National Rock Garden

Celebrating the Geological Heritage of Australia

Newsletter No. 16
October 2018

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

Australian National University

www.nationalrockgarden.org.au

Comings and goings at the National Rock Garden

Brad Pillans, Chair, NRG Steering Committee

There has been a lot going on at the NRG, since our last newsletter in March 2018, including meetings with ACT and Federal politicians, as well as continued liaison with the National Capital Authority regarding further development of the NRG site. Here are a couple of highlights:

Inauguration of
Mt Gibraltar Microsyenite display

On 25th March 2018, the National Rock Garden welcomed the arrival of an 11 tonne Mount Gibraltar Microsyenite block to the NRG site in Canberra. This spectacular specimen was donated by Wingecarribee Shire Council, while funding for the transportation and the preparation of the rock for display (creation of an informative plaque, plus work by a local stonemason) was provided to the NRG through donations from the Mount Gibraltar Landcare & Bushcare Volunteers and the Veolia Mulwaree Trust. The display was formally opened by Councilor Ken Halstead, Mayor of Wingecarribee Shire Council.

Mayor Ken Halstead (left) unveils the Mount Gibraltar Microsyenite display at the NRG, assisted by Brad Pillans (right). Image courtesy of John Henderson.

The Mount Gibraltar Microsyenite (MGM) has been used extensively as a decorative building stone in Sydney and the Southern Highlands of NSW, as well as Australia House in London. Sydney examples include the Queen Victoria Building in George St, Challis House in Martin Place and the ANZAC Memorial in Hyde Park. It was also quarried for ballast in construction of the Great Southern Railway line from Mittagong to Goulburn.

In Canberra, the MGM was famously used for the city's foundation stone, laid in front of Parliament House in 1913, and upon which the Governor General's wife, Lady Denman, stood to proclaim the nation's capital as 'Canberra'. According to a contemporary newspaper report (Queanbeyan Age, 14th March 1913) the foundation stone was intended to have a 'Commencement Column' on top, rising to a height of 26 feet (about 8 metres), but it was never completed. Coincidentally, the National Rock Garden is located on Lady Denman Drive.

Canberra Foundation Stone, laid in 1913. Image courtesy Brad Pillans.

Mount Magnet Astro Rocks Fest

In September, I was invited to attend the annual Mount Magnet Astro Rocks Fest, in the historic gold mining town of Mt Magnet in Western Australia. Held over two days, the festival featured a terrific mix of displays, talks, films and local tours on geological and astronomical topics. See https://mtmagnet-astrorocks.com/ for further details.

Astro Fest enthusiasts with telescopes at the ready, Mt Magnet oval. Image courtesy Brad Pillans.

In my talk, 'Celebrating Mount Magnet rocks in the National Rock Garden', I was able to highlight the fact that we have a Mt Magnet rock in the NRG collection – Boogardie Orbicular Granite. I also held discussions with event organiser, Karen Morrissey, regarding her proposal to establish a local rock garden at Federation Park in Mt Magnet.

Boogardie Orbicular granite is one of Australia's most spectacular (and rare) decorative stones, which is why it was a 'must-have' for the National Rock Garden. The 5 large pieces that we have in Canberra were gifted to us by German philanthropist and adventurer, Wolfgang Kraker von Schwarzenfeld, who obtained the rocks from Boogardie Station in 2000. Wolfgang also shipped five similar rocks to Germany, where they are on display in the Tiergarten, in Berlin, as part of his Global Stone Project (see http://www.globalstone.de/). [The five specimens in Canberra are on temporary display outside Geoscience Australia until such time as we are ready to place them on permanent display at the NRG.]

Immediately following the festival, I was thrilled to have the opportunity to visit the orbicular granite quarry on Boogardie Station and to meet the station owners, Paul Jones and his family. I would also like to thank Karen and Adrian Morrissey for making my stay in Mt Magnet so enjoyable. Mt Magnet is a small town with a big heart and I thoroughly recommend a visit, especially if it coincides with a future Astro Rocks Fest.

Brad Pillans and Michael Wingate (Geological Survey of WA) admiring quarried blocks of orbicular granite at Boogardie Station, near Mt Magnet, WA. Image courtesy Brad Pillans.

