CHAPTER 4

The Maelifell Colapse Area

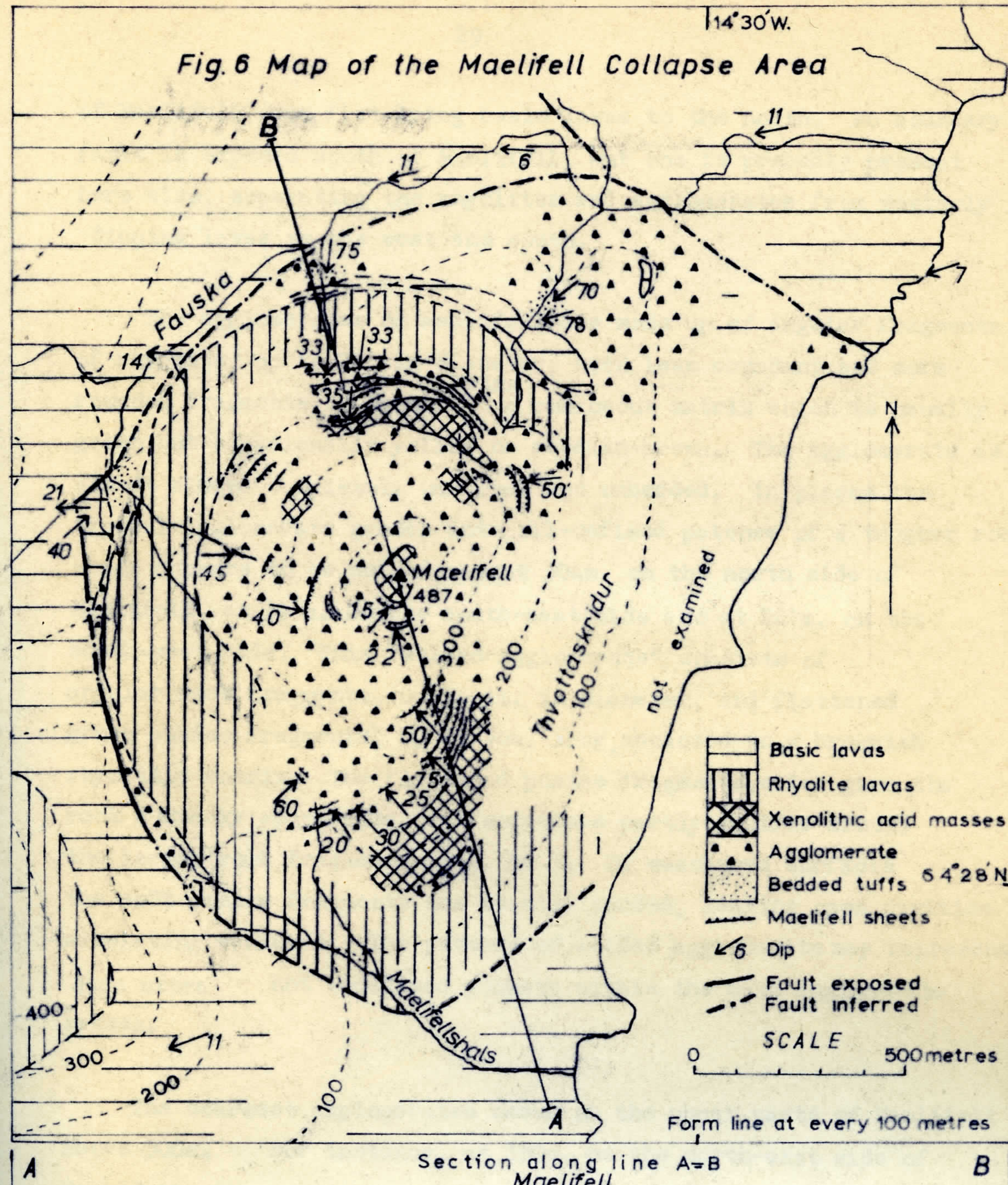
General Description

Maelifell is a hill, situated just north of Krossanesfjall, composed largely of acid pyroclastics (figs.5, 6&8)–tuffs and agglomerates–together with subordinate acid and intermediate lavas and a number of xenolithic acid bodies, including the enigmatic "Maelifell sheets", which show some of the characteristics of lavas and some of tuffs. All the rocks dip inwards and the dip generally decreases upwards, with the shallowest dips occurring near the top of the hill. A total thickness of some 650m. is exposed here. It is believed that Maelifell is bounded by faults and represents a distinct collapse area on the southern margin of the main caldera of the Alftafjordur volcano.

Much of Maelifell is covered by a veneer of scree, but sufficient exposures occur in gullies and on crags projecting through the scree to enable the structure to be determined. The steepest slopes are on the east side of the hill, where an active scree descends, via a 10m. cliff, into the sea.

