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JANUARY/FEBRUARY 2024



A thin layer of black manganese ore is overlain by alternating beds of sandstone. Notice the reddish-brown ochre clay - once a popular cosmetic and a colouring substance. Photo: Lesley Andrews.

DIARY

January	27	9.30–	CLUB CLEAN UP DAY
February	3	10:00–14:00	Open to the Public Day – Rocks, gems, jewellery, mineral specimens to look at, chat about, swap, sell or buy.
March	2	10:00–14:00	Open to the Public Day – Rocks, gems, jewellery, mineral specimens to look at, chat about, swap, sell or buy.
	9		ANNUAL GENERAL MEETING
	28	Easter weekend	Gemboree at Barberton

A Field Trip to the Hout Bay Manganese Mines

By Prodromos Nikolaidis

A suggestion about visiting the Hout Bay manganese mines was made on the mineral club's WhatsApp group chat which led to more than a dozen club members showing up on Saturday 16th December 2023 to participate. We met at 08:00 at the agreed spot, put on our hats and sunscreen and off we went for an approximately 1,3 km hike towards the old mines (**Figure 1**).



Figure 1 left: An approximately 1,3 km hike (red-coloured line) is required to reach the old manganese mines, starting from the parking lot right next to East Fort on Chapman's Peak Drive. The location of the mine relative to Hout Bay is seen on the inset map with the red star.

Inset map source: OpenTopoMap.org. Satellite image source: Google Earth.

We climbed on up and the hot sun split us into subgroups, with each having its own hiking pace (**Figure 2**).



Figure 2: Members of the Cape Town Gem and Mineral Club hiking up to the old Hout Bay manganese mines. Visible in the background is the Sentinel peak (331 m) and just below it the Hout Bay Heights. Photo: Prodromos Nikolaidis.

Frequent stops were made during the ascent to catch our breath and re-hydrate. That was a good opportunity for Malcolm to share his knowledge and enlighten the group about the mine's history and geology, and for others to honour the club's motto (*Omnem Movere Lapidem* – leave no stone unturned) trying to find some nice specimens in the old ore piles (**Figure 3 below**). At this point Malcolm demonstrated how to use a ceramic streak plate to distinguish manganese ore (black streak) from iron ore in the form of goethite (brown streak). He donated some streak plates that he had once made to those present.



Figure 3: Panoramic view from a spot close to the mines with Hout Bay in the background. Malcolm shares his knowledge about the mines' history and geology. Notice that the group is standing on top of an old pile of black manganese ore (many of the group members went through the pile trying their luck on finding a nice specimen – after all *Omnem Movere Lapidem!*). Photo: Prodromos Nikolaidis

Eventually, we reached the abandoned mines and entered one of the adits, and were impressed by the height of it (exceeding 10 m) and the amount of ore that was extracted (<Figure 4).



<Figure 4: Philip standing amazed by the height of the old mining adit. Photo: Lesley Andrews.

At the walls of the mining adit, one can observe interesting features such as the textural relationship between the manganese ore and the host sediments (Figure 5) or ochre clay alongside manganese ore horizons (Figure 6).



Figure 5 to right: Textural relationship between the black manganese ore and the white-orange-brown host sediments. Notice how the host sediments (primarily sandstone) texturally flow around and engulf the manganese ore. Photo: Chris Hajec.



Figure 6: A thin layer of black manganese ore is overlain by alternating beds of sandstone. Notice the reddish-brown ochre clay - once a popular cosmetic and a colouring substance. Photo: Lesley Andrews.

After everyone had had their fair share of adventure, hiking and titbits of knowledge, it was time to go downhill. Fortunately, we honoured a second motto during the day – that of the marines – and we left no man (or woman) behind. Everyone made it back happy, safe and sound and a group photo is proof of that (**Figure 7**).



Figure 7: Group photo at the end of the field trip. Photo: Melanie Jackson. (Chris and Cornelius are missing from the photo.)

A short note on the history and geology of the Hout Bay manganese mines

When the words “manganese” and “South Africa” are put together at the beginning of a sentence, then it is almost a certainty that words such as Postmasburg, Kuruman or Kalahari Manganese Field will follow. And this is natural as the manganese ore reserves that lie near those areas, all within the Northern Cape, are the vastest in the world (Cairncross & Beukes, 2013). However, in rare instances, manganese and South Africa can be combined with Hout Bay in the Western Cape where older abandoned manganese mines are found. As a matter of fact, the manganese mines of Hout Bay pre-date the grand mines of Northern Cape, although they were subsequently overshadowed by them.