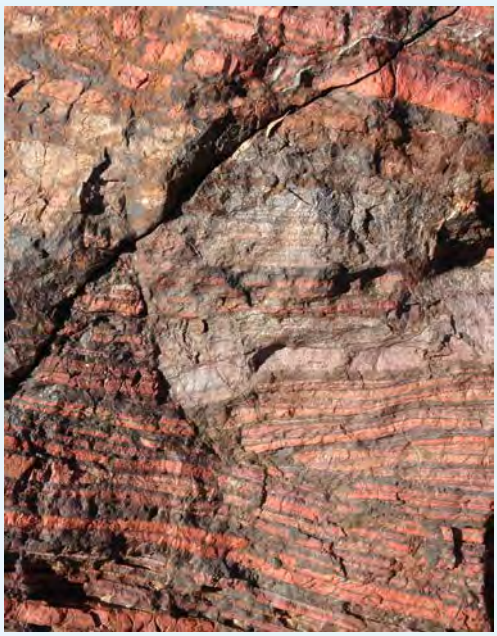
The seven rocks that made Australia

Marita Bradshaw, Consulting Petroleum Geologist

Key geological events of the last 4 billion years have shaped Australia's present day environment, economy and society. Below is a list of seven rocks that represent some of these crucial episodes with a focus on the geological units that have had major impacts on the economic and population history of the last 150 years. For more discussion of the geology and themes introduced here, please see *"Shaping a Nation: A Geology of Australia"* (Blewett, editor, 2012).

1. Paleoproterozoic Pilbara banded iron formations

There is a long back story to Australia's recent resources boom that starts in the Pilbara some 2.6 to 2.4 billion years ago when layers of iron rich sediments were laid down from an ancient ocean as the oxygen content varied with the activity of early photosynthetic organisms. Today, iron ore provides a sixth of Australia's export income and once remote mines in the northwest are tethered by railways and ports to global supply chains for steel production (Office of the Chief Economist, 2018). The activity of early life over 2 billion years ago has built wealth for Australia and contributed to industrial growth in north Asia. The Federation rocks at the NRG include two big beautiful red blocks Brockman Iron Formation from Hamersley Range donated by Fortescue Metals Group and the Government of Western Australia http://www.nationalrockgarden.org.au/rock-collection-2/federation-rocks/



Left: Banded Iron Formation, Pilbara. Image courtesy Marita Bradshaw. Right: Brockman Iron Formation, Federation Rocks display at the proposed site of the National Rock Garden. Image courtesy Brad Pillans.

2. Paleoproterozoic Broken Hill ore body

The zinc-lead-sliver lode outcropping at Broken Hill, in far western NSW, is one of the many mineral deposits formed between 1760 and 1500 million years ago during the assembly of the cratonic blocks that form the older western and central parts of the continent. Other examples include the Mount Isa lead-zinc-silver ore body, and the Olympic Dam copper-gold-uranium deposit. Many such finds have been important in establishing cities and towns in the Outback and in providing wealth, but Broken Hill has been especially influential in shifting Australia from an agricultural to an industrial society. The rich mineral lode was discovered in 1883, in 1885 the Broken Hill Proprietary Company was formed, and in 1892 there was the first of several major miners' strikes. The 1919 Great Strike eventually resulted in improved safety conditions and a 35-hour working week and BHP remains one of Australia's largest companies, though it ceased operations at Broken Hill in 1939.

The Oorlano Metasomatite, from Wallaroo, donated by the South Australian Government to the NGR, is a representative of the Paleoproterozoic mineralisation interval. The original sediments were deposited 1760 million years ago and then altered around 1575 million years ago in the same geological event that formed the Olympic Dam orebody.

3. Early Paleozoic gold-bearing metasediments, Victoria

Step forward a billion years and the edge of the Australian continent had shifted eastwards with the accretion of island arcs, continental slivers and thick sediment piles in back-arc basins. One of these, the Castlemaine Basin, hosts the rich gold deposits of central Victoria formed as the sediments were folded, metamorphosed and injected by mineralising hydrothermal fluids. The discovery of gold in 1851 in Victoria changed the trajectory of Australia bringing a major jump in immigration and significant economic benefits. In 1852 the mining sector, led by the Victorian gold fields, contributed 35% of Australia's GDP and over the next three years the population of Melbourne trebled. Political tensions grew with these sudden changes, the 1854 Eureka Rebellion over miners' license fees took at least 27 lives but hastened the development of Australian democracy; and in 1856 Peter Lalor, the injured rebel leader (minus an arm) was elected to the Victorian parliament.

