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JULY 2024



Halloysite Quartz, Cabiche, Colombia (©Elliot, Fine Minerals International)

DIARY

This monthly members-only version of the newsletter is your primary source of club and workshop information. Please keep it to hand.

July	6	10:00–14:00	Open to the Public Day – Rocks, gems, jewellery, mineral specimens to look at, chat about, swap, sell or buy.
August	3	10:00–14:00	Open to the Public Day – Rocks, gems, jewellery, mineral specimens to look at, chat about, swap, sell or buy.

Included Quartz

by

Peter Rosewarne

Introduction

The title of this article sounds like part of an unfinished sentence, as in, “...the collection included quartz”, but read on. I was scratching my head for inspiration for a new non-whacky article when I opened up an offering of new minerals on the Hummingbird Minerals website in March 2023. There I came across a very attractive quartz crystal cluster with halloysite inclusions. I’d never heard of halloysite (sounds like quartz with bad breath) but have come across pretty quartz specimens with, e.g. hedenbergite (green), fuchsite (green), dumortierite (blue), papagoite (blue), ajoite (blue) and hematite (red) coloured inclusions. So, I thought I’d write an article on included quartz, which specifically excludes (no pun intended) the standard coloured varieties such as amethyst, citrine, rose and smokey quartz, and those containing bubbles and non-colour enhancing minerals such as rutile. As I only have two quartz specimens in my collection, this article relies heavily on dealer and internet images.



Quartz

Is quartz the only mineral that occurs in white (*milky*) and black (*morion*) varieties as well as every colour in the visible spectrum, and colourless?

Quartz is a simple *silicon dioxide* and is the most common mineral in the Earth's crust. It has a Mohs hardness of 7 and crystallises in the trigonal system. The clear variety is referred to as *rock crystal* from the Greek *krustallos* meaning icy cold as the ancient Greeks believed it to represent super-cooled ice. It can occur as small interstitial grains in rocks, as sand grains and as giant crystals tens of metres in length in pegmatites. Table Mountain is mostly composed of quartz.

Primary quartz is formed in three environments, hydrothermal, pegmatite and from silica-rich magmas. Inclusions are apparently most commonly found in quartz of hydrothermal origin. The difference between, e.g. amethyst and citrine and, e.g. blue and yellow quartz is that in the former two varieties, ions imparting the varieties' colour are incorporated into the crystal lattice whereas in the latter two varieties, blue and yellow minerals exist as separate phases within the quartz crystals.

Inclusions can be of three origins:

- Protogenetic: these formed before the host crystal included them;
- Syngenetic: these formed at the same time as the host crystal; and
- Epigenetic: these formed after the host crystal.

Varieties of Included Quartz



As a fitting introduction to included quartz, the image from p53 of *Minerals of South Africa* is reproduced in **Figure 1**. I'm not 'into' quartz as a collector but these specimens are awesome – clockwise from the top inclusions are, papagoite, ajoite/hematite, papagoite/hematite/*chlorite*-stained *kaolinite* and *native copper* wires, hematite/kaolin/papagoite/ajoite, kaolinite.

Figure 1: Included Quartz Crystals from Messina No. 5 Shaft (courtesy of Prof. Bruce Cairncross)

Yellow Quartz

We might as well start with the specimen that triggered this article, so here is a lovely specimen of halloysite quartz in **Figure 2** from the Chivor Mine, Colombia, better known for its *emeralds*. Halloysite is an *aluminosilicate clay* mineral, very drab in person, and is usually present in the crystal terminations. I think this variety is also called mango quartz. Another example is shown in **Figure 3**, also from Colombia, and the specimen in **Figure 4** takes this from quartz to another level, with an 'explosive' array of yellow-tipped quartz crystals.



Figure 2 left: Halloysite Included Quartz, Chivor Mine, Colombia (courtesy of Hummingbird Minerals)



Figure 3: Mango Quartz, Cabiche, Colombia (courtesy of FossilEra)



Figure 4: Halloysite Quartz, Cabiche, Colombia (©Elliot, Fine Minerals International)

Green Quartz

There are several varieties of quartz included by green minerals, including fuchsite (a *chrome mica*) and hedenbergite (a *pyroxene*). Quartz included by hedenbergite is often referred to as *prasy*. An example of fuchsite quartz is shown in **Figure 5** and hedenbergite and *prasy* in **Figures 6 and 7**.



