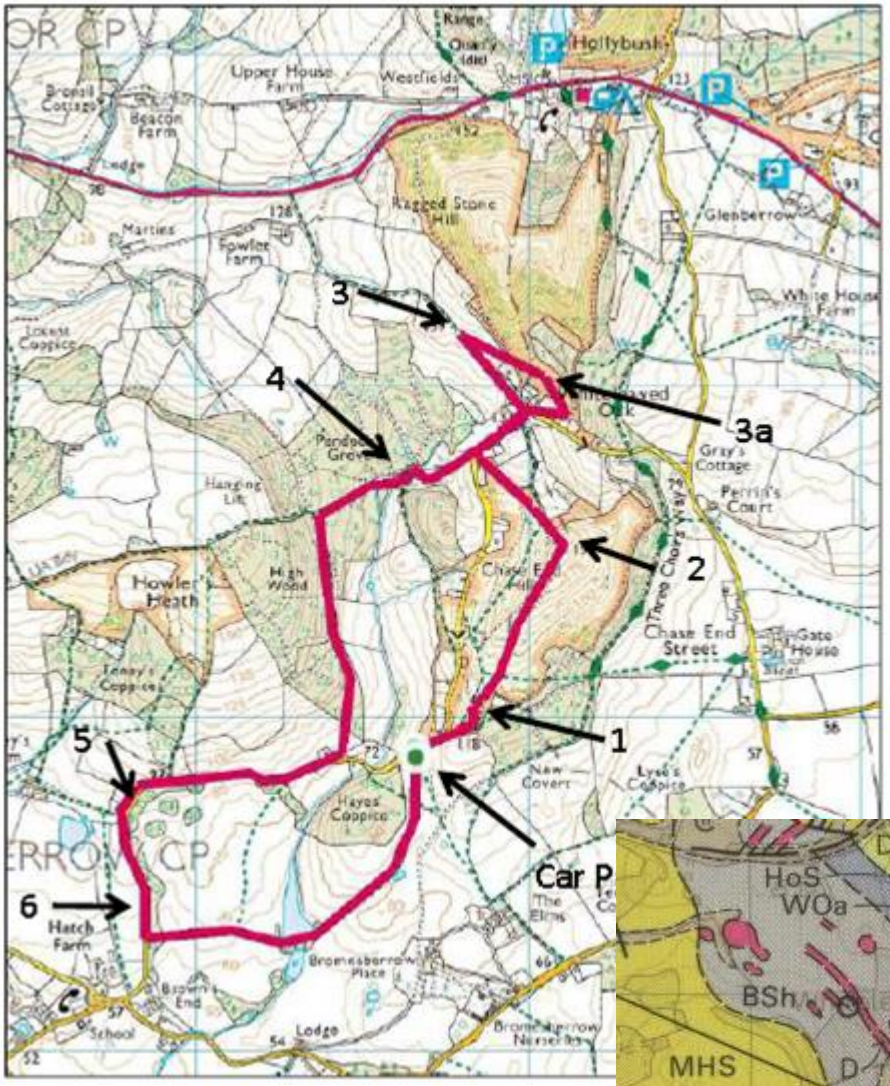
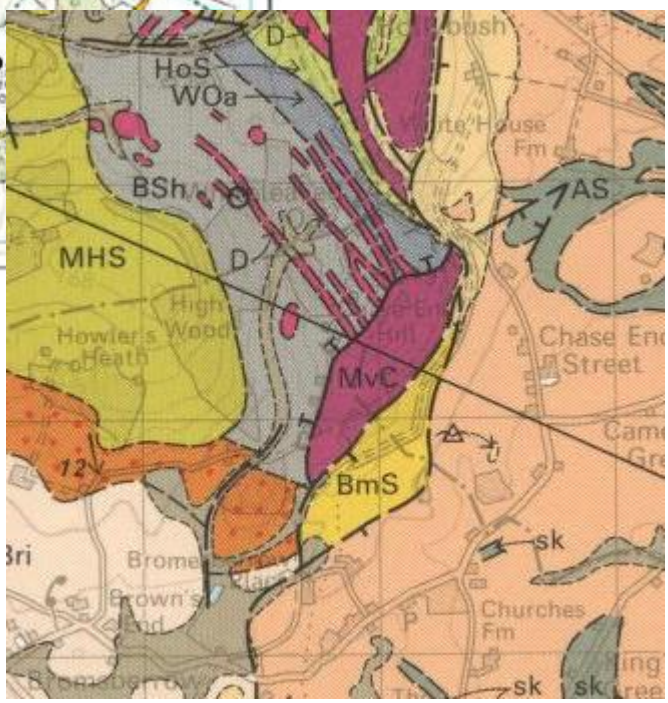
Chase End Hill Field Trip, Wednesday 22nd May 2019