Although the Maelifell collapse area is thought to be bounded by faults, only occasionally can these faults be seen in the field. In one exposure on the south bank of the Fauska river, north-west of Maelifell (fig. 7a), north-easterly dipping andesitic lavas of the Maelifell collapse area are faulted against westerly dipping flank basalts to the north and west. This fault can be traced southwards over the col to Maelifellshals, where its trace is followed by a dolerite dyke separating rhyolites to the east from tholeiite lavas to the west. A continuation of this fault has not been found north of the Fauska river, though a fault possibly follows a course roughly parallel to that of the Fauska river before joining the continuation of another fault exposed on the shore north-east of Maelifell (fig. 6). This last fault separates the chaotic agglomerates

Fig. 6 Map of the Maelifell Collapse Area

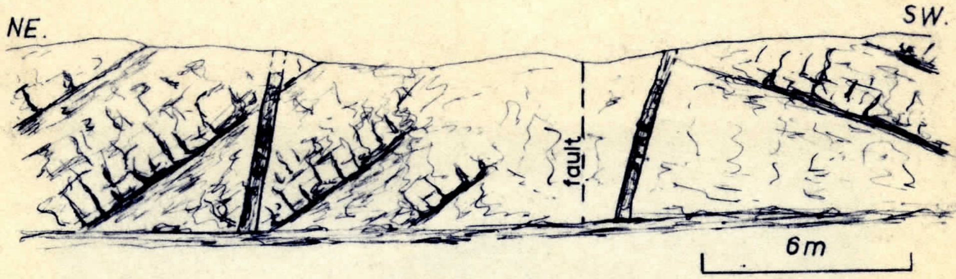


of Maelifell from flat-lying basic lavas to the north. No boundary fault is exposed south of Maelifell, but one is probably present here also, separating the rhyolites and agglomerates from westerly dipping lavas to the west and south.

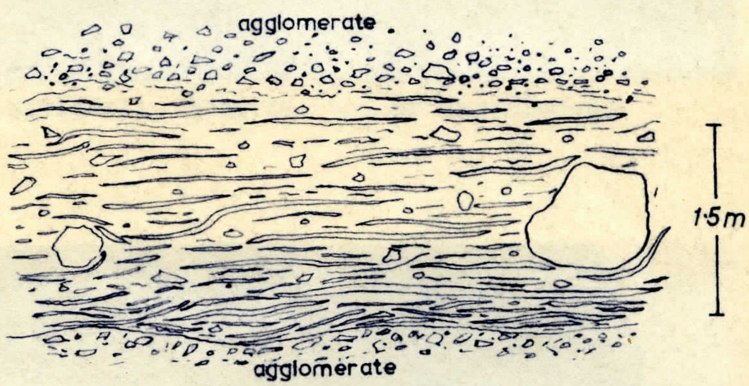
The agglomerates on Maelifell are made up of angular fragments of rhyolite, up to 7m. in diameter, with less abundant and more rounded fragments of basalt, lying in a pumiceous matrix which is usually green but occasionally yellow or reddish-brown. The agglomerate is almost always completely unsorted and unbedded. In places the typical agglomerate grades into ill-defined patches of a tougher rock which appears to be welded, as at 304m. on the north side of Maelifell, at 396m. on the south-east side and at 247m. on the south-west side. This "welded agglomerate" consists of angular rock fragments, up to 1m. in diameter, and flattened green pumice fragments, up to 3cm. long, enclosed in a brownish rhyolitic matrix. The flattened pumice fragments, which give the rock a streaky appearance, are sometimes partly moulded around the larger rock fragments (fig. 7c). On weathered surfaces the soft pumice fragments are readily eroded, leaving open cavities simulating vesicles. The patches of welded agglomerate may represent once extra hot localised pockets within the main agglomerate masses.

The coarsest agglomerates occur on the upper parts of Maelifell above 300m. For instance, at 350m. on the north-east side of Maelifell, there are many angular blocks of flow-banded rhyolite, up to 7m. in diameter, in the agglomerate, while just above are some even larger rounded boulders of a richly porphyritic basalt, one such boulder being at least 15m. in diameter: this porphyritic basalt is identical to that occurring as boulders in a similar agglomerate in Kyrfugil, 3.5 Km. to the north-west. Large angular blocks of rhyolite are also characteristic of the higher agglomerates on the south side of Maelifell, though here the large porphyritic basalt fragments are absent. The lower agglomerates, as exposed

