

Visit to Malvern Hills with John Payne April 3rd 2019

Introduction

A recent paper in the OUGS Proceedings concludes with this sentence:

The structure of the Malvern Hills and the graben is [...] the result of a surprisingly long and complex history of crustal accretion, compression and extension".¹. (If you would like to see the complete paper please contact the group co-ordinator.)

Our route and the development of the Malverns

In the course of the tour John Payne explained some of the complexity mentioned above. We met him at British Camp and he took us round various viewpoints on the hills and pointed out how the underlying geology has influenced what we can see today. The rocks of the hills are pre-Cambrian formed deep underground (plutonic) then thrust upwards to form a mountain range. It is unusual to see exposures of them in England (unlike Wales). To the East are much younger rocks, of Permian and Triassic eras and to the west, Devonian and Silurian in a series of faults and folds.

The photo below is of a boulder showing a granite dyke from a display of samples at Tank Quarry. The main part of the boulder is a rock type called amphibolite; a black coarse-grained component consisting mainly of the magnesium rich mineral hornblende, within which we can see streaks of a light-coloured coarse-grained granite. The dyke itself was formed at a much later stage after the amphibolite had solidified and a molten rock, has invaded the older rock along zones of weakness, forming the dyke of the cream medium grained granite.



The Graben

To the east a mountain range of 30,000 feet was created when there was crust compression followed by their eroding to nothing. Subsequently two parallel faults occurred (the Worcester Graben) and when there was a spreading of the crust, they allowed what remained of the mountains to sink and create a rift valley. One of the faults was just to the east of the steep east edge of the Malverns.

Products of the area

Malvern Water was filtered through cracks in the granite. These cracks arose in a series of four tectonic collisions. Where the water meets impervious rocks, sandstone or limestone, it would overflow.

¹ Pharaoh T. 2019 'The complex tectonic evolution of the Malvern region' *Proceedings of the Open University Geological Society* Volume 5 2019.

In the afternoon we visited quarries where mainly granite and diorite are quarried until quite recently and used for aggregate and facing although the colourful Malvern Stone can be seen on house wall nearby.

Keeping the geology visible

John also spoke about the importance of regular clearance work by volunteers so that what is of interest in the rocks can still be appreciated, for instance in the final quarry, North quarry we were able to see part of the East Malvern fault. (see photograph below).



Many thanks to the group members who submitted photographs and observations.

Angela Dyer