

## An Sithean, Islay

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### SUMMARY

*The survey of the settlement and field-systems at An Sithean, Islay, was followed by a programme of soil sampling. Pollen analysis indicated cultivation on the site prior to, and contemporary with, the hut circles and field banks, whose construction probably took place not long after 975±60 bc (GU-1474) (c 1220 BC). Although some field banks were refurbished after peat growth had begun, possibly in the Iron Age, this was not accompanied by arable farming. The central area of the site was reused for cereal cultivation in the post-medieval period. A model for the use of podzolized soils and the onset of peat growth as chronological indicators was tested with partial success.*

### INTRODUCTION

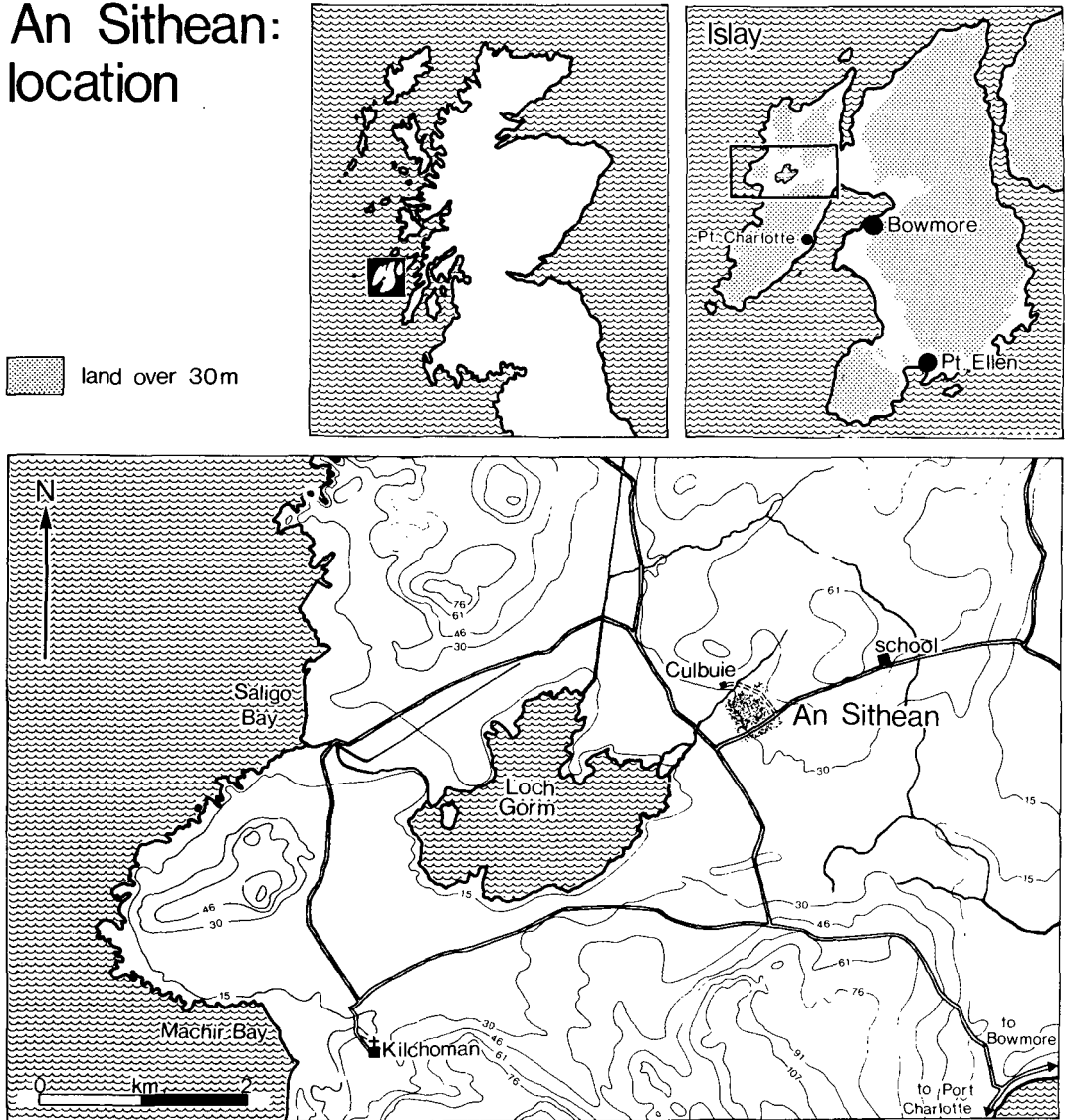
During fieldwork on Islay carried out by the Royal Commission on the Ancient and Historical Monuments of Scotland in preparation for the fifth volume of the *Inventory of Argyll*, a number of hut circles and field banks were identified and surveyed, of which the group at An Sithean is the most extensive example. This settlement, which is situated in the NW part of the island, in Kilchoman parish, possesses in a relatively well-preserved form many features of construction common to the other recorded sites. It extends over a stretch of heather moorland measuring 750 m by 650 m (NGR NR 250 655 centre) which straddles the 30 m contour on each side of the road (B8017) between Loch Gruinart and Loch Gorm. Sloping gently westwards to Loch Gorm in a series of slight terraces, the area is mostly covered by blanket peat 28 cm in average depth, and contains patches of marshland (carrying fen vegetation) and rough grassland, which in summer support a flourishing crop of bracken.

The settlement at An Sithean seems to have been first referred to by Pennant, who visited the area on 5 July 1772 and passed 'by some cairns and antient fences on the heaths' as he rode from Sunderland, a farm south of Loch Gorm, to the head of Loch Gruinart (Pennant 1774, 1, 226). This is most probably the site that Pennant noted, though the settlement and field system at Glacan Daraich, 1 km to the E, might have given rise to a similar remark. The first edition of the Ordnance Survey six-inch map, prepared in 1878, records the position of five of the structures on the site. They are shown as small circles, and the name *An Sithean* (the fairy mound) is attached

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## An Sithean: location



ILLUS 1 Site location map

to the largest of them (*OS Original Name Book (Argyll) 1878*, No 33, 137). James Whittaker, who saw the area in 1956, was the first of several visitors to mention the site in recent times; he identified it as a group of wheelhouses having their entrances on the SW (*Discovery Excav Scot 1956*, 10). Four of the hut circles were noted by the Islay Archaeological Survey Group in 1958 and one was surveyed (*Discovery Excav Scot 1958*, 13–14; *IASG 1960* (1), 20). F and H E Newall commented on the field banks three years later (*Discovery Excav Scot 1961*, 19). The site is marked as an antiquity on the Ordnance Survey 1:10,000 scale map prepared in 1979, and the eight circles are indicated.

Mechanical clearing of the ditches on both sides of the B8017 in the spring of 1981 resulted

in damage to the field banks close to the road and exposed some of them in rough section. At that time members of the Central Excavation Unit (SDD AM) were working at Kilnave, Islay (Barber 1981) and took advantage of the opportunity thus provided to clean and record the exposed profiles and to sample these and other sections through both hut and field banks, and to examine their soil history (pedogenesis), pollen content and dating. It was intended that this study should complement similar work undertaken on material from Arran and in particular test a model for pedogenesis on the west coast of Scotland, developed in the light of the work on Arran. This is discussed more fully below. A total of 15 sections numbered 1 to 16 (the use of the number 13 is avoided throughout) were prepared, of which three (8, 9 and 12) were unsuitable for recording and sampling.

