11 THE POSTGLACIAL ENVIRONMENT K HIRONS

INTRODUCTION

In the early postglacial period a highly dynamic environment was produced in the Hebrides by a combination of exposure, climatic change, fluctuations in sea level, and rapidly changing vegetation. This changing environment must have imposed various stresses on the resource base of the early inhabitants of Kinloch and thus on their survival strategies. To examine it an integrated series of palaeoecological and palaeoenvironmental studies were carried out in conjunction with the archaeological investigations. Plant fossils were not abundant on the excavation site itself, but a series of pollen studies was undertaken to help characterise the sediments on site (Moffat mf, 2:F1–G12; Edwards and Hirons mf a, 2:C4–D13), and wood was analysed where it had survived (McCullagh mf, 3:A3–A11). Off-site, pollen analysis was carried out on monoliths taken from a bog that had developed to the W of the excavation on part of the Farm Fields (Farm Fields sites RH 1; RH 2, Hirons & Edwards mf a, 2:C4– D13), on a core from the Kinloch Glen (Kinloch Glen site K, Parish mf, 2:A3–B8), and on sediments collected from the bed of Loch Scresort (Chapter 3), (Ill 89). Botanical and English nomenclature follows Clapham *et al*, 1962.

BACKGROUND

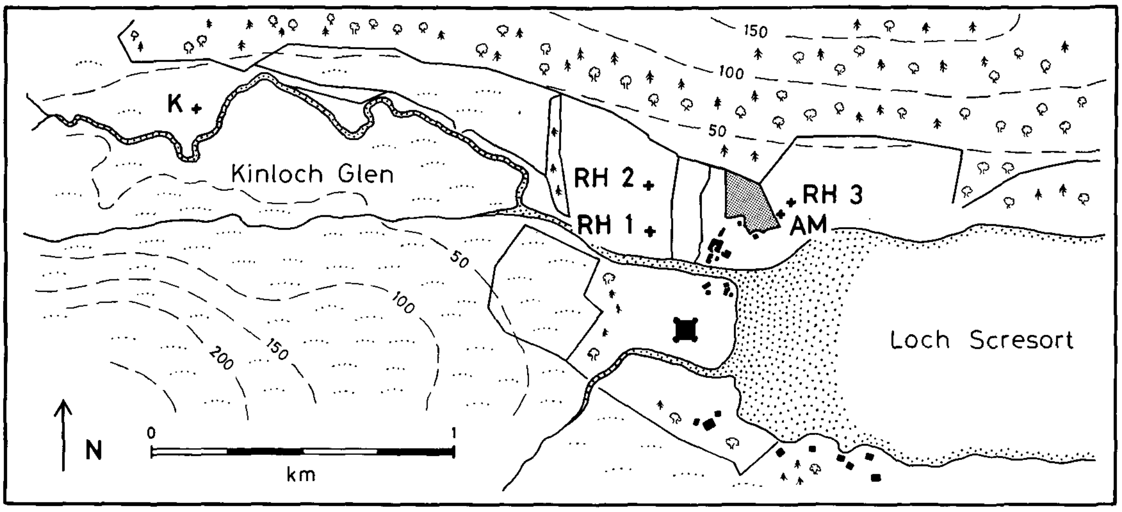
VEGETATION

Reconstructions of the past vegetation of other Hebridean islands have shown the importance of the geographical location of Rhum. Closed woodland was probably never able to develop on the flatter and more exposed islands such as Tiree and Canna (Flenley & Pearson 1967; Pilcher 1974; Birks & Williams 1983). On the larger and more topographically diverse islands of Skye, Mull, and Lewis, woodland was of limited extent in the early postglacial period, and it was restricted to sheltered localities (Birks & Williams 1983; Bohncke 1988; Lowe & Walker 1986; Walker & Lowe 1985). Limited woodland cover, with frequent tall-shrub, heath, and grassland communities is also indicated in the pollen evidence from the north west of mainland Scotland (Birks 1980).

The geographical limits of both pine (*Pinus sylvestris*) and oak (*Quercus* spp.) are thought to have lain in the Inner Hebrides. Pine has always been infrequent, or absent, on west and central Skye, the Fort William area, and Kintyre, but pine forest with birch (*Betula* spp) was able to develop in eastern Skye, Wester Ross and the central Grampians (Birks 1977; Birks & Williams 1983). On south east Skye and on Rhum, occasional stumps of pine have been recorded (Steven & Carlisle 1959; Birks 1975). The northern limit of oak may have lain near to southern Skye (Birks & Williams 1983); certainly oak woodland was able to develop on Mull to the south (Walker & Lowe 1985; Lowe & Walker 1986). Thus, Rhum lies close to the presumed northern limit of oak woodland and close to the western limit of pine.

