

## Day Trip to Glen Esk

7<sup>th</sup> September 2013  
Participants 20  
Leader Dr. Ben Harte  
Reporter: David Martinage

The bulk of our group left Glasgow 8.35am, with Raymond as our driver, and arrived in Edzell car park at 10.50 am. where we met our leader ,Dr. Ben Harte, and the remaining group members. The day was, and remained, dry with sunny intervals and a cool wind. Dr. Harte outlined the aim of the day and gave us a comprehensive handout based on work he had previously published.

Dr. Harte shows the route



He explained that the North Esk river cuts through a sequence of six metamorphic zones, first described by Barrow in 1893 and elaborated in his paper of 1912, referred to as Chlorite, Biotite, Garnet, Staurolite, Kyanite and Sillimanite. The metamorphism dates from the Dalradian orogeny, c.480Ma.

After a short ride in the bus we walked about half a mile to our first site beside the North Esk river. There we viewed rocks from the Highland Border Complex, notably greenstones (fine grained basic chlorite rich schists derived from basalts) and sandstones from the Margie series. Like the greenstones they are weakly metamorphosed. Small areas of green conglomerate could also be seen.



North Esk river

About 30m upstream we came to the first of the Dalradian zones comprising slates/phyllites composed of chlorite, muscovite, quartz and a little feldspar. Very small specks of partially oxidized pyrite could be seen. Dr. Harte commented on the absence of biotite. This location was in Barrow's chlorite zone.

Walking upstream over rough ground we came to a gorge with exposures of Margie 'grits', sandstones containing small pebbles. Ribs composed of regular, very small, parallel folds were visible on the surface of a large boulder. We were now in Barrow's biotite zone.



Margie series sandstone

The next zone up sequence is the garnet zone but we omitted this as Dr. Harte felt it was difficult to access. We had lunch at the top of the gully and proceeded back to the bus.

Our next stop was in Barrow's Staurolite zone, conveniently transected by a gravel road constructed for grouse shooting parties. A ten minute walk uphill revealed a number of rocks with grey nodules on the surface comprising Staurolite with its surface degraded to muscovite but we were also able to find examples of unaltered Staurolite as brown prisms. Small garnets were also sometimes visible.



Another short bus ride and walk brought us to the kyanite zone, the kyanite showing as attractive streaky blue crystals embedded in white quartz veins. Finally, after another short hop and fighting our way through deep bracken over rough ground, Dr. Harte showed us some examples of Sillimanite with a superficial appearance of grey felt but which, apparently, were composed of fine needles and likely to be enveloping garnet.

Back in Edzell car park at about 5.15pm. Alison Drummond gave a vote of thanks to Dr. Harte for a very enlightening day