

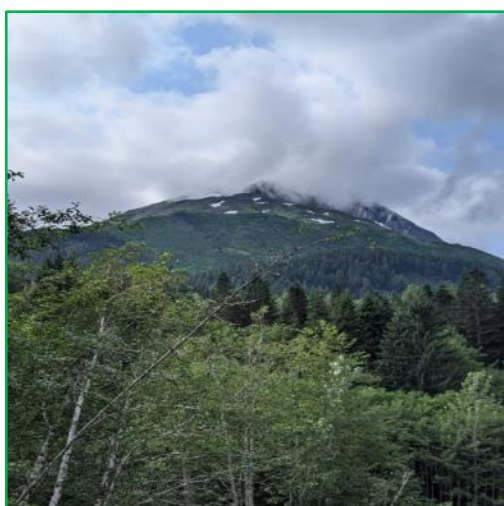
NOVEMBER 2021



DIARY

November	6	10:00–14:00	<i>Open to the Public Day – Rocks, gems, jewellery, mineral specimens to look at, chat about, or buy. NO MASK, NO ENTRY. All Covid-19 protocols still in force. STAY SAFE – GET VACCINATED.</i>
December	4	10:00–14:00	<i>Open to the Public Day – Rocks, gems, jewellery, mineral specimens to look at, chat about, or buy. NO MASK, NO ENTRY. All Covid-19 protocols still in force. STAY SAFE – GET VACCINATED.</i>

ROCKHOUDING THE TRETHERWEY WAY IN NORTH WEST CANADA, SEPTEMBER 2021



Bruce reports:

“We were chatting about the difficulties re the pandemic and how we are cut off from friends. I miss the SA rock hounding trips! And the mineral club meetings and show offs, I loved it all. South Africa has a fond place in all our hearts!

Three weeks ago, we had an expedition up to our old family claims at Le Rose creek right by the bottom right of the US/Alaska panhandle.

1500 kms later we arrived: down two tyres and a spring, challenged by no barge to take us over to Alice Arm, and we could not drive up the 6 miles to our creek due to a road washout at 4-mile.



It was early afternoon, and we were trying to organise a chopper to take us over in the morning, so Chris took one of the ATVs (he insisted that I get "with it" and have an ATV for everyone - so we had four, plus a trailer!) and did a ride around the community. There are three different mining camps there, and he met a geologist on the road and started chatting. She invited him into the drill shack to look at the mineralization they are excited about. Being a true rock hound, he could not pass the opportunity up to discover what we had been doing wrong all these years so he had the tour.

Shortly after his return to our camp, the town manager stopped in to say that we were "persona non grata" and had to be off the town site by nightfall (this was at 19:30). We were scrambling to pack up all and relocate to the required 4 miles outside the gate when a chopper landed behind us.

Chris went over and chatted and had an instant ride to the claim, so there was then a crazy scramble to get all packed for a 20-minute departure. ATV and trailer sent up in a sling, we are whisked off to a bridge 6 miles up the river, and the gear followed in second trip.



Set up a quick camp and started our adventure at least near the claims (they are 1900' in elevation and we are about 50' on the river sharing space with the salmon run and the bears). The boys spent the next day re-slashing the trail up to the claims (cut 13 years ago in 3 days) while I tried to set up base camp, falling a standing dead tree, bucking, splitting, and hauling, setting up tarps, etc.



The whole crew went up the mountain and checked out our prior base camp and decided we were better off staying at the river and commuting the 30/40 minutes as we were not super-supplied due to the quick departure. The boys (Chris and Simon) went off next a.m. looking for GPS claim post locations (actual posts long since rotted) and trying to find a shaft mentioned in the 100 years of notes we have on the property. (Not sure if all is real or a contrived story to justify a pay check.) Did not find it, but then this is prospecting.