The Federation rocks at the NRG include examples of Bendigo metasandstone & Ballarat quartz donated by the Government of Victoria, Unity Mining and Castlemaine Goldfields.

Brad Pillans with the Victorian Federation Rocks. Image courtesy Brad Pillans.

4. Permian Coal Measures – Sydney, Gunnedah and Bowen basins

Australia and other parts of Gondwana (South America, Africa, India, and Antarctica) accumulated thick coal deposits in high latitude peat-swamp forests after the late Carboniferous early Permian glaciations. In eastern Australia, behind the convergent margin of eastern Gondwana, the Sydney-Gunnedah-Bowen foreland subsided and allowed the accumulation thick peat beds that, with later burial, were converted to large seams of high quality black coal. Coal was found outcropping along the Hunter River near Newcastle (1797) and the Brisbane River, in the early days of colonial settlement. Location close to surface and nearby the major population centres lead to coal becoming Australia's major energy resource, it currently generates the most of our electricity and contributes more than 14% of export income (Austrade, 2017). Energy captured by ancient Gondwanan forests helps keep the lights on and fires steel-making furnaces around the world.

Coal at Port Waratah Coal Services, Newcastle. Image courtesy Michelle Cooper.

5. Triassic sandstones

The Triassic section in many parts of the world is characterised by sandstones deposited in deserts, alluvial plains and deltas across the supercontinent of Pangea. Australia's biggest city Sydney is built on one such unit, the Hawkesbury Sandstone, which shapes its iconic landscapes and preserves the engravings and labours of indigenous and later cultures. Thick Triassic sandstones are also found on the other side of the continent, deposited in deltas that built out into the Carnarvon, Browse and Bonaparte basins that now underlie the North West Shelf. The gas in these sandstone reservoirs now represents more than 80% of Australia's conventional gas resources and supports a major export LNG industry. The Federation rocks at the NRG include a large block of Hawkesbury Sandstone donated by the Government of New South Wales.

North Head exposure of Hawkesbury Sandstone as seen by Captain Cook. Image courtesy Mike Smith.

6. Cretaceous marine shales

The last major marine flooding of Australia occurred in the Aptian and Albian Stages of the Cretaceous Period, around 125 to100 million years ago. About half the continent was inundated with the sea holding sway from the Gulf of Carpentaria to South Australia and from the Great Australian Bight to the North West Shelf. Fine grained marine muds and silts were deposited across vast areas and with burial under later sediments compacted to claystones and shales. These low permeability units now seal many of the gas and oil fields on the North West Shelf and in the Eromanga Basin in central Australia. Cretaceous marine shales, in particular the Rolling Downs Group, are also a major aquitard in the Great Artesian Basin, confining groundwater resources that can be accessed by drilling to support the pastoral industry across the dry interior.

7. Southern margin Cenozoic limestones

Eocene and younger limestones occur all along Australia's southern margin, forming the Nullarbor Plain and spectacular coastal landscapes and extending far offshore in deposits kilometres thick. Calcareous skeletons of bryozoans, bivalves and foraminifera contribute much of the sediment deposited in carbonate shelf environments that extended far onshore during high sea level episodes in the Eocene and Miocene. These extensive limestones record the opening of the Southern Ocean and the separation of Australia and Antarctica, its last partner in Gondwana, as the island continent formed. They represent Australia's long isolation which has been so influential in shaping our flora and fauna and history.

Coastal landscape of cliffs and sea stacks, Miocene Port Campbell Limestone, Victoria. Image courtesy Marita Bradshaw.