The history of the Hout Bay manganese mines is vague and not well documented, and sources of information are rather scarce. The available sources suggest that the Hout Bay manganese ore occurrence was discovered in the area in November of 1873. However, the ore was not mined at that time due to its low grade combined with a relatively low demand. The situation changed when metallurgical advances led to the invention of manganese steel and demand for the metal gradually picked up. In 1909, two individuals, named Prior and Parker, formed the Hout Bay Manganese Ltd. company and within the same year they exported the first batch of ore to Belgium. However, this turned out to be a very short-lived project and by 1912 the mine was closed. It is unclear why the mine was shut down, but it is speculated that this could have been the result of a combination of reasons – the most likely being the recurring problems and breakdowns of the ore transportation system. According to the sources, the manganese ore that was extracted from the mountain’s slope was transported down the shore through a 300 m steel chute built at an angle of 45 degrees. Then the ore was transferred via a jetty (its concrete remains are still visible today) onto barges which in turn discharged their load on cargo ships waiting in the bay.

The last attempt to revive the mines was made in 1929 but given the fact that the giant Northern Cape deposits had just been discovered and that the Wall Street Crash happened the same year, it meant that this venture was doomed to fail before it even started. Today one can see heaps of manganese ore lying around the mountain slope still waiting

to be transported down the shore and to be exported.

Structurally, the manganese ore fills northwest-southeast trending fractures and cracks developed perpendicular to the bedding of the surrounding sandstone host rocks. The width of the manganese-filled fractures varies considerably and at depth it has been proven not to exceed 75 cm (Harris, 1978). According to Harris (1978), the ore exposure on the surface was much greater than at depth and he indicatively mentions that an 18 m-width surface exposure very rapidly pinched down to a mere width of 1,5 m after a depth of only 3 m. This apparent surficial width could have potentially created “false hopes” about the deposit’s dimensions and volume.

Geologically, the prevailing genetic model is that manganese was leached from the host rocks of the Table Mountain Group by meteoric groundwater and then re-precipitated in near-surface faults, fractures, cracks and cavities by the oxidation of the reduced acidic groundwater carrying iron and manganese in their reduced states (Marchant et al., 1978).

Although Hartnady and Rogers (1990) are in general agreement with the aforementioned model, they suggest a somewhat modified two-stage alternative model in which primary hydrothermal leaching and syntectonic precipitation of the metals in extensional features is followed by later supergene enrichment by meteoric groundwater.

A third alternate model is proposed by Killick (2020) who agrees that the mineralization has most probably precipitated in a near-surface environment from groundwater circulating through fractured rocks, but he further suggests that this model is not sufficient to fully explain all field observations. Killick (2020) argues that the manganese mineralization is spatially associated with intrusive dolerite dykes which penetrate rocks of the Table Mountain Group sequence. Specifically, he suggests that the dykes played a dual role: 1) they provided the heat source and conduit for hydrothermal fluids to circulate, thereby facilitating the mineralizing process and 2) these dykes provide a favourable host rock after their intrusion, cooling and subsequent weathering and erosion.

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<https://www.mindat.org/loc-56228.html>

Footnote and photo on Dufrénite from Duncan Miller regarding the visit to the above mine ...

Dufrénite is an iron phosphate (<https://www.mindat.org/min-1323.html>), and one of the more unusual minerals found at the Hout Bay manganese mines (<https://www.mindat.org/loc-56228.html>). Visually it is difficult to distinguish from goethite, but it has a greenish-yellow streak and under the polarising microscope elongated fragments are strongly pleochroic, dark reddish brown to green. **DM**



Dufrénite in radiating clusters from the Hout Bay manganese mines (83 × 60 × 44 mm) (Photo Duncan Miller)