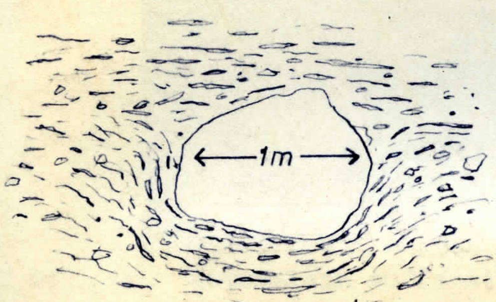
Fig. 7



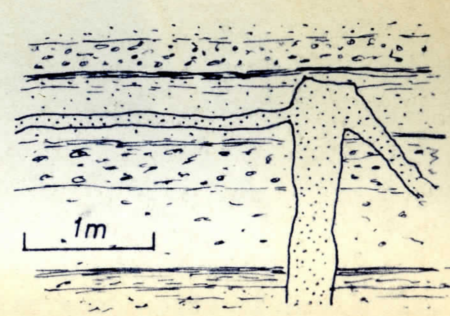
(a) Sketch of the fault outcrop on the south-eastern bank of the Fauska river, west of Maelifell.



(b) Cross-section of a typical Maelifell Sheet outcropping at 290m on the southern side of Maelifell.



(c) Basalt block in welded agglomerate at 350m on the north side of Maelifell.



(d) Intrusive tuff cutting bedded tuff at 400m on the south side of Maelifell.

Fig. 8a. Maelifell, from the top of Snjotindur.

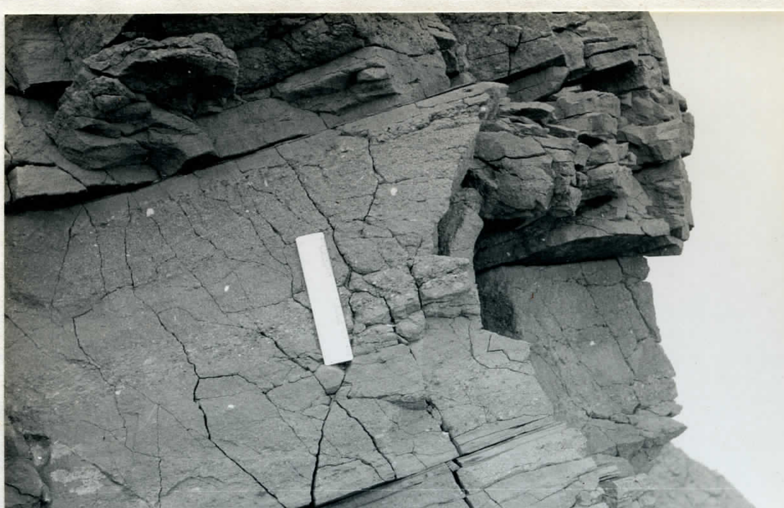


Fig. 8b. Water-lain tuffs at 400m. on the south side of Maelifell. These tuffs are dipping northwards at 23°.

on the north side of the hill, contain few fragments greater than 15cm. in diameter, although here two large isolated blocks of basalt, some tens of metres in diameter, were seen.

Bedded tuffs are exposed at 150m. on the north side of Maelifell, on the south-east bank of the Fauska river just east of the western boundary fault, and also at 402 m. on the south side of Maelifell. At this last locality(fig 8b) some 15m. of thinly bedded tuffs dip inwards towards the centre of Maelifell at about 22^{o}. The tuffs here consist of pale green and purple layers, 1-2cm. thick, and they vary in grain size from fine silt to coarse grit. There is no current bedding or graded-bedding, and these tuffs must have been laid down as nearly horizontal layers in tranquil water. Some later thin, cross-cutting tuff sheets have apparently been intruded into these bedded tuffs (fig. 7d). The bedded tuffs on the north side of Maelifell are similar to those just described but have much steeper inward dips, while those of the south-east bank of the Fauska river have been broken up into large and irregularly-oriented blocks to form a collapse breccia alongside the bounding fault

The outcrops of rhyolite lavas almost completely encircle Maelifell (fig. 6), being absent only on the east side. These lavas have the prominent platy flow structure typical of rhyolite extrusions (Williams 1942, figs. 9 - 12): the flow banding at the base of the lava is roughly parallel to the basal contact and then it gradually steepens upwards until it becomes more or less perpendicular to the upper surface of the flow. Each rhyolite lava is surrounded by rhyolitic agglomerate or breccia, and pitchstone is present only in the basal part of a flow. The rhyolites are purplish and generally non-porphyritic, though some flows contain sparse feldspar phenocrysts: xenoliths are absent, in contrast with their abundance in the other, higher, rhyolitic masses on Maelifell.

Intermediate rocks are much subordinate in bulk to acid rocks on Maelifell, although some andesite lavas occur on the north and west side of the hill. An inwardly dipping andesite lava, some 30m. thick, is exposed at 206m. on the north side of Maelifell and a similar lava occurs below at 134m., both lavas forming prominent crags. The lower lava has a maximum thickness of 7m. and is rudely columnar: the columnar-jointing is perpendicular to the base of the andesite. A platy jointing parallel to the upper surface is present at the top of the andesite, similar to that of many extrusive andesite lavas; such jointing is not normally present in andesite intrusions. A continuation of this lower andesite is exposed in a gully further west and other similar lavas outcrop at 208m. on the north-west side of Maelifell and on the south bank of the Fauska river, just inside the western boundary fault of the Maelifell collapse area.