There are notable absences from this list, such as the Golden Mile Dolerite from the Kalgoorlie district or the Latrobe Group sands that host the giant oil fields in Bass Strait; and consideration could be given to an eighth rock, the one we are making now in the “Anthropocene”. There are also many other ways to order the geology that are important to Australians beyond this narrow economic perspective. For example, the cratons, foldbelts and basins that are the actual building blocks of Australia; or the iconic rocks that record the rise of life (Strelley Pool Formation stromatolites from the Pilbara, Ediacara Member trace fossils from the Flinders Ranges) or the materials that represent the long human history on the continent (ochre from the Rumbalara Shale, central Australia; Skillogalee Dolomite quarried for grinding slabs near Lake Eyre). The National Rock Garden provides the space and opportunity to explore these and many other themes that link people to the geology beneath our feet.

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SAVE THE DATE!

Subject to the approval of the National Capital Authority, we are planning to hold a ceremony to open the Adelong Norite display at the National Rock Garden.

TIME: 2.00 pm to 3:00 pm on Sunday 25 November 2018

PLACE: National Rock Garden site, Barrenjoey Drive (off Lady Denman Drive), Canberra

We have chosen this date to coincide with a visit to Canberra of artist Andreas Buisman who sculpted the Adelong Norite display specimen (see NRG newsletter no. 15, March 2018).

Adelong Norite rock, sculpted by Andreas Buisman, to be donated to the NRG. From left to right: Kris Piper (Adelong Alive Museum), Andreas Buisman (artist), Stephanie Smyth (Bendigo Bank, Adelong), Brad Pillans (NRG) and Gary Newnham (Adelong Progress Association). Photo courtesy Andreas Buisman.

PLEASE MAKE A NOTE IN YOUR CALENDAR

AND WE WILL CONFIRM CLOSER TO THE EVENT.

Geology in Art—Earth Monument to New York

Mike Smith, NRG Director

The National Gallery of Australia (NGA) in Canberra is currently presenting an exhibition entitled “American Masters 1940–1980”. The display opened on 24 August and closes on 11 November 2018. “American Masters” examines how a generation of young Americans challenged local traditions and reinvented modern art. The exhibition covers Abstract Expressionism, Colour Field, Pop, Neo-Dada and Photo-Realism, Conceptual, Land and Performance Art.

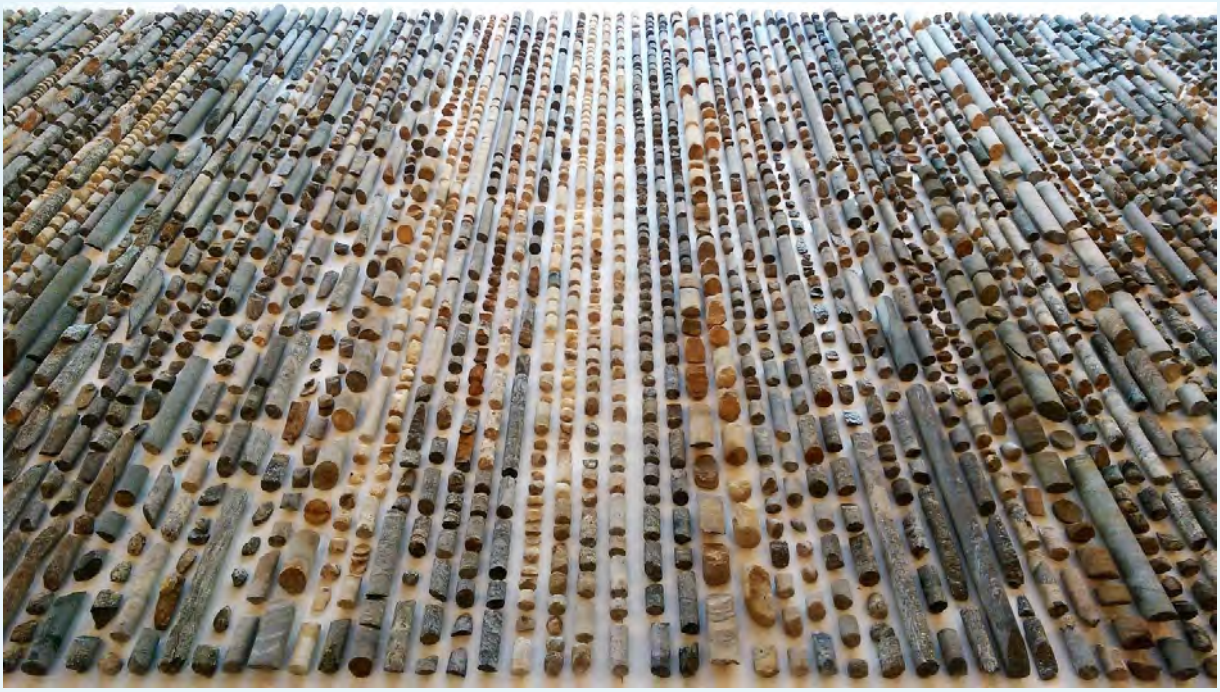
At the entrance to this exhibition a very large work of art, lying flat on the gallery floor is immediately striking. For the visiting geologist, the piece is instantly appealing, because the artwork is made up a vast number of multi-coloured cylinders of rock. The piece is called *Earth Monument to New York*.