The present vegetation of Rhum has been mapped by the NCC (1970) and discussed by Ball (Ball 1983 & 1987). The principle plant communities identified by Ferreira (1967) fall into four general classes: base-poor heath; fen; blanket bog; and richer grasslands (Ball 1987). The latter only occur on the lower slopes of the western glens. Natural scrub only survives as very small fragments in inaccessible sites, where it gains some protection from grazing. Hazel (*Corylus avellana*), birch (*Betula pubescens*), oak, rowan (*Sorbus aucuparia*), holly (*Ilex aquifolium*), aspen (*Populus tremula*), hawthorn (*Crataegus monogyna*), and sallows (*Salix atrocinerea* and *S. aurita*) are the only tree species thought to remain naturally; there is a record of the removal of the last copse of wood in 1796 (Ball 1987).

On Eigg, however, small but significant woodlands do survive, and they are dominated by hazel with ash (*Fraxinus excelsior*), wych elm (*Ulmus glabra*), rowan, hawthorn, blackthorn (*Prunus spinosa*), and aspen. Colonsay also supports two mixed woodlands (oak, birch, hazel, rowan, sallow, ash) in sheltered eastern sites, and in the centre of Soay there are soils that are derived from Torridonian sandstone (and are more akin to those to the



ILL 89: Location map of environmental sampling sites. RH1–3: AM: K.

north of Loch Scresort on Rhum); these soils support birch-rowan and sallow-birch in sheltered areas. On Skye, oak is virtually confined to Sleat, where it occurs as pure oak or birch-oak stands on the Torridonian sandstones; stands of ash-hazel and birch-hazel also survive on the better soils derived from this bedrock.

These woodland remnants on nearby islands suggest that Rhum is within the range of occurrence of many tree species and that its soils could have supported some woodland in the past. The success of the recent tree planting schemes on Rhum has also confirmed the suitability of the island for tree growth, albeit of selected species and in selected situations (Wormell 1968).

CLIMATE

The climate of Kinloch is oceanic, dominated by strong westerly airflows from the Atlantic, and characterised by low summer temperatures and high winter temperatures (Green & Harding 1983). The seasonal temperature range is limited, and frosts are relatively rare at low elevations (mean 116.3 days with ground frost, and 20.4 days with snow). The average rainfall is high (2373 mm per year), and it is coupled with a low evaporation demand thus leading to soil moisture excesses even in the summer. Wind speeds are moderate, but the salt content of the wind aggravates damage, especially to trees, and using the criterion of wind effect on lone growing broad leaved trees Kinloch has been categorised as "moderately exposed with extremely mild winters", and the northern slopes of the Kinloch Glen have been categorised as "exposed with extremely mild winters" (Birse & Robertson 1970). Anticyclones can persist for a month or more over the area, bringing interludes of dry conditions in the summer and cold conditions in the winter, and it has been suggested that these episodes might create dry conditions favourable to natural fires in the summer and to possible frost damage in the winter (McVean 1964).

