

Lickey Hills Day Trip

13 April 2025



Well kept trails in the Lickey Hills Country park.

Five members travelled to a country park on the southeast boundary of Birmingham for a captivating field trip hosted by Alan Richardson of the Lickey Hills Geo-Champions. The main Lickey Hills feature is a quartzite horst running roughly north-south, two kilometres long, Ordovician in age and surrounded by significantly younger rocks. We set out to determine how and when, having been buried to a depth of at least 1 km, it had come to be exposed and preserved amongst younger sediments.

We first went to the north end of the ridge, just inside the Birmingham city limits, where the quartzite of the ridge is exposed in an A38 road cutting. Overlying it is the younger Rubery Sandstone, dated as Silurian. The contact is marked by a breccia layer of varying thickness, ~2-20 cm and, as there is no great angular difference in bedding between the two formations, this contact is a discontinuity rather than an unconformity. A small fault in the quartzite some 20 cm wide had filled with the sands from the Rubery above. Some 200 metres south along the contact, we were shown a pebble-filled channel where water had scoured down some 80 cm into the top of the quartzite.

We moved on to Rednal Hill and a small exposure of bedding planes in the quartzite. Here we saw where thin beds of clay and sand separated the quartzite layers, as well as rippled surfaces. These all indicated marine deposition, with some variation in sea levels. One particular bed surface was dotted with small (1-2 cm) depressions, which it is postulated are the tops of u-shaped *diplocraterion* worm casts.

Next stop was at Barnt Green quarry, on the east side of the ridge. Here, extensive folding was apparent in the quartzite of the quarry walls, including a spectacular overturned fold. Again, thin layers of fine material separated the beds in the quartzite. We could only access the “right way up” limb of the fold, where the interbed material was sand-mica-clay from bottom to top (i.e. fining up).



Folding at Barnt Green Quarry.

It was a busy day, so we quickly moved on to the south end of the ridge, to Kendal End quarry. The initial impression was that it was just more of the same, quartzite beds separated by thin layers of sediment. However, here the sediment layers were clay-mica-sand, the reverse of what we had seen at Barnt Green and showing that the beds here are inverted. The overturning we had seen at the previous site was obviously quite widespread. Also seen here was a convex cross-section in many of the beds, these being ripples of around 1 metre scale. The convex sections bulged upwards and, as these represent the trough of each ripple, confirm the overturned nature of the beds. Like site 1, we again saw non-quartzite sediments filling the fissures in the rock, which could only have originated from the top of the ridge.

Walking up the west side of the ridge we came across large (5-10 cm), well-rounded pebbles in the path. There were Triassic in age and brought here by glacial outwash from the beds further west.



The proofing range butts, into which guns were fired.

The butts were sand-filled for the testing.

covered unconformably and whatever covered it trickled down into these fissures and became lithified. Also of interest here, though now sadly badly eroded since it was first discovered, was one example of *cruziana*, a trail left on the seabed by a feeding trilobite.

Moving ever onwards, we climbed to the top of the ridge where we found, in some large boulders (~1 metre scale), where the sediment-filled fissures reached the surface (top) of the ridge. The overlying sediments that provided the fill of the fissures were eroded off. We had great views to both east and west, where younger rocks (Triassic to the east and Carboniferous to the immediate west and Triassic about 1 km distant) lie below the ridge. That younger rocks surround the ridge clearly indicates that the ridge is a horst, bounded by faults of the east and west sides. The fissure fill would have been from the Triassic sediments that would have been deposited unconformably on top of the quartzite before being both eroded and down-faulted to their current positions. The ridge, being of hard quartzite, survived the erosion. Furthermore, it is evident that the uppermost 20-30 cm of boulders, the very top of the ridge, had been hardened even further by a silcrete that formed in the uppermost layers, increasing the ridge's resistance to erosion.

Our final site was in the gorge carved east-west through the ridge in the Triassic. Here, in Rose Hill quarry, we saw the ridge in section (the other four quarries had been along the edges of the ridge). Though there was little folding evident in the quartzite here, there was evidence of a lot of movement between the near-horizontal beds, indicated by imbrication between the moving layers.

We had a brief lunch at the visitors' centre before moving on to Warren Lane quarry, on the west side of the ridge. Interestingly, this had been used as a proofing range for artillery pieces re-barrelled in Birmingham after service on the Western Front in the First World War. The quarry showed more sediment-filled fissures we had now seen now on the ridge at all four points of the compass and which must have been open to the surface at the top for the sediments to enter. Our host proposed that these surely indicated that the ridge had been



The cruziana trace fossil, now largely eroded away, with a photo of the original find.

So, in summary:

The Lickey Hills were deposited as an offshore sand strand in the Ordovician (the rippled beds and *cruziana* support this). The strand became buried under at least 1 km of sediment, but uplift and erosion deformed and fractured it (overturned folds, fissures) and exposed it at the surface. In the Triassic, further deposition occurred, washing sediments into the fissures which became lithified. More erosion occurred and, in the late Triassic, the crustal extension accompanying the opening of the Atlantic caused the faulting that created the horst that is now the ridge. Silcrete formation hardened the top layers and preserved it against further denudation.



View north to Birmingham city from the top of the ridge.