## PART 1: PHYSICAL BACKGROUND AND SURVEY

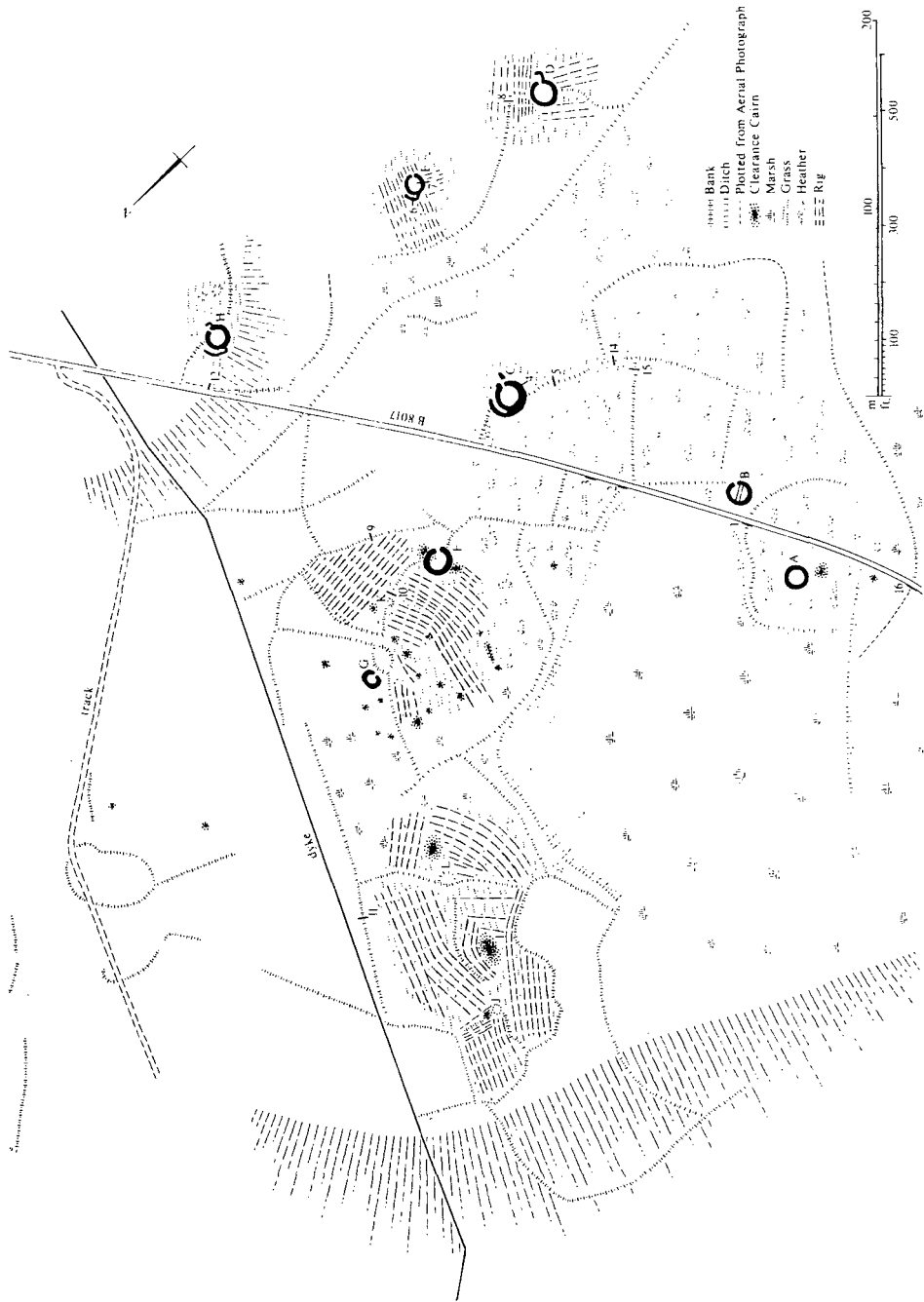
### THE GEOLOGY AND GEOMORPHOLOGY OF THE AREA

M Ashbrook

The west part of Islay is composed of pre-Cambrian rocks (older than 600 million years BP); those underlying An Sithean are folded and metamorphosed grey-green, black and coarse-grained slates alternating with grey schistose grit and thin bands of sandy limestone. Such rocks produce base-poor soils which become acidic and are prone to podzolization under the right circumstances. Podzolization is the process whereby aluminium, iron and organic compounds are leached down the soil profile, giving a pale horizon just below the surface humus and a layer of redeposited iron, aluminium and possibly humus lower down. Normal earthworm activity ceases under these conditions.

In late glacial times, Islay was a small archipelago (Steers 1973, 163) with a broad strait connecting Lochs Indaal and Gruinart, both then wider (illus 1); another strait ran from Sanaigmore Bay to Saligo Bay, thence to Machir Bay and finally E to the Indaal-Gruinart strait. The high sea level was close to the present 100 ft (30 m) contour (McCann 1964, 13) which cuts An Sithean, but the soils there do not seem to have formed over marine deposits. This apparent anomaly is explained by the erosion of the shoreline to the E of Loch Gorm by the late glacial sea, which reworked the fluvio-glacial deposits already in existence there. Thus, although the site is on a raised beach, it is not on raised-beach deposits. The main postglacial transgression (for a general discussion see Jardine 1977; Bishop & Dickson 1970) began in the Mesolithic period and the regression of the sea would have continued into the Neolithic. During this time most of the Gruinart flats would have been swamped, separating the Rinns from the rest of the island, though the crossing of the strait would not have been difficult.

The low terraces on which the settlement at An Sithean lies are fringed in places with stones and boulders, and since they have been exploited for agriculture, their nature and formation are of some interest. Two distinct and separate processes, the first glacial and the second marine in origin, can be invoked to explain these phenomena. Stone-banked lobes and terraces, whose differences are purely morphological (Embleton & King 1975, 112) can be formed as the result of periglacial activities, in this case probably occurring during the period when the glaciers had begun to recede. These terraces usually occur on moderate slopes of 10° to 25°. They are partially composed of deposits resulting from the flow of water-soaked debris over permanently or seasonally frozen sub-surface layers. The formation of stone embankments by periglacial processes is not well understood. Suggested explanations include stones being heaved to the surface by frost and then moved downhill at a faster rate than the slow creep of fine materials. Downward movement can be arrested by slight changes in slope, clumps of vegetation, or accumulations in which several stones form a pile; after the pile reaches a sufficient size, little further movement will occur apart from soil creep (Embleton & King 1975, 112–16). The terraces could also have been formed by the late glacial sea. Its waves appear to have been eroding glacial sediments, probably boulder clay, on the east of Loch Gorm. As the sea level receded, a series of low terraces could have been formed. Jardine (1977, 102–3) suggests that the uneven surface is the result not only of its intertidal or shallow water origin but also of the effects of ice and other abrasive agents.



