

Field Meeting in Iceland, 26 July – 9 August, 1993

Tony Waltham

WALTHAM, T. 1994. Field Meeting in Iceland, 26 July – 9 August, 1993. *Proceedings of the Geologists' Association*, **105**, 231–234. The spectacular volcanic and glacial geology of southwest and northeast Iceland was studied in a two-week field meeting which included two crossings of the island's interior.

Civil Engineering Department, Nottingham Trent University, Nottingham NG1 4BU.

1. INTRODUCTION

Mike Bamlett had organized the tour of Iceland's finest geological splendours, but ill-health prevented him from leading it, and his replacement dropped out at the last minute. A new leader joined the team at two days' notice, and the style of the excursion therefore became informal verging on abstract. With 10 days of sunshine out of 14, the 18 members of the party saw Iceland at its best; even the rigours of camping were avoided with all nights spent in school or hotel accommodation.

Iceland's position on the Mid-Atlantic Ridge is well

known, and the active zones of rifting over the divergent plate boundary are indicated on Fig. 1. All the active volcanoes and the freshest volcanic features occur within these zones. The most prolific geothermal sources are also within or adjacent to these zones, though hot springs are found throughout the island nation. Outside the rifting zones, the geology is mainly Tertiary flood basalts deeply dissected by Pleistocene glaciers and meltwater. The modern ice caps are mainly on the higher ground of the younger volcanics.

The excursion route wound around the country (Fig.



Fig. 1. Outline map of Iceland, with excursion route and numbered localities referred to in the text.

1) linking the geological highlights which are largely within the zones of current spreading. Details of nearly all the localities visited have been published by Mike Bamlett in the two guides (Bamlett & Potter, 1988, in press), which were the new leader's data sources for the excursion. This report is, therefore, presented as merely a few additional comments and impressions, which should be read as a supplement to those published guides. Numbered locations refer to Fig. 1.

2. SOUTHWEST ICELAND

The excursion headed north from Reykjavik. The Glymur waterfall (1) was noted for being almost impossible to see, but Eldborg (2) is a splendid caricature of a crater with steep walls left by internal drainage of its lava pond. Snaefells (3) remained in cloud, so Jules Verne was not encountered, and an interesting day was spent rounding the peninsula coast. The dykes exposed in the wall of Alftafjörður (4) were overshadowed by the zeolites found at the roadside viewpoint on the western side; good crystals of natrolite and scolecite were found.

On day 3, the route east took in Hraunfossar (5), an exceptionally beautiful series of cascades fed by large springs which convincingly demonstrated the high permeability of basalt lava sequences. Surtshellir (6), Iceland's longest lava cave, was briefly visited but the entrance collapse, some flow features and an ice floor barely yielded their secrets to inadequate torches. South of a cloudy Kaldidalur, a rough road east (7) provided splendid views of the Langjökull glaciers, the Skjaldbreiður shield volcano and the ex-subglacial tuya of Hlódúfell.

Geysir (8) was passed, but was left for a visit on the penultimate day. Then, Geysir itself failed to perform; it rarely does these days, unless provoked illegally with soap or on rare special occasions. The adjacent geysir of Strokkur was, however, magnificent, erupting at intervals of 3–15 minutes – and surely its momentary, domed bubble of steam is unique among the world's geysirs. West of Geysir, the last day also included the stream section next to the artificial cave of Laugarvatnshellir (9); the exposed pillow lavas formed in a Pleistocene sub-glacial eruption enthralled the party and can hardly be overrated.

East from Geysir, day 4 took in the archaeological excavation at Stong (10) where a splendid sequence of Hekla tephra is exposed, then the front of the 1970 lava on Hekla itself, and Gigjökull (11) in the Thorsmörk valley. This magnificent glacier from the Eyjafjalla ice cap ends right against the road, where recent moraines enclose a small proglacial lake complete with icebergs. Judicious scrambling over moraine-covered ice gave everyone close-up views of the crevasses, and the site was voted a high point of the excursion.