From the Cabinet of Curiosities



LIBYAN DESERT GLASS

Recently, Elizaveta Kovaleva, a lecturer at the University of the Western Cape published an article (<https://theconversation.com/libyan-deserts-yellow-glass-how-we-discovered-the-origin-of-these-rare-and-mysterious-shards-217565>) and a scientific paper (<https://doi.org/10.2138/am-2022-8759>) about Libyan desert glass. This is bright yellow glass, found in sand-blasted fragments, in the eastern Libyan and western Egyptian desert. It has been a curiosity for millennia, even used for a carved scarab in the centre of Tutankhamun's breastplate. Elizaveta has shown that these glass fragments originated from a meteorite impact - rather than a meteor explosion in the air - thus solving a long-standing mystery of their origin. This may also have solved the mystery of a curious 20,5 g piece of yellow glass in my collection. It has a completely frosted surface that makes the accompanying photograph look out of focus even though it isn't, contains spherical bubbles typical of glass, but also contains small, round, fuzzy, white blobs and some tiny black inclusions. These all point to its possibly being a specimen of Libyan desert glass, which has been lurking in a packet of miscellaneous faceting rough for somewhat less than millennia. The next step is to ask Elizaveta for her opinion. **DM**



And to start off the New Year, Peter Rosewarne asks the question:

Why?

By Peter Rosewarne

Introduction

This is the briefest title of any MinChat article I've written yet and the most arcane and could presage a discussion on just about any subject you can think of. But, in this case, it is about our passion, minerals, and not just any minerals, but the most aesthetic you can think of or imagine. Leafing through Volumes 1–7 of *Wilensky Exquisite Minerals* (2005–2020), *Ikons* (2007) and *Flawless Beauty* (2023), amongst other sensory-stimulating mineral books, got me thinking, or rather philosophising. I realize that is a big word not usually associated with my articles but please bear with me, while I, er, philosophise...

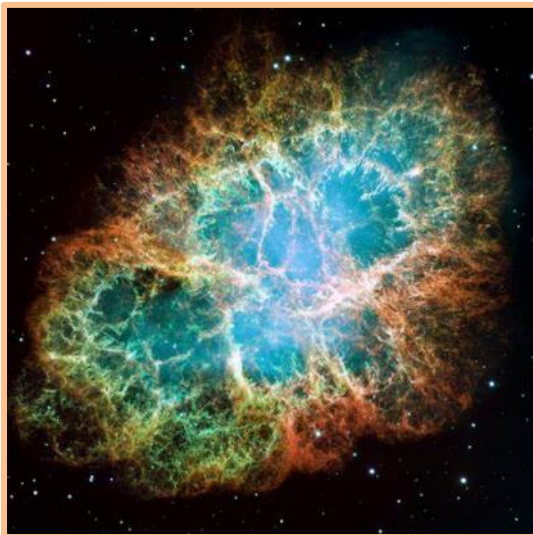


Background

We tend to take the beauty of crystals for granted but, a bit like the question, “why are we here?” the question, “Why are many minerals so colourful and aesthetic?” can also be asked. Many/most were formed millions of years before there was anyone capable of appreciating them. And most were formed below ground in environments that never saw the light of day until a miner or collector exposed them. Many are essential to our way of life but they didn't need to be aesthetic or colourful to achieve this role. Animals and insects that live in caves in the blackness of the earth's interior evolve into species that lose their sight organs or they are greatly atrophied, but fortunately for us collectors, minerals retain their vivid colours in that environment.

Early Days/Millennia

The process of mineral development starts in supernovae, which are basically exploding stars at the end of their lives. Elements up to *iron* in the Periodic Table are generated in stars but once they start producing *nickel* their fate is sealed as this process *requires* energy rather than produces it. Stars larger than 8 times the mass of our Sun eventually



become unstable and explode, to condense a very complex process into one word, and their contents are blown out into space. All the other known elements beyond iron in the Periodic Table are created in the nuclear inferno of the supernova. The Crab Nebula is the remnant of such an explosion which was first noted by Chinese astronomers in 1054. It is estimated to be 6 300 light years from Earth and is expanding at 1 500 km/s (Wikipedia). So don't hold your breath waiting for any minerals to reach Earth from that source!