The boys took a couple of falls (it is steep country!), losing the GPS and a cell phone, after losing the \$5000 DRONE THEY HAD BORROWED BEFORE THE TRIP. (Damn cap locks!) Well, next morning they found the GPS and cell, but no drone... they also found what they thought was a beautiful mineral sample - called it "Charlie". Being 800' above the level of the ATV and trail, thought it would be best to toss down the steep slope and pick it up lower down. Well, it enjoyed its trip down so much, developing such serious speed that when it came across a serious rock at the bottom, it exploded. So, RIP to Charlie!

I think I have managed to pass over the baton to my youngsters and they will continue to spend money on this BoonDang just as my predecessors have done for the past 100 years!

The chopper picked us up after 5 days as per arrangements and we were packing and heading home. Before leaving camp, we went to the town manager and asked what happened.

Apparently, a drill camp manager saw Chris going into the drill tent and had a cat fit, "Industrial espionage"! Is that James Bond??? Anyway, the town manager is cool with us now, and recognises we are just a bunch of crazy rock hounds, not spooks!

We always have an unforgettable trip up there. You should come some time! We have looked at the trip reasonably carefully and I think next time, no vehicles (possibly a Honda Trail 90) and an aluminium box slung with all inside in a bear proof format. Everything slung in, so it can stay all the time on site, on claim. Experience is knowledge. I think we are smarter!

Our next expedition will be out to petrified mountain; there are petrified logs everywhere (but of course buried in the overburden). This is about 60 kms north west of us, 20 on dirt. There is an exposed 7'x3'x4' stump? or log, not sure what. Kind of a rectangular shape so possibly some "table tops" inside! It is still attached so will need cut off saw and jacks to break off. People have dug it out but the weight and size I think stumped them. I think with our logging skidder (11000 lbs) we would be able to pull it down to the road - fairly steep downhill to road but then the fun would start getting it loaded on to a trailer etc. We have a 1200 lb sample which was fun getting out but we have not cut yet as my big blades, 3' and 6'4" are still unmounted. Somehow it managed to bend the floor of my trailer so my guessing on the weight could be out. That was the one we pulled downhill on sled with pulleys and ATV."

That was great, thank you, Bruce!



"It's a Kind of Magic": From Drab Hand Specimen to a Rainbow Thin Section

By
Peter Rosewarne

1 Introduction

Borrowing the title of one of my favourite Queen tracks, this article takes a look at how a drab-looking hand specimen of say quartzite or basalt can be transformed into a riot of colour in a thin-section viewed under a polarising microscope. This being the November edition of MinChat some fireworks are provided in the form of the often-pyrotechnical display of colours of rocks and minerals in thin section in Section 3. Firstly, bear with me with a bit of technical stuff to set the background and provide some of the basics of optical mineralogy. For those only interested in the colours, skip to Section 3.

2 Technical Background

A thin-section, in terms of this article, is a slice of a rock or mineral, cut with a diamond saw and mounted on a glass slide and ground-down until it is 30 microns thick (0.03 mm). It is a standard and indispensable petrological/mineralogical aid to the identification of rocks and minerals. To bring an unprepossessing thin-section alive it needs to be viewed through a polarising microscope. An example of one with some important features labelled is shown in **Figure 1**.