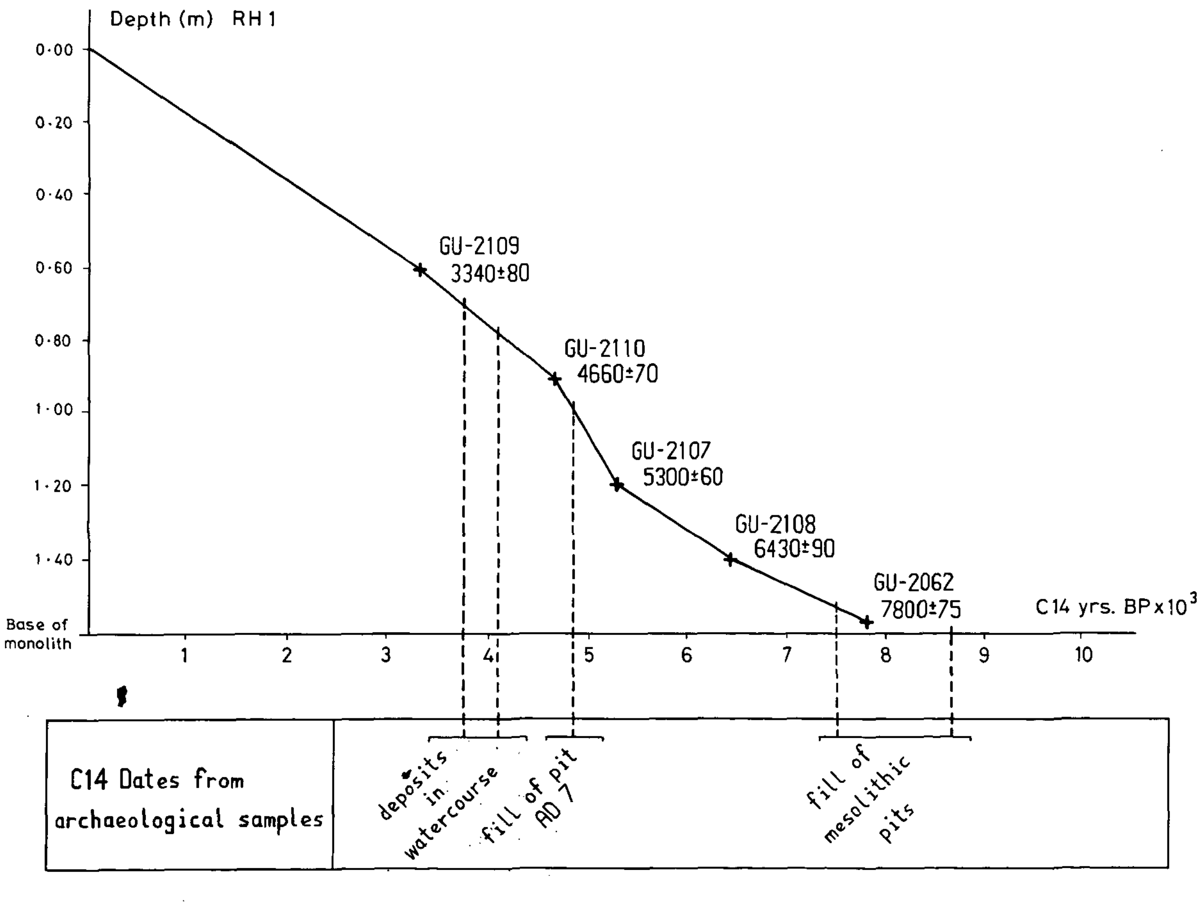
SOILS

In general, the soil parent materials of Rhum are poor and readily acidified, leading to the general development of peat. The soils local to Kinloch are peaty gleys on both the Torridonian sandstones to the north and on the igneous complexes to the south. Around the head of Loch Scresort, on the cultivated land, humus-rich iron podsols have developed. There has been no specific work on the blanket peats of Rhum, but it is now suspected that wide variations in timing, and probably in causation, may be expected (eg Edwards & Hirons 1982). Wider inferences may be drawn from studies of basin peats, both on Rhum and on other islands of the Inner Hebrides (Skye, Islay and Colonsay), and these suggest that a major environmental change took place between 4000–5000 BP. This change is manifest in a shift from woodland to an open environment (probably similar to that observed over much of the Western Isles today), as areas receiving run-off from the surrounding slopes developed into base-poor grasslands, whilst water-shedding areas became gradually covered with heath and shallow blanket peats.

THE VEGETATIONAL AND RELATED ENVIRONMENTAL HISTORY OF RHUM

INTRODUCTION

There are major difficulties in the reconstruction of the past vegetation of islands, such as Rhum, using pollen analysis. The Hebrides are exposed to frequent westerly gales, and it has been suggested that in such circumstances the pollen of wind pollinated taxa might be blown away from the islands, so that it would be under-represented in the fossil pollen record (Walker & Lowe 1985, 605). In addition, the anthropogenic factor within any pollen record is difficult to identify, particularly where predominantly open environments are concerned. The criteria used for the recognition of anthropogenic changes in wooded landscapes cannot be applied to open or partly open landscapes without qualification (Vorren 1986; Vuorela 1986). Many species which might suggest human impact when encountered in pollen diagrams from woodland environments can readily colonise sites where open environments are maintained by other agencies. Stress caused by proximity to marine conditions or exposure to climatic extremes (both physiographic norms for much of the Hebrides), may provide ready niches for the particular plants that favour these conditions. Changes in maritime influence caused by sea-level fluctuations, as well as exposure, and anthropogenic activity may all have similar expressions in the pollen diagrams (eg Birks & Madsen 1979), and this has caused problems in the interpretation of the spread of heath and grasslands in the fifth and sixth millennia BP elsewhere, eg on St Kilda, Lewis, Skye and Mull



ILL 90: RH 1: peat growth in relation to dated deposits on site. (Assuming a date of 0 years BP for the bog surface).

(Birks & Madsen 1979; Birks & Williams 1983; Walker 1984; Walker & Lowe 1985; Lowe & Walker 1986; Bohncke 1988). All of these problems are relevant to the site at Kinloch.

The postglacial vegetation of Kinloch may be divided into three time-zones which broadly equate with those defined in the pollen diagrams from the Farm Fields site (Ills 90, 91, 92).

ZONE I: 10000–6500 BP.

Zone I precedes the rise in alder (*Alnus glutinosa*) pollen; it includes zone RHI at the Farm Fields site (RH 1) and local assemblage zone K1 at the Kinloch Glen site (K). This is a period of dynamic environmental change, oscillating sea levels (Chapter 12), and developing and stabilising soils, combined with rapid climatic change and an almost constantly changing vegetation.