The Crab Nebula

The answer to the “Why?” regarding the colours of minerals can be summed up in one word - *oxygen* - and one event, the Great Oxidation Event (Hazen, 2015). Prior to this, minerals were mostly dull as the prevailing geochemical conditions meant that only metallic native elements, sulfides and oxides could form, e.g. the massive banded iron formations such as those at Sishen, Northern Cape,

South Africa. For about the first 2,5 billion years of Earth's history, all free oxygen was taken up in the formation of *hematite* and *magnetite*. Once free oxygen became available courtesy of cyanobacteria, colourful minerals of e.g. *copper*, *uranium*, *nickel*, *zinc*, *cobalt* and many others could form.

The appearance of excess oxygen also paved the way for the development of humans billions of years later and evolution of colour-sensitive eyes and the brain capacity with which to appreciate the natural beauty of minerals. Every other inanimate aesthetic collectible has been created by people, be they paintings, stamps, coins, artifacts i.e. after the development of sight and appreciation developed for such items. These artistic creations also have inherent biases related to *inter alia* their country of origin and the political or religious leanings of their creators, however subtle. However, minerals are stateless, classless (apart from their crystal form) and agnostic, although many is the time that a human has cried out, “Oh my god,” or “Holy ****!” on opening up a cavity lined with fabulous mineral treasures 😊.

Revolution

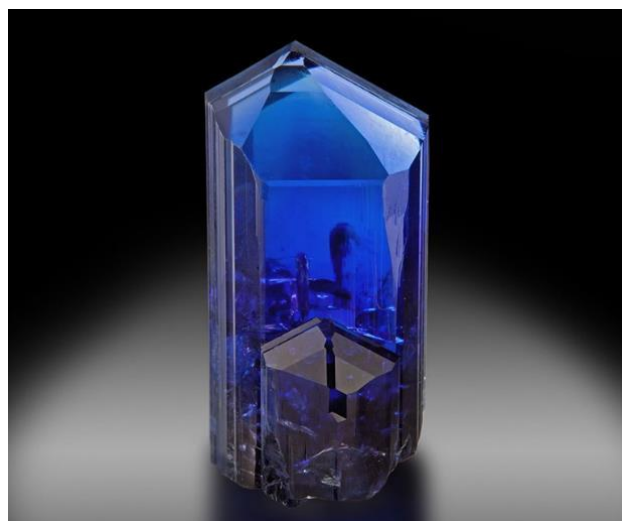
Around 43 000 years ago our ancestors started using minerals for pigments to paint scenes on cave walls and to paint themselves. *Lapis Lazuli* was discovered in Afghanistan about 5 000 years ago and iron and copper minerals were smelted by our ancestors in the iron and bronze ages. The evolution of the discovery and use of hundreds of other minerals followed, leading us into the steel, nuclear and space ages.

One consequence of human appreciation and collection of aesthetic minerals is that the quality of specimens has mostly been increasing since collecting first became fashionable in the 16th century. This isn't because minerals can think and have decided to make themselves more attractive to us but is driven by market forces which drive the quest for unearthing ever better specimens and the saving of exquisite specimens from the crusher by far-sighted mine managers and companies. Dedicated specimen mining has also played its part; think the Pederneira Mine, Brazil. Imagine priceless works of art being purposely consigned to the shredder/compactor of a landfill operation? Well, that is what has happened to countless thousands of specimens over centuries of commercial mining via the ore crusher. Another threat to the preservation of exquisite mineral specimens is the breaking up of world-class gem specimens for the cutting trade.

Most mining companies had/have a zero tolerance for the collection of specimens by miners but fortunately, many disobeyed these instructions and hid wonderful specimens in their lunchboxes or overalls to be sold to dealers and thence into the hands of collectors. It is no coincidence that one of the major international dealers is called The Miner's Lunchbox. Dedicated specimen mining at famous mines has also contributed to the discovery of wonderful mineral specimens, e.g. *wulfenite* from the Red Cloud Mine, *rhodochrosite* from the Sweet Home Mine and *fluorite* from the Rogerley Mine, UK. Some randomly selected wonders of the mineral world are shown below.



