

Diminishing prospects for Heimaey

Changes in the nature of the volcanic eruption on the island of Heimaey have greatly reduced any prospects of saving the township there. Here a leading volcanologist provides an on-the-spot description of these recent developments

Dr George Walker

is head of the volcanology group at Imperial College, London

The volcanic eruption on the island of Heimaey continues with unabated vigour and there is little sign of the slackening which usually takes place after the first hours of an Icelandic eruption.

The first and most obvious threat to the township of Heimaey now are the scoria falls which have been coming since the beginning of the eruption whenever the wind has been south-easterly. Scoria has accumulated to a thickness of 5 m at one end of the town and 50 cm at the other, and where it is thickest little more than the chimneys of the houses and the tops of the telegraph poles are visible.

The worst scoria fall came during the vigorous and continuous gas blast eruption on the night of February 15. In the space of nine hours, between 50 cm and 2 m of scoria accumulated over a swathe several hundred metres wide crossing the town. Within about 300 m of the volcano, the whole ground was continuously glowing as incandescent scoria fell—many of the fragments were over 10 cm. Near the harbour, the part of town farthest from the volcano, the falling scorias were hot though not incandescent and had a median diameter of 7 mm and a maximum diameter of 8 cm. At the height of the fall there, I measured a rate of accumulation of 1.1 kg/sq.m/min. The sound was like that of a hail-storm, only louder.

For a geologist who has for some years been researching ancient scoria—and pumice falls, it was an enlightening, if at first rather alarming, experience to walk through such a fall. Well dressed against the cold weather, and wearing a crash helmet, I suffered no harm. This scoria fall caused relatively little damage on Heimaey and nobody was hurt by it. However, it set a house and some telegraph poles on fire, and many flat-roofed buildings collapsed under its weight (several others were saved by gangs of workmen shovelling the scoria off their roofs).

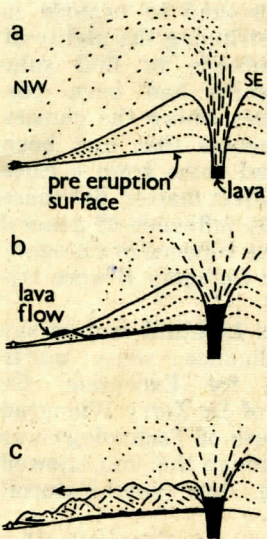
A second threat to the town developed at the beginning of February when lava, hitherto flowing straight out into the sea, started to flow along the coast in the direction of the harbour and soon almost blocked the harbour entrance. The lava flow, being 20 m or more thick, transformed what was sea into land at a higher level than the town, and consequently the lava then began to advance upon the town. This threat is being countered by bulldozing an embankment between the lava and the town, and by spraying water on the front of the lava flow. Attempts to stem a lava flow by water spray and create a dam of solid rock were tried out on Surtsey in 1965, but this is the first time it has ever been done in earnest. So far, the lava has been kept at bay, but it seems likely that the harbour mouth will eventually become completely blocked. The

two water pipes which conveyed the island's water supply 11 km under the sea from the mainland of Iceland have been broken; however, the submarine cable which brings power to the island is not yet damaged.

The third threat to the town is unique because the Heimaey eruption is the first one from a vent close to a town. Gases, such as CO, CO₂, H₂, CH₄ and H₂S, have accumulated in houses—initially at toxic levels and then forming highly explosive mixtures. The gases from the volcano seem to have permeated the rocks over the whole area of the town. The smell of sulphur pervades the streets even when the wind is blowing towards the volcano. It is probable that the gases entered the houses through the sewerage system, because they have killed all the rats in the town.

The most serious threat of all arose on the morning of February 20 when half the new volcanic cone of Kirkjufell, some 10 million cubic metres of scoria, slid towards the town. The threat perhaps really began to develop three days before when the vertically-directed explosive eruptive column rising out of the crater altered into a strongly divergent one. A rise in the level of lava in the crater until it was higher than the base of the cone caused this change. Lava then probably began to work its way slowly along the ground beneath the cone. A small lava stream eventually broke out on the morning of February 19 at the north-west foot of the cone. Later the same day part of the south-western side of the cone collapsed inwards. The following night we were able to see the lava lake in the crater for the first time. A second breakout of lava threatened that night at the western foot of the cone, and the whole north-western half of the cone, weakened by lava under it, slid in the space of two or three hours towards the town. The front of the slide wrecked a house in the outskirts and buried a bulldozer parked there. Lava has since broken out from this side of the cone and is directly threatening the town. Barriers are being bulldozed, and water is being sprayed on the lava in an attempt to stop it.

The township of Heimaey, with 2½ per cent of the population of Iceland, was until a month ago, an important fishing centre with some of Iceland's most modern fish-processing plants, and it accounted for between 10 and 15 per cent of Iceland's total exports. Evacuated on the first day of the eruption, a considerable force of men is now on the island making a valiant effort to save as much as possible. Expensive machinery is being airlifted out by US Air Force and Icelandic planes whenever the weather permits. The longer the eruption lasts the less hopeful are the prospects of saving the town, but at present only about 10 per cent of it has been destroyed.



a 15 February. Scoria cone of Kirkjufell 200 m high. Heavy scoria fall in the town

b 19 February. Strongly divergent eruption from high-level lava lake. Small breakout of lava at NW foot of cone

c 20 February. Sliding of NW half of cone towards the town