ILLUS 2 An Sithean: site plan

## THE LOCATION AND DESCRIPTION OF THE SITE

The visible elements of the site at An Sithean were surveyed by members of the RCAMS (illus 2) and to this plan were added certain details only detectable on aerial photographs (RAF 106G/SCOT/UK 49 6 MAY 46 3337-8, 4293-4; Ordnance Survey 19 April 1972 ISLAY & JURA 72 071 120-1). These were extensions of banks already recorded, where the image of the conventionally surveyed field banks was the same as that of their continuation through thick heather.

The modern road (B8017), which divides the site into two unequal parts, marks a change in the vegetation. Little detail can be detected on the S side of the road, where the ground is covered in thick heather. Only where there are small grassy or marshy areas can the form of field banks be identified. On the N side of the road, grass and very short heather interspersed with marshy pockets extend as far as the modern track to the farmhouse of Culbuie, allowing a more careful examination of the remains. Beyond the track the ground is again covered with thick heather. A drystone dyke crosses the area from NW to SE. While the site may extend beyond the confines of the plan, the decreasing density of the remains makes it likely that the core of the settlement and its most intensively cultivated areas have been recorded.

## HUT CIRCLES (illus 3)

## Hut circle A (NR 249 664)

The wall has been reduced to a low stone and earth bank, covered in peat and heather, standing up to 0.3 m high, with an average width of 2 m, and enclosing an area 7.5 m by 8 m. No entrance can be clearly identified, but there is a slight lowering in the level of the wall debris on the NW arc.

## Hut circle B (NR 249 664)

A second hut circle 7.2 m by 7.8 m lies 42 m to the SE of A. Its wall is constructed of stone and earth and, although extensively robbed, it still stands to a height of up to 0.95 m above the exterior ground level, the thickness varying between 1.8 m and 2.8 m, with only one outer facing-stone remaining. The wall is distinctly lower on the N arc, a feature it shares with all the other hut circles at An Sithean with the possible exception of F. The entrance lies on the SE. In the relatively recent past the hut has been divided, probably to create animal pens.

## Hut circle C (NR 251 664)

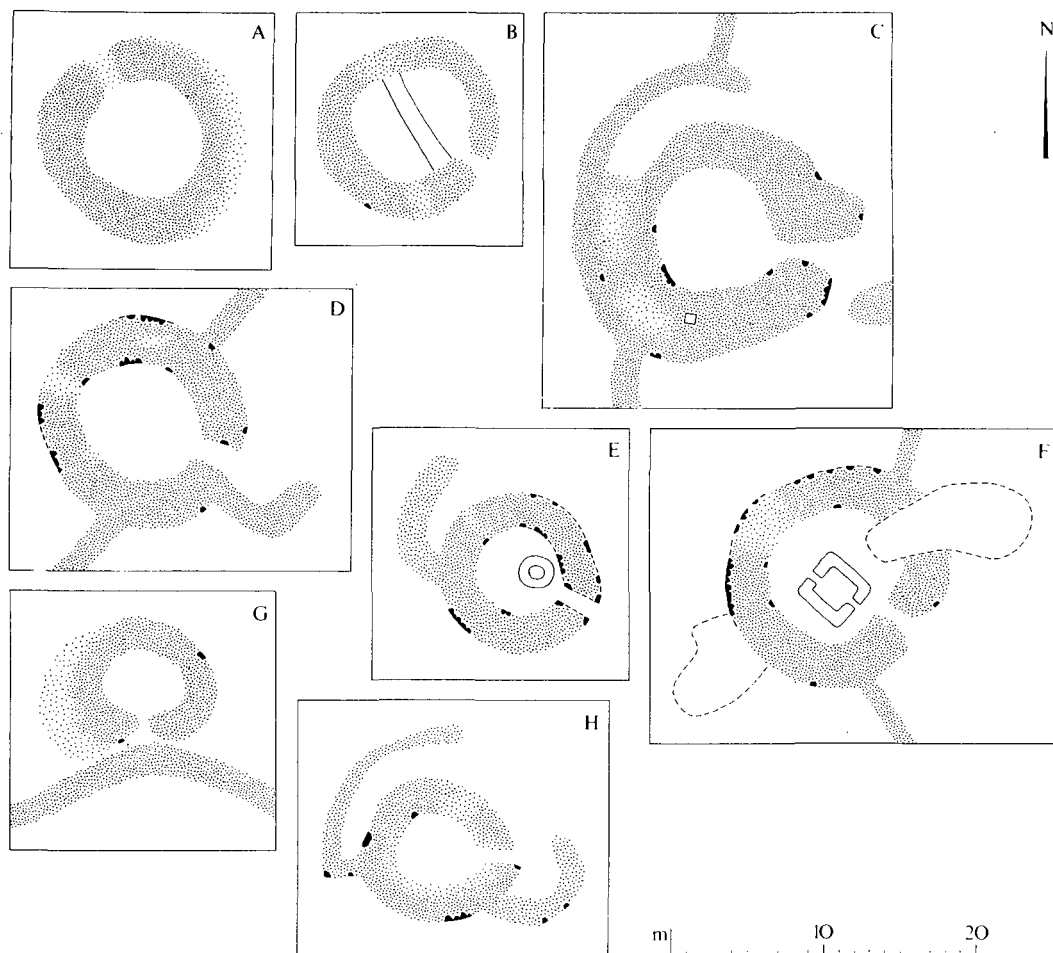
This hut circle, the most prominent on the site, is levelled into the summit of a small hillock 120 m NE of B. Its wall, some 4 m thick near the entrance, with many inner and outer facing-stones surviving, stands 1 m to 1.5 m above the level of the slightly dished interior and encloses an area 8 m in diameter. On each side of the entrance, which is 1.5 m wide and lies on the ESE, are slight stony banks. There are annexes on the NW and SW arcs formed by a wall which curves around the hut circle and separated by an indeterminate band of earth and stone. Field banks join the encircling wall on the SSW and N. Two small, linked sub-rectangular structures, probably of recent origin, are attached to the bank on the NW.

## Hut circle D (NR 252 663)

The most southerly of the hut circles at An Sithean, lying 145 m SE of C, is surrounded by a series of irregular ridges, similar to those created by certain types of spade and plough cultivation, though a section cut through them revealed no distinct structure. The hut circle wall, which stands up to 0.7 m in height and is covered with grass and bracken, has an average thickness of 3 m, with several stretches of outer and inner facing-stones in position, and encloses an area 7.75 m in diameter. The entrance, which is about 1.5 m wide, lies on the ESE with a low crescentic bank attached to its S side. Field banks abut the wall on the NE and SW. Slight structures, probably sheep-pens, lie within the interior and partly overlie the wall.