<u>Xenolithic acid rocks</u>

These include the "Maelifell Sheets", each less than 2m. thick, and the thicker xenolithic rhyolite masses which are probably of similar origin. They are all extrusive and are regarded as "tuffolavas", intermediate between welded tuffs (ignimbrites) and normal lavas. The thicker masses are exposed on the north and south-west sides of Maelifell and on the summit. They are made up of a very fine-grained, though generally non-glassy, buff-coloured rhyolite which contains variable amounts of small feldspar phenocrysts and which is characterised by the abundance of small xenoliths; these xenoliths are usually less than 1cm. in diameter. The rock is invariably flow-banded and the banding is usually parallel to the top and bottom of the mass though it is often contorted in the interior. The contacts are usually not well exposed, perhaps because the rhyolite apparently grades outwards into agglomerate.

The "Maelifell Sheets" are certain inwardly-dipping and conformable xenolithic pitchstone sheets which appear to encircle the upper part of Maelifell, simulating cone-sheets (fig. 6). The individual sheets are always underlain and overlain by pyroclastic rocks, though these may occur only as very thin separating layers. They are most numerous on the south-west side of Maelifell, where there are at least twenty-seven such sheets between 265m. and the summit. Their inward dips are somewhat variable, and the sheets which dip 65° north-north-west at 290m. on the south-east side of Maelifell, when traced 100m. westwards, have an average dip of less than 25° north-north-west. Other sheets at a comparable level on the other sides of Maelifell generally dip inwards at over 45°, but the highest sheets exposed, just below the summit, have much shallower dips. The Maelifell sheets have a thickness which averages 1m., but varies from 2m. to less than 50cm.; the thinner sheets sometimes wedge out and terminate. A cross-section of a typical Maelifell sheet is shown in fig. 7b : the base is generally hummocky and is usually sharply defined, while the top grades imperceptibly upwards into agglomerate or tuff. Often the pyroclastic rock immediately adjacent to the sheets appears welded. The sheets are always richly xenolithic, containing angular and sub-angular fragments of rhyolite, up to 50cm. in diameter, similar to those in the surrounding agglomerate. Often the sheets also contain pale streaky crystalline inclusions, up to 10cm. thick and with a length:breadth ratio of sometimes more than 50:1, which give the rock a prominent flow-structure parallel to the sheet contacts. The matrix of the sheet rock is very fine-grained and often glassy, and contains small scattered phenocrysts.

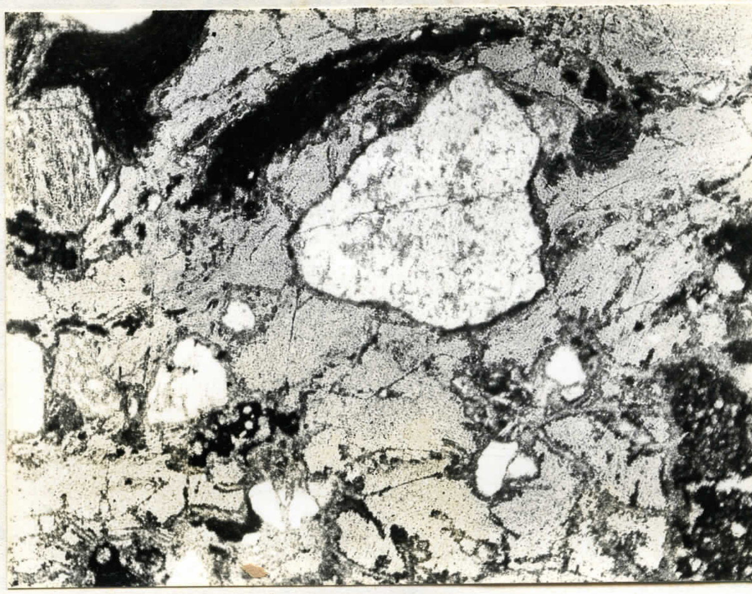
Petrography

In thin section (fig. 9) the Maelifell sheets are seen to consist of angular and sub-angular fragments of rhyolite, andesite and basalt lying in a porphyritic glassy matrix (sometimes devitrified). This matrix, when glassy, is a clear brown acid glass, n = 1.503 - 1.507, which often possesses a vaguely defined eutaxitic texture; sometimes constituent glassy fragments appear to be of flattened acid pumice containing hollow tubes: these are gas bubbles squashed or pulled out by flow. The phenocrysts are of plagioclase and pyroxene and appear similar to the phenocrysts in the included rhyolite fragments. The plagioclase is andesine (average An40): the crystals are euhedral to subhedral prismatic, sometimes fragmentary and are about 1mm. long. The phenocrysts of pyroxene, a pale green augite, are of similar shape and size to the plagioclase. There are also rare phenocrysts or xenocrysts of a more calcic plagioclase.

