

Rubicon Valley's explosive past

By Emily Friedel

IMAGINE THE Rubicon Valley and a chunk of the Earth's crust around it – about 27km in diameter – sinking into a massive magma chamber, causing a volcanic eruption with worldwide ramifications. Imagine a ring of spectacular explosions around the edge of the magma chamber sending great clouds of hot ash several kilometres high, only to rain down and cover everything in sight.

It may be difficult to envision the serene forests of the Rubicon Valley sitting at the centre of a furious ring of volcanic activity, but this is precisely what happened around 365 million years ago.

The Rubicon Valley lies in the heart of the Cerberean

Caldera, a supervolcano, which was highly active during the late Devonian period when Australia was still part of the supercontinent Gondwana.

"They would have been gigantic eruptions, mainly of ash flows or ignimbrites, and they probably would have had some sort of global effect on the atmosphere," says Dr Bill Birch, Curator Emeritus at Museum Victoria, describing the Cerberean Caldera's activity at its climax.

"There was some life around at the time, there were some plants and fish, and anything that was in that area would have been completely obliterated."

The Cerberean Caldera was probably active for millions of years. There were smaller eruptions

and periods of dormancy before the enormous chunk of Earth's crust broke away taking the Rubicon Valley with it and sank a couple of kilometres down into the magma chamber during the late Devonian. This was the last time the supervolcano erupted – it quite literally went out with a bang.

"There's some early volcanism represented, isolated flows that are preserved underneath the main thick volcanic eruptions, and there were lake horizons in there with fish, so there were some quiet periods between eruptions in the early stage. Then there was this massive collapse, and that's when you had the very thick ash flows," Dr Birch says.