## Hut circle E (NR 252 664)

This hut circle is similar in form to hut D, 70 m to the S. Its wall, 2.25 m thick, stands up to 0.9 m above the exterior ground level and encloses an area 5.3 m in diameter. The entrance, which lies on the SE is 1 m in width at the inner end and 1.2 m at the outer. On the NW arc there is a low curving bank



ILLUS 3 An Sithean: hut circles

which forms an open-ended annexe. The interior is occupied by a small circular structure probably of relatively late date. The hut is closely surrounded by grass-covered ridging similar to that around D.

#### Hut circle or enclosure F (NR 250 664)

What is probably a much damaged hut circle lies on the N side of the road 80 m NNW of C in an area of rig cultivation. Its wall, with a thickness of 3 m indicated by the surviving inner and outer facing-stones, stands up to 1 m high and encloses an area 8.4 m by 9 m. Stone robbing, which has widened the entrance on the SE, and stone dumping have obscured the form of the structure, possibly an enclosure rather than a roofed building. Field banks, which have been partly constructed from field clearance heaps, abut the hut circle on NE and S. There are traces of a small secondary sub-rectangular building in the interior.

#### Hut circle G (NR 250 666)

This hut circle, which lies 60 m NNW of F, has been reduced to a slightly dished oval mound 8 m by 9.5 m standing up to 0.4 m above ground level. Dumping in the interior has obscured the line of the wall and only two outer facing-stones are visible. A spread of stony debris on the W may mark the site

of an annexe-like structure similar to those noted on hut circles C, E and H. A later field bank closely approaches the hut on the S.

#### Hut circle H (NR 252 665)

This severely damaged hut circle, lying 145 m NE of C, is levelled into a slight hillock, with its wall, which stands up to 1 m above the level of the interior, enclosing an area 5 m by 6 m. The extent of the stone robbing makes it difficult to ascertain the original shape of the hut, but it was probably more circular than the plan indicates. A few inner and outer facing-stones remain, but about two-thirds of the wall has been quarried away. The entrance, which lies on the E, has been widened, possibly to facilitate stone robbing; it has a low bank attached to its S side. There is an open-ended structure on the NW arc. About 15 m to the SE of the hut circle are two small sub-rectangular structures, which are probably secondary.

There are similarities in form between the hut circles; all appear to have walls of stone and earth and, in all but one example, the remains of a built stone face. If F (with an area of about 60sq m, which may be an enclosure rather than a hut circle) and G (where the internal diameter is not known) are excluded, the internal areas in four cases cluster around 47sq m, while the other two have a mean area of 22sq m. This marked difference may reflect their function or status rather than a chronological distinction. The entrances lie on the SE arc with short stretches of walling attached to the S sides of C, D and H. Annexe-like structures on the arc opposite the entrance occur in C, E and H. A broad distinction may be drawn between A and G, which are low and heather-covered, and the more imposing grass- and bracken-clad remains of B, C, D, E and H.

#### FIELD BANKS

The banks that divide up the area around the hut circles at An Sithean give the immediate impression of a system that is complex, multi-period and incomplete. Two categories of bank can be distinguished, both of which are earlier than the modern drystone dyke: Type 1 comprises low stony banks covered by peat, grass or heather, and sometimes formed of projecting upright stones; Type 2 comprises grass-covered stone-and-earth banks. The present vegetation and peat cover, however, varies so much that the surface appearance of the banks is seldom, if ever, consistent through their lengths.

#### Type 1 banks

There are considerable differences in appearance among the banks of the first type and it is not possible to distinguish separate systems or to say which areas of the site were in use contemporaneously. These field banks which tend to run in gentle curves, utilizing the edges of the natural terracing, lie towards the perimeter of the site. The bank which passes between hut circles A and B, cut by section 1, is low, peat-covered and stony, about 2 m wide and standing up to 0.15 m above ground level. Its course is no longer clear, though it may have joined the bank to the W which is cut by section 16. Two roughly rectangular areas in the E of hut circle B are bounded by field banks. One of these measures 60 m by 50 m and one of its banks is cut by section 15; the more southerly measures about 100 m by 55 m and section 14 has been cut across one of its banks. Two gaps which occur in the corners of these enclosures may be the sites of gateways. The bank which divides these two fields continues to the NE and abuts hut circle C. In the area where it is cut by section 5 the bank is about 2 m across, stony and grass-covered, in contrast the bank of hut circle D appears for part of its course as a short length of projecting upright stones. On the N of the road the field banks assigned to Type 1 surround those of Type 2. A curvilinear enclosure with an area of 0.12 ha lies towards the northern edge of the site. Its low, partially peat-covered bank consists in some sections of projecting upright stones.

#### Type 2 banks

The grass-covered banks of Type 2 which, it is suggested, belong to a different phase of agriculture, are found in the centre of the site at An Sithean. For the most part they bound or divide areas of ridge and furrow cultivation, forming about half a dozen fields over an area of about 1.8 ha. Though in general larger than the Type 1 banks and constructed in short straight stretches, the Type 2 banks share with the former a preference for the lines of the natural terrace edges. In consequence they often bound fields on different levels such as those revealed in section 10. One length of bank, cut by

section 9, was composed of a series of clearance cairns. Clearance material has been placed on many of the banks, some of which may overlies field banks of Type 1.

#### CAIRNS

The cairns on the site, which are probably clearance cairns, can be divided into two types on the basis of their size and vegetation cover. Some 15 of the larger type, which measure up to 15 m by 10 m and stand up to 1 m high, cluster in an area of ridge and furrow cultivation (illus 3). The spread of ridge and furrow seems to avoid the cairns which are grass- and bracken-covered and in some cases lie on rock outcrops. Economy of hypothesis suggests that they were formed at the same time as the ridge and furrow, although earlier stone heaps may lie beneath. The other cairns are more widely scattered, though none was noted S of the road. These smaller, heather-covered examples average 2 m in diameter and 0.3 m in height. It is likely that they may be associated with an earlier stage of cultivation on site. The limitations of such a survey make it impossible to say whether any of them were erected for sepulchral purposes or contained secondary burials. The mass of stone, I (illus 3), may lie on the site of a ninth hut circle.

#### LATER FEATURES

Three small sub-rectangular buildings, J, K and L (illus 3) are attached to field banks of the second type. K is possibly a corn-drying kiln, but the specific functions of the others are unknown. The small rectangular structures adjacent to hut circles C and H and the pens created within B, D, E and F are thought to be connected with sheep-rearing.

## PART 2: THEORETICAL CONSIDERATIONS

This section offers two approaches to the problem of establishing chronologies for archaeological features in the absence of excavation. The first is concerned with field survey, and its limitations in the particular case of An Sithean, and the second with the use of soil development in the western coastal areas of Scotland as a guide to relative dating.

#### A PROPOSED CHRONOLOGY BASED ON FIELD SURVEY

Site chronologies based solely on field survey are limited by the nature of the evidence. At An Sithean, wherever one feature clearly cuts another, the intrusive feature – the road, the track to Culbuie or the drystone dyke – is of relatively recent date and all make their earliest recorded appearance on the first edition of the Ordnance Survey six-inch map, though the road appears to be on the line of the boundary of the lands of Ballinaby and Sunderland, as far as this can be judged from a small-scale map prepared in 1748 (Smith 1895, 552–3). In the absence of clearly defined relationships, it is necessary to consider similarities between the recorded features as a guide to their possible contemporaneity, bearing in mind the difficulty of dealing with those which may have been in use at different periods.