The writer examines Earth Monument to New York at close range. Image courtesy Mike Smith.

The US-based artist Alan Sonfist was born in 1946 and produced this work in 1979. It was purchased by the NGA in 1979. The plaque adjacent to the artwork explains that “Sonfist creates work that makes visible the unseen structures and processes of natural materials and the environment. His work investigates humanity’s interaction with nature”. The components of *Earth Monument to New York* are diamond drill core samples of stratified rock acquired from between 1.5 metres and 40 metres below ground level right across New York City.

Sonfist has stated “My feeling is that if we are going to live within a city, we have to create an understanding of the land …. We have to come to a better understanding of who we are and how we exist on the planet”.

Detail of some of the drill core making up Earth Monument to New York *(scale in cms). Image courtesy Mike Smith.*



A very wide diversity of rock is represented in Earth Monument to New York. Image courtesy Mike Smith.

An interview conducted with the artist by John K Grande in October 2008 may be accessed at http://umintermediai501.blogspot.com/2010/04/alan-sonfist-natural-history.html, Grande comments “Alan Sonfist continues to advocate, in his urban and rural artworks, projects that heighten our awareness of the historical geology or terrain of a place, earth cores become a symbol of the deeper history or geology of the land. His art emphasizes the layered and complex intertwining of human and natural history. He has bequeathed his body as an artwork to the Museum of Modern Art. Its decay is seen as an ongoing part of the natural life cycle process”.

While providing a curious interest to our NRG Newsletter readers, the artwork links in with our acquisition of a wonderful sculpture in Adelong Norite by the Austrian artist Andreas Buisman (see invitation to attend event earlier in this newsletter).

Chillagoe limestone and marble

By Rowena Duckworth, Mintex Petrological Solutions

One of the most photographed landscape features of the Chillagoe area in northeast Queensland is the limestone karst scenery (Figure 1). Limestone is a sedimentary rock formed from the shells of marine organisms which accumulated on the sea bed millions of years ago. The layers of sediment become compressed, compacted, hardened, and eventually folded and fractured by earth movements, then raised above sea level to outcrop on the current day land surface. Karst topography is formed due to the later partial dissolution of the limestone and this process also leads to cave formation.

Figure 1. Limestone karst topography, Chillagoe area. Image courtesy Lynn Hodgson.

The Chillagoe caves are spectacular (Figure 2). The dissolution occurs because rainwater picks up carbon dioxide from the air as it percolates through the soil, which turns into a weak acid. This slowly dissolves the soluble limestone along joints, bedding planes and fractures, some of which become enlarged enough to form caves. These caves are a local tourist attraction and well worth a visit if you're in the area.

In places this limestone has been further cooked by the emplacement of basaltic lavas during periods of volcanic activity. The calcium carbonate in the limestone is re-crystallised during these metamorphic events to form marble. Pure calcium carbonate is white but there are many other minerals in the original limestone and these give the newly formed marble its characteristic streaks and patterns. Pink and cream colourations are caused by iron oxide inclusions. Impurities such as organic matter or globules of oil, are responsible for blue, grey, and black marble. Chillagoe marble is popular as a decorative stone and was used as a building stone for the new parliament house in Canberra after first being shipped to Italy and resupplied as Italian marble. Walls of Chillagoe marble can be also be seen in Cairns airport (Figure 3). The dominant minerals in limestone and marble are calcite and dolomite (Figure 4).