The deposits collected for this study did not include material from the earliest postglacial period. However, using a core from the Long Loch bog on Rhum, Ford shows a classical late glacial sequence of two solifluction deposits indicating frost heave of soils, interrupted by an organic deposit (possibly representing a warmer period), and more stable soils (Ford 1976; and see Godwin 1975). At the beginning of the postglacial period (around 10000 BP) temperatures increased rapidly and birch, pine and juniper (*Juniperus communis*) invaded the countryside. Pollen from the Kinloch Glen site (K) at around 8800 BP shows that, even in this sheltered part of the island, conditions were very open; a few copses of birch, and possibly some hazel or bog myrtle, were present, along with taxa characteristic of open non-bog habitats, such as juniper, mugwort (*Artemisia*), and plantain (*Plantago* spp.) (Parish mf, 2:A3–B8). The predominance of grass (*Gramineae*) and heather (*Ericaceae*) pollen suggest the early establishment of grass and heathlands in the area.

At Farm Fields, estuarine saltmarsh with reeds (*Phragmites communis*) had developed before the start of peat growth at 7800 BP. The archaeological site lies at about the maximum altitude of the postglacial high sea levels (Chapter 12). The early part of Zone I is characterised by a great variety of herb pollen, some of which reflects the salt water influence, eg various pinks (*Caryophyllaceae*), sea plantain (*Plantago maritima*), and composites (*Compositae*), while other herbs are more characteristic of late or early postglacial open environments, eg mugwort, Iceland purslane (*Koenigia islandica*), rue (*Thalictrum*). crowberry (*Empetrum nigrum*), and fir clubmoss (*Lycopodium selago*). After the sea level receded around 7800 BP, open hazel scrub became established with an understorey of horsetails (*Equisetum*), ferns, and sedges, together with tall-herb communities, including meadowsweet (*Filipendula ulmaria*), sorrel (*Rumex acetosa*), and umbellifers (*Umbelliferae*). Low pollen frequencies of birch and pine indicate that they may have been present on the island at this time, but they were probably not local to the site. The establishment of dwarf-shrub heaths on the drier sandstone soils near to the site is suggested by the increased frequencies of cinquefoil or silverweed-type (*Potentilla*-type) and scabious (*Succisa pratensis*), in combination with the appearance of ling (*Calluna*) pollen and the continued presence of other ericaceous pollen. Finally, the closing of the hazel canopy appears to have suppressed the flowering of composites, rue, fir clubmoss, and crowberry.

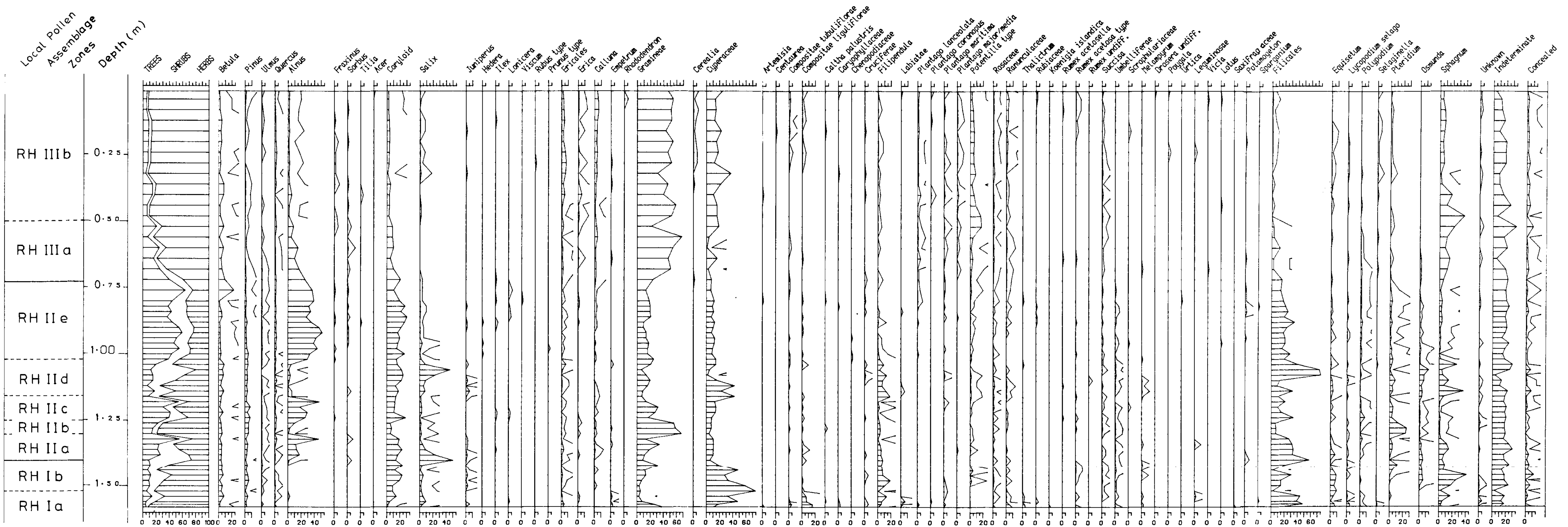
A combination of evidence suggests that the vegetation of the mire surface at the Farm Fields site was disturbed by fire at times throughout this zone (*cf* Bohncke 1988), and this disturbance could have contributed to the establishment of alder in the next zone (McVean 1956a). It is not possible, on the available data, to attribute this disturbance to either anthropogenic or natural fires, but, even if the inhabitants of Kinloch were not directly responsible, then they would certainly have benefitted from the changes that fire promoted (Mellars 1976b). At Long Loch, a decline in tree pollen at a time of increasing bracken (*Pteridium aquilinum*), umbellifers, and composites, (but before the rise in alder), has been interpreted as evidence for clearance activities (Ford 1976). There was apparently more extensive tree cover in the vicinity of Long Loch, mainly comprising birch (up to 25% of total pollen) and alder.

