Threlkeld Knotts-Lavas, Laccolith and Landslips

Leader John Rodgers 10 July 2019

This was a trip that was originally planned for the afternoon of 12 June but bad weather forced its postponement. A group of 15 met at the road junction 500m SW of Burns Farm (NY 304 240) for car sharing to a small layby in the lane at NY 314 231, just south of Wanthwaite Mill. We then proceeded on foot to the main road (B5322) and a short way along to the start of the Old Coach Road public way. We then followed this track for about 700m before turning up onto the fellside and eventually after a further 500m locating an obvious path up towards Threlkeld Knotts.

The aim of the excursion was to examine and explain the topography of Threlkeld Knotts. Until quite recently the dome-like form seen from the north was interpreted as a laccolithic intrusion of microgranite, modified by glacial erosion. (Field evidence and geophysical surveying indicate that the original form of the intrusion was indeed a laccolith emplaced around 450 m.y. ago). However, further research using ground-penetrating radar has shown the sub-surface nature of the upper part of the Knotts to be consistent with the idea of a massive landslide. Direct observation of the morphology and lithology of the upper part of the Knotts immediately below the scarp face of Red Screes enables appreciation of this interpretation.

En-route up the track an outcrop of dark grey slaty rocks was described as part of the underlying Buttermere Formation of the Skiddaw Group. This was overlain by microgranite, a pale-grey fine-grained porphyry with infrequent phenocrysts of quartz and cream feldspar. At the top of the track lies a large depression with a prominent E-W ridge on the north side and the steep scarp face of Red Screes on the south side. The ground is littered with large angular boulders (up to 2m across) that have fallen from the adjacent slope and consist of microgranite and various volcanic rocks from the overlying lowest formations of the Borrowdale Volcanic Group (BVG) Birker Fell Formation. Some of the boulders displayed excellent examples of flow- brecciated andesitic lavas, the recessed surface clearly picked out by differential weathering. The group then ascended the steep ridge to the north where a zone of rusty weathering, dark fine-grained lavas were found to be extensively filled with a network of pyrite veins, (NY 330 230). This ridge is now interpreted as the upper part of a great rotational landslip with the volcanic rocks now forming a transverse antiscarp. An emplacement model of the sequence of events is shown in Figure 1. Other linear depressions, both transverse (E-W) and longitudinal (N-S), over the surface of the Knotts coincide with subsurface discontinuities that have been revealed in the profiles produced from ground penetrating radar. Threlkeld Knotts is now regarded as a major landslip, estimated as 40 million cubic metres

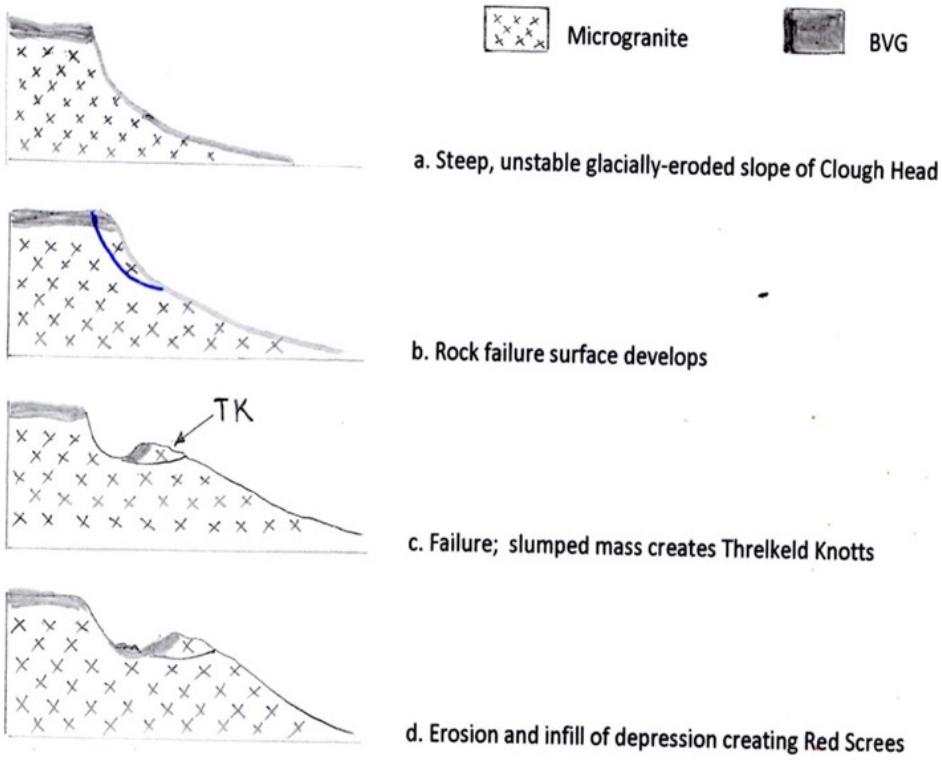


Figure 1. A model of how Threlkeld Knotts developed.



Figure 2 View of Clough Head and Threlkeld Knotts from the north.

in volume and composed of a moderately disaggregated mass of microgranite and volcanic rock. The rock slope failure is thought to have originated up on Clough Head, possibly along a line that was c. 100m behind the post-glacial cliff edge, which itself would have been an unstable surface following de-glaciation.

Advantage was taken of the elevated viewpoint to demonstrate many of the other landscape features in the surrounding area including the south face of Blencathra, the Coniston Fault line along the valley of St. John's in the Vale, the stepped (trap) topography of the BVG rocks of High Rigg and the microgranite mass of Low Rigg which has been separated from the Knotts intrusion by erosion along St. John's in the Vale. The existence of two much smaller and previously recognised rock slope failures on either side of Threlkeld Knotts was also mentioned, with a comment on how surprising it is that the landslip origin of the Knotts itself was not fully researched until relatively recently. It is now considered as one of the largest in the country and emphasises the importance of re-evaluating landscapes partly because of the need to assess the possibility of future landslip events.