National Rock Garden

Celebrating the Geological Heritage of Australia

Newsletter No. 29

April 2025

Autumn in the National Rock Garden Treasure hunting at the National Rock Garden A visit to the Harlequin Stone quarry, Wallaroo Stranger things: the legacies of glaciers How you can help the NRG



The National Rock Garden is proudly supported by the Geological Society of Australia and the Australian National University and the Minerals Council of Australia





www.nationalrockgarden.org.au

Autumn in the National Rock Garden

Brad Pillans, Director, National Rock Garden

Autumn is a beautiful season in Canberra, enhancing the visitor experience at the National Rock Garden. Several months after they were installed, the rocks of our Stage 1 display (about 30% of the site) have settled in very well. Hopefully the mild autumn weather will persist as the NRG participates in the 2025 Canberra and Region Heritage Festival, which runs for four weeks from 18 April until 11 May. Read more on activities at the NRG later in the newsletter.



The Federation Rocks in autumn at the National Rock Garden. Image courtesy B. Pillans.

Now that the installation of Stage 1 is complete, we are keen to expand our display, and I am pleased to announce that, following successful fund-raising over summer, Stage 2 construction (another 30% of the site) will begin in mid-June and be completed in July, weather permitting. Then, subject to further sponsorship, we hope to begin work on Stage 3 (the remaining 40% of paths and display pads), in late 2025 or early 2026. The stages are marked out on a map of the NRG on the next page.

Construction of Stage 2 will again be undertaken by Glascott Civil and Landscape. New clusters will include rocks representing the breakup of Gondwana, modern Australian landscapes, mineral, energy and construction resources, and the spectacular Peace Rocks. Some of the rocks destined for these clusters are already in Canberra but others are still to be obtained or transported to the ACT. If you are thinking about making a charitable donation, the NRG has Deductible Gift Recipient status so you can claim any NRG donation on your tax return. Details on how to donate are on the NRG website: https://www.nationalrockgarden.com.au/support/.

The Peace Rocks were donated to the NRG by German philanthropist, Wolfgang Kraker von Schwarzenfeld, as part of his <u>Global Stone Project</u>, in which rocks from 5 continents have been placed in the Tiergarten in Berlin. Five sister rocks are on display in their country of origin, including the rocks destined for the NRG. The 5 rocks signify 5 steps to global peace: Europe (Awakening), Africa (Hope), Asia (Forgiveness), America (Love) and Australia (Peace).

Right: two pieces of banded iron with cut and polished faces that will form the centrepiece of the Peace Rocks cluster. Inset: photo of the unpolished side of one of the 5 pieces of orbicular granite that will be part of the Peace Rocks, showing the large 'orbicles'. Images courtesy M. Cooper.





National Rock Garden





Map outlining the construction stages of the National Rock Garden. Stage 2 construction is due to start in mid-June 2025. Image courtesy B. Pillans.

There was more great news in March: the National Arboretum Canberra received Gold for Ecotourism and Silver for Excellence in Accessible Tourism at the 2024 Qantas Australian Tourism Awards. A celebratory morning tea was held at the Arboretum in early April. Marita Bradshaw, Michelle Cooper and I represented the NRG at the celebration—in perfect autumn weather, of course. As a site partner, the NRG can justifiably be proud of this achievement.



Left: National Arboretum Canberra's Gold Qantas Australian Tourism Award for Ecotourism 2024. Right: National Arboretum Canberra staff with their award. Images courtesy the National Arboretum Canberra.





Treasure hunting at the National Rock Garden

Michelle Cooper and Brad Pillans, Directors, National Rock Garden

The National Rock Garden is participating in the 2025 ACT Heritage Festival, which is running from 18 April until 11 May. See: <u>https://www.environment.act.gov.au/heritage/heritage-festival</u>.

This year's festival theme is 'Unearthed', which fits beautifully with our display of deep time rocks. NRG events planned for the festival include free guided and self-guided tours and a Treasure Hunt game for kids (big and small alike) to explore some of the more interesting features of our rocks.