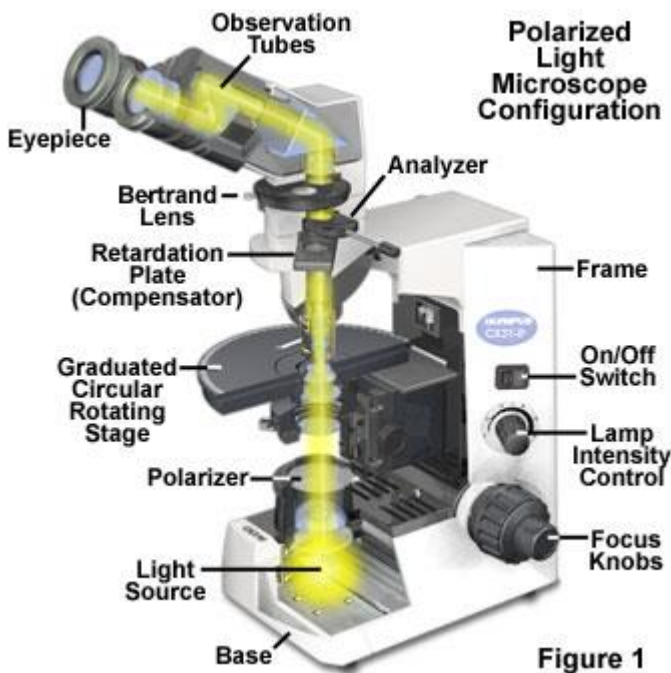
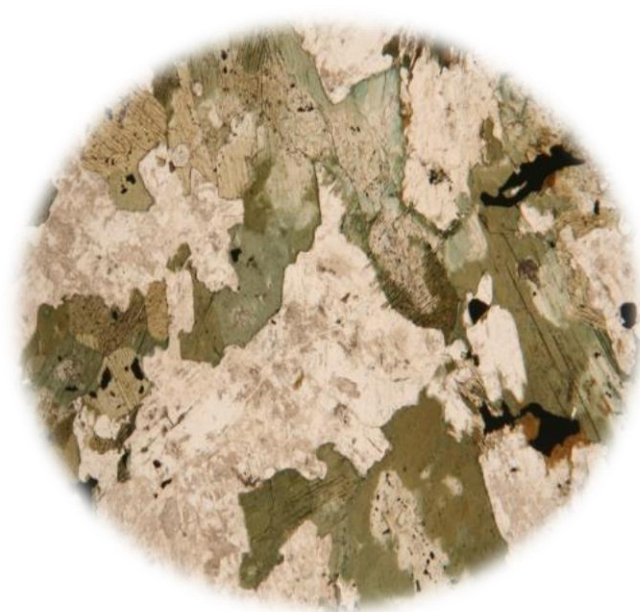


Figure 1

This microscope has a rotating stage and two polarising filters, aligned at right angles to each other. These filters are made of polaroid. One is located below the stage and the other above. When just the lower filter is in operation the thin section is viewed in plain polarised light, an example of which is shown in Figure 2. This shows monochrome plagioclase feldspar and coloured minerals such as biotite and amphibole in a diorite and some opaque magnetite.

< Polarising Microscope Details

Figure 2 below. Diorite Thin Section in Plain Polarised Light



When the upper filter or *analyser* is inserted, the thin section is viewed in crossed polars or crossed Nicols. This is when the play of often bright and varied colours comes into effect. The colour displayed by a mineral in plain polarised light is called its *absorption* colour. Most minerals show a play of different colours as the microscope stage is turned. As crystals making up a rock are likely to be cut in different orientations, they will display different colours or shades of one colour. This property is known as *pleochroism* and is a very useful diagnostic feature of some minerals.

Light entering a mineral in thin section from the light source below the stage is split into two components, each having different velocities. On emerging from the mineral, the two rays interfere with each other and, when viewed with the analyser inserted, show what are termed *interference* colours. These colours are similar to those seen when a thin film of oil is floated on water or on a wet

surface.

Light is split into its component colours by the differing refractive indices within minerals, a property known as *birefringence*. Note that minerals crystallising in the cubic/isometric system do not exhibit birefringence. To aid in the identification of minerals, the birefringence measured in a thin section of known thickness can be compared to a Michel-Lévy Chart (**Figure 3**). You can ignore the figures and just admire the colours, literally a rainbow of colours, although not in the same order (as in the Morcombe and Wise sketch with André Previn, with Eric Morcombe saying he's playing all the right notes to Grieg's piano concerto but not necessarily in the right order).