With regard to their present form the hut circles may be divided into two types. A and G are both low and heather-covered in contrast to the grass- and bracken-clad B, C, D, E and H which have many features in common. Because of these similarities it may be suggested that these five belong to a similar tradition and may be contemporary, though whether any distinction of date could be made between these and A and G cannot be known from field survey. By analogy with excavated hut circles, dated by radiocarbon and artefacts, in western coastal areas of Scotland, in particular with sites on Arran (Barber 1982) and Jura (Stevenson 1984) the examples at An Sithean are likely to be of prehistoric date.

Where hut circles and field banks abut, as at C, D and F, it is likely that they are contemporary or that the field bank is later, but the nature of the peat cover prevents close examination of the junctions and it is possible that the huts cut the field banks. Though differences in form and vegetation cover indicate that the field banks are not all of one period, it is not possible to distinguish more than two broad types. The state of preservation of the first type suggests that they are earlier than those that relate to the ridge and furrow cultivation, while their diversity of construction suggests that more than one phase is represented. It is probable that all four banks forming the sides of an enclosure to the E of



hut circle B were in use at the same time, but development of the field system may well have taken place over a long period, and the banks could have been constructed at different dates. The cairns have also been divided into two types, based on their form and vegetation cover. The chronological range of clearance cairns is wide (Graham 1957; Edwards 1978) and their presence on the site does not help to clarify its dating.

The second group of field banks, which bound areas of rig in the central part of the site, have structures built on them and into them in such a way as to suggest that those structures and the banks were in use contemporaneously. The possible corn-drying kiln and the two sub-rectangular buildings relating to a field bank can be most readily paralleled at post-medieval sites, as at Rosal, Sutherland (Fairhurst 1968, 143–52), and Polmaddy, Kirkcudbrightshire (Yates 1978, 134–5), and it is to this period that the latest phase of arable cultivation should most probably be attributed. There are no dated medieval sites that could provide a helpful comparison. It is difficult to fix more precisely the date of this second arable use of the site by the use of documentary sources. If the present road, as seems likely, follows the line of the boundary between the lands of Ballinaby and Sunderland in the mid-eighteenth century, then the areas enclosed by the later field banks would all lie on the Ballinaby side. There are no references in the rentals and charters reproduced in the *Book of Islay* (Smith 1895) that might allow the tentative attribution of these fields to any named settlement. Pennant was interested in agricultural improvement and his comments on what is probably the site at An Sithean do not suggest the presence of corn fields in close proximity to the ‘antient fences’. It is interesting to speculate on the identification of the ‘cairns’ that he mentions. Those at Carnduncan (NR 239 672) and Carn Beannachd (NR 356 676) are probably too far north to be intended, and it is possible that he was not referring to the relatively small clearance cairns scattered across the site, but to the hut circles themselves, which in July would have their form obscured by bracken. The estates of Ballinaby and Sunderland were both held in feu farm, and Pennant comments on the good condition of their land, presumably contrasting it with the farms elsewhere on Islay, which were leased from the proprietor (Pennant 1774, 1, 224). Campbell of Ballinaby had recently reclaimed an area of heath by the addition of shell sand; the cultivation at An Sithean may have been the result of later efforts at improvement during the latter part of the eighteenth century, though the form of the later field walls is not typical of that related to agricultural improvements on Islay. Alternatively, it may be that arable cultivation had already ceased before Pennant’s visit and that he did not distinguish the later field banks from those which might well be described as ‘antient’. The presence of small pens inside the hut circles B, D, E and F and adjacent to G and H is evidence for sheep farming in the area. Such slight structures are difficult to date. Though sheep were kept on Islay in the Neolithic period and have probably been raised there ever since, more intensive sheep-farming was not introduced to Islay before the mid-nineteenth century (*Statist Acc*, xi (1794), 279; *New Statist Acc*, vii (Argyll), 653–4).

The field survey of the site at An Sithean has suggested certain probable phases of occupation and the possible contemporaneity of some structures and features, but in the absence of a sufficient number of closely dated parallel sites for comparison, a more precise chronology cannot be elucidated.

#### PODZOLIZATION AND PEAT FORMATION ON THE WEST COAST OF SCOTLAND: A MODEL FOR ISLAY

Glasbergen, in his report on the excavation of the barrows of the Eight Beatitudes (1954) hinted at the idea that podzolized soils provided a useful chronological indicator for the archaeologist and noted that only under monuments of the later Bronze Age or later were podzolized soils to be found. However, there is much evidence that podzolization took place at much earlier dates in some areas. The finding of podzolized soils under the chambered cairn at Monamore, Arran (Romans 1964, 30) indicates that it began there during the Neolithic period, and the process of podzolization continues in some areas to this day. It has similarly seemed that the onset of peat formation, or at least the type of peat known as climatic or blanket peat, might carry useful chronological implications for the field archaeologist. However, the dates of initiation of peat formation are even more variable, covering a range of almost 3000 years (Lynch 1981, 59–60).

The attraction of the concept of distinct and readily observable soil phenomena, which are datable, however imprecisely, remains very strong, and there is a certain amount of evidence to suggest that it is possible, at least in principle. It has been suggested that podzolization is an inevitable phase in the cycle of any interglacial. Interglacials undergo cyclical changes in climate, soils, vegetation; at first, a generally ameliorating climate encourages the development of a succession of vegetation types, and later, as the temperature again drops, the sequence is largely reversed until finally the ice returns. This

extremely simplistic description begs many questions, not least the causes of the temperature fluctuation; however, it serves to make the point that a cyclical set of changes underlies each interglacial (see Godwin 1975, 11–14, for a fuller discussion). Iversen, in 1958, drawing on the work of Jessen, Milthers and others extended this concept and supplied the nomenclature which is here described in table 1 (after Godwin 1975, fig 147). To this table has been added the modifications of Turner and West (1968). They have suggested that Iversen's third phase, the 'Mesocratic stage', sees *inter alia* a relative decline in the oak forests; this, they argued, was caused by soil degeneration and not directly by climatic deterioration. Both schemes see a final stage, Iversen's Telocratic stage, with heavily podzolized and acid soils. This late episode of podzolization is that which Romans refers to as the regional podzolization (1970, 99).