Figure 2. Chillagoe caves. Image courtesy Lynn Hodgson.

Figure 3. Cairns airport- marble wall. Image courtesy http://www.cairnsmarble.com/files/photos/full/0/107-photo.jpg.

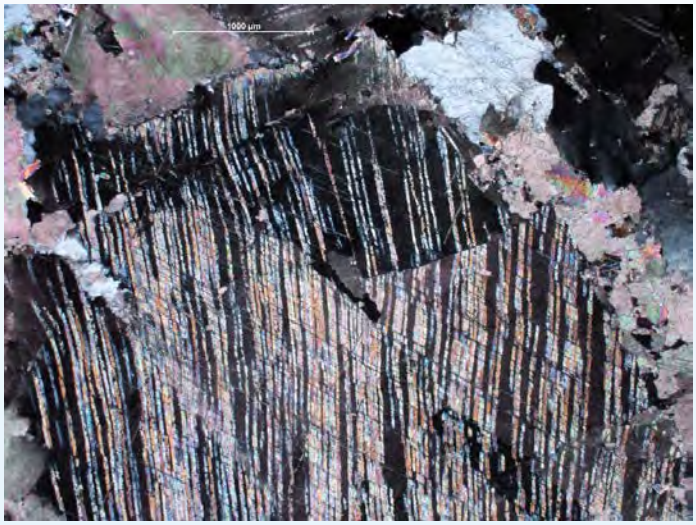


Figure 4. Photomicrograph of twinned calcite with dolomite in typical marble.
Image courtesy Rowena Duckworth.

Quarrying is still being carried out from the flat, weathered, and smooth rock pavement. Massive cutting equipment is used to excavate from not far below the surface. The marble bedrock is cut into rows of huge regular blocks with geometric precision by vertical cuts at right angles to each other—and finally separated from the ground by a horizontal cut below (Figure 5).

Figure 5. Quarrying the marble at Chillagoe. Image Courtesy Lynn Hodgson.

The limestone is also important in the area as it was contact metamorphism of this limestone by intruding granites that caused the formation of localised gold and base metal deposits known as skarns. Discovery of these deposits in the late 1880's allowed Chillagoe to became a beacon for copper, silver and gold miners for over 60 years.

It was John Moffat who sent out the first prospecting party into the area in 1887 and with Atherton's help found copper in the area. From the start, Moffat tried to develop the area as a whole and Moffat's company employed 70 miners on developmental work on deposits around Chillagoe, Redcap, and Mungana. By 1891 a smelter had been erected at Muldiva to treat the silver-lead ores and another at Calcifer in 1894 for the copper ores. Only the rich ores could be treated effectively without the necessary beneficiation so a central smelter was needed to treat lower grade ores. The Chillagoe Railways and Mines Co. Ltd was formed and in 1897 began construction on a railway from Mareeba to Chillagoe and Mungana. In 1901 the line was completed and a large copper smelting plant was opened by the company at Chillagoe. In 1903 the lead smelter was blown in (Figure 6). From then until 1914 was the most prosperous period for the district. However, much of the capital backing the companies was German and was frozen when war broke out in 1914. In 1918, the Queensland Government bought the smelters and the 1920's saw the small miner from all districts to Cloncurry battling a corrupt government enterprise when hand-picked rich ores brought low assays. This resulted in the Royal Commission of 1930 into the key political figures involved. The smelters continued to struggle on until closure in 1943 and were sold for removal in 1950. In the 1970's gold mining resumed and mining continues today, with Auctus Resources developing several deposits in the area.

Figure 6. Old workings. Roaster chimneys were part of the lead-sulphide pre-treatment area built as part of the 1906-1907 mine expansion. Image courtesy Lynn Hodgson.

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Will you be at the AGCC? Come and visit the NRG at our booth!

The Megaliths at Cromlech of the Almendres

Mike Smith, Director NRG

(All images by M. Smith unless otherwise attributed.)

Introduction

Visitors to Portugal are often encouraged to travel by car, bus or train to the east of Lisbon to the regional city of Evora (for example see www.evora-portugal.com/index.html). Évora was an historic trading centre from Roman times, and is now the capital of the south-central Alentejo region. The city contains the ancient Roman Temple of Diana, the nearby massive Gothic Cathedral of Évora, and the curious Igreja de São Francisco, a church which features Gothic and baroque architecture along with the skeleton-adorned Chapel of Bones.