Guided tours will be held on the following dates and you can book to secure your spot on the <u>festival</u> <u>website</u>.

- Tuesday 22 April
- Wednesday 30 April
- Saturday 3 May
- Sunday 11 May

The Treasure Hunt, which was designed for the ACT Heritage Festival, was generously road tested by the ladies from one of our committee member's yoga class! Great fun was had by all and a few minor wrinkles in the game were duly ironed out.



'Can we find the next clue, a sea-lily (crinoid) fossil in the Canberra limestone?' Marita Bradshaw and members of her yoga class road testing the NRG Treasure Hunt. Image courtesy M. Smith.

During the festival, you can play the game in multiple ways:

- pick up a treasure map at the National Arboretum Canberra's information desk
- download and print your own copy of the map [PDF]
- play online via this link.

Participants who complete the Treasure Hunt during the festival can show their completed game to the information desk at the Arboretum to claim a small reward. Although the Tresure Hunt game was specifically developed for the 2025 Heritage Festival, it can run online at any time.



A visit to the Harlequin Stone quarry, Wallaroo

Anastasia Morfiadakis, National Rock Garden Steering Committee

I recently had the chance to visit the source of the National Rock Garden's South Australian Federation Rock, a quarry near Wallaroo, about 150 kilometres north of Adelaide on South Australia's Yorke Peninsula. The trip was part of the <u>National Exploration Undercover School (NExUS)</u>, a summer course hosted by the University of Adelaide.

The formal name of the rock quarried here is Oorlano Metasomatite. This rock formed when heat and mineral-rich fluids from nearby granite intrusions altered older sedimentary layers. The exact nature of those original sediments isn't certain, but the outcome is a hard, visually distinctive metamorphic rock.



Oorlano Metasomatite at the quarry in Wallaroo. Image courtesy A. Morfiadakis.



This rock features a mix of green, orange, red, and black minerals. Epidote, amphibole, and diopside give it green tones; feldspar and haematite bring the reds and oranges; and magnetite adds dark contrasts. Veins of quartz-dolomite cut through the rock and carry traces of pyrite and chalcopyrite, linking it to the region's long copper mining history.

Geologically, Oorlano Metasomatite is tied to some of South Australia's most important mineral systems. The original sediments were laid down around 1,760 million years ago and underwent transformation about 1,575 million years ago—during the same deformation event that formed the Olympic Dam deposit and the historic Moonta and Wallaroo copper mines. It is because of its geological relevance and appearance that it was selected to represent South Australia in the National Rock Garden in Canberra.



Close up of the minerals in the Oorlano Metasomatite: Epidote, amphibole and diopside (greens), feldspar and haematite (reds and oranges), and magnetite (dark contrasts). Image courtesy M. Cooper.



National Rock Garden



Banding in the Oorlano Metasomatite caused when the rock was compressed under enormous pressure. Image courtesy M. Cooper.

Beyond its geological significance, the stone has also made its mark in architecture and design. Known commercially as Harlequin Stone or Verde Fuoco, it is used for countertops, cladding, flooring, and other decorative elements and has been exported around the globe.

Seeing it up close at the source was a solid reminder of just how much history—and beauty—can be locked inside a single piece of rock.



National Rock Garden

Stranger things: the legacies of glaciers

Dr Steve Hill, Chief Scientist, Geoscience Australia

A dry summer and early autumn in southern Australia has revealed remnants of Permian glacial landscapes around the shores of Lake Eppalock in central Victoria. Below is an excellent example of an exhumed glacial pavement that cuts across the eroded surface of Ordovician sedimentary rocks previously covered by Permian glacial sediments.

Kellam's Rock, located on the northern shore of Lake Eppalock, sits on the margins of what would have been a 'keel-shaped' topographic rise composed of Ordovician sedimentary rocks. Glacial ice and embedded sediments have scratched and polished this rise during the Permian. It's remarkable to touch and feel this polished surface, which has changed little in its 280–260 million year existence. It features large etched grooves (striae), crescentic pits, and chatter marks (crescent-shaped grooves) formed from the pressurised gouging of rock by the ice and when rocks embedded in the base of a glacier impact and chip away at the bedrock beneath. These surface features indicate local variations in the direction of ice movement, although there's a predominance towards the north.





