EXCURSION

Malvern Hills

7-8 July 2018

Leaders: John Payne, Richard Edwards, Moira Jenkins

A small contingent of Society members was hosted by three local geologists for the two-day tour of the Malvern Hills. Between them, our guides represented the Earth Heritage Trust based at the University of Worcester, the Woolhope Club of Herefordshire, the local U3A geology group and the Martley geovillage.

Despite their location at the very margin of the ancient 'Celtic' homelands, these hills and their surrounds seem quintessentially English, looming sheer out of the flatness of the Severn Vale, with their strong connection to that most English of composers, Edward Elgar: a land of hope and glory indeed!

After meeting John Payne, our guide for Saturday morning, in the car park at Earnslaw Quarry, we were soon immersed in the antiquity of these hills with an introduction to the characteristic granites (to the north) and diorites (to the south) in the Wyche road cutting. This is one of many faulted breaches along the length of this narrow, almost linear range of hills. The Malverns are basically a kilometre-thick slab of Pre-Cambrian basement thrust up from the east along the 30° inclined East Malvern Boundary Fault, a deep crustal fracture traceable from Cheshire to Dorset.

The oldest rocks are a few remnants of ocean floor (now metamorphosed) presumed to be some 700-800 million years old, into which a series of calc-alkaline, island-arc-related plutonic rocks were intruded: the granite and diorite, along with tonalite and ultrabasic bodies date to around 675 Ma – and were presented as 'the oldest [dated] rocks in England'. The varied lithologies are well illustrated by a collection of large boulders displayed in the Tank Quarry on the northern fringe of the hills, seen later in the day.

Wyche Pass area

Saturday morning was occupied with a walk around the Wyche area, taking in locations above the north side of the cutting. Good views in both directions helped to emphasise the contrast between young Mesozoic England to the east (Worcestershire Basin with the Cotswolds beyond) and Palaeozoic Wales (Ledbury Hills and Woolhope Dome with the Black Mountain

The steeply inclined unconformity between Llandoverian conglomerate and Malvernian diorite exposed in the abandoned remains of the Gullet Quarry.

and Hay Bluff beyond). Fresh examples of Precambrian lithologies were conveniently displayed in an award-winning wall around a garden on the ancient Salt Way. Beyond, we were shown the site of an optimistic venture; a shaft sunk in 1720 for a proposed gold mine! Sadly this was based on misunderstood 'golden flakes of mica' (and pyrite?) which are locally abundant in a small body of biotite-rich rock, one of several local units within the Malvernian suite. Nearby, closely jointed, foliated and fault-brecciated textures were pointed out. The final location was the Upper Tolgate Quarry, in which it was possible to see one of the thrusts that makes up the East Malvern Boundary Fault complex, well hidden behind a narrow screen of mature woodland.

West and North Malvern

On our way to the nearby Geocentre in Upper Colwall we passed an area of rock falls and a small spring. After lunch our guide for the afternoon, Richard Edwards, took us to the northern fringe of the hills, where the subtleties of fractionation and stacked magma chambers were explained with the help of the boulder display in Tank Quarry, where we were also shown an unusually thick quartz vein, suggestive of a point near the roof of a former magma chamber. In the nearby North Car Park

View NNE from Herefordshire Beacon towards the distant Worcestershire Beacon, which at 425m is the highest point alomg the spine of the Malvern Hills.

Pillow lavas of the Warren House Volcanics (which are mainly amygdaloidal spilitic basalts) exposed at Clutter's Cave, below Herefordshire Beacon.

Quarry, another outcrop of the East Malvern Boundary Fault was examined, here with an obvious fault-breccia. Finally, at West Malvern, we walked between the Dingle and Westminster Arms quarries, taking in an exposure of the celebrated Miss Phillips Conglomerate, marking the locally preserved and much debated unconformable relationship of the Llandoverian transgression over the Precambrian basement.

Three Passes: Silurian, The Gullet, Hollybush

Sunday began in the car park at the foot of the Gullet Pass where we met our third guide, Moira Jenkins. Most of the day was spent on a circular walk up to Clutter's Cave, returning via the Gullet Pass. Both the Gullet and the quaintly named Silurian Pass, are further examples of fault-guided breaches across the Malvern ridge. Moira produced a map that showed a sizeable outcrop of Silurian bedrock on the 'wrong', eastern, side of the hills, explaining that older mapping claimed to show evidence for this as an extension to a narrow strip of Silurian in the eponymous pass itself.

The East Malverns Boundary fault zone, here seen as a thrust surface exposed in Upper Tolgate Quarry.

At Clutter's Cave we admired the Precambrian pillow lavas of the Warren House Volcanics, which form only a small proportion of the Precambrian suite of rocks, preserved in an east plunging syncline. Further up the path we came to a broad saddle from which we could enjoy fine views in all directions. Earthworks of the British Camp on Herefordshire Beacon and the Red Earl's (or Shire) Ditch occupied the foreground while Worcestershire Beacon, displaced to the east by a dextral shear fault and marking the highest point along the Malvern ridge, stood out clearly to the north, with the Lickey Hills just discernible on the distant skyline.

Returning around the flank of Swinyard Hill, we descended to the well-known Gullet Quarry where there is another unconformable confrontation between the Llandoverian sediments and the igneous mass of the Malvernian, though the latter rocks are largely out of bounds (officially anyway, not that non-geologically minded visitors seem to take any notice!). Lunch was taken at a newly cleared exposure of the conglomeratic Cambrian Malvern Quartzite on the Gullet Pass. This records an earlier transgression across a Pre-Cambrian surface, although the relationship between this older inferred unconformity and that up in the quarry is obscured by the large fault that defines the pass.

After a break on nearby Castlemorton Common, we completed our excursion with a brief visit to the 'Golden Valley' and exposures of the Triassic cover and Malvern ?fluvio-glacial gravels, both of which proved to be no longer visible beneath cloaks of mud from recent flooding events. The final stop of the day was on the Hollybush Pass, to see an exposure of minor intrusions in the eponymous Cambrian sandstone, which also proved to be somewhat obscured, this time by vegetation.

Despite this downbeat finale, the excursion as a whole was most instructive, and our thanks go to John, Richard and Moira for their insights and guidance.

Mike Allen