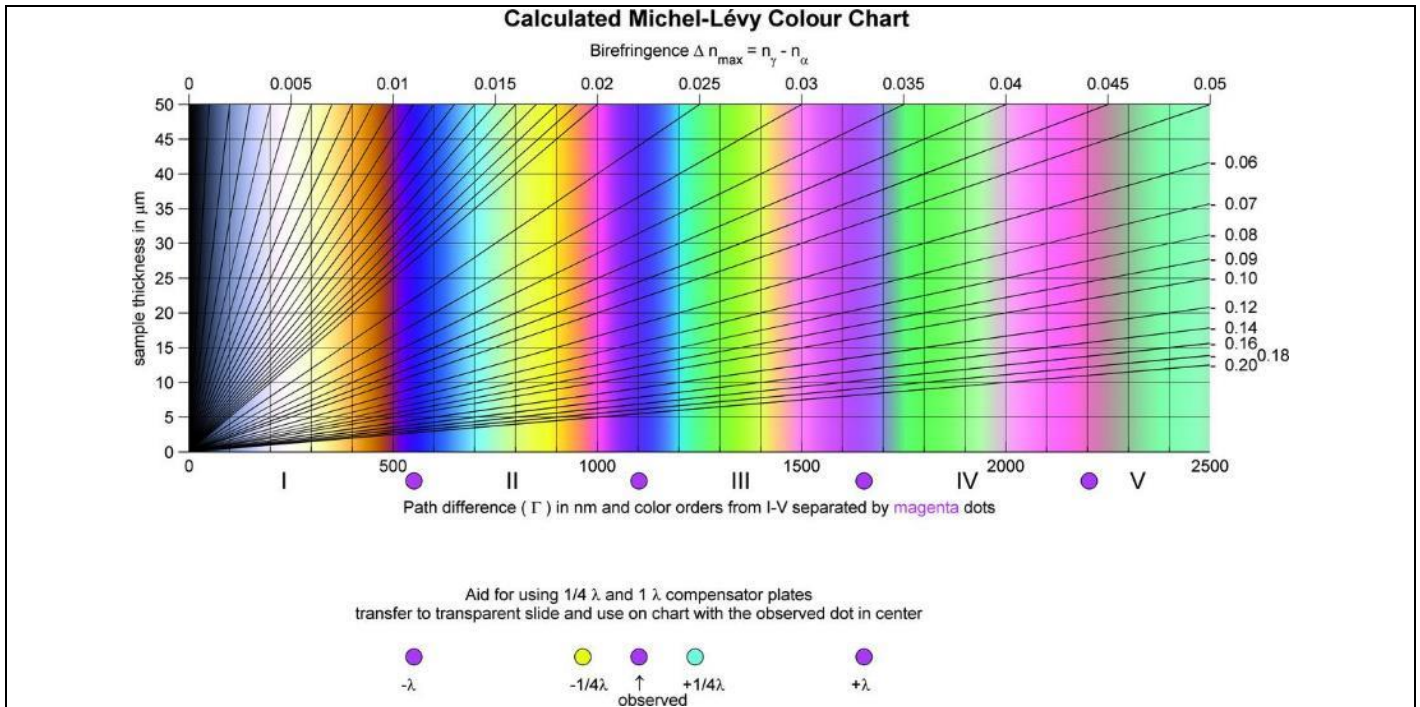


Figure 3 Michel-Lévy Chart

Some of the non-colour related properties of minerals that can be determined from a thin section are cleavage, twinning and crystallisation history, but that is another story.

3 A Kaleidoscope of Colour

And now onto the magic part – some colourful images of common rock types and common minerals from the three rock classes of igneous, sedimentary and metamorphic, but from a different perspective to what you would normally see on a club Open Day or field trip. The thin section images have been sourced from the internet.

Dunite is usually an unremarkable, green-coloured rock consisting mostly of *olivine*, an example of which is shown in **Figure 4**. Examples can be found in the Rustenburg Layered Suite of the Bushveld Complex, although many have been altered into *magnesite*. However, in thin section in **Figure 5** – **abracadabra!** 🪄 it comes alive, with the olivines showing first order interference colours. The example in Figure 5 reminds me of a stained-glass window. There is a wealth of petrological and mineralogical information available in these pictures, but we are only interested in colours for this article. The cross-cutting yellowish-brown veins are *serpentine* and the black/opaque mineral could be *chromite*.



