

Field Trip to Box Rock Circus and Brown's Folly Nature Reserve - May 2015

Box Rock Circus

In the corner of the recreation ground of the picturesque Wiltshire village of Box, lies a mini Stonehenge edifice of geological education and information. The Rock Circus is the brainchild of Elizabeth Devon, who enthusiastically guided us around the exhibits of local rock as well as specimens from further afield. These are arranged in a circle with an obelisk of Box Ground limestone, a very high quality building stone excavated and donated by local quarry company Hanson Bath & Portland Stone, at the head. Moving clockwise the exhibits comprise:

Crystalline Climbing Block containing igneous and metamorphic samples including some donated by local quarry companies and sourced from Elizabeth's mother's coffee table top as well as other beautiful examples of gneiss and marble. This is followed by Silurian lava and Devonian Old Red Sandstone. Opposite the obelisk is the Fossil Rubbing Block, with various fossil casts. Unfortunately these casts are a victim of their success and are starting to wear and become weathered but are due to be replaced with casts in metal. Following the circle back around to the obelisk are the Tropical Limestone, New Red Sandstone and finally the Sedimentary Climbing Block made of sedimentary rocks, fossils and minerals.



These exhibit blocks are intended to appeal to children of ALL ages, and succeed admirably as demonstrated by the enthusiastic attention they received from our group and these future FGS members!

Across the middle of the circus are two sets of dinosaur "footprints", one large and the other smaller, scientifically arranged to indicate walking and running, to encourage children to interpret the story that the prints may tell. Finally there are a series of black lines marked around the granite sett perimeter to demonstrate the evolution of life on Earth condensed into one calendar year. The origin of the Earth, 4,600Mya, on the 1st January is shown by the first black line behind the obelisk, followed by the arrival of simple cells 3,600Mya, on 18th March and Algae demonstrating photosynthesis 3,400Mya on 3rd April and so on. This is an elegant way of showing the development of life and the more condensed explosions of variety from the emergence of animals with shells and skeletons, 542Mya or 19th November to Homo sapiens at 23minutes to midnight on the 31st December.

The Rock Circus imparts an immense quantity of information in an interesting, imaginative and readily accessible manner. There is much more on the website: <http://www.boxrockcircus.org.uk>

Box Rock Circus is testament to how Elizabeth channelled her enthusiasm, if not outright passion, for geology and the desire to impart the knowledge to others by engaging the local people, companies, groups and societies so much so that it is now a source of civic pride. The unerring support of a "long-suffering" but willing spouse was also vital!

Before Elizabeth took us to Brown's Folly Nature Reserve she outlined the geology of the valley in which the village of Box sits. The principal strata are Great Oolite overlaying Fullers Earth and then Inferior Oolite. The Great Oolite layers comprise the good quality building stone that are such an important feature of the buildings in the locality and Bath as well as important buildings throughout the country. The Fullers Earth clay is mainly responsible for the serious landslip issues in the area. The Inferior Oolite layers are interesting due to the greater abundance of fossils but are far less useful for building purposes.

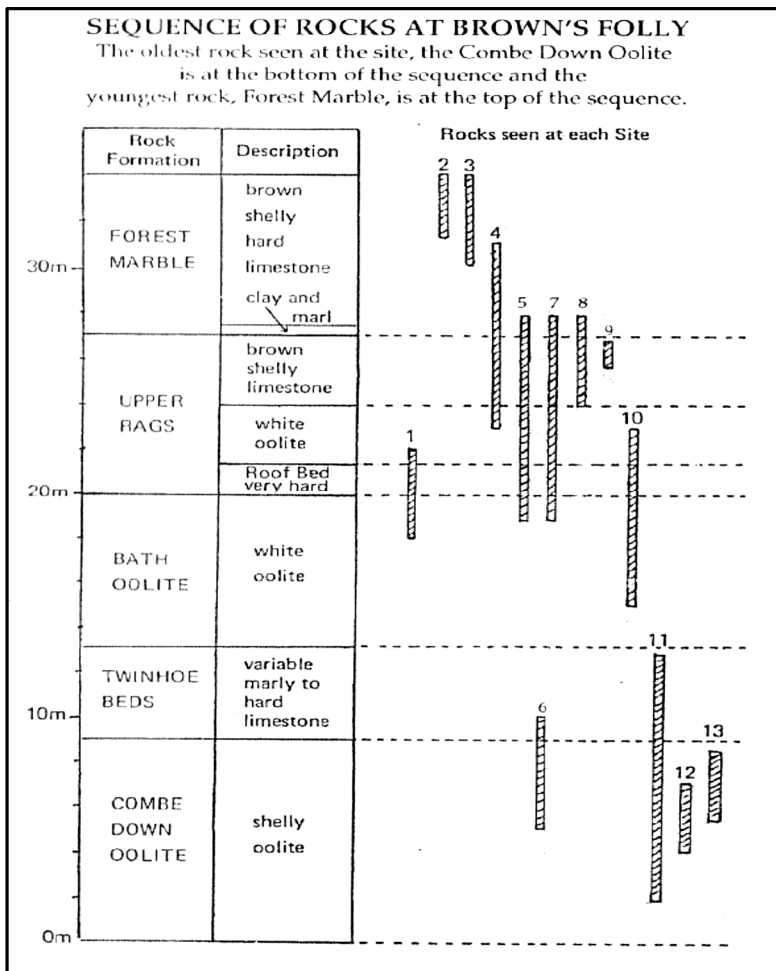
Intriguingly it is thought that the whole 32m plus sequence of rock was formed over only a 2Ma period, which incorporated several changes in sea level to bring about the appropriate conditions for each layer. The valley itself is far too large for the rather small By Brook which now flows through it. As such the hypothesis is that it is a post-glacial valley eroded by melt water.

