ANDYSEZ 62 – *Mondmilch*.

Andy Spate

There have now been 125 ACKMA Journals – nearly half have had ANDYSEZs (and many other contributions from me).

So here is another one!

What, I hear you cry, is *mondmilch*? You may have heard the term 'moonmilk'? The term comes from Germany where, and in many other counties, it has been used for medicinal purposes – probably for millennia. We will come back to this later.

Hill and Forti (1997, as I have said before this book, this book should be in every show cave office for the use of staff) state on page 81:

> *Moonmilk is a term used to describe aggregates of microcrystalline substances of varying composition. Moonmilk is soft, plastic, and pasty when wet, but crumbly and powdery when dry. Wet moonmilk looks and feels like white cream cheese when rubbed between the fingers; dry moonmilk resembles talcum or chalk powder. [In Australian conditions the pasty form will sometimes set hard.] … Moonmilk is a speleothem. Not a mineral.*

Hill and Forti discuss moonmilk at length pointing out that moonmilk is found in caves from alpine to tropical environments being more common in the latter. Palmer (2007) also provides a good discussion (page 298). Hill and Forti list four ways in which moonmilk can originate. An edited version of their list is:

1. *Freezing of limestone by water ice causes carbon dioxide to be expelled from the limestone, and a milky fluid is produced on the limestone wall. [Won't work for the tropics!]*
2. *Moonmilk is formed as part of the life cycle of microorganisms. Species of bacteria, algae, and fungus have all been isolated from moonmilk deposits … However other authors … did not find microorganisms ... It appears then, that microorganisms are a possible, but not essential factor in the formation of moonmilk ...*
3. *Moonmilk is a disintegration product of bedrock or speleothems … This is the most frequently used and oldest explanation of the origin of rock milk, the theory first having been proposed by Lang in 1708: "Water … in internal cavities appears to contain salts and superficial vapors behaving as solvents which substantially convert to moonmilk." This explanation does not adequately account for moonmilk flowstone issuing forth from cracks in the wall, nor does it account for the fact that moonmilk often contains silica and other impurities when the limestone bedrock may be free of these impurities … [But where did the impurities come from, then?]*
4. *Probably the best theory – the one that explains the majority of moonmilk deposits – is that moonmilk precipitates directly from groundwater as do other speleothems such as stalactites and stalagmites, but that, for some reason, the crystals in the deposit never grow large. This theory readily applies to magnesium carbonate minerals such as … it is the nature of these minerals to form as finely microcrystalline to cryptocrystalline deposits. The existence of non-carbonate moonmilk is, from our point of view, also an important factor in favor of this theory, because it implies that moonmilk formation does not have to be strictly related to a defined chemical reaction, but only to particular physio-chemical conditions. [Known as having a bet each-way.] However, this theory does not readily explain why many moonmilk deposits are composed of minerals such as calcite and aragonite which usually form as microcrystalline or crystalline deposits.*

Gillieson (2021), in his splendid new book, has this to say about moonmilk:

> *Moonmilk, a soft powdery calcite, has attracted a lot of attention primarily because of its unusual chemical composition and its use by humans. The precise reasons for its microcrystalline habit are unclear.* (page 149)

Well – there you have it. And probably as confused as I am!

Moonmilk was mentioned as far back by Agricola in 1546. Harking back to explanation #2 – microorganisms - some forgotten someone I was with in Jillabenan Cave, Yarrangobilly, many, many years ago noticed moonmilk on the bare limestone wall leading up to the 'Crystal Grotto' and suggested, having seen early 20th Century photos of the wall with little or no moonmilk, but now seeing a relative abundance wondered whether we humans could 'infect' one cave with microorganisms – food for thought. I have been unable to track down early Jillabenan photos.

Gillieson has this to say on this issue:

> *The sudden appearance of Mondmilch (moonmilk) in some caves may be related to the introduction of bacteria foreign to the cave by speleologists (Derek Ford, pers. comm.)* (page 273).

Could it have been Derek and I in Jillabenan years ago?

Right – I have been avoiding the medical aspects of moonmilk thus far so let us take a look. Gillieson has this to say in this regard:

> *The healing properties of caves and their contents have been highly regarded for millennia. Crushed stalactites were used in Chinese traditional medicine as early as the fourth century BCE. They were used as an antacid, to suppress coughs, to stop bleeding and to encourage lactation in nursing mothers.* (page 324).

Here I must stop and confess to a shameful event. At Yarrangobilly I was chatting with a young Indigenous man from the local Wiradjuri peoples. He told me that the Wiradjuri had been coming to Yarrangobilly to collect calcite for medicinal purposes. I (thankfully mentally) dismissed this as nonsense. If they did visit, they left

little trace of their coming. And then I started to think about moonmilk and the fact that calcite is an antacid. I am so glad I didn't voice my stupid, off the cuff, thoughts!

But let's look briefly at the history of moonmilk as medicine. What follows is an edited page of Shaw's page 224:

> ***Mondmilch*** *…was commonly used as a treatment for eye diseases, for drying up of abscesses and wounds and for increasing the flow of mother's milk. It used to be sold also at county fairs as a medicament to admonish evil spirits and to bewitch loved ones. … In veterinary medicine, the Swiss used mondmilch to reduce abscesses, to increase milk production in cases of udder disease, and the protect animals from mange. According to Gesner (1555):*
>
> > Certain people superstitiously and foolish think it beneficial to use for any patient's disease, for which reason it is sought in the Mondmilchhlock Cave for that purpose.
>
> *… DeBoodt (1609) added that it is of special benefit to a patient if his name is mentioned when the mondmilch is taken from the cave. …*
>
> *Sennert (1667) used mondmilch in several prescriptions, including one to prepare a lozenge against the burning of the stomach (an antacid), a glactophore lozenge for wet-nurses, a powder to dry and heal ulcers and as a cometic to beatify the face and hands.* [You can Google galactophore for yourselves] …
>
> *De Costa (1557) recorded its continued use for "hemorrhages, … diarrheas, dysenteries , the gravel, [??] malignant fevers & … for the drying up of ulcers of all kinds'.*
>
> *It appears that in the western world calcium carbonate from caves ceased to be used medicinally about the middle of the 18th century …*

This brief history doesn't mention the Asian use of moonmilk that goes back millennia as Shaw notes. But does it have any medicinal relevance today? It sure does!

The tetracycline collection of antibiotics – some used to treat eye problems – sound familiar? – originated as organics collected from soils and cave sediments! I cannot find a reference to tetracyclines from caves – I had one years ago but here are two for you to look at:

https://researchbank.swinburne.edu.au/file/048bf8e2-0337-4ed2-9972-4ff572dd1de1/1/hasina_mkwata_thesis.pdf

https://core.ac.uk/download/pdf/55290962.pdf

References (all are remarkable texts).

Hill CA and Forti P, (eds) 1997, *Cave Minerals of the World*, (2nd edition), National Speleological Society, In, Hunsville, Alabama.

Palmer AN, 2007, *Cave Geology*, Cave Books (an affiliate of the Cave Research Foundation), Dayton, Ohio.

Shaw TR, 1992, *History of Cave Science: The exploration and study of limestone caves, to 190*0, (2nd edition), Sydney Speleological Society, Sydney.

Winner of the Photography Category of the IYCK Competition

Croesus Wandering - By John Oxley

Cave: Croesus, Northern Tasmania

Date: October 2020 Model: Ciara Smart.
Camera: Canon 600D – 2-second exposure - lit by a single LED light directed at the camera.