TABLE 1  
A typical interglacial cycle

	Cryocratic	Protocratic	Mesocratic	Telocratic
Climate	Cold	Warm	Climatic optimum	Cooling
Soils	Immature – base rich	Fixed but transitional	Brown earths	Acidification Podzolization Onset of blanket peat
Vegetation	Open; herb and low shrub (Arctic and Alpine)	Park-tundra (transitional to woodland)	Climax deciduous forests	Acidic heath and <i>Sphagnum</i> mosses coniferous woodland
Correlative major pollen zones	Pretemperate zone	Early temperate zone	Oligocratic late temperate zone	Post temperate zone
	Forests of birch and pine	Expansion to deciduous woodland	Decline of deciduous woodland spread of <i>Carpinus</i> and <i>Abies</i>	Birch and pine with extinction of oak

Based on Godwin (1975) and Turner & West (1968), this table represents the synthesis of many sources of evidence on early European interglacials. It demonstrates that podzolization and peat formation result from natural phenomena; at most, human interference merely hastens their initiation

It is clear, therefore, that late in the cycle of an interglacial the conditions are created which favour the onset and development of podzolization on a regional scale. These conditions are complex and are inter-related in complex ways. Amongst them must be numbered the parent material of the soil, its porosity and drainage, the altitude of the site, its slope, aspect, rainfall and vegetation. Combinations of these factors lead to podzolization but the overriding determinant for the regional podzolization must be the climate.

Like any other climatically-induced phenomenon the initiation of podzolization, and indeed of peat formation, is not synchronous throughout the country. Rather, it begins first in those areas where the alteration in climate first creates the necessary conditions, and spreads thence throughout the remainder of the landscape, subject always to the other factors outlined above. Thus chronological spread is of necessity built into the phenomenon even from the beginning.

In the case of podzolization the very complex nature of the process also contributes to the difficulties involved. There exist in Scotland soils, whose composition, texture, drainage and altitudinal and zonal contexts have rendered them subject to podzolization from the earliest phases of this interglacial. Durno (1959) has shown that the soils in the South Grampians under the zonal peat between 1500 and 2000 ft (450 and 600 m) were podzolized before the Atlantic/Sub Boreal boundary at approximately 5000 bc. However, these soils are in a sense exceptional and their contribution to the confusion in the dating of climatic podzolization, though great, can in practice be detected and offset despite the fact that the formation of a podzolized profile can take place over a considerable period of time.

Occasional archaeological sites preserve podzol profiles displaying varying degrees of leaching. Romans (1970, 97) has noted that the A2 layer (see notes to section drawing for explanation of technical terms) beneath the bank of the Roman temporary camp at Kirkbuddo in Angus was noticeably paler than that of a nearby profile whose development had not been halted by the imposition of a bank. Comparison between a control profile and a profile buried beneath the Neolithic tomb at Monamore, Arran, supports this proposition (Romans 1964, 30).

Finally, man himself has of late been supposed the cause and originator of podzolization (eg Bradley 1978, 59; Barrett *et al* 1976, 287). The case of man's involvement in the process, originally advanced with due caution and reservation (Moore 1973, 350; 1975, 267) has regrettably come to be regarded as established fact (compare for example Ritchie *et al* 1974, 69 with Barrett *et al* 1976, 287). Coles and Harding (1979, 248) state quite categorically that 'podzolized soils with heath vegetation developed in many places as a result of Bronze Age clearances' (our emphasis). Similarly Turner (1981, 67) whilst recognizing that the deterioration of the soils precluded regeneration of the forests, none the less concludes that the process is largely anthropogenic in origin.

One pressure in the direction of the anthropogenic interpretation, as Lynch seems to suggest (1981, 56), is the great variability in the dating of the initiation of both podzolization and peat formation which we have already noted. Faced with this date range she argues that climate alone cannot have been the controlling factor. As we have argued above, climate ought to be viewed not as a controlling factor, but as a 'prime mover' which, operating through the influence of many other factors, finally causes podzolization. There is, on Occam's principle, no need to invoke an anthropogenic explanation since nature itself can more than account for the observed variability, and the activities of ancient populations, however widespread we conceive them to be, cannot possibly account for the enormous areas now podzolized. Neither can the anthropogenic explanation to be extended to account for episodes of podzolization in the earlier interglacials.

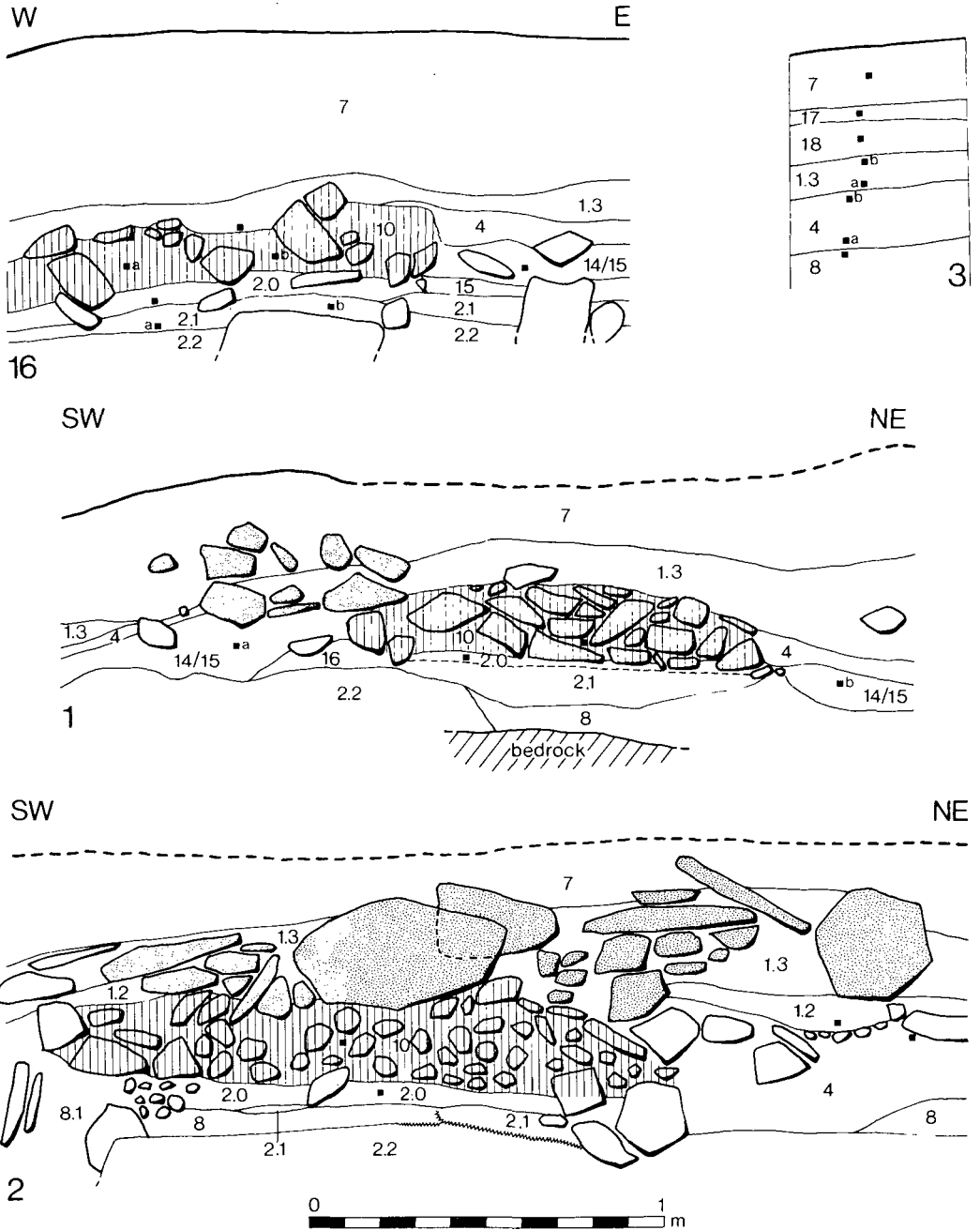
Extensive work in peat-covered environments on Arran has tended to suggest that podzolization took place on a regional scale at, or soon after, the middle of the second millennium bc. The radiocarbon date of  $1359 \pm 50$  bc (SRR-219) returned from a sample from the Ao horizon of a developed podzol sealed beneath a field bank at the Moss of Achnacree, North Connel, Argyll, falls within this period and provides a ready parallel for the field banks at An Sithean (Ritchie *et al* 1974, 68). With due reservation for those cases where local conditions or the interference of man may have triggered its initiation at a slightly earlier date, this is the model for regional podzolization against which the evidence from An Sithean was examined.