Figure 4 Typical Hand Specimen of Dunite

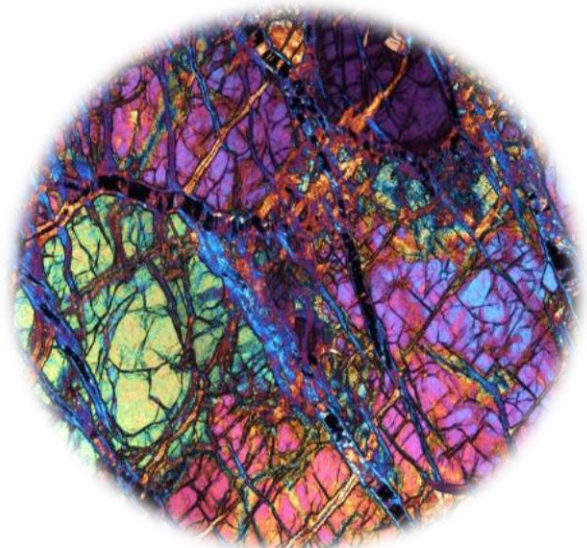


Figure 5 Dunite in Thin Section

Basalt is the most common 'basic' lava and forms the floor of the oceans and builds some of the largest volcanoes, known as shield volcanoes, such as Mauna Loa in Hawaii. It is a dark microcrystalline rock and not much to look at in hand specimen, as seen in **Figure 6**. However, a 30-micron slice under crossed polars can produce a kaleidoscope of colours, as shown in **Figure 7**. The brightly coloured crystals are olivine set in a groundmass of microcrystals and black volcanic glass.



Figure 6 Olivine Basalt



Figure 7 Olivine Basalt in thin section

Quartzite is another nondescript looking rock in hand specimen, consisting, unsurprisingly, of quartz and is usually a uniform white, grey or light brown in colour. Two types occur: sedimentary and metamorphic, an example of which is shown in **Figure 8**. Table Mountain is largely comprised of quartzite and quartzitic sandstone of the Table Mountain Group. A thin section is shown in **Figure 9** with a very colourful mosaic of quartz crystals. This is probably a metamorphic type as there is no indication of a cementing material between the quartz grains/crystals. The different colours of the quartz crystals are due to their different orientation in the thin section.