ZONE II: 6500–4000 BP.

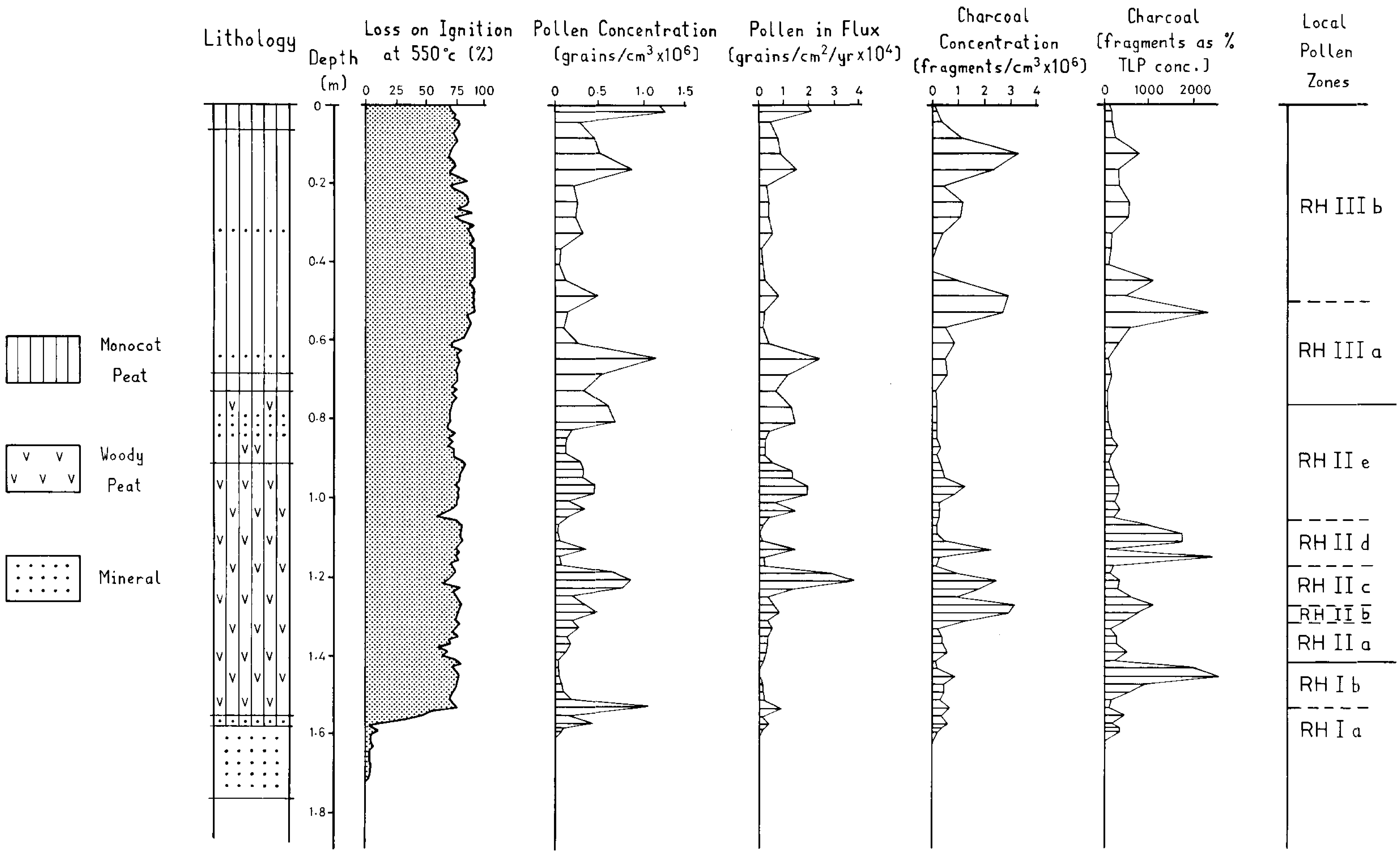
Zone II starts at the rise in alder pollen (6500 BP) and ends just after the beginning of the major decline of both alder and hazel/myrtle (pollen of hazel and bog myrtle is difficult to distinguish and is given the composite name Coryloid), pollen at the Farm Fields site. It encompasses zone RHII at Farm Fields and much of zone K2 at Kinloch Glen. Heather heath was widespread, and birch, pine and oak were also present on better drained areas. Higher frequencies of hazel and alder pollen at Farm Fields suggest that the scrub cover there was more closed than further up the Kinloch Glen.

