

Day trip to Keltie Water

Joint Excursion with the Edinburgh Geological Society

Sat 20th July 2013

Leaders: Dr Chris Burton, Dr Jim MacDonald

Participants 40, 18(from Glasgow) 22(from Edinburgh)

Reporter *David Hollis*

The purpose of this visit was to explore the valley of the Keltie Water, north of Callander, and study the Highland Border Complex – a series of rocks lying within the Highland boundary Fault zone between the Old Red sandstones of the southeast and the Ben Ledi (Dalradian) schists to the northwest.

Our leader, Dr Chris Burton of Glasgow University, provided us with a plan of the day's activities (1). There is controversy about the Border Complex because of conflict between stratigraphic, fossil, and dating evidence (2, p 154). Tanner (3) and Bluck (4) take opposing views on this subject. Indeed, Dr Jim MacDonald, our second leader, had a further suggestion – that of compressive extrusion of parts of the ocean floor as an ancient ocean closed. We visited six of the eight possible locations in order to “make up your own minds”, as Dr Burton told us. We proceeded up the farm track past Braeleny Farm to a point south of Tom a Bhacain. From there the Keltie Water was followed downstream.

At location 1, NN 63933 11864, in a fault either side of the farm track are the black graphitic shales of ?Ordovician? age, and an orange weathered dolomite. Two felsite dykes cut these strata, and a Tertiary quartz dolerite dyke cuts all of these. Some members climbed up to a vantage point on the dolerite dyke. A short distance south of these, andesite of Old Red Sandstone age crops out. The presence of these rocks, and their correlation with those at the Keltie waterfall confirmed that location 1 is on the Highland Border Fault.

At location 2, NN 63977 12428, further up the farm track to its summit, Dalradian schist with schistose texture and quartz veining showed that we were north of the Highland Boundary Fault. This outcrop was examined and photographed.

Towards location 3, the group walked in an ENE direction towards the Keltie Water, through tussocky grass, over the Transition Member of the Keltie Water Grit (Tanner, 3) to the grey and white gritty sandstone which lies beneath the Keltie Water Limestone and Slate. At a sharp bend to the east the strata are strongly folded.

At location 4, about 120 m downstream, black graphitic shales, and a felsite dyke which forms a waterfall, appear.



Waterfall and Kelsite dyke

Just below the waterfall, a thin cream coloured dolomite horizon exists, as seen in location 1. Although no fossils have been found here, the fossils found in similar strata further west in Leny quarry are of Lower Cambrian age.

At location 5, NN 6450 1237, further gritstones, transitional between the Leny Limestone and slate member and the Keltie limestone and slate member, were examined, together with cobbles of limestone in the river bed.

At location 6, NN 64480 12275, a large waterfall empties into a gorge containing a plunge pool. Tanner (3) shows that the Leny Limestone and Slate Member is cut by a fault beyond which lies the Old Red Sandstone strata. This zone of faults and associated igneous rocks is similar to that elsewhere on the Highland Boundary Fault, including the Leny quarry. Some members of the group proceeded further to an erosional remnant of the former cover of lava, an example of which can also be seen on the east side of the Keltie Water opposite Braeleny Farm.

There are two more locations which were not visited by the group. By then, the group were suffering from the fierce heat about 30°C and the difficult walking on the tussocky grass. They headed back to the farm track and some previously prepared “caches” of clean water until one of the coaches collected them and brought them back to the car park.

Location 7, NN 6376 1093, is a flat area just south of the lava ridge on which Braeleny Farm stands. Andesite’s intercalated with conglomerate layers can be observed. These overlie all the other strata.

Location 8, NN 6385 1010, is another waterfall which falls into a plunge pool into which a number of intrepid young men were jumping. This locality demonstrated the thick, almost vertical, beds of the Old Red Sandstone. Beds of grey sandstone are intercalated with conglomerates whose clasts are water rounded cobbles of material which is not of Highland origin, and whose weakly developed south-westerly palaeoflow indicated possible alluvial flood fans originating from high ground in the south.

The two Societies boarded the coaches and headed to the Old Rectory Inn in Callander for High Tea at which discussion of the day’s activities continued, and vast quantities of liquid refreshment revived the group. A vote of thanks to our leader was proposed, and seconded by enthusiastic applause from those present. The members of the two tired but happy groups bade their goodbyes at 6.30 pm and went their respective ways. Our sincere thanks go to Maggie Donnelly for organising this visit and high tea.

References.

1. Dr C. Burton, “Joint Excursion (20th July 2013) “The Keltie Water”
Excursion itinerary and notes on locations chosen for that visit.
2. Stephenson D., Gould D., British Regional Geology, the Grampian Highlands (pp. 154).
4th ed., 1995, H.M.S.O. London.
3. P.W.G. Tanner, “Keltie Water” in Tanner P.W.G., Thomas C.W., Harris A.L., Gould D., Harte B., Treagus J.E., Stephenson D., 2013, “The Dalradian Rocks of the Highland Border Region of Scotland, *Proceedings of the Geological Association*, **124**, 240 – 5.
4. a. Bluck, B.J., 2010. “The Highland Boundary Fault and the Highland Border Complex, *Scottish Journal of Geology*, **46**, pp.113 – 4.
4. b. Bluck, B.J., 2011. Reply to the discussion by Tanner on (ref. 4a above). *Scottish Journal of Geology*, **47**, pp. 89 – 93.