Figure 5 left: Fuchsite Included Quartz, Anovitra, Madagascar (courtesy of Hummingbird Minerals)

Figure 6: Hedenbergite Included Quartz, Huanggang Mine, China (courtesy of Weinrich Minerals)



Figure 7: Prasym Quartz with Andradite, Dalnegorsk, Russia (Rosey Collection)

Tangerine Quartz

This variety is due to hematite coatings or inclusions and an example from Morocco is shown in **Figure 8**.



Figure 8: Hematic Quartz Crystal Cluster, Tinejad, Morocco. (courtesy of Hummingbird Minerals)

Red Quartz

This variety is really a variety of hematic quartz as it also owes its colour to hematite coatings and inclusions. The example shown in **Figure 9** is from a classic site in Thunder Bay, Ontario, where lustrous hematite is coating amethyst crystal points.



Figure 9: Hematite Coated Amethyst Crystals, Thunder Bay, Ontario. (©Budd, Fine Minerals International)

Two nice examples from the Orange River area in southern Namibia are shown in **Figure 10** below.



Figure 10: Red Quartz, Orange River, Namibia 10a left (ex Heini Soltau specimen) 10b right (Marin Minerals)

Blue Quartz

There are a few inclusions that can give rise to blue quartz, including dumortierite, ajoite, papagoite (*calcium-copper-aluminium-silicate-hydroxide*) and shattuckite. Dumortierite is an *aluminium, borate-silicate* that usually occurs in a massive form often used for carvings and polished eggs and spheres. It can also give rise to attractive blue quartz, as shown in **Figure 11**.



Figure 11: Dumortierite Included Quartz, Vaca Morta mine, Bahia, Brazil. (courtesy of Dakota Matrix)

When ajoite (pronounced ah-hoe-ite), a *hydrated copper silicate*, occurs as inclusions in quartz it gives rise to very attractive and sought-after specimens commanding high prices from dealers (four figures US\$ and *up*). The #5 Shaft at Messina Mine in Limpopo Province is a renowned source of such specimens and an example is shown in **Figure 12a**, along with a crystal group (**12b**). Papagoite is also a collector's favourite and **Figure 12c** shows stunning crystal group c.20 cm tall. African Gems and Minerals has an awesome collection of ajoite and papagoite included quartz crystals from Messina and I was privileged to be given a showing of the best of them recently by Rob Smith, including what must be two or three of the best-ever-found for these types in terms of size, form and colour. One "best of" specimen of a large group of ajoite included quartz crystals was unfortunately still awaiting expert cleaning (possibly Collector's Edge lab in the US) before it could be photographed. What looks like a chipped termination of the main crystal in **Figure 12c** is in fact natural. This specimen rates being photographed by a Jeff Scovil-level photographer, not my poor rendering.

Below: Figure 12: Ajoite and Papagoite Included Quartz Crystals



12a Left. Ajoite Included Quartz (courtesy of African Gems and Minerals)



12b Centre. Ajoite Included Quartz (Internet image)



12c Right. Papagoite Included Quartz (courtesy of African Gems and Minerals)

Concluding Remarks

The 'trade' names for coloured/included quartz are somewhat confusing to me, especially being a non-quartz collector, and I may have got, e.g. tangerine, mango and hematic, and other varieties mixed-up. Anyway. this article is more about colour than science and to paraphrase a famous Henry Ford quote, "You can have any colour you want *as well as black!*"

Included quartz is now included in the set of mineral species articles featured in the Mineral Chatter for your edification that include gold, beryl, fluorite, the garnet & tourmaline groups, the feldspathoids, lapis lazuli, uranium-bearing minerals and botryoidal & fluorescent minerals. I'm very fond of the *pyroxenes* but they mostly don't form attractive hand-specimens unless you are into igneous petrology where they become very interesting in thin section.

References

Cairncross, B. and Dixon, R. (1995), *Minerals of South Africa*. Geological Society of South Africa. Johannesburg.
 Von Bezing, L. Bode, R. and Jahn, S. (2014), *Namibia 1: Minerals and Localities*. Bode. Germany.