Above left: Kellam's Rock, on the northern shore of Lake Eppalock, Victoria. Above right: close up photo of Kellam's Rock showing large etched grooves (striae) caused by glacial action. Left: large grooves (striae) and crescentic pits etched into the rock. Images courtesy S. Hill.



National Rock Garden





Kellam's Rock, an exhumed glacial pavement in central Victoria. Image courtesy S. Hill.

Adjacent to Lake Eppalock, in Derrinal, large glacial erratics (large, exotic boulders deposited from glacial ice) that still stand proudly in the landscape. This large boulder (below), locally known as 'The Stranger', is made of granite, a contrast to the local geology dominated by Ordovician shales, mudstones, and sandstones. As early as the 19th century, geologists recognised that this boulder had been moved into its current position by northward-moving glacial ice associated with a vast and thick southern polar ice cap that covered much of Gondwana during the Permian period (about 280–260 Ma). This glaciation included parts of the contemporary southern continents of Antarctica, South America, Africa, and Australia, where similar deposits and landscape remnants can also be found.



Left and right: two views of 'The Stranger', a large glacial erratic made of granite in a field in Derrinal, Victoria. 'The Stranger' sits on a hillside made of Permian sedimentary rock overlooking Lake Eppalock. Images courtesy S. Hill.



National Rock Garden



National Rock Garden-Newsletter No. 29



Photo looking along the top of glacial erratic 'The Stranger' showing how the surface has been scratched and polished by its transport in the Permian glacier that covered this area during that time. Image courtesy S. Hill.

Weighing many tens of tonnes, this boulder serves as a testament to the immense power of ice in moving rocks. It sits as an isolated exposure on the hillside within farmland, yet it is immediately underlain by deposits of Permian 'diamictite' or 'tillite'. This sedimentary rock contains a mixture of boulders, pebbles, and sand-sized rocks and minerals within a fine-grained (mud and clay-sized) matrix. The boulder shows signs of being shaped and abraded by the scraping of ice and other rocks during its journey, with many of its sides (particularly its upper surface) scratched, smoothed, and polished (faceted). These large 'out of place' boulders are referred to by geoscientists as 'glacial erratics'. While there are many other examples in the area (as seen in the final photo here, from near 'The Stranger'), 'The Stranger' stands as a stunning local example that is well worth a look.



Top: Bottom: Another glacial erratic in a field in Derrinal, Victoria. Scratches made as the boulder was transported by a glacier are clearly visible on its surface. Image courtesy S. Hill.



National Rock Garden





WE NEED YOUR FINANCIAL SUPPORT

Although work by committee members and friends of the National Rock Garden is voluntary, we nevertheless incur the regular costs of an incorporated entity. We therefore seek donations from individuals who recognise the importance of geoscience and geoscience education to the future of Australia.

Stage 2 of the National Rock Garden requires substantial funding for footpaths, rock display pads and an NRG pavilion. Significant funding is also required for transport and delivery of rock specimens, preparation of specimens for display, creation of descriptive plaques for the rocks, and maintenance of the NRG site. While we will be encouraging corporate contributions for the high-cost transportation of larger rocks from interstate, we welcome all donations, however large or small.

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Feedback and further information

We welcome feedback and suggestions on the development of the National Rock Garden and would love to hear from you! Email us at: <u>brad.pillans@anu.edu.au</u> or <u>michelle.cooper@ga.gov.au</u>.

Tax deductible

The National Rock Garden is a registered charity and all donations over \$2 are tax deductible. Making a donation to the National Rock Garden is a great way to reduce your tax and feel good too! To donate, please complete the form on the previous page or visit <u>https://www.nationalrockgarden.com.au/support/</u>.

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Newsletter edited by Michelle Cooper.