At the Farm Fields site there are two periods which have reduced alder pollen and increased herb frequencies. These indicate a decline in tree cover, both on the damp alder-fern woodland of the mire and on the drier surrounding slopes, which may have supported hazel. Continued drying of the mire surfaces is demonstrated by a change to grasses and bracken, together with reductions in sphagnum moss and horsetails. These pollen changes and the increased frequency of charcoal at the time (eg in subzone K2b) suggest that the decline of the woodland may be associated with an increased incidence of fire. Alder is thought to be fairly resistant to fire (McVean 1956b), however, so it may be that these periods (which lasted an estimated 250 years) were the result of direct and repeated clearance, in which case the inhabitants of Kinloch would be the primary agency. If this were so, then it is difficult to see what long-term advantages such clearance provided for the population at Kinloch. The promotion of nutritious grazing after burning is a short-term effect (Mellars 1976b), and the driving of game is likely to be a one-off activity. Fire might promote the flowering and productivity of local hazel-nut crops (Smith 1970), but this is unlikely to be the case at Kinloch because hazel was reduced. The hazel reduction suggests that a more widespread impact was taking place on the drier slopes above the mire as well as on the bog itself.

The charcoal concentrations decline after 5300 BP (apart



ILL 91: RH 1: pollen percentage diagram.
Pollen sum = total land plant pollen, types outside this sum are calculated as pollen sum + taxon.
Exaggeration of the open curve is ×10.



ILL. 92: RH 1: loss on ignition; microscopic charcoal concentration and percentage data; pollen concentration and accumulation data.

from brief peaks in RHIId and RHIIe), and this decline suggests a reduction in the incidence of fires similar to that found on the North York Moors (Simmons & Innes 1981 & 1987), the Isle of Arran, and the Kintyre Peninsula (McIntosh 1986). The start of subzone RHIId (c. 5200 BP) dates to around the time of the elm decline, at which time climatic shifts have been suggested elsewhere in NW Scotland (Pennington *et al* 1972; Williams 1976), and these shifts possibly involve increased precipitation resulting from the southward displacement of the polar front (Magny 1982).

The first major local impact of the inhabitants of Kinloch is visible towards the end of zone II, in mid-RHIIe (c.4600 BP). There is an increase in mineral matter, and ribwort plantain (*Plantago lanceolata*) and cinquefoil pollen start a slow increase, while meadowsweet and royal fern (*Osmunda regalis*) values begin to decline. Grass pollen frequencies also start to rise, honeysuckle (*Lonicera periclymenum*) is present, and the tree pollen assemblage begins to include such open habitat taxa as holly, ash, and rowan. At the end of the subzone birch expands to its maximum value in the profile (23%).

In this subzone cultivated flax (*Linum usitatissimum*) occurs as five pollen grains at 0.30m depth in the on-site monolith (Moffat, mf 2:F1–G12). Flax pollen is large, and it is not carried far by the wind (Gennard 1985), so that its occurrence either indicates that it was cultivated nearby or that it was artificially deposited, eg with collected flax in a retting pond. The radiocarbon date from this monolith suggests that the dump of mineral material that overlay the findspot of the flax pollen is dated to slightly before 4000 BP (GU–2042). Although this date may be influenced by the redeposition of derived organic sediments, the secure dating of the slopewash deposits nearby (GU–2041) suggest that the cultivation of flax occurred at the start of the second millennium BC. In Scotland, flax has been recorded from bronze age deposits in Fife (Jessen & Helbaek 1944, 55), and it has recently been reported from likely neolithic deposits in Kincardine and Deeside (Bond & Hunter 1987, 175).

