# GEOLOGY OF KERRERA, NORTH-WEST SCOTLAND

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## or - What happens when you put seven geologists on a six-mile long island with no roads, no shops, no pub and a population of thirty people and three thousand sheep!

### INTRODUCTION

Field mapping at 1:10,000 scale is an essential part of any geology degree. All students are given a good grounding in the discipline and, in the summer of the second year of the course, most are given the option of conducting several weeks of field mapping as a basis for their dissertation. In this article I am going to try to give an account of what can happen on a field-mapping course.

The island of Kerrera is situated in the Firth of Lorne, between Mull and the Scottish mainland, just opposite the town of Oban. It is approx. 6.5 miles long and 2 miles wide. In early July of 1999, four geology students from Southampton University set out to map this island. It was to be an interesting experience.

### GEOLOGY OF THE ISLAND

The first problem we encountered was to get all four of us up to Oban at around the same time and in time to catch the last ferry of the day to the island. One person decided to get the train but the rest of us travelled together. That was how, at six in the morning on the third of July, I found myself waiting in the car park of the Severn View Service Station with a pile of bags, a hard hat and my trusty geological hammer. After being picked up by the car-owning member of our group, we set off on the first leg. The third member of the party was due to be picked up at Knutsford Services by eleven so we were trying to keep to time. After a safe pick-up, the other two alternated the driving and I sat in the back on top of a pile of various equipment. It was the Wimbledon semi-finals that day and we were rolling along listening to Tim Henman lose to Pete Sampras. That lasted us most of the way to Glasgow.

We arrived safely in Oban and made the trip across on the ferry. Our accommodation was a little basic, but the four of us from Southampton soon adapted as not much time was really spent inside. The first few days of mapping were spent trying to get a basic overview of the area. One of our mapping supervisors was due up at the end of the week and we wanted to have the essentials down to show him. Luckily, the first week we were blessed with good weather.

We found that the geology of the island consisted of a metamorphic basement of Dalradian age. This was composed mainly of a fine-grained, silvery-grey phyllite and often contained very large, perfectly square pyrite crystals. Other members of this meta-morphosed basement formation included a lime mud and red, calcareous sandstone. This formation corresponded closely to a description of the Easedale Slate Formation found in Craig's *Geology of Scotland* and so that name was used. The formation was heavily deformed and showed two strong cleavages. There was also folding of this formation, on a scale from a few centimetres up to regional. All of the folds showed a hinge line plunging and trending at approx. 10/040°. The dip of the beds tended to vary within the folds, as was to be expected, but the strike was fairly constant, measuring approx. 045/215° depending on which limb of a fold you were working on. The very strong $S_1$ cleavage cut these folds at a fairly constant orientation of ~ 065/75° This intersected with the bedding at ~26/220° Cleavages observed cutting though pyrite crystals indicated that their formation was syn- tectonic.

The distribution of this formation was strongly topographically controlled. It appeared mainly on the lower northwestern side of the island, with a fault-controlled strip appearing on the southeastern side. Above this formation was an unconformity, representing a long hiatus lasting up until Devonian times. In a very few places the basal breccia that forms the base of

the Devonian units can be seen. These places are strongly related to the occurrence of faults and probably represent scree slopes at the base of fault scarps.

We were lucky in that Kerrera is just about the only place in the region where the basal beds of the Lower Old Red Sandstone of Devonian age are exposed. These beds consist of huge thicknesses of polymict conglomerate. The clasts are principally made up of volcanics from the Devonian and Dalradian times, and large quartz pieces. There are very few metamorphic clasts, indicating that the source area for these conglomerates fed from the volcanic highlands. These clasts were up to half a metre in places and very well rounded. They were topped by alternating layers of sandstone, mudstone and a second conglomerate. These are not laterally extensive. This second conglomerate was characterised by a much smaller clast size. Some sedimentary features such as graded bedding and imbrication were also observable in places. It appears that the basal conglomerate may have represented a massive debris flow, with the successive beds being deposited in shallow marine or lagoonal systems fed by rivers from the highlands. The second conglomerate may have been deposited by periodic flash floods. This entire formation shows an overall dip of a maximum of ten degrees to the northwest. The direction and steepness of the dip is very constant over the whole island.

A Devonian lava is also present. This was emplaced by one of the faults that are common in the area. The Great Glen Fault runs nearby on the island of Mull and our island was cut by a series of related sinistral strike-slip faults. One of these introduced the lava alongside the metamorphic basement on the southeast side of the island. The lava is andesitic in composition and badly weathered. It is characterised by a highly vesicular texture. This andesite is not to be confused with the Tertiary volcanics that are also present. These occur as a series of basaltic dykes, related to the Tertiary igneous complex on Mull. A large plug of spectacular columnar basalt can also be seen on the western side of the island and topping off several of the highest hills.

**CONCLUSION**

I have tried to give a brief overview of the island of Kerrera. It took us all of the six weeks that we had to get the geology straightened out though. Although mapping is meant to be carried out in pairs, for safety reasons, we bent this rule. All of us worked independently, but made sure that we always left a note of the area we would be covering and the time we expected to be back.

By the time our supervisor arrived, we had a fairly good idea of what was going on. The visit was characterised by extremely hot weather. One of our number was a former hill runner and had us all marching up and down all day. On his return to Oban our supervisor was heard to have said that it had very nearly killed him! Apart from this, the only noteworthy happening in the day was when one of our number stepped on what turned out to be a grass covered hole whilst descending a slope. He arrived at the bottom rather faster than expected, leaving the rest of us to pick up various equipment.

We got used to eating some very strange cooking and to timing our shopping trips to the worst of the weather. Several memorable trips were made into Oban to meet up with groups mapping on the mainland. The situation on the island became a little more cramped when three more geologists from other universities arrived. One of the lasting effects of the trip on me has been the development of a taste for single malt whisky. A pastime on some of the wetter nights was sitting in front of the video working our way through the Classic Malts series.

There are many other tales that I could include in here. Lack of space and (in some cases) the laws of decency combine to keep them out. I will finish by saying that the map, notebook and dissertation were all handed in on time. The trip was something that none of those involved will ever forget. All I can say is that field mapping is something that every geologist should try at least once in his or her life.