The basalt fragments within the acid glass may make up 10% or more of the rock. Many are wisp-like and are often partly moulded around other inclusions, and they may vary from a clear dark brown basalt glass (average n = 1.602), through opaque glass, to very fine-grained basalt: the opaque glass often contains skeletal plagioclase crystals. Basalt pumice fragments also occur, similar to those found in the Skessa welded tuff (Walker, 1962, plate XIc). Sometimes intimate mixing has occurred between acid and basic glasses, with minute globular inclusions of basalt glass disseminated within the acid glass (fig. 9b). The glassy nature of many of the basalt fragments, their wisp-like form and the evidence of mixing indicates that much of the basalt was liquid when incorporated within the acid magma and was still plastic when the Maelifell Sheets were formed.

The thicker xenolithic rhyolite masses on Maelifell are made up of very fine-grained flow-banded rhyolite, the banding being shown by thin spindle-shaped masses of coarser rhyolite. Phenocrysts are similar to those in the Maelifell sheets. No inclusions of basalt glass have been found in these masses.

(The welded agglomerate patches on Maelfell are not dis-similar to the Maelifell sheets in thin-section, but eutaxitic textures are much better developed in the more sparse glassy matrix of the former. The welded agglomerate, like the Maelifell sheets, contains wisp-like fragments of basalt glass.)



Fig,9a. Photomicrograph of a Maelifell sheet, showing a dark wisp-like basic inclusion in acid glass, both being moulded around a rhyolite fragment. Another basic inclusion in the top L.H. corner shows flow structure. A small piece of basaltic scoria is seen in the bottom L.H. corner, together with other rock fragments and phenocrysts of andesine. X25 Ordinary light. (H558)

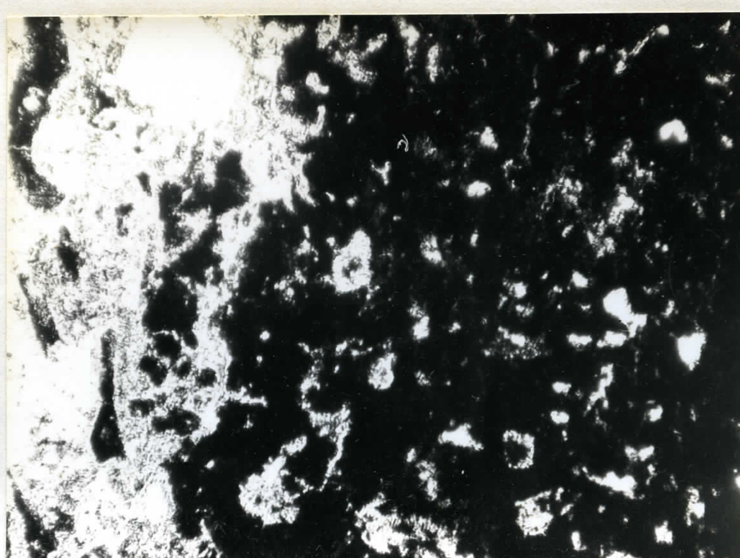


Fig.9b. Photomicrograph of a Maelifell sheet showing an intimate mixture of pale porphyritic acid glass, containing feldspar phenocrysts, and dark, non-porphyritic basic glass. Both acid and basic glasses have devitrified. X30. Ordinary light.(H553).

Classification of the xenolithic rocks

The xenolithic acid masses on Maelifell, which include the Maelifell sheets, are regarded as "tuffolavas" (=clastolavas). The term "tuffolava" was first proposed by H.Abich in 1899 (quoted by Shirinian, 1963) for certain volcanic rocks in Armenia which are intermediate in character between welded tuffs (ignimbrites) and normal lavas. According to Shirinian (1963), tuffolavas differ from welded tuffs in having a lava-like, instead of pyroclastic, matrix, and they can not be intensely welded tuffs as they are less dense than welded tuffs of comparable composition.