'Participating' dealer websites

www.marinmineral.com www.MardaniFineMinerals.com www.hummingbirdminerals.com www.africangems.com

“Mellow Yellow”

by

Peter Rosewarne

Introduction

Anyone around in the swinging 60s who was into pop music will remember Donovan’s catchy tune, Mellow Yellow, although conventional wisdom has it that if you can remember the 60s you weren’t there. Be that as it may, you’ll now be able to say that you remember Rosey’s Mellow Yellow from the 2020s. Back in the scary days of approaching ‘Day Zero’ regarding Cape Town’s water supply, the official dictum was, “*If it’s yellow, let it mellow,*” but we won’t go into the alternative here. Yellow minerals that readily come to mind include native sulfur, fluorite, calcite, legrandite and smithsonite and a rare one in triphane, a yellow variety of the pyroxene, spodumene.

Legrandite (MIM Museum)



I think the causes of the yellow colouration must vary as native sulfur is yellow because it is native sulfur, whereas smithsonite is yellow because of the presence of cadmium ions in the crystal lattice. We’ll find out about the others as we go along and so let’s get straight into some minerals. There might not be 50 shades of yellow here but there are certainly quite a few. The examples are all from or ex the Rosey Collection so there are no image credits.

The Minerals

We’ll start with probably the rarest of the yellow minerals featured here, triphane, and a lovely crystal from Afghanistan that has recently joined the Rosey Collection. The crystal is 10 cm tall and it is a relation of kunzite (mauve) and hiddenite (green) as varieties of a mainly pegmatitic mineral, spodumene, $\text{LiAlSi}_2\text{O}_6$. Traces of iron (Fe) cause the yellow colouration.

Figure 1: Triphane Crystal, Afghanistan



Cadmium smithsonite occurs as attractive rhombohedral crystals and botryoidal masses from such iconic sources as Choix, Mexico and Tsumeb Mine, Namibia. However, the edible-looking botryoidal example in **Figure 2** is from Yunnan, China.



Figure 2: Cadmium Smithsonite, China

Native sulfur is probably the best-known yellow mineral and Agrigento, Sicily is probably the best-known source of collector specimens. The example in **Figure 3a** is of a cluster of small sulfur crystals on *aragonite*, while **Figure 3b** shows a larger crystal (2 cm) also on aragonite.



Figure 3a: Sulfur Crystals with Aragonite



Figure 3b: Sulfur Crystal on Aragonite

New finds of bright yellow *brucite* were made in Balochistan, Pakistan in 2015 and appeared at the Munich Show of that year. A large example is shown in **Figure 4**, 13.5 x 8 x 1.5 cm. Beyond the fact that brucite ($MgOH_2$) is derived by the weathering/alteration of *dunite* to *serpentine*, I couldn't find a definitive answer as to what causes the bright yellow colour beyond that it might be due to traces of Fe.



Figure 4: Brucite, Balochistan, Pakistan

Calcite isn't a mineral I normally collect but the scalenohedral crystals in **Figure 5** below left from Tennessee caught my eye; do they catch yours too? The complete crystal is 10 cm tall. The calcite crystal structure readily allows substitution of metallic ions and the yellow colour is probably due to the presence of Fe ions.



Figure 5: Calcite Scalenohedrons, Tennessee, USA



Figure 6: Fluorite, Valvergues, France

The Valzergues deposit in France is famous for its intense yellow fluorite specimens, an example of which is shown in **Figure 6 above right**. The yellow colour is apparently caused by one oxygen atom (O^{2-}) substituting for two fluorine (F) atoms in the crystal lattice.

The crystal group of *wulfenite* (*lead molybdate*) blades in **Figure 7** featured in one of my first Minchat articles on unusual crystal forms way back when but I think they deserve a reprise here. This example below is from Slovenia.



Figure 7: Wulfenite Crystals, Slovenia

Figure 8 below shows a lovely vug of gemmy, yellow mimetite crystals from the home of the best mimetite crystals ever found, Tsumeb Mine. I still have 'seller's remorse' from parting with this specimen to Crystal Classics in a brain-fade episode in 2015. The best mimetites were found in 1971 in the famous 'gem' pocket and clusters of the gemmy yellowish crystals to 2 cm sell for five figure US\$ prices, if you are lucky enough to come across such a specimen for sale these days. It is a lead *arsenate*.



Figure 8: Mimetite Crystal Vug, Tsumeb Mine, Namibia

Staying in Namibia, last but not least, is a lovely barite specimen from the Rosh Pinah mine in southern Namibia from some of the best finds, *circa* 1989, of this mineral in southern Africa. This one is 11 cm long and features a crust of small platy barite crystals on a calcite and *sulfide* matrix. It was bought at a club Open Day in 2023.