Top: Elbaite from the Congo. Lower: Blue Cap Tourmaline, USA (Fine Minerals International © J. Elliot)



Tanzanite from Tanzania (right hand crystal Fine Minerals International © J Elliot)



A selection of Superb Mineral Specimens from Wilensky Exquisite Minerals
(l to r, aquamarine, fluorite, elbaite, *spessartite on quartz*, *heliodor*, *vivianite*)



Fluorite, Illinois, USA

Wulfenite, Red Cloud Mine, USA

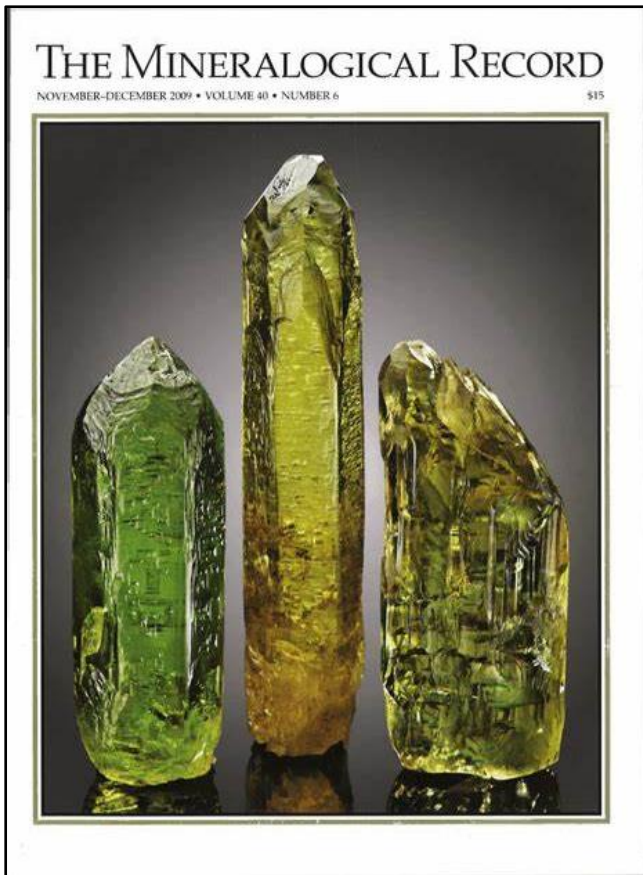


Amethyst, Georgia, USA

Rhodochrosite, Sweet Home Mine, USA

Four Selections from Fine Minerals International (© J Elliot)

Many wonderful mineral specimens have graced the front cover of *The Mineralogical Record* over the years and one of my favourites is shown below.



Heliodor Crystals from the Ukraine

I have a coffee table book, *Minerals of the World*, published in 1986 which I thought was a fine book when given it in 1987. However, looking at the pictures now it doesn't compare very favourably with e.g. *Masterpieces of the Mineral Word* (2004). The beryl specimens (aquamarine, emerald, heliodor and morganite) for example are downright drab while those in the latter book show a very rapid evolution of specimen quality (and photography) in just 17 years.

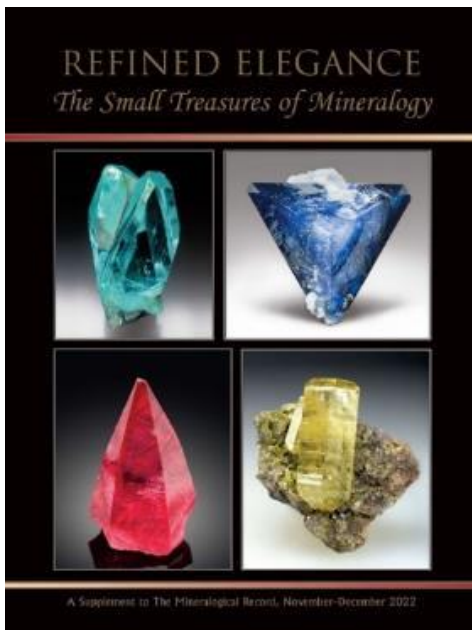
Another unique aspect of mineral collecting is that no two specimens are the same and there is always the likelihood that a "best of" specimen will be discovered to replace the previous best of specimen. With all other forms of collecting, collectors already know what is "out there" and it is unlikely that a new Rembrandt painting or previously unheard-of stamp is going to be discovered.

In the mineral world, bigger is not always better. Some of the most exquisite mineral specimens are so-called micro-mounts that need a microscope to reveal their beauty. So not only did these minerals need someone/something to develop sight to be

appreciated but they also needed the same beings to invent the microscope. As the saying goes, "Ours not to reason why," although we are. A micro-mount of *villiaumite* and *tuperssuatsiaite* enclosed in *phonolite* from Aris Quarry south of Windhoek, Namibia is shown below and *The Mineral Record* devoted a supplement to thumbnails in their November-December 2022 issue.



