HFNC Excursion to Mount Shadwell & Lake Keilambete on 22 April 2018

Rod Bird, Diane Luhrs & Yvonne Ingeme

Participants: Nine members of HFNC (Glenys Cayley, Lyn & Dave Munro, Rod Bird & Diane Luhrs, Reto Zollinger & Yvonne Ingeme, Roger Thompson and Peter Hocking) and 6 members from Timboon FNC (Lynda Avery, Marg Gristede, Pamela & Ian McConnell, Helen & Paul Langley).

This excursion was organised by Yvonne, who arranged for members of the Timboon FNC to guide us to two of the wetlands in the Noorat-Mortlake area before we visited the quarry at Mt Shadwell.

We were met at about 10 am in **Noorat** by members of the Timboon FNC and Ian McConnell guided us first to **Lake Keilambete**. The entry to the lake is obscure, with access through a farm gate on the highway and along a paddock fence line for about 300 m to the rim of the lake bank. We were met by the landholder (Andrew Chard) who owns the paddock adjacent to this unfenced road reserve. He explained that this was the public access for the townsfolk in days long past when there was a jetty and shed below on the edge of the lake. It remains public access but there are no facilities there now. There is a small area of Crown Frontage to the lake but the remainder appears to be privately owned and most of it, including the public access, is grazed by cattle.

Lake Keilambete from the north rim

We walked down the fairly steep slope of the crater to near the water which was about 200 m from the plateau rim. On the slope we observed several areas of seepage.

East side of Lake Keilambete

West side of Lake Keilambete

The following geological information for Lake Keilambete has been obtained from the report **Eruption Points of the Newer Volcanic Province of Victoria** by Neville Rosengren, published in 1994 for the National Trust of Australia (Victoria) and the Geological Society of Australia.

Lake Keilambete is a circular lake up to 11 m deep occupying a maar crater 2 km in diameter. A maar is a broad, low-relief crater resulting from a phreatomagmatic eruption (hot lava contacting groundwater). The maar often fills with water to form a relatively shallow crater lake.

The crater is surrounded by a basaltic tuff ring which gives a maximum enclosed crater depth of 40 m. Tertiary sediments (clayey limestone and limestone) form the bedrock and are exposed at the lake shoreline and in the lower walls of the crater. There is no stream inflow or outflow but a clayey lake floor prevents seepage loss. There is a history of changing lake levels and salinity. Carbon dating of lake floor sediments indicates a minimum age of 30,000 years for crater formation.

The site is a rare example of an almost perfectly circular, entire crater. The tuff ring is very clear and well preserved. The lake floor deposits contain an outstanding and extensive record of palaeoclimates.

The tuff quarries are presently small and although interrupting the profile of the tuff ring, this is compensated for by providing exposures of bedded tuff. Future quarrying needs to be defined and restricted to avoid more extensive damage to the integrity of the tuff ring. Quarry cuts at right angles to the tuff ring rather than parallel to are preferable. Overburden should not be dumped on the tuff ring. Suitable quarry faces should be retained and maintained clean of debris for educational access.

Since that paper was written there appears to have been extensive quarrying for limestone and volcanic material. These activities occur on the SE slopes of the lake.

Andrew Chard told us that the water level has changed markedly over the decades and at one time was at least 10 m higher than at present. One can observe wave benches on the NW slope.

Andrew Chard (in green hat) talking with our group at Lake Keilambete

There were a few waterbird species present, principally Grey Teal and Australian Shelduck, each numbering a few dozen birds.

A few Banded Stilt and a dozen small waders (these appeared to be Common Sandpipers) were seen at a long distance on the western shore. Golden-headed Cisticola were seen on the slopes.