The morning was interrupted by, what appeared to be, light rain. However Graham explained that it was just the morning dew being blown down from the nearby trees. Satisfied with this explanation we can safely assume that Graham's record of organising only dry weather for field trips remains intact!

Brown's Folly Nature Reserve

The reserve is a designated SSSI site and consists of 91 acres on the hillside overlooking the valley of the River Avon near the village of Bathford. It is owned by the Avon Wildlife Trust. The extensive limestone extraction of the past, largely by mining, has left the rock exposed and accessible for study at many sites. This has made it possible to establish a detailed picture of how the strata were formed and what the area would have looked like at the time. This geology seems to be the "pride and joy" of the Bath Geological Society who have produced a geological guide and website <http://www.brownsfolly.org.uk/>. There is an excellent pamphlet produced by the society entitled "The Rocks of Brown's Folly" by Ron Smith. It is not the intention of this report of our field trip to plagiarise this pamphlet entirely (although it may at times seem like it) as several copies were purchased and can be

borrowed from the attendees, if necessary, for more detailed reading. However the diagram showing the sequence of rocks is just too useful to leave out as it shows very simply and clearly the whole sequence and what strata are visible at each of the 13 sites that can be visited.



First stop – Site 1:

It is likely that this site was originally an adit mine, the two side walls of which remain; however the roof has collapsed and was cleared. The very hard Roof Bed is clearly visible on both sides sitting atop the now fractured Bath Oolite, which was mined for building stone. This layer is also known as Farleigh Down Stone. We were fortunate to discover some freshly fractured pieces, which when examined under hand lens clearly showed the tiny spherical ooids. Encouraged by Elizabeth we reflected on the conditions under which the layer formed. It would have been a warm sea, highly agitated, somewhat turbid and sludgy at the bottom. The highly agitated water would have restricted the formation of other fossils as creatures could not have lived in such a zone and skeletons of other animals would have been broken down along with the shells. The area would have been located at about 30°N with conditions similar to those of Indonesia and the Bahama Banks today, but with pterosaurs flying overhead!

The Roof Bed would have been retained as a roof as these adit mines were constructed and worked. Being much stronger and harder suggests that the water would have been calmer,

thus this layer contains more fossils, with bivalves evident on the underside.

Second stop – Site 2:

This hollow seems to be the result of rocks collapsing into a mine, similar to several other such collapses that can be seen on the reserve. These rocks are some of the youngest present on the reserve, but still 170Ma. They form the Forest Marble layer. Although not strictly a marble, as it is not metamorphosed, it retains the name as the stone takes a polish very well and as such is used for ornamental purposes. Its other main use is for walling as it splits easily along the lines of shell bands. The rock contains more whole shells in layers than the lower limestone layers and exhibits cross-bedding. The conditions for the formation of this layer would have been shallow, warm, near-shore marine shell banks, in other words a rather pleasant desert island location. Unfortunately our visit was quite a few Ma too late.

Third Stop – Valley Panorama

We stopped on the path along the E edge of the reserve to appreciate the views across the Bristol Avon valley to Bathampton village and Bath itself in the distance. The Great Oolite stratum continues on the opposite side of the valley but without the Forest Marble layer on top. The By Brook joins the River Avon on its meandering way to Bath. The diverse route of the Avon is somewhat intriguing and is thought to have been created by the effects of glaciation; however there appears to be little evidence to confirm this theory.

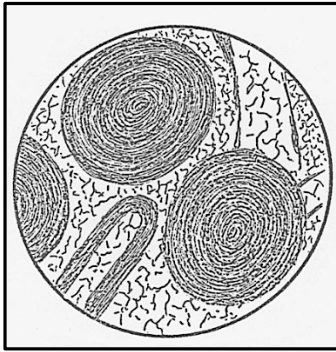
The dry stone wall parallel to the path is constructed of Forest Marble. A small, fresh sample of broken rock was carefully examined under hand lens to reveal a beautiful star-shaped crinoid ossicle, looking very like a minute starfish. Try 'googling' 'star-shaped crinoid images' to see what we found.