The variability in the dates for the development of podzolization is paralleled in the dating of peat initiation. Lynch (1981) has, for example, drawn together the radiocarbon dates for peat initiation, dated by the basal deposit, in Northern Ireland and has provided a series of dates for the south-west of Ireland; these range from 2255 bc to ad 1150. The very late dates can with some reason be attributed to the effects of peat cutting. Evidence exists for the use of peat from burnt mounds of Bronze Age date in Orkney and its use for fuel in Orkney is attested on sites of all periods from the Bronze Ages to the early historic (J W Hedges pers comm). Thus some at least of these later dates must be dismissed. It may be possible in the field to determine whether the peat had been removed in antiquity, since this almost invariably entails the removal of the fen peat which precedes blanket peat (Mitchell 1977, 128, pl 15; Proudfoot 1958, 188, 196) and which appears as a more dense, black, greasy non-fibrous deposit. However, if the area of subsequent peat-cutting is large, the re-generating peat is again preceded by a fen stage.

It is believed that the variability of the dates for peat initiation is related to the type of peat deposit concerned. However, the definition of types of peat deposits is not without its problems. Fraser (1954) suggested a division into climatic or zonal bogs which develop in response to cool wet climate, and intrazonal bogs which develop from shallow lakes and waterlogged hollows. However, in dealing with the climatic bog cover, or blanket peat, of Arran many small rock clefts and surface hollows, in which deep peat deposits lie, have been noted and these are not distinguishable on the surface of the apparently uniform blanket peat spread. One of these, on Tormore, Arran, has returned a radiocarbon date of  $1180 \pm 70$  bc (GU-1137) from its basal deposit. On the other hand, dates in the range 500 bc to ad 100 seem rather more typical of the basal deposits of blanket peat.

A threefold division of Scottish peatlands has been proposed by Hulme (1980, 46-7), based on the Canadian system of Radforth (1969a; 1969b). He uses the terms 'unconfined' mires (ie climatic, zonal or blanket peat), 'confined' mires (ie raised or domed bogs) and 'partially-confined' mire (to

# An Sithean



ILLUS 4 An Sithean: sections 1, 2, 3, 16

cover intermediate states) in place of the older nomenclatures. This goes some way towards resolving the archaeological problems. The Moss of Achnacree is, for example, a partially-confined mire and as such owes its initiation, not to a climatic change but to poor drainage. Thus the radiocarbon date of  $980 \pm 80$  bc (N-1468) relates merely to the initiation of peat at the sampled position. It need not coincide with the general spread of peat in response to continuing climatic deterioration, which because of its synchronicity, may yet prove a useful archaeological indicator.

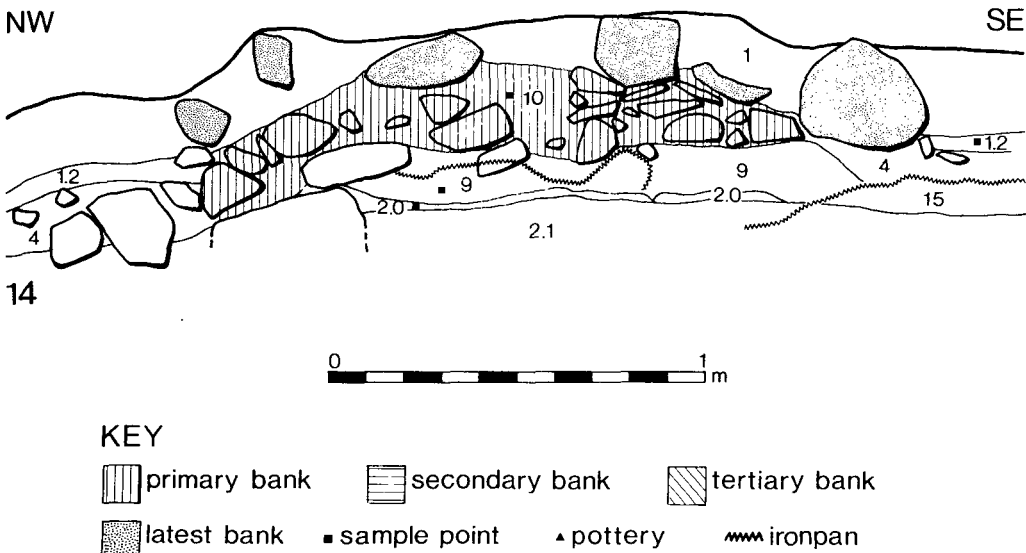
It is clear that the common archaeological practice of seeking the deepest local peat deposit for dating is likely to provide misleading results, since these deep deposits can have formed at considerably earlier dates than the general spread of blanket peat. To avoid this, 100 measurements of depth were taken at An Sithean in two randomly selected 50 m squares, one W and one E of the road. These yielded a mean and standard deviation of  $27.6 \pm 7.1$  cm and a position was then selected for the dating sample whose depth was 28 cm. A one metre square was opened in the peat down to the level of the black greasy basal peat and the latter was thinned down to approximately one centimetre. A sample of some two kilogrammes of this basal centimetre was then taken for radiocarbon dating.

### PART 3: INVESTIGATION OF THE SAMPLED SECTIONS

#### A STRATIGRAPHICAL DESCRIPTION OF THE SECTIONS

Of the sections cut at An Sithean, 12 have been recorded and sampled and are reproduced here in illus 4-7. They fall into two groups on the basis of the model proposed above for regional podzolization and blanket peat formation. The first group, the largest, consists of field bank sections 1, 2, 14 and 16 and hut and annexe bank sections 4, 6 and 7. These are characterized by having buried beneath them podzolized soil profiles. The second group consists of field bank sections 5, 10, 11 and 15. Section 3, cut at a randomly selected point on the roadside (illus 4) was intended to represent a 'non-archaeological' profile and to serve as a control against which the others might be judged. It was sampled and is covered in the palaeobotanical report, but is not further discussed.