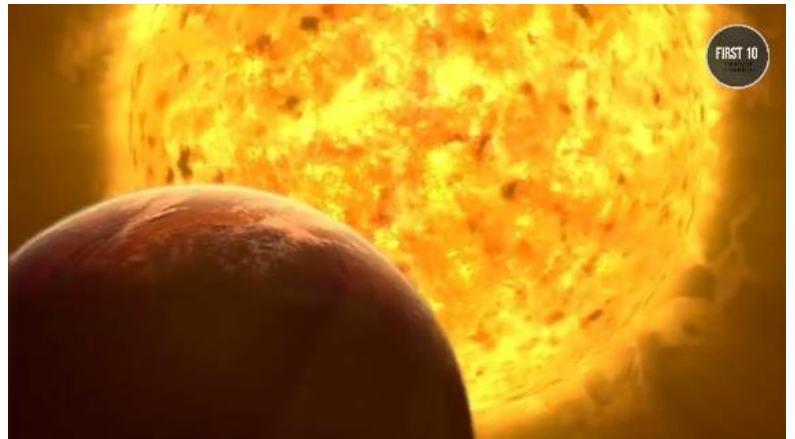
Villiaumite and Tuperssuatsiaite from Aris Quarry, Namibia



Supplement to The Mineralogical Record on Thumbnails (clockwise from top left-hand corner, *phosphophyllite*, *benitoite*, *mimetite* and *rhodochrosite*)

And in the End...

In about 5 billion years, the Earth is going to be engulfed by the expanding Sun as it evolves into a red giant (too small for a supernova). All the aesthetic minerals and everything else on or in the Earth will be melted/vaporized to release their constituent ions into space ready to start the cycle again, but humans will presumably have migrated to other worlds by then otherwise they are going to be toast.



And to answer the original question, **“Why?”**,

my take, and it is no doubt not original, is that it is mostly down to oxygen which paved the way for both the development of aesthetic and colourful minerals and also the evolution of humans with the ability to see in colour and the mental capacity to appreciate these natural wonders; the so-called Anthropogenic Principal at work?

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Wilensky Exquisite Minerals
Fine Minerals International

FACETING A LARGE SPODUMENE

Duncan Miller

In 2016 retired geology professor Izak Rust sent me a large yellow spodumene crystal, weighing 77,4 g. Some years ago I sawed a piece off successfully, through a plane of inclusions.

The smaller piece I faceted into a standard round brilliant, with no problems. I gave both the cut stone and the remaining rough to the CT Gem & Mineral Club for their annual auction.

A bidding war then ensued between me and the late Ken Coleman, who dropped out at R1200 when I bid R1500. Immediately after the auction he offered me R1200 for the cut stone, which is what he actually wanted.



So the club got R1500, Ken got his stone, I got the big piece of rough for R300, and everyone was happy.

In mid-2023 I tackled faceting the big stone, which now looked like this (with a more realistic colour). See right.

A large oval seemed to offer the best recovery, with a checker crown to avoid a table parallel to the major cleavage face (facing outwards in the photograph).

Performing the pavilion went reasonable easily, although it took a

long time. But when I started grinding the girdle facets some penetrating cleavage cracks appeared, threatening to split the stone horizontally.

This was so disheartening that I took it off the dop and put it aside.



Some months later I felt sorry for it – and I don't like unfinished business – so I ground a table at 10° to the major cleavage face, redopped the stone, and started cutting a much smaller oval to avoid the existing cleavage cracks.

Having both the orthogonal cleavages now well off the table and any girdle facets made it safer. Grinding on the 1200 mesh diamond lap was slow, but fortunately spodumene polishes very easily so the final stages went quickly.

The result is a light yellow 30,06 ct, 22,85 × 17,14 × 13,35 mm oval (unfortunately only 15% recovery) but very brilliant with lots of sparkle.



Thank you Izak for your donation and the challenge. It is not one I want to repeat!

“FACETIPS – A Gem Cutter’s Notebook” by Duncan Miller.



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.

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