Then there is also the Cromelech of the Almenderes.

These are very unusual rocks close to the village of Almenderes, about 15 kms west of Evora. They take the form of isolated rocks or clusters of large rocks which are interpreted to have been put in place by people in prehistoric times. Archaeological studies indicate that the placement of the stones and the carvings on them occurred in the Neolithic period, some 7,000 years ago, prior to the building of Stonehenge.

Credit for the discovery in the 1960s goes to a teacher named Henrique Leonor Pina who died in May 2018, and was posthumously awarded the Gold Medal of the City of Evora on June 29, 2018.

The megaliths of the Cromlech de Almederes

When found, most of the elongate stones were lying on the ground. They have been re-positioned based on archaeological research conducted during the 1970s and 1990s.

The major cluster is on a gentle east-facing slope, with an elliptical axis aiming eastwards, so some kind of solar (sunrise) association has been proposed as being relevant to an agricultural community.

An aerial view of the Cromlech of the Almendres published by Simon Broughton (2016).

The writer inspects one of the central megaliths.

About the Granite

The geological map of Portugal (Geological and Mining Institute, 2018) and Pope and Miranda (1999) indicate that many megaliths are associated with an extensive Palaeozoic intrusive complex in the country. The megaliths appear to be the products of natural weathering over millions of years, and that suitably sized residual masses of rock were brought to specific sites. The specimens show no evidence of being dragged so ether they were sourced locally (most likely) or they were transported with great care.

The megaliths are composed of porphyritic granite, as they contain large clumps (phenocrysts) of whitish-pink potassium feldspar. The rock started life as a molten magma deep within the Earth, and stayed there (or rose very slowly) while the "phenocrysts" had time to grow to the size of 10c to 20c pieces. At a later time, the magma was lifted up closer to the cooler Earth's surface so that the other constituents solidified as finer grained crystals all around the larger feldspar clumps.

Detail of phenocrysts in granite, with broad lichen growths in various colours.

Megalith with finer-grained aplite in centre.

One megalith shows layers (veins) of finer pink crystals, and that material is called an aplite. The crystal of alkali-feldspar and silica are 1 – 2 mms in size.

These lithological notes about the granite have been provided by Dr Graziella Caprarelli of Hypatia Scientifica, who also made the interesting observation that the granite shows a lot of lichen cover, while the surface of the aplite appears quite clean. This may be due a difference in the chemistry of each material which in turn influenced the rock texture and roughness. The lichens may prefer to make their home on granite due to its mineralogy and its texture.

Carvings

The symbols carved onto many stones are fading due to erosion over the years. Shapes such as circles, arcs, snake-like figures and hooked staffs have been identified but cannot be explained with any certainty.

Mr Dennis Moore, CEO of Vancouver-based exploration company Fremont Gold, stands beside one of the prominently inscribed megaliths.

Pope and Miranda (1999) describe the geomorphic characteristics of granite megaliths in southwestern Portugal, noting that megalithic concentrations throughout western Iberia tend to appear in areas where granitic rocks outcrop nearby. This region was relatively undeformed during the Mesozoic and Cenozoic eras, allowing bedrock weathering and erosion to generate spheroidally weathered “corestones” in the more resistant granite.

For those who are interested, good panoramic images of the Comlech of the Almenderes can be found at https://en.wikipedia.org/wiki/Almendres_Cromlech.

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Stories in Stone at the Geological Survey of NSW WB Clarke Geoscience Centre, August 2018

Dr Ian Percival, Geological Survey of NSW

During National Science Week in August 2018, the Geological Survey of NSW (GSNSW) held its second annual Stories in Stone event at the WB Clarke Geoscience Centre at Londonderry in western Sydney. Anyone with an interest in Earth's treasures was invited to attend and we welcomed approximately 70 members of the public, including 23 Year 11/12 Earth and Environmental Science students and their teachers from the nearby Bede Polding College in South Windsor, and Councillor John Thain, Mayor of Penrith. Other visitors travelled to Londonderry from as far afield as Wollongong, Port Stephens and Hazelbrook.