The essential similarity of the Maelifell and Soviet tuffolavas is apparent from the descriptions by Shirinian (1963) and Petrov (1963) of the Armenian tuffolavas and by Vlodavetz (1963) of Kamtchatka tuffolavas. Both the Maelifell and the Soviet examples contain pyroclastic debris within the rhyolitic or glassy matrix, both when glassy often contain pale streaky crystalline bands, and both merge outwards into normal pyroclastic rocks. The "froth-flow" lavas of Yellowstone National Park, Wyoming (Kennedy, 1954; Boyd, 1961) and of Kenya (McCall, 1962 a and b) may also be examples of tuffolavas. For instance, Boyd writes of the Canyon Flow, Yellowstone N.P. (p.405) "This flow has textures and structures which suggest that it may have been emplaced in a type of eruption transitional between a lava flow and a pyroclastic flow" and (p.406) "all thin sections of the Canyon flow show textures which suggest that the rhyolite has vesiculated then collapsed. The flow was possibly emplaced as a froth which was not thoroughly ruptured into fragments but which collapsed and continued to move as a lava". The vaguely defined eutaxitic texture and the presence of squashed pumice fragments seen in thin sections of the Maelifell sheets similarly suggest vesiculation of the acid magma followed by collapse.

The majority of tuffolavas are similar in form and extent to normal acid lava flows. The Maelifell Sheets, however, are exceptional in being very thin and sheet-like. The cause of their thinness is thought to be that they were erupted as mixtures of acid and basic magmas; the basic magma heated the acid and rendered the whole much less viscous than purely acid magma (c.f. the Skessa welded tuff, Walker, 1962, p. 289).

Formation of the Maelifell Complex

The centripetal dips on Maelifell indicate that here there is a separate collapse cone (fig. 6) located at the margin of the main Alftafjordur volcano. Similar collapse cones occur within a number of well-known calderas, including the Santorin Caldera, Greece (Williams, 1941). It seems probable that a local high level acid magma chamber was situated beneath Maelifell, from which the Maelifell acid lavas were derived, and at one time there may have been a subsidiary volcanic cone on the site now occupied by Maelifell. The eruption of the acid magma was accompanied by much explosive activity, and coarse pyroclastic deposits are associated with the lavas. Between eruptions small lakes are presumed to have formed in the crater area of the Maelifell volcano and fine-grained tuffs were laid down in these lakes. The occasional basic and intermediate lavas on Maelifell are thought to have their sources of eruption outside the Maelifell area and to be unrelated to the local magma chamber.

It has not been found possible to determine whether the collapse at Maelifell took place periodically or all at one time. Collapse was probably caused by either the temporary or permanent withdrawal of magma from the magma chamber below Maelifell and the foundering of the central part of the Maelifell volcano into the void so created.

To account for the tuffolavas it is postulated that the local acid magma chamber slowly migrated upwards below Maelifell. While still at some depth normal non-xenolithic acid lavas were erupted, but eventually the magma chamber entered the base of the loose pyroclastic pile and pyroclastic debris became incorporated within the acid magma as xenoliths. Eruption of this xenolithic acid magma led to the formation of the thick tuffolavas on Maelifell: whether these were erupted as normal acid lavas or as partly fragmented tuffolavas (froth-flow lavas) is uncertain. (It is significant that on Maelifell all the lower acid lavas are non-xenolithic while all the higher lavas are xenolithic). It is also postulated that after the acid magma chamber below Maelifell had reached a high level within the pyroclastic rocks, it was intersected by some of the intrusive sheets of basic magma associated with the main magma chamber of the Alftafjordur volcano. On such occasions violent mixing of the two magmas took place. The acid magma, with the addition of the basic magma, became heated and was rendered less viscous (see p.73); at the same time it may also have become enriched in gas. Pressures increased in the magma chamber, an eruption was triggered off, and a Maelifell sheet was erupted, perhaps as a froth-flow lava as envisaged by McCall (1962 a). Each Maelifell sheet may represent a separate occasion on which basic magma was intruded into the acid magma chamber.

CHAPTER 5

The Flanks of the Volcano

In the Austurhorn area the flank deposits of the Alftafjordur volcano cover an area of some 30 sq. Km. and consist of tholeiite, porphyrtic basalt, andesite and rhyolite lavas, with agglomerates and bedded tuffs. In general, when corrections are made for the regional dip (fig 2), the flank deposits dip outwards from the core of the volcano. A number of small agglomerate filled volcanic vents cut through the flank lavas.

The upper limit of the flank succession it taken to correspond roughly to the base of the Fossarvik porphyritic group of flood basalts which occurs around the western margin of the volcano and overlaps and interdigitates with the upper-most flank deposits. Along the base of Kjolfjall and on Snjotindur and Ljoshamrar flank lavas and tuffs occur for some metres above the Fossarvik group, and many of the higher thin tholeiitic lavas exposed on Kjolfjall and on the western side of Lonsheidi may also be products of the Alftafjordur volcano. The relationship of these latter lavas with undoubted flank lavas of the volcano is uncertain. The stratigraphical base of the flank succession is not seen.

