

LECTURE

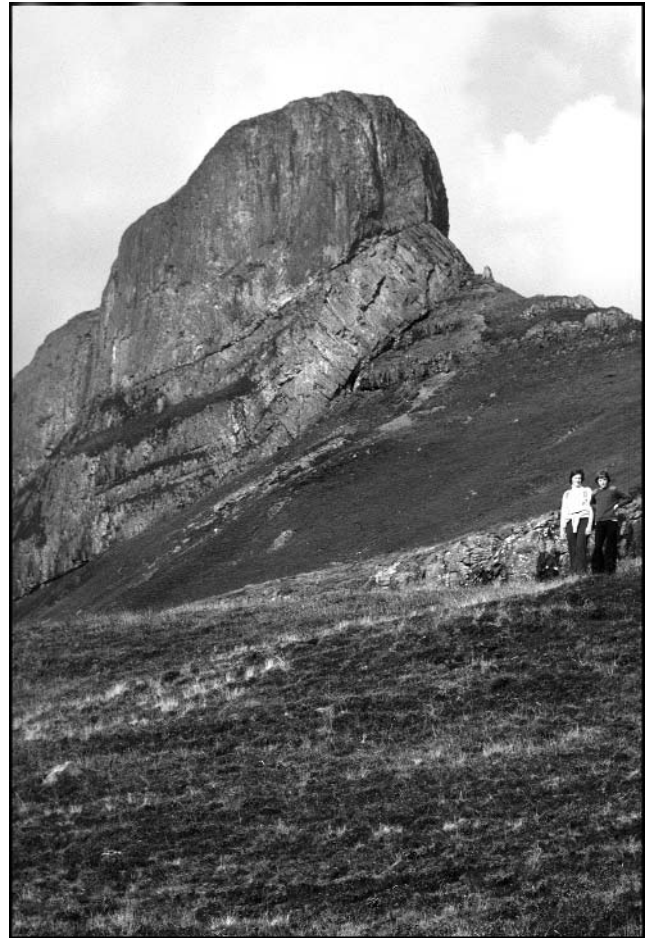
The Isle of Eigg: its geological history and the history of its geology

Summary of lecture presented to the Society on Saturday 7th April 2001 by Prof. John Hudson of Leicester University.

In the late 19th and early 20th centuries, the island of Eigg, in the Hebrides, was famous in British geological discourse, out of all proportion to its size. Fossil wood, the "Eigg Pine", had been described from there as early as the 1830s. In the 1840s, Hugh Miller discovered the first Scottish plesiosaur and graphically described his visits in his posthumous "Cruise of the Betsey" of 1858. Then Archibald Geikie, in 1865, interpreted the dramatic pitchstone rock of the Sgurr of Eigg as the fill of a pre-existing valley, carved in the underlying basalts, and now standing proud of its surroundings. This provided him with an object lesson in the power of erosion at a time when the erosional origin of valleys was not universally accepted. In 1906 Alfred Harker challenged Geikie's interpretation, claiming that the pitchstone was a transgressive sill, not a lava flow; Geikie was outraged, and in 1914 E.B. Bailey sided with him. But perhaps because of this clash of the geological titans of the day, the Sgurr lost its textbook popularity, and petrologists who studied its mineralogy and geochemistry were reluctant to comment on its field relations.

In more recent times, these 19th century discoveries and controversies have been re-investigated. Geikie's interpretation of the Sgurr pitchstone has been vindicated. Ann Allwright's mapping has revealed a buried landscape, not just a single valley, beneath the pitchstone. At its base the pitchstone contains pumice-shards, showing that explosive eruptions preceded the lava flow. Fossil wood occurs partly in the basal pitchstone but mainly in underlying conglomerates in the base of the old valley system, attesting to a vegetated landscape. Some of the wood occurs as charcoal from wildfires, perhaps started by volcanic activity.

The Jurassic rocks, especially those now known as the Kildonnan Member, contain remarkably well preserved fossils, ranging from protists to Miller's plesiosaur. Visitors are often surprised by the occurrence of mollusc shells of pristine aragonite beneath a substantial pile of basalt lava flows. This excellent preservation has enabled the author and colleagues to use isotopic geochemistry, as well as more traditional palaeontology, to interpret the environment of deposition, which we believe to be shallow, brackish lagoons, fed mainly by freshwater inflow, close to the coast and subject to occasional invasion by seawater and marine fauna. The Valtos Sandstone, forming the cliffs on the west coast of Eigg, contains remarkable concretions cemented by calcite. These developed in the subsurface, and the



The Sgurr of Eigg with the unconformity clearly visible where the massive pitchstone fills in the valley that had been cut into the horizontal basalts.

larger ones took millions of years to grow. Erosion of the sandstone contributes sand to the present beaches, especially the famous "singing sands".

These sandstone cliffs, and the gleaming white sand, form an unforgettable picture as the foreground to the view of the mountains of Rum. The top of the Sgurr is one of Scotland's supreme viewpoints; the whole framework of northwestern Scotland, from the Outer Hebrides, via the Minch, Skye, Mull and the Small Isles, to the Caledonian mountains of the mainland, is laid out before you. The island of Eigg has much to offer geologists, and it is a delightful place to visit.

Reference

Emeleus, C. H., 1997. Geology of Rum and the adjacent islands. *Memoir of the British Geological Survey*, Sheet 60 (Scotland).