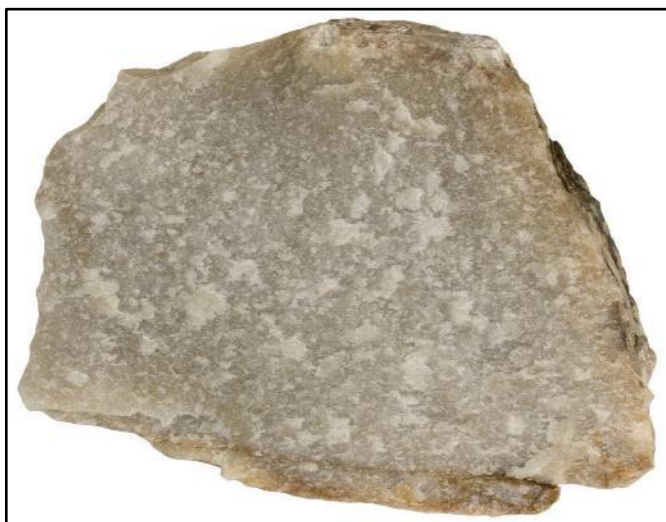


Figure 8 Typical Quartzite Hand Specimen

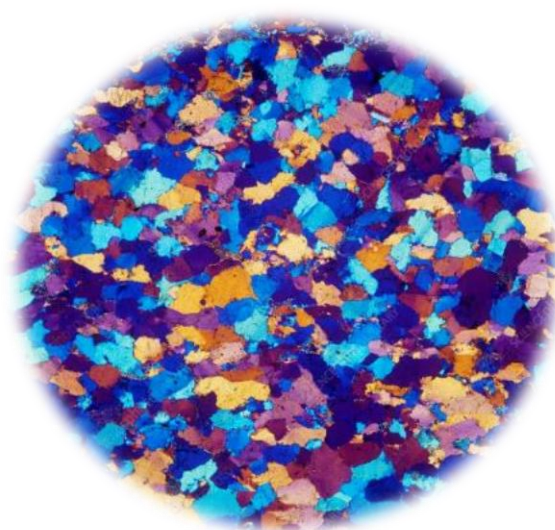


Figure 9 A Typical Quartzite in Thin Section

Gabbro is a common coarse-grained, normally dark coloured igneous rock consisting of *pyroxene* and *plagioclase feldspar*, sometimes with some accessory olivine. It is a common rock in the Rustenburg Layered Suite of the Bushveld Complex. A typical hand-specimen example is shown in **Figure 10** and is nothing much to look at. The thin section example in **Figure 11** shows a miraculous transformation, with two types of pyroxene in shades of blue, brown and pinkish-red and laths of diagnostically twinned plagioclase feldspar (probable *magnetite* is black/opaque). A second example is shown in **Figure 12**.



Figure 10 Typical Hand Specimen of Gabbro



Figure 11 Typical Gabbro in Thin Section



Figure 12 Another Gabbro in Thin Section

Kimberlite is an often interesting looking but drab coloured igneous rock in hand specimen, with phenocrysts of minerals such as olivine and *phlogopite* and xenoliths of *eclogite* and, very rarely, *diamond*, in a fine-grained greenish-grey groundmass. An example from the Big Hole in Kimberley is shown in **Figure 13**.



Figure 13 Hand Specimen of Kimberlite from the Big Hole, Kimberley

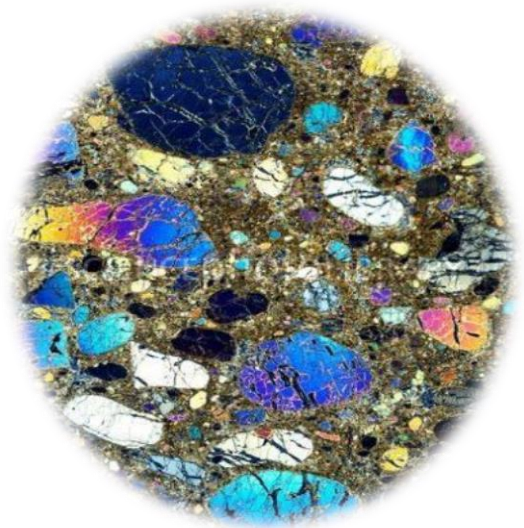


Figure 14 A Kimberlite in Thin Section

However, in thin section it can take on a totally different appearance (there are several different types of kimberlite), as shown in **Figure 14**. The colourful phenocrysts are olivine set in a groundmass of smaller olivines and possibly serpentine, *chlorite* and *carbonate*. No diamonds in this one!

In keeping with the 'fireworks' theme, in **Figure 15 (right)** we have a garnet mica schist with a Catherine Wheel formed of a *garnet porphyroblast* in a matrix of foliated quartz and *muscovite*.

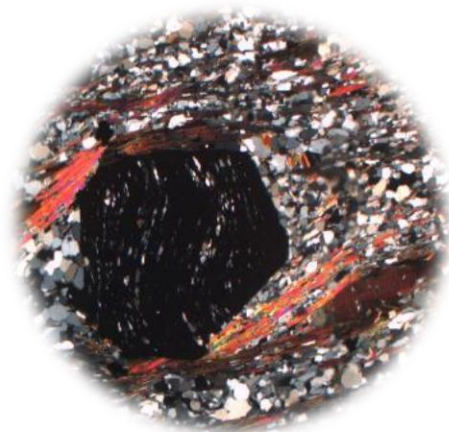
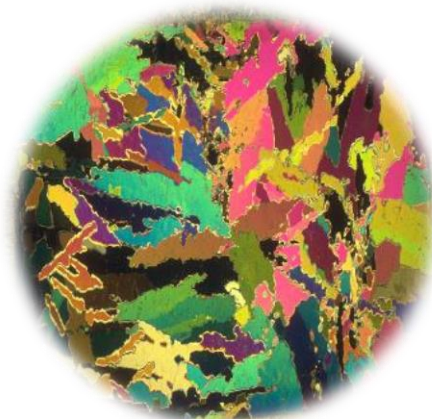