As might be expected there is no general stratigraphical succession common to the flank deposits throughout the area, and marker horizons, the best of which are acid lavas, cannot be traced for far along the strike. In the following description, therefore, the area covered by the flanks of the volcano has been divided up into four sub-areas (fig.3), comprising (a) north of the Sela river; (b) Kyrfugilsheidi; (c) H lidarfjall; and (d) Krossanesfjall, Maelifellsdalur and Hvaldalur.

North of the Sela River

Here the flank deposits consist chiefly of bedded tuffs with occasional interbedded lavas.

The bedded tuffs are well exposed along the base of Kjolfjall. They consist of angular and sub-angular acid and basic fragments, up to 1cm. in diameter, with larger pebbles and boulders, up to 50cm. in diameter, randomly distributed in a fine-grained sandy matrix. The tuff varies from black to brown, dark green or purple, and is much darker than most of the other tuffs associated with the Alftafjordur volcano. It is typically poorly sorted, though well bedded, with locally variable dips. The variation in dip is depositional: the tuffs are sub-aerial pyroclastic deposits which accumulated on the uneven flanks of the volcano. On the lower slopes of Kjolfjall the upper-most tuffs are interbedded with flood basalts of the Fossarvik group and higher lavas, while in Starmyrardalur they underlie the Fossarvik group.

Occasionally andesite lavas are associated with the bedded tuffs. The individual lavas have a very local distribution and probably occurred as finger-like lava streams flowing down the sides of the volcano. A single rhyolite lava is also present on the west side of Vatnshlid. This rhyolite is overlian by basic lavas to the south and west and by bedded tuffs, with some andesites, to the north.

Kyrfugilsheidi

South of the Sela river, on Kyrfugilsheidi, andesite and tholeiite lavas dominate the flank succession. Pyroclastic deposits are generally insignificant, though interbedded tuffs and agglomerates occur in the north-west, where the flank lavas lie along the western margin of the core of the volcano; also a prominent bedded tuff, 15m. thick, occurs at 310m. on the south-west side of Kyrfugilsheidi. The only rhyolite lava seen is a continuation of the acid lava exposed on the north bank of the Sela river.

On Snjotindur flood basalts overlap unconformably the more steeply dipping flank basalts of Kyrfugilsheidi; the plane of unconformity is marked by a layer of basaltic rubble. The angular difference between dips of the flank and flood basalts is less than 2^o (fig10a) and it seems that when these lavas were erupted the Alftafjordur volcano did not here form a prominent topographical feature.

Hlidarfjall

In this area, which extends southwards from Svarthamrar, across Hlidarfjall, to the Seltindur Ridge, the flank deposits include tholeiite, porphyritic basalt, andesite and rhyolite lavas, with agglomerates and tuffs.

A rhyolite lava occurs at the base of the exposed flank succession, outcropping along the western border of the caldera boundary fault. This rhyolite originally formed a dome, against which the lower lavas of the succeeding basalts were banked up. The basalts above the rhyolite are altered greenish tholeiites and tholeiitic andesites containing abundant calcite and chlorite. Agglomeratic tuffs are interbedded with these lavas in the Thvotta river area, and, at the same stratigraphical level on the south side of Svarthamrar, more agglomerates occur, again interbedded with basic lavas.

The tholeiitic lavas are succeeded by two acid lavas, the Thvotta rhyolites, which are particularly well exposed near the Thvotta river. The rhyolite flows are separated from each other by a thin acid agglomerate, except on Hlidarfjall where there is an intervening basalt lava. The Thvotta rhyolites usually possess a prominant flow-banding and an altered pitchstone is sometimes present at their margins. They vary from purple to yellow or even white on weathered surfaces, though are dark grey when fresh. They are weakly porphyritic, with feldspar, fayalite and pyroxene phenocrysts.

A group of thin greenish tholeiitic lavas with interbedded green agglomeratic tuffs succeed the Thvotta rhyolites on the north side of Hlidarfjall. There is also an extrusive xenolithic pitchstone sheet of Maelifell type here which is some 3m. thick.

North of Nonbotn three porphyritic basalt lavas separate the tholeiites from an overlying group of andesite lavas, some 245m. thick, above which, at 546m, come the basalt lavas capping Snjotindur. The andesite lavas are not found south of Nonbotn. Near the top of Snjotindur tholeiites and coarser basalts occur and many, if not all, of the lavas above 646m. on the eastern side of this mountain may be flood basalts and not products of the Afltafjordur volcano. These highest lavas come stratigraphically above and lie conformably on the Fossarvik porphyritic group, which is exposed on the western side of Snjotindur.

South of Hlidarfjall about 100m. of tholeiite lavas, with occasional porphyritic basalts, separate the Thvotta rhyolites from two higher acid lavas, the Hestabotnar rhyolites. One rhyolite only occurs in Hestabotnar itself, where it is 16m. thick, but two flows outcrop on the Seltindur ridge to the south. Above the acid lavas in Hestabotnar the exposed succession is completed by a somewhat mixed group of lavas, consisting mainly of tholeiites, but also including porphyritic basalts and andesites, with occasional interbedded tuffs.