Fourth Stop – Brown's Folly

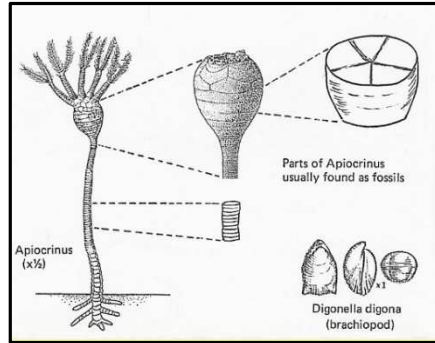
Why this tall tower is so named is unknown. What is known, however, is its construction of Farleigh Stone with finely sawn stone (Ashlar) corners. These limestone corner pieces were sawn underground when freshly mined and therefore still saturated and soft. Each piece is marked to ensure it is installed in the same orientation so that it is resistant to weathering and takes about a year for the surface to harden. A quaint story associated with the tower is that the ladies of the manor liked to take tea at the top – pity the poor serving maids!

Fifth Stop – Site 5

We skipped Sites 3 and 4 and took the steep path down to Site 5. The exposed face is made up of Brown Shelly Limestone, White Oolite and the Roof Bed layers of the Upper Rags over the White Oolite of the Bath Oolite strata. The Roof Bed is the marker layer which shows quite clearly where you are in the sequence. The Roof Bed also exhibits some minor faulting. The cave in the White Oolite below the Roof Bed has been sealed with an opening secured with a grille as it is now home for a colony of Greater Horseshoe Bats.



Oolites under microscope



Fossils, site 4



Adit Mine, Site 10, Browns Folly

Stop 6 – Site 7

We skipped Site 6 as the same rock strata can be seen at Site 11, later on. Site 7 exhibits similar views of the strata as Site 5, although somewhat more jumbled as the Roof Bed had largely collapsed, however the Clay and Marl layer above the Brown Shelly Limestone was more clearly visible.

The adjacent area of grassland is being carefully managed to reinstate it as calcareous grassland. Trees and shrubs have been removed and over winter a small number of Wiltshire Horn sheep were introduced to the reserve to graze this area. This will help rare plants and insects to thrive in the reserve, which in turn will support the very important bat and bird populations at Brown's Folly.

Stop 7 – Site 8

Expectation levels were somewhat raised in anticipation of visiting this site. Initially enthusiasm was muted as upon first sight there did not seem to be anything of great interest. However it soon became apparent that there was a very different rock outcrop at the same level as the Brown Shelly Limestone which transpired to be a Patch Coral Reef. Elizabeth showed us a wonderful sample of the net-like coral as well as another intriguing sample of coral with a small Brachiopod trapped inside a burrow tube.

Stop 8 – Site 9

The discrete outcrop of Brown Shelly Limestone has distinct lines of cross-bedding. This may be the only matter of interest at this site, but it is a very good example of cross-bedding from which it is possible to determine the ancient current direction.

Stop 9 – Site 10

We passed through a kissing gate and descended a little further along a path through the lower wooded area to reach Site 10. This was originally an **adit mine**, but was only excavated a short way into the hill, and then was used as a munitions store. The White Oolite above the Roof Bed is very weathered, beneath the Roof Bed lies the Bath Oolite which was the material mined here. To the left of the mine entrance the Roof Bed tilts in in a downhill direction to display a good example of cambering. To the right the Roof Bed is faulted in three locations, leaving isolated blocks at different levels. It may well be the case that this faulting limited the mining activities at this site.

Stop 10 – Site 11

We continued down and along the path to the lower track on the way to Site 11, passing large blocks of rock that had broken away from the main rock mass. At Site 11 there are two high exposed rock faces separated by scree and other large blocks of rocks that had tumbled down. Although some of this may have been caused by mining activity it is likely that it is mainly the result of a slip down the hill on the underlying Fuller's Earth Clay. Much of the exposed face consists of Combe Down Oolite, the oldest rock on the reserve, and contains a considerable amount of fossil debris and some small whole fossils. However this makes the stone here unsuitable as a building material and for working. Near the top of the Coombe Down Oolite there is a band of Brachiopod fossils filled with calcite. Above this lies the Twinhoe Beds which were a source of ironshot in localities south of Bath.

It was at this site that we lost Graham for a while. Despite the unsuccessful attempt of the one man search team to find him, celebrations were postponed as Graham emerged from examining the cave at the top of the rock scree.

Stop 11 – Site 13

The last site of our visit consisted of an outcrop of the topmost Combe Down Oolite and has very well preserved burrows and displays complex cross-bedding. This stratum was formed as calcite "sand" in a warm sea.

Final Thanks

Back at the car park we gathered for Janet Catchpole to formally and warmly thank Elizabeth for such a splendid and fascinating tour of Box Rock Circus and Brown's Folly Nature Reserve, as well as Graham for organising the trip. It was a very full day but extremely satisfying and interesting.

John Greenwood, FGS Member