Golden-headed Cisticola

Birds at Lake Keilambete:

- Grey Teal
- Australian Shelduck
- Silver Gull
- Banded Stilt
- White-fronted Chat
- Skylark
- Golden-headed Cisticola
- Welcome Swallow
- Australian Magpie
- Superb Fairy- wren
- Nankeen Kestrel
- Peregrine Falcon (seen by Paul)
- Pink-eared Duck (seen by Paul)

Banded Stilt & small waders

Leaving Lake Keilambete, we proceeded along Williamsons Lane to a dry, shallow lake. We stopped for a view over the lake to Mount Shadwell to the NW. The road then follows the bank to the east and back onto the highway to Mortlake.

Birds seen at the dry lake off Williamsons Lane:

- Noisy Miner
- Red-rumped Parrot
- Black-shouldered Kite
- Swamp Harrier

We had lunch in the gardens at **Mortlake**, where Purple Swamphens, Dusky Moorhens, Grey Teal and Eurasian Coots were active in the pool.

View from Williamson Rd salt lake to Mt Shadwell

Mortlake picnic area pond

Mount Shadwell

After lunch we drove to the quarry on the eastern side of Mt Shadwell where we met our guide for the next couple of hours. Our guide, Linda Saunders from Warrnambool, was also a keen gemstone hunter. She unlocked the gates and led us around to a new working near the top of the flank on the mount.

Mt Shadwell quarry on SE side

The following geological information for Mt Shadwell has been obtained largely from the report **Eruption Points of the Newer Volcanic Province of Victoria** by Neville Rosengren, published in 1994 for the National Trust of Australia (Victoria) and the Geological Society of Australia.

The mount has multiple scoria eruption points with craters. Mount Shadwell is the highest of a group of scoria cones overlying a small accumulation of tuff and surrounded by lava flows. There is no distinct enclosed crater as the scoria mounds overlap, creating several shallow crater-like depressions. The arrangement of scoria mounds suggests an original crater with a high southern rim opening towards the north-west but largely covered by later eruptions.

The scoria is both red and black, coarse and contains numerous basalt blocks and bombs. Mount Shadwell is a noted source of olivine and augite ultramafic xenoliths, as well as clinopryoxene and orthoclase megacrysts contained in basalts and scoria. The host rock is basanite which is the most common lava of the explosive centres.

This is a good example of a multiple eruption volcano with scoria mounds filling the craters. It illustrates a gradually declining phase of fire fountaining, rather than an abrupt ending of activity.

There is a large operating quarry at the base on the eastern flank, a smaller pit on north and two smaller pits on south.

The Mt Shadwell olivine may have formed around 70 km below the ground and was brought to the surface during volcanic eruptions and blasted into the sky. Much of the olivine around Mortlake is contained in 'bombs' which look like tear-drop shaped lumps of rock but may range in size from an egg to a huge boulder. The outer layer is comprised of dense, dark grey basalt.

About 90 % of olivine is an olive green colour but sometimes there are golden-coloured pieces. Most of the olivine in the bombs at Mortlake appears like tightly packed green sugar grains. The gem quality olivine at the Mt Shadwell quarry, for those lucky enough to find it, comprises a larger piece of olivine which can be cut into a gemstone, or peridot.

According to tourist information published in the Hamilton Spectator, the crystals at Mt Shadwell are usually a mixture of olivine and two types of pyroxene crystals and the combination is termed *Iherzolite*. The age of the volcano is suggested to be within the last 1 million years.

The Shire of Mortlake operates a quarry to supply lapilli scoria (particles 4-32 mm in size) and ash (particles <4 mm in size) for road construction.

Access to Mt Shadwell quarry is limited to Fridays, Saturdays and Sundays by appointment. Call the Information Centre on 55 992 899 (Monday to Thursday).

HFNC gemstone hunters and observers at Mt Shadwell

We left the quarry at around 3 pm, having cracked open many small bombs and found quite a few colourful specimens but none with large olivine crystals. For most of us this was a first and enough!

The photographs above show some examples of the contents of some ‘bombs’ that were split open with a hammer. The samples were wetted to amplify the colours for the photos.

These were small bombs (see photo on p.6, where they fit in Rod’s hands) and there are no large olivine crystals. The final photograph shows a bomb containing some white orthoclase.