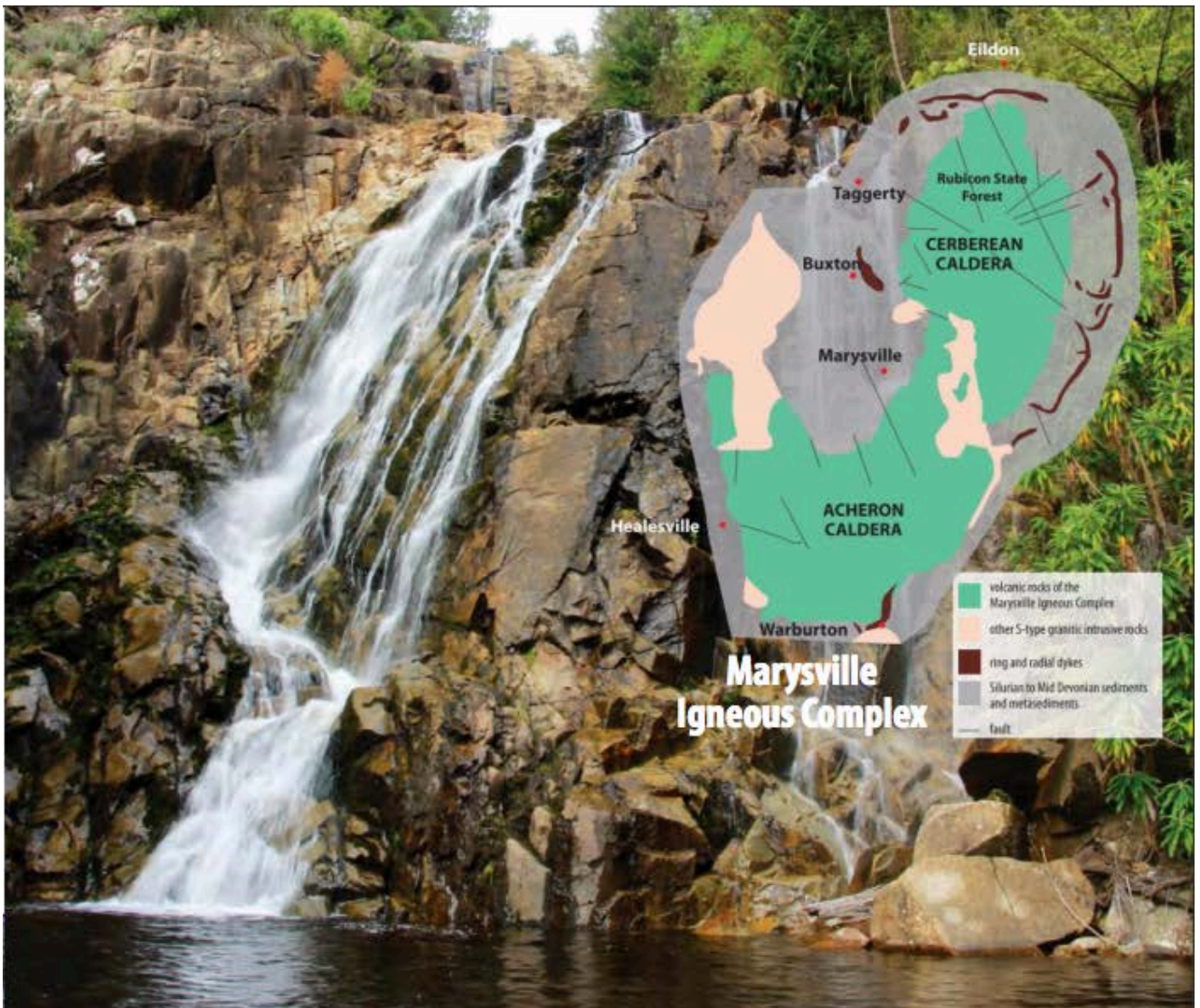
Since that final collapse,

erosion has lowered the landscape of that time by up to several hundreds of metres, but today's familiar landscape features still show evidence of the volcanic rocks. The Rubicon Rhyolite is a thick sheet of rock that erupted from the Cerberean Caldera and, even after millions of years, it is seen in the prominent scarps around the edges of the Cerberean Ranges, the volcanic rock that forms Steavensons Falls, and the cuttings along Snobs Creek Road.

"The Rubicon Rhyolite erupted as a gigantic cloud of hot ash, what's known as pyroclastic flow: very turbulent and very hot – 800 degrees Celsius – with churning, turbulent crystals, ash, and pieces of the magma that had been blown to bits. Eventually, it all ➤

Photo page 13: Snobs Creek Falls follows a fracture in a gigantic slab of rock that was formed during volcanic eruptions around 365 million years ago. Below: The old quarry on Snobs Creek Road, which was used to extract rock for part of the Eildon Dam in the 1940s, cuts into the Rubicon Rhyolite.





Marysville Igneous Complex

Steavensons Falls is formed by volcanic rock that erupted from the Cerberean Caldera supervolcano during the late Devonian period.

settled, but because it was so hot and so thick, everything stuck together, and you get what's called welding, so it just looks like a solid rock," Dr Birch says.

"It's a remarkable rock actually; it's a unique rock. It contains crystals of a mineral called iron cordierite, and it's the only known occurrence of this mineral in a volcanic rock in the world as far as we know."

The Lake Mountain Rhyodacite sits on top of the Rubicon Rhyolite and was formed in much the same way. The Lake Mountain Rhyodacite created the high, level plateau of the Cerberean Ranges, and Snobs Creek Falls follow a

large fracture through the sheet of rock.

While there is still clear evidence of the Cerberean Caldera's impact on the landscape, its appearance today belies the magnitude of the turmoil it caused during its peak activity, and this is part of the reason why both locals and tourists are mostly unaware of its existence.

"It's quite a subdued structure, it's very worn down, and it just looks like a range of forested hills," Dr Birch says. "You can't always tell how exciting a geological event has been from the landscape as it is now."

And, even though the magma chamber beneath

the Rubicon Valley and surrounding area has long since cooled and stabilised, the Cerberean Caldera still holds some tantalising mysteries.

"There are still puzzles to be worked out," Dr Birch says.

"The whole structure of the caldera is a bit strange: it's circular, so there's obviously been collapse around a ring fracture, but there are also radial fractures, which focus at the middle, and these radial fractures are harder to explain. The radial fractures suggest that there might have been some sort of really big explosion at depth where the faults focus right underneath it, where the magma probably exploded."

So the next time you're wandering through the cool, ferny undergrowth of the Rubicon Valley, or exploring the surrounding mountains and enjoying the magnificent views from their peaks, stop for a moment and consider the history of the ground on which you're standing and the geological significance of the area.

"As you walk or drive through the forest, appreciate that there's some fantastic geology underneath," Dr Birch says.

For more information on the Cerberean Caldera and other volcanoes in Victoria, you can order the book, *Volcanoes in Victoria*, from the Royal Society of Victoria rsv.org.au