Figure 10: Barite Crystals on Matrix, Rosh Pinah, Namibia

Concluding Remarks

We usually end up with *diamond* in these colour-theme articles and it is one of the few minerals that could feature in each of the pink, black, colourless, red and yellow Minchat articles so far. However, Instead, we'll go with *gold*, the ultimate yellow mineral, although gold isn't a true colour, *per se*. It is one of the noble metals, i.e. it doesn't oxidise or tarnish and only reacts with *aqua regia*, a potent mixture of hydrochloric and nitric acids. It is one of the few minerals that is still prized by collectors even after being worn-down by the action of water to form gold nuggets. It comes in crystalline, leaf, vein, nugget and microscopic grain form and examples are shown in **Figure 9**. I've never owned a gold specimen so the images are courtesy of The Mineral Gallery and Auction.

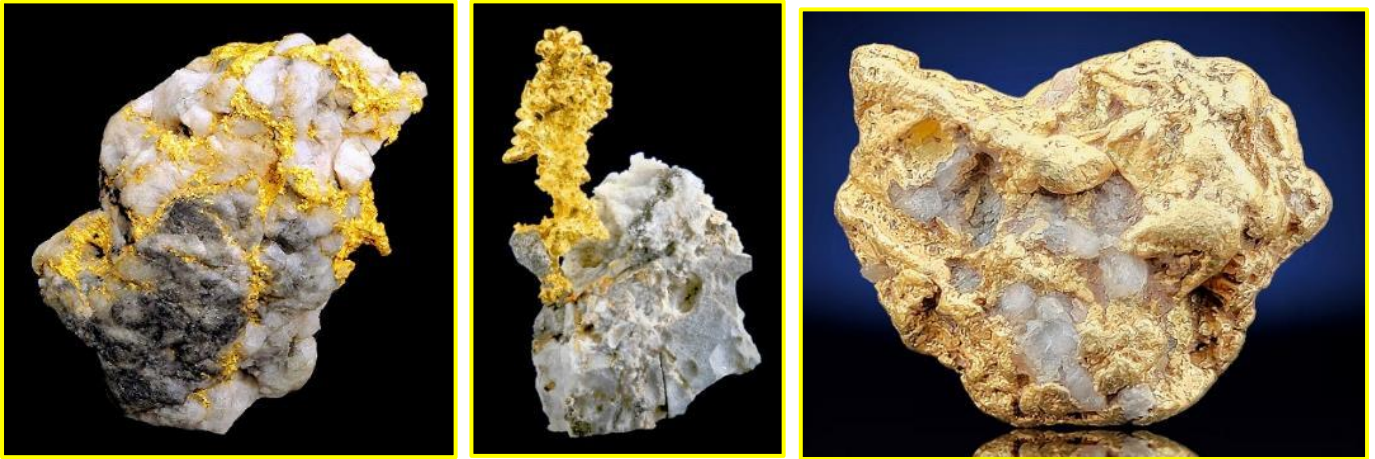


Figure 9: Vein, Crystallised and Nugget Gold (courtesy of The Mineral Gallery and Auction)

We've still got blue and green colours to feature, and plenty of minerals to choose from in those hues...

PR

From the Cabinet of Curiosities



A large piece of unusually blue quartz from Ysterputs Mine, Namibia. The blue colour of chalcedony is reportedly ascribed to the Tyndall effect or Rayleigh scattering - due to cavities, mineral inclusions, or sub-micron-sized spheroids thought to be amorphous silica. Presumably this definition may also apply to this blue quartz.

Height of crystal = 220mm



"FACETIPS – A Gem Cutter's Notebook" by Duncan Miller.

Most of the faceting articles published over the past few years in the Mineral Chatter have now been compiled into a single 128-page document. The pdf file is available for download for free from <http://ctminsoc.org.za/articles.php> for those interested in having all the articles together.

LAPIDARY WORK A Seagull and its Egg

What can you make with a thick block of Blue Lace agate?



Cut two cores and make two 7cm spheres. And with the piece left over?



Give the outer side a polish...

Reveal your seagull..., add an egg..., et voila!



Maybe you'll get a hatchling too!

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capetowngemmineralclub@gmail.com