ZONE III: 4000 BP – THE PRESENT DAY

Zone III starts as alder begins to decline at the Farm Fields core site. Changes at this time suggest a decline in the alder woodland and in the tall-herb communities that dominated the mire surface, as well as in the hazel on the surrounding drier soils; this is reflected by a decline in the wood content of the peat. Both ling and scabious expand, suggesting that the hazel was replaced with the spread of heath vegetation. Birch and rowan are present in high frequencies, both possibly expanding as pioneer taxa on the drier cleared areas left open by the decline in hazel. One cereal-type pollen grain was found at the start of RHIIIa; in combination with the increase in plantains (*Plantago lanceolata*, and *P. media*), as well as increased charcoal, this suggests clearance of the land for agriculture. The start of this subzone also coincides with a decline in pine. This decline is approximately coeval with the regional pine decline (c. 4000 BP) which has often been interpreted as the result of human activity and/or climatic change (eg Birks & Madsen 1979; Bennett 1984; Bradshaw & Brown 1987; Bohncke 1981; Birks 1987).

The sediments collected from the infilled watercourse on the excavation site relate to this period (Moffat mf, 2:Fl–G12): they are composed of a woody *Molina* peat 0.3m deep (the remains of purple moor grass), and this is overlain by a more woody peat (0.3m in depth). Between the two peat layers there was a band of stony-silts (0.25m deep), and this was barren of pollen; stony-silts also occur within the top 0.1m of the profile. There was a quantity of brushwood within the watercourse; this was mostly alder, but it included oak, birch, hazel, together with rowan, crab apple (*Malus sylvestris*) and hawthorn. The small size of these macroscopic wood fragments suggested that they may have been deliberately collected or, if natural windfall, that they had come from managed scrub (McCullagh mf 3:A3–A11); woodland coppicing may have been taking place (*cf* Goransson 1987).

Three events are closely related at around 4000 BP. Firstly, this is a time of major local impact by the inhabitants of the archaeological site: tree cover was reduced, and acid grassland spread around the site, whilst heaths increased to dominate the drier sandstone slopes (this change dates to after 4660±70 BP, GU–2110). Secondly, there was a build-up of slopewash, visible as extensive spreads of sandstone materials across much of the archaeological site and to the E (Edwards & Hirons mf, 2:B9–C3). Thirdly, there was the deliberate deposition of a layer of stony-silt into the water course (dated to 3890±65 BP, GU–2042), as well as the deposition of midden-type deposits and gravel dumps (TAQ 4080±60 BP, GU–2148). This combination of events suggests that this was a time when local anthropogenic impact was greatly increased.

In contrast, the changes in the pollen assemblages from the Kinloch Glen are much less striking than those visible on site, but they do still confirm the widespread development of agricultural activity. The amount of birch and alder pollen are slightly increased throughout much of zones 3 and 4, indicating that the sparse tree cover in this part of the Glen is little changed, and hazel/bog myrtle (Coryloid) is also better represented. There are, however, increased frequencies of certain weed taxa: cinquefoil; several composites including thistles (*Centaurea*); and ribwort plantain (*Plantago lanceolata*), and these do indicate an increase in open and disturbed habitats. A decline in tree pollen recorded further afield (at Glen Shellesder and Long Loch, both on Rhum; Graham 1986; Ford 1976) must indicate the widespread decline of trees and their replacement with heath, acid grassland, or blanket bog, but it is not possible to correlate these sites precisely with the Kinloch data.

At the Farm Fields core site after 2800 BP, hazel and ferns were replaced by heaths, grasses, sedges and cinquefoil; all suggesting the development of base-poor grassland (perhaps similar to that on the site at present). The reduced mineral content of the peat in the first half of the subzone shows that the local soils had reached an equilibrium after the decline of alder and hazel. In the latter half of this zone, cereal-type pollen is present in the record as a continuous curve, and the presence of pollen of weedy taxa, eg composites, mugwort, buttercups (*Ranunculaceae*), and sorrel (*Rumex acetosa*), suggests that this was the period of the most intensive cultivation on site. This period starts at a depth of around 0.28m in the Farm Fields core (c. 1500 BP), and it coincides with increased mineral input to the peat of the watercourse. The washing of mineral material onto the bog suggests soil instability, and it probably resulted from agricultural activity directly upslope of the pollen site (possibly in the same area where the remains of recent cultivation may be seen; Hirons & Edwards, mf a 2:C4–D13).

ON-SITE POLLEN SAMPLES

Pollen analysis from the fill of the watercourse shows a succession of pollen spectra (Moffat mf, 2:F1–G12). The samples from the top of the fill reflect the heather communities which now dominate the site; higher tree pollen frequencies (in the midden-type material) perhaps reflect conditions around the site prior to the full development of heath and acid grassland. Elsewhere on site, the mesolithic samples tended to have low tree pollen counts, as did the samples from the dump of rock and debris within the watercourse and the samples associated with pot sherds in the ploughsoil. Samples with high tree pollen frequencies include those from the midden-like dumps; these are neolithic or later. The relative chronology of tree cover implied by these samples is confirmed by the interpretation of the off-site pollen analysis, namely that the period when tree and shrub vegetation was most prominent was after the time of mesolithic settlement.

