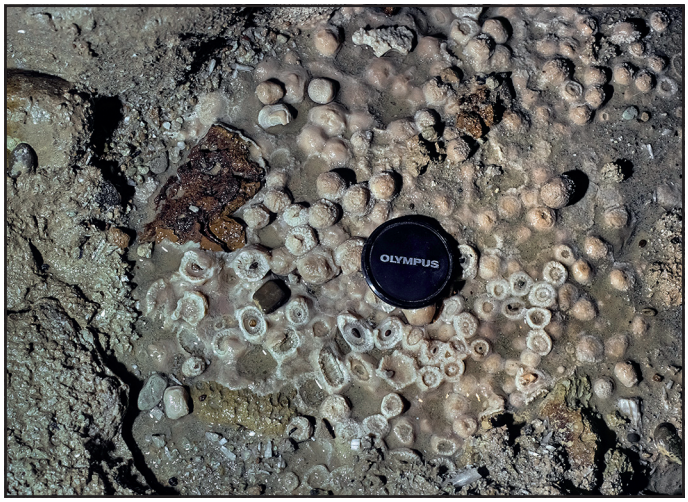

Photo Feature

The "Pearls of Wisdom", Warren's Self Respect Cave, Waitomo, New Zealand

John Gunn

In February 2026, when we received the paper by Garry Smith that features in this Issue of *Cave and Karst Science*, I was reminded immediately of the most fascinating cave pearls that I have seen. The "Pearls of Wisdom" (the name I gave them) are in Warren's Self Respect Cave, one of the Waipapa Road Caves in the Waitomo District of New Zealand, where I undertook the research for my PhD. Originally photographed on 35mm slide film using an Olympus OM1 camera with a 49mm Zuiko macro lens; the slides featured were scanned commercially.

The top image of the set shown on the left was taken in September 1976, and includes most of the pearls within this "nest". Below that, the other three images, taken in February 1976, show part of the same area at increasing levels of detail. A 49mm lens-cap included in the upper two images gives an indication of scale, but note that it is at a different location on each slide. Although I did not undertake any more-detailed research at the site, I suggest the following developmental sequence:

(1) initial growth of the pearls was centred around nuclei comprising small grit clasts, by deposition of calcite from water saturated with calcium carbonate in an enclosed basin. At this stage the pearls must have been able to move freely, each forming a sub-spherical or elongate structure, reflecting the shape of its grit nucleus.

(2) eventually the pool became filled with pearls, preventing their further movement and, as calcium carbonate continued to be precipitated from the saturated water, they became buried. This can best be seen on the right-hand side of the top image and the left-hand side of the second image.

(3) subsequently there was a change in the water chemistry and unsaturated water flowed across, and/or accumulated in, the pool. Calcite was dissolved, exposing pearl nuclei, which – in some cases – have been removed completely. This is well-shown on the third image, where the nuclei are missing from most of the pearls, especially those in the lower part of the picture. Interestingly, the former nuclei are nowhere to be seen, suggesting that the clasts must have been eroded/transported away from the pool. Scaling from the lens cap, the two clasts just below the centre of image 2 are about 6mm in long axis (medium gravel) and the Hjulstrom curve indicates that a minimum velocity of *c*.90cm/s is required to erode and transport clasts of this size. This suggests that, at some stage, there was a fast-flowing stream of aggressive water passing over the pearls.

One possible factor that might have triggered the change from deposition to erosion is that native forest was removed from the area and replaced by pasture around 50 to 75 years before the photographs were taken. This would have impacted on soil carbon dioxide concentrations, which are higher beneath native forest than under grassland (Gunn and Trudgill, 1982).

Sadly, just as this issue was going to press, I received news that the floor with the pearls has disappeared beneath a thin layer of mud, most likely washed down from the entrance during heavy rain. This emphasises the dynamic nature of cave processes!

"PhotoPhill" Round, of the Auckland Speleological Group, is thanked both for help with the original photography and for the update on the current situation"

Reference

Gunn J and Trudgill, S T, 1982. Carbon dioxide production and concentrations in the soil atmosphere: A case study from New Zealand volcanic ash soils. *Catena*, Vol.9, 81–94.