## An Sithean



ILLUS 5 An Sithean: section 14

### Group 1 (a) The field bank sections 1, 2, 14 and 16 (illus 4 and 5)

#### *Buried soil profiles*

The Ao, A2 and B horizons of a podzolized profile are buried under each of these banks (these are coded 2.0, 2.1 and 2.2 respectively in the drawings). The Ao horizon (2.0) was preserved as a black greasy layer only in section 14. In the other three it had undergone various degrees of gleying 'chemical alteration in waterlogged conditions' and in general appeared as a blue/grey to grey/white band from which the underlying leached A2 layer (2.1) was a bright orange to red colour and was clearly iron enriched.

#### *Primary field banks*

In all four sections, the primary field banks (coded 10 in the drawings) consisted of a flattened stone and earth bank. The banks measure 20cm high on average and were probably never much higher. The soil in them is a uniform mid- to dark-brown clay loam, but the stones vary both in size and number (see illus 4 and 5).

#### *Possible ploughsoils*

Soil layers ranging from 15 to 30cm deep were found on one or both sides of each of the field banks. On stratigraphic grounds, it was considered that they represented either run off from the banks (15) or plough-soils (14) or a combination of both of these (14/15). These layers were not consistent with the horizon development; they were in fact buried cultivated soils (bAp). In sections 1 and 16, and on the SE of section 14, the upper part of these deposits had been converted to gleyed-podzols (4) by the overlying peat, and in section 2 and the NW side of section 14, gleying had altered the entire deposit (4, 8, 8.1).

#### *The latest bank*

A stone-built bank overlies the primary bank in whole or part in sections 1, 2 and 14, and has been stippled on the drawings. These consist of relatively large stones and boulders which seem to have been piled together along the denuded primary banks. In all these cases the lower stones rest directly on the soil of the primary bank, and these courses may simply represent episodes of clearance associated with the primary bank. In sections 1 and 2 there are clearly visible stone piles which interdigitate with the peat, and on the NE face of section 2 the fallen stones rest on the layer of basal peat. These stone heaps seem to have been erected at a time when the basal peat was forming, or very shortly thereafter. The later bank is not well represented in section 14, but this is partly a result of the position of the section, as a substantial mass of stones was removed from the peat in the process of its preparation.

#### *Miscellaneous features in the Group 1 (a) field bank sections*

The most important of these is the 'pre-bank' feature (9) which underlies the primary bank and overlies the buried podzol profile in section 14. This 12 to 15cm thick lens of medium grey/brown silty loam was mottled with humus and iron, and an iron pan occurred within it. It is thus clear that it had existed for some time before the superimposition of the primary bank since this would have operated to prevent the leaching which gave rise to the mottle and pan. The form of the deposit militates against its interpretation as a bank but in the absence of horizontal excavation, it is not possible to advance alternatives. A feature common to sections 1, 2 and 16 is the layer of redeposited soil (7) which has been thrown up from the digging and repeated clearing of the roadside drains.

### Group 1 (b) The hut bank and annexe section 4, 6 and 7 (illus 6)

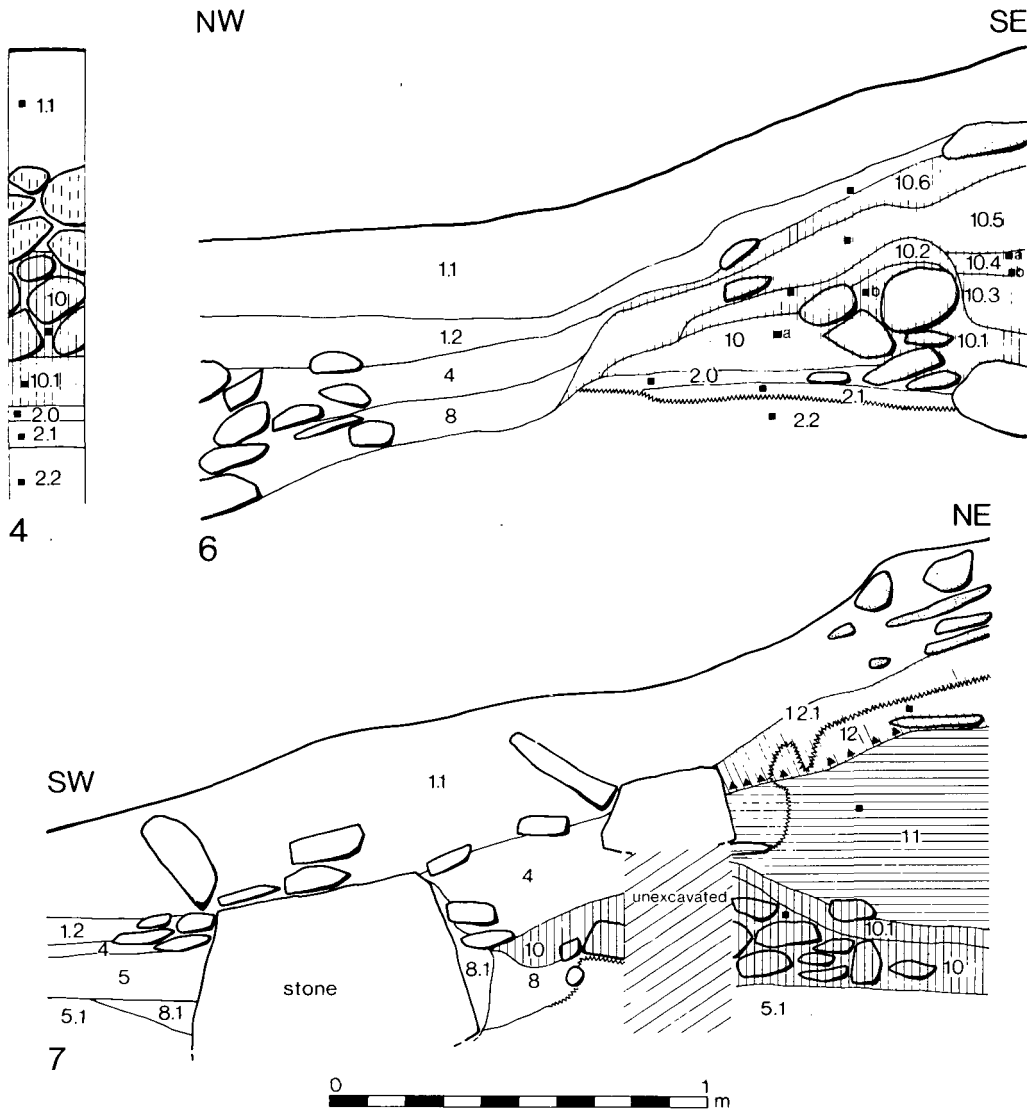
Recent damage on the SW and NW sides of hut E (illus 2) presented an opportunity to examine cross-sections of the hut bank (section 7) and an apparent annexe on its NW side (section 6). Similarly a very constricted and narrow section through hut C (illus 2) was examined (section 4) by cleaning a disturbed area.

#### *Buried soil profiles*

Well-developed classic podzol profiles were preserved beneath the banks examined in sections 4 and 6. In both cases a black greasy horizon (2.0 on illus 6) overlay a pure white A2 layer (2.1), which in