Figure 15 Garnet Mica Schist

And finally, a truly pyrotechnical ending – any guesses what this is a thin section of?



Ice!

4 References

MacKenzie, W.S. Adams, A.E. and Brodie, K.H. (2017). *Rocks and Minerals in Thin Section*. 2nd Ed. CRC Press.

From the Cabinet of Curiosities

A blast from the past, **Geological Cakes!** Many years back we had a cake competition. Here are some of them.



La Palma? Volcano



Aquamarine and schorl tourmaline



Spongeite

Tracy, the intrepid Tripper...

by Tracy Hannath

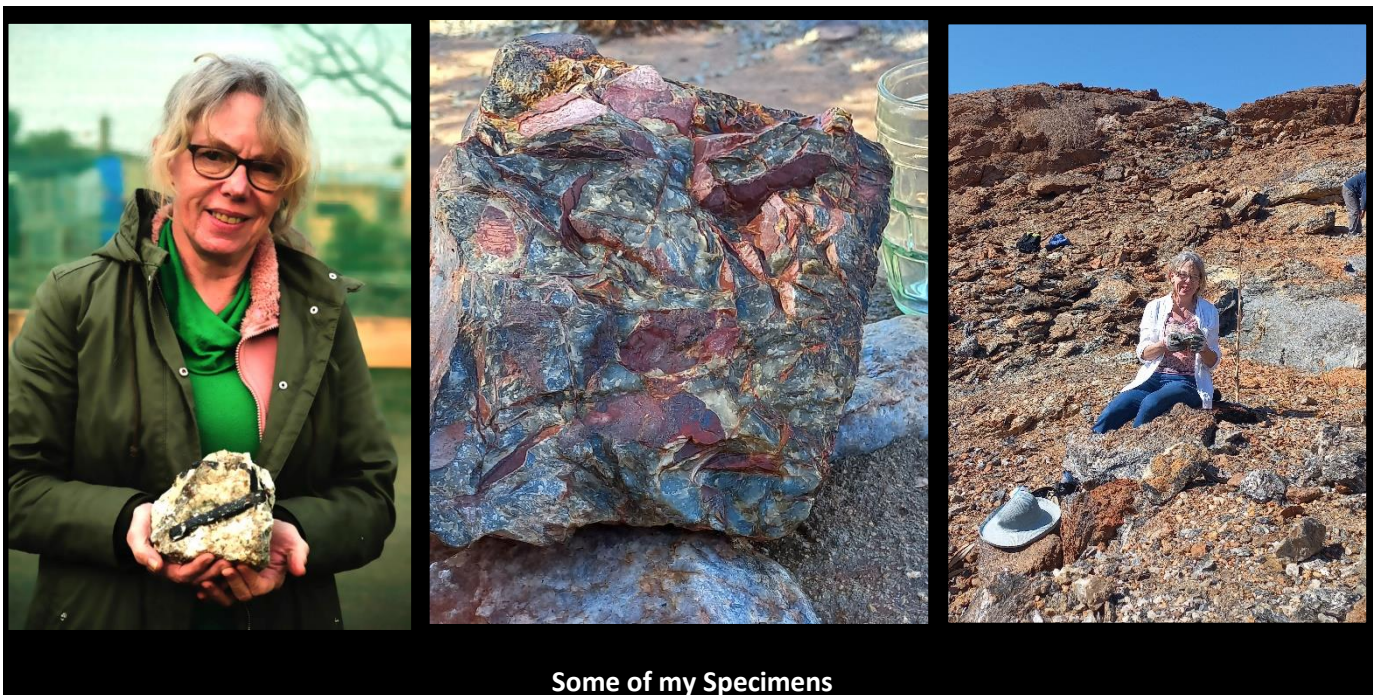
But with trepidation too! I had been debating for a long while whether to go or not. I had not driven long distance alone ever before. But I had serviced the car, booked accommodation and checked distances.

