some that have interesting items: “Sell Some Rocks!”, “Australian Crystals and Minerals – For Sale”, “Stones to Sell…”, “Cool Rocks Minerals Buy Swap Sell”. Each have rules, but they are pretty easy to abide by.

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I'm experiencing considerable difficulty finding Australians collectors who may be interested to exchange and sell me. I have several lists of minerals and waste from all over the world, ranging in size from Micromount in Miniature. I am interested also in rare Australian minerals.