A volcanic vent is thought to occur on Hlidarfjall, south of Nonbotn, where a mass of agglomerate cuts through the basalt lavas. This agglomerate is unsorted and unbedded, and contains angular to rounded fragments of basalt and rhyolite, up to half a metre in diameter, enclosed in an acid buff coloured tuffaceous matrix. Unfortunately exposures are insufficient for the margins of the vent to be accurately delineated.

Krossanesfjall, Maelifellsdalur and Hvaldalur

The flank deposits in this area again consist of tholeiites, porphyritic basalts, andesites and rhyolites, with agglomerates and tuffs. Three agglomerate-filled vents have been found here.

The lowest exposed rocks of the flank succession are the thin, green, altered basalts, with some interbedded green and purple tuffs, all cut by many minor intrusions, which outcrop along the east coast between Dalsa and Krossanes. On the Seltindur ridge in the north these basalt lavas are overlain by the Thvotta rhyolites, which are succeeded by further basalts and the Hestabotnar rhyolites. The Thvotta rhyolites thin out to the south, and do not outcrop in Maelifellsdalur, where basalts only are exposed. The two Hestabotnar rhyolite lavas outcrop at the head of this valley, where they have a total thickness of some 60m. Here they overlie a chaotic acid agglomerate which cuts vertically through the underlying basalt lavas. The agglomerate is made up of angular to rounded fragments of rhyolite and basalt, up to 1m. in diameter, enclosed in an acid pumiceous matrix. The agglomerate appears to occupy a vent, possible the one from which the Hestabotnar rhyolites were erupted. Another cross-cutting "vent agglomerate" occurs on the south side of Maelifellsdalur. Both these agglomerates have been intruded by gabbro (the Krossanesfjall gabbros).

South-west of Seltindur, on Krossanesfjall, the flank succession consists almost entirely of thin greenish altered basalt lavas, with occasional green and purple tuff bands. These basalts become hardened and indurated close to the Austurhorn intrusion. A fossil tree, preserved in jasper, was found near the base of one lava in the sea cliff on the north side of Illiskuti(fig.10b) and many other cylindrical masses of jasper in the basalts here may also be of organic origin.

Near the top of Krossanesfjall laccolithic masses of rhyolite (page 57) intrude the lava succession, and only on the main summit and further west are higher, tholeiitic, lavas exposed. These lavas probably come stratigraphically below the Hestabotnar rhyolites.

In Hvaldalur the lowest lavas are those on the south-western slopes of Krossanesfjall; these are mainly tholeiites, though two rhyolite lavas outcrop some 800m. south-east of Halsagil. 2Km. south-east of Halsagil there is an agglomerate-filled vent, 150m. in diameter, bordered by brecciated basalt. Tholeiitic lavas, with occasional porphyritic flows, continue to dominate the succession north-west of Halsagil, though andesite lavas, outcrop at 280m. and at 450m. in Selgil. The lavas on the north-west side of Hvaldalur have an average thickness of over 8m. but on Ljoshamrar, on the south-west side, the lavas are much thinner, having an average thickness of only 3m. These very thin lavas are typically highly amydaloidal. Interbedded dust beds and tuffs are rare, indicating that the lavas were erupted in rapid succession allowing little time for the accumulation of such deposits between eruptions. The steep dips here may be partly due to a high depositional dip (hence the thinness of the lavas), though they must be mainly due to subsequent movement. Two boulder beds have been found in the succession on Ljoshamrar, one in the south-east at 40m., and the other on the north-west side of Ljosasdalstindur, at 585m. Both beds are unsorted, and contain rounded boulders of basalt, some more than a metre in diameter, lying in a pebbly basalt matrix: neither boulder bed can be traced far along their strike, and they are probably stream bed deposits. Flood basalts of the Fossarvik porphyritic group occur at the north-western end of Ljosamrar, but thin out rapidly to the south-east, where, at a comparable horizon, there is a single very thin (less then 1m.) olivine basalt lava. Thin basic lavas continue above the flood basalts and the highest lavas exposed, on the summit of Ljosardalstindur, are andesites. These are still, presumably, flank lavas from the Alftafjordur volcano.

Fig. 10a. The unconformity (-c-) on the north-west side of Snjotindur, with flood basalts overlapping more steeply dipping flank lavas. Snjotindur is the peak in the background.

Fig. 10b. Fossil tree trunk, preserved as jasper, in a basalt lava exposed in the sea cliff on the north side of Illiskuti.

Fig. 10c. The volcanic vent, infilled with agglomerate, cutting nearly horizontal basalt lavas at the western end of Vikurfjall.