My deciding factor was my “coming to the rescue” to get a coat, a camera, and a shaver to Malcolm and Margaret after these items were stolen out of their Land Rover in Steinkopf. When I hit the N7 and saw the sign for Namibia, I thought “What the heck am I doing?” Every extra kilometre I covered, it got easier. I got to Lutzville at 5 pm as I was staying over with my niece and her husband for the night. I set off the next morning at 10.00 to meet the rest of the tour group in Steinkopf.



We stayed at the Hollywood Lodge (photo left). Even though I had booked for two nights, I was told that I could only have the room for one night, so we improvised. I said I would stay in the dining room. They moved the tables and a bed was put under the window for me. At around 3 am in the morning a neighbour, *lekker dronk verdriet*, was shouting in the road on his way home and the door to “my room” did not lock! We had someone on guard so it was fine. I found it so interesting to stay in a home and get the feel of day-to-day living in a small town. On my first day everyone met at the local garage for the trip to look for corundum near Steinkopf. We all searched very enthusiastically along the walls of dongas and dug out some lovely specimens.

Over the next few days, we went to Witbank, Swartkoppies mine, Gamsberg, and other mines and sites, looking for ‘water sapphire’ (cordierite), sillimanite and black tourmaline. Two of my best finds were a large piece of black tourmaline still embedded in quartz, and a large green rock embedded with orange minerals.



Some of my Specimens

Malcolm and Connie sourced traders where we could buy quartz crystals. The gravel roads on the way to Klein Pella were quite ridged and really shook me up. Klein Pella was so beautiful. We visited Pella Mission Station to see the cathedral and museum. I stayed in a rondawel but joined the campers for a braai one evening. The night sky was so dark and the stars were so brilliant. Martin pointed out star constellations for us; Scorpio was so clear. I took a drive

in the late afternoon to the date palms. They were so beautiful and magical to see. The Orange River was spectacular, as well as seeing Namibia so close on the other side.



Date Palms at Klein Pella

Klein Pella Mission Station Cathedral

View from Riemvasmaak Hillside

In Pofadder we visited Louise Niemoller's shop and museum. The group then moved on to collect lapidary material on her property. We were like kids in a candy store. On the 17th we drove to Riemvasmaak to look for fluorite. It was so remarkable to see beautiful fluorite just lying around in patches where less-perfect pieces were dumped. I hiked half way up to the mining site. I could hear talking and drilling but decided not to go further as the surface was loose. While looking at the view my phone rang. It was the Automobile Association. The operator asked me: "How can I be of assistance". I could not resist, and told her: "I am stuck half way up a mountain!". She asked: "Can we send someone to help you?". I said: "No, it is okay!". She was confused and asked: "Why not?". I replied: "I am not in my car but on a hike". She was silent a while, then put down the phone.



On the last day we visited Jaco's shop in Kakamas. There were such beautiful minerals and jewellery on display. I bought a pendant with a sliver of polished meteorite and some woven bracelets for gifts. On the last night everyone got together for dinner and a speech from Malcolm and Linda to end off the very successful and enjoyable trip to Namibia and the Northern Cape.

I made my way home having decided to drive the nine hours or so straight. Near Garies I stopped to take photos of the fields of daisies. The very best was to see Table Mountain again. I really had the most

amazing trip, seeing the beautiful landscapes, mineral sites and have to thank Malcolm and Margaret for this amazing adventure. I got to see so much of the Northern Cape - going to places I would not have otherwise seen and experienced in my little Nissan Livina. 🚗



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