Analysis of the monolith from the watercourse also produced the remains of the ova of the sheep liverfluke (*Fascicola hepatica*), and liverfluke ova were also present in three samples of wood peat from the midden-like deposit (BA D1) and in one sample of wood peat found by the edge of the watercourse. Although it is known as the sheep liver fluke, this parasite has been recorded in most orders of animal, and it is closely associated with livestock. It is particularly prevalent amongst animals kept in large numbers and in enclosed conditions, as repeated feeding on infested grasslands leads to severe infestation. The swampy edge of the watercourse is an appropriate habitat for the wetland snail which is necessary to complete the life cycle of the fluke, and it may have originated in the red deer of Rhum, or in any livestock watering and excreting there.

THE CHANGING RESOURCE BASE OF RHUM

ZONE I

In zone I the first settlers would have been presented with the initial development of stable vegetation under conditions of relatively rapid climatic change and oscillating sea level. The climate warmed rapidly at the onset of the postglacial period (eg Lamb 1982) and, as the soils became stabilised, a time lag developed between the temperature and the vegetation. It seems that open conditions persisted on Rhum rather longer than on parts of the nearby mainland; there is little evidence for the rapid expansion of birch woodland as found in most areas of mainland Scotland (or even in south Skye, eg Birks 1977), and open heathy grasslands survived both in exposed places and in more sheltered areas such as the Kinloch Glen. After 8000 BP soils improved, and hazel thickets developed around the archaeological site, while on the higher, drier slopes, away from the saltmarsh of the estuary, birch-oak woodland developed. Although hazel may have been widespread at this time (Graham *pers comm*), the higher altitude site at Long Loch produced more evidence of birch than of hazel (Ford 1976), so that the distribution of hazel-nut resources may have been patchy.

Rising water tables have been suggested on a continental scale at about the time of the rise in alder pollen, and the expansion of alder to the west of Scotland does appear to have taken place fairly rapidly at around 6500 BP, suggesting that some environmental threshold was overcome rather than that alder arrived by immigration. This would require the presence of small pre-existing local alder colonies and, indeed, pollen of alder was recorded on Rhum in low quantities in the earlier period, perhaps indicating the presence of just such foci (Parish mf, 2:A3–B8; Graham 1986). The subsequent expansion of alder at the time of maximum marine transgression, and a shift towards the dominance of westerly anticyclonic weather conditions (mid 6th millennium BP), indicates both wetter soil conditions and a higher water table.

ZONE II

At Kinloch, alder replaced hazel in the areas of wetter flushes, and it presumably expanded to cover wider areas as the sea later stabilised at a lower level. Throughout this time the tree cover on the soligenous bog at Farm Fields fluctuated, and the area was clearly an ecotone of peaty soils supporting a carr of first hazel and then alder. The soils were often very wet, fed by water flushing downhill from the sandstone slopes above, and at times the slopes became unstable (several episodes of mineral deposition are indicated, Hirons & Edwards mf a, 2:C4–D13). It is notable that there are no remains directly associated with activity on site at this time, but such littoral scrub areas are highly productive today, and they probably attracted both game and fowl for the hunt, as well as vegetable resources. Evidence for generalised human impact does suggest that people were not far away, particularly towards the end of this period.

ZONE III

After c. 4000 BP there was a rapid decline in the tree cover around the site, and this signals a radical change in the resource base. On higher ground the environment became dominated by open, windswept moorland and blanket bogs, and game would undoubtedly have been reduced in density. This was a transition to essentially present-day vegetation-types, and it occurs in similar fashion on many Hebridean islands, though it varies in date (eg Birks & Williams 1983; Birks & Madsen 1979; Walker & Lowe 1985; Lowe & Walker 1986; Bohncke 1988). At Kinloch the short-lived expansion of birch, just before the decline of alder and hazel in K2e, together with the sporadic record of plantain, suggests anthropogenic activity, possibly agriculture, on the slopes above the Farm Fields. This activity gained impetus around 4700 BP and seems to have resulted in the flushing of eroded material on to the mire below. By *c* 4000 BP there is renewed evidence for anthropogenic activity on and around the archaeological site itself. At this time a period of climatic change has been suggested, based on evidence elsewhere (Birks 1987; Andrews *et al* 1985; Walker 1984). This change involved increased stormyness and oceanicity, and it may have resulted in the expansion of exposed open land; it was presumably felt most severely on the Atlantic seabord and must have had an effect on the inhabitants of Rhum, though Kinloch itself would still have been relatively sheltered.