A visit to the Laki fissure (12) took a whole day but

was well worthwhile. The scale of the 1783 eruption could almost be appreciated and some splendid details of the lavas and vents could be observed. The steep walk to the Laki summit was most rewarding, both for the spectacular view along the fissure vents (Fig. 2) and also for the clean graben faults preserved where lava never reached the higher level. As a bonus, the road up to Laki passes some spectacular and accessible river cuts in glassy moberg (hyaloclastite) breached by dolerite dykes.

Erosion processes were demonstrated at the parallel volcanic fissure of Eldgja (13), where the oft-photographed natural rock bridge across the Ofaerufoss waterfall was found to have collapsed during the previous winter. The site also provoked much debate over how much the main fissure owed its size to either graben faulting or explosive excavation; the discussions in the field were unresolved, but other sources discount the graben hypothesis. At Landmannalaugar (14), the obsidian lava revealed excellent flow banding and produced an enjoyable walk, before the adjacent



Fig. 2. Cones along the Laki fissure.

Nordurnamur crater was appreciated as a drained lava lake where the term 'caldera' seemed inappropriate. The night was spent at Versalir (15), a new roadhouse dramatically located between the ice caps of Vatnajökull and Hofsjökull.

3. NORTHEAST ICELAND

Clear skies gave excellent views of the glaciers as the route continued across the huge stone plain of Sprengisandur (16). Glacial tills and outwash gravels have lost any fines to wind erosion, and the lag deposits now create a desert environment. The Icelandic driver and cook together rendered the traditional Sprengisandur song in fine style as the excursion bus crossed the Icelandic watershed.

Aldeyrafoss (17) scored highly among the many waterfalls seen, mainly on account of the well-developed basaltic columns which even curve around at one end of the exposure to trace the profile of the pre-eruption valley which they fill (Fig. 3).

Two days were spent at Myvatn (18), visiting all the fine volcanic features around both the lake and Krafla. The boiling mudpools and the 1984 lavas at Leirnjukur won the popularity ratings, while a few more energetic members found the view of the rootless craters from the top of Vindbelgjarfjall well worth the steep scramble. North from Myvatn, the rougher road was taken down the west side of the Jökulsá Fjöllum river. This allowed viewing of what is probably the better side of Dettifoss

(19), Europe's most powerful waterfall; the access path also crosses a massive abandoned channel which gives some idea of the enormous flows at the end of the Pleistocene on the ice cap fed river. The west bank also gives an excellent view of the dyke feeding a lava flow, exposed in the wall of the gorge at Hafragilsfoss only a short way downstream.

West of Akureyri, the landslides in Oxnadalur (20) were recognized as being due to the loss of ice support after glacial oversteepening of the valley sides. A short diversion was then made to the traditional turf houses at Glaumbaer (21) where the artform of this novel building material is admirably displayed. The keen interest in matters non-geological was hardly anomalous on an excursion where the orchids and campions had been known to eclipse the rock exposures at more than one locality. The excursion route then closed the loop with another crossing of the Iceland interior, this time via the Kjölur saddle (22). Volcanic profiles and distant ice caps vied for attention, and a break was enjoyed at the singularly beautiful iceberg lake, glacier and meadows of Hvítarnes (23).

4. RETROSPECTIVE

A penultimate day with visits to Strokkur, the Laugarvatn hellir pillow lavas and the Thingvellir fissures (24) took the excursion back to Reykjavik in fine style. The final day was intended for a flying visit to the volcanic sites on the island of Heimaey (25), but the weather



Fig. 3. Columnar basalt fills the channel below Aldeyrafoss.

finally broke and all flights were cancelled. A wet Sunday in Reykjavik is, however, a part of the real Icelandic experience.

To cover even just the truly spectacular of Iceland's geological sites would take a little more than two weeks,

so something has to be missed out. In retrospect, perhaps the Skaftafell glaciers or the Askja caldera would hold greater interest than the Snaefells peninsula, but all is not possible. Members of the 1993 party agreed that Mike Bamlett had produced an excellent itinerary.

REFERENCES

BAMLETT, M. & POTTER, J. F. 1988. Icelandic Geology: an explanatory excursion guide based on a 1986 Field Meeting. *Proceedings of the Geologists' Association*, **99**, 221–48.



Grotagja, near Myvatn