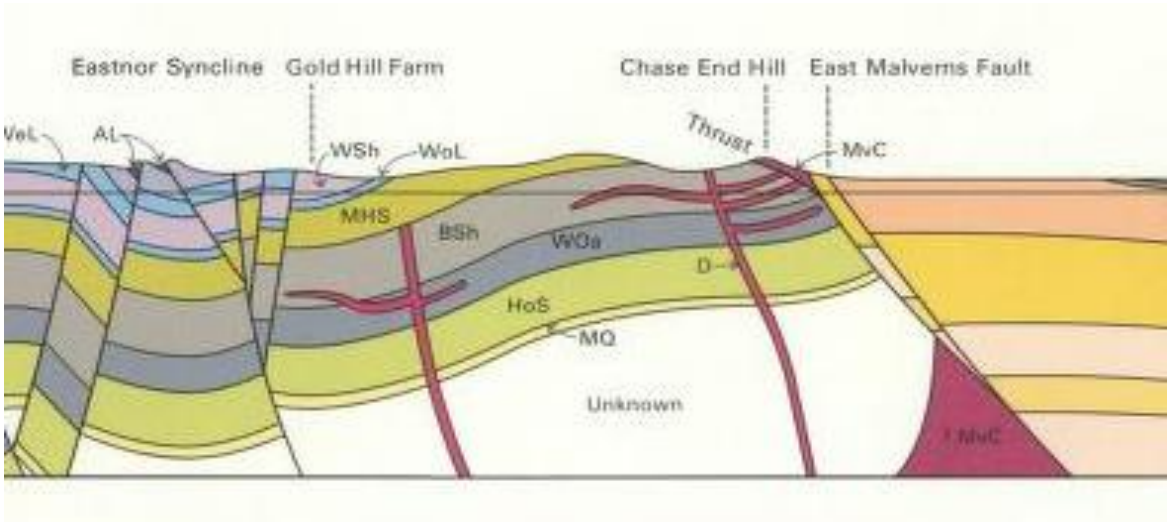
Led by Peter Bridges

The itinerary was based on the Chase End Hill Rural Geology and Landscape Trail Guide published by the Gloucestershire Geology Trust, available from www.glosgeotrust.org.uk. Seven quarries and outcrops were visited, with rocks ranging in age from those of the Precambrian Malvern Complex to Permian sandstone and breccia.





A cross section from WNW to ESE through Chase End Hill (Line on Geological map extract).



After parking at the southern end of Chase End Hill 19 people walked up to Chase End Quarry **(1)** where a good example of “Boudinage” can be seen. This is a

geological term for structures formed by the fracture of a rigid tabular layer between softer more plastic layers. The harder layer has been broken by periods of thrusting of the Malvern Complex rocks, and the more plastic material has entered the cracks between the blocks or “boudins”. Blocks of light coloured pegmatite can be seen on the quarry face.

Boudinage is the French word for Black Pudding and describes the mixed-up types of rock in the quarry face. At the side of the quarry the less fractured country rock of the Malvern Complex could be seen (right).

A short walk to the top of Chase End Hill **(2)** led the group to an excellent viewpoint with 360° views from the Severn Valley and the Cotswolds to May Hill, Sugar Loaf Hill and the hills of the Welsh borders round to the Malvern ridge stretching northwards. Looking from the north to the north-west across the Whiteleaved oak valley the

sequence of rocks we would be walking on was the Precambrian Malvernian (MvC), Hollybush Sandstone (HoS), Whiteleaved oak Shale (WOa) and Bronsil Shale (BSh). Several intrusions of dolerite (D) could be seen in the fields where the pastureland is raised and the grass is a different colour.

After a steep descent from Chase End Hill and a walk through the hamlet of Whiteleaved Oak, the lower and upper quarries of Whiteleaved Oak **(3a)** were visited. The lower quarry is on the Earth Heritage Trust's list of places which will be tidied up, so that in future all the rock exposures can be examined more easily. When the vegetation has been reduced, a surveying and mapping exercise will take place. The group limited their study of the rocks to a pegmatite ridge leading down from the upper quarry (left).

A steep ascent of the beginning of the Raggedstone Hill path led to the Upper Whiteleaved Oak Quarry where the unconformity between the Malvernian and the Hollybush Sandstone can be seen. This irregular erosion surface was covered in Cambrian times by sandstones containing glauconite, showing that the conditions of deposition lacked oxygen. The flaggy sandstones are given a greenish colour by the mineral (as are the Cretaceous greensands of south-east England).

A gradual descent through the trees on the west side of Raggedstone Hill led to the intrusions of dolerite/microgabbro in the fields **(3)**. Small outcrops were found, and where the sill was intruded into the Hollybush Sandstone bleaching occurred because of the high temperature in the zone of contact.

At stopping point **4** an interesting quarry in the Tremadoc Bronsil Shales shows intruding sills of dolerite of Ordovician age, broken in places by faults. The shales show signs of thermal metamorphism at the zones of contact with the dolerite. In one part of the quarry one sill was visible, but in another two layers of dolerite were seen. (For labelling, click on the pdf)

Ord Sill in Bronsil Shales.pdf

After following the forest track back to the road, a walk towards Bromesberrow (marshalled by Alan) took the group onto much younger Permian rocks, (c.298 My). The road cuts through Haffield Breccia **(5)** with a very small outcrop exposed by the wheels of vehicles, then a deeper road cutting in Bridgenorth Sandstone at **6**. These soft sandstones show clear signs that they were deposited in sand dunes, with cross-bedding visible in some places. Their red colour and soft structure is a result of their haematite cement which does not make them resistant to weathering and erosion.

Haffield Breccia

Bridgenorth Sandstone in the road cutting

Cross-bedding in aeolian Bridgenorth sandstone.

The group returned to their cars across the parkland belonging to Bromesberrow Place, then had a good lunch at the Duke of York Inn in Rye Street. Thanks were given to Peter Bridges for the work he had done to make this an enjoyable and instructive walk.