Dr Ian Percival, palaeontologist, explains the significance of the amazing fossil record of past inhabitants of NSW—stretching back over 500 million years. Image courtesy Gavin Ayre.

The WB Clarke Geoscience Centre is the repository for all drillcore generated during exploration activities conducted by industry and the government throughout NSW, and therefore constitutes a valuable asset for the state. In operation since 1968, this specially designed building holds over a million metres of drilled rock that records what lies beneath the surface of NSW. While this library of drillcore is available for all to 'read' and interpret, it is predominantly used by geologists from industry, universities and government organisations to assist their research and exploration activities. Stories in Stone offers the opportunity for the general public to see behind the scenes as to what geologists study and how they do so, and is an important component of the Geological Survey's outreach program. The dozen geoscientists who work at Londonderry were supplemented by five staff who came down from the Geological Survey's head office at Maitland, in order to provide expertise in core logging, geophysics, and deep ocean drilling (the latter presented by Dr Chris Yeats, Executive Director of the GSNSW, based on his previous career with CSIRO).

The WB Clarke Geoscience Centre also houses the state's geological reference collections, comprising the Palaeontological Collection, Petrological Collection, and the Economic Rock and Mineral Collection that includes spectacular and unique mineral and rock specimens from NSW, Australia and around the globe. These specimens, many of which were formerly housed and displayed at The Earth Exchange and its predecessor, the Geological and Mining Museum in The Rocks area of central Sydney, are usually kept securely out of view. Events such as Stories in Stone allow the public to view these treasures at close quarters and learn of their origins and significance in short talks given by Geological Survey staff members. Visitors were also shown how high-tech equipment at the centre (the HyLogger™) can help to identify minerals in rock, and were able to marvel at their beauty under the microscope and in hand specimen.

Dr Chris Yeats, Executive Director of the GSNSW, holds a model of deep sea drillcore preserving the record of the asteroid impact that is thought to have caused the extinction of the Dinosaurs 66 million years ago. Image courtesy Gavin Ayre.

For further information about geoscience information from the GSNSW, please visit: https://resourcesandgeoscience.nsw.gov.au/miners-and-explorers/geoscience-information

The Federation Rocks display at the National Rock Garden

National Rock Garden

Celebrating the Geological Heritage of Australia

Although work by committee members and friends of the National Rock Garden is voluntary, we nevertheless incur the regular costs of an incorporated entity. There are also costs 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.

The acquisition and display of the Mount Gibraltar Microsyenite in March 2018 was a great success, with good local, regional and national publicity. We are currently documenting proposed new rock garden display specimens and planning a major fund-raising campaign to construct an education pavilion and outdoor rock display gallery. We are also building our contacts with the ACT and Federal Governments for critical co-funding opportunities.

While the committee pursues major funding from corporate and government sources, the ongoing costs must be met. We therefore seek donations from individual geoscientists who recognise the importance of geoscience and geoscience education to the future of Australia.

WE WOULD REALLY APPRECIATE YOUR FINANCIAL SUPPORT

Please Make a Donation (tax deductible):

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ADDRESS: .....

CREDIT CARD: Visa ..... Mastercard..... (Please tick one)

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EMAIL ADDRESS: .....

PHONE NUMBER: ..... DONATION AMOUNT: $ .....

SIGNATURE: .....

Please mail/email this information to National Rock Garden Trust Inc. c/- Geological Society of Australia, Level 2, 141 Peats Ferry Road, Hornsby, NSW 2077 Email: nationalrockgarden@gsa.org.au

A cheque made out to the National Rock Garden Trust would also be fine.

Feedback and further information

We welcome feedback and suggestions on the development of the National Rock Garden. See the feedback boxes on the National Rock Garden website: www.nationalrockgarden.org.au

Tax deductible

The National Rock Garden is a registered Charity and all donations are tax deductible. Making a donation to the National Rock Garden is a great way to reduce your tax and feel good too! To make a donation, please visit the NRG website or phone (02) 9290 2194.

Join our mailing list

The newsletter is circulated twice a year, ordinarily March and September. New "friends" are welcome and can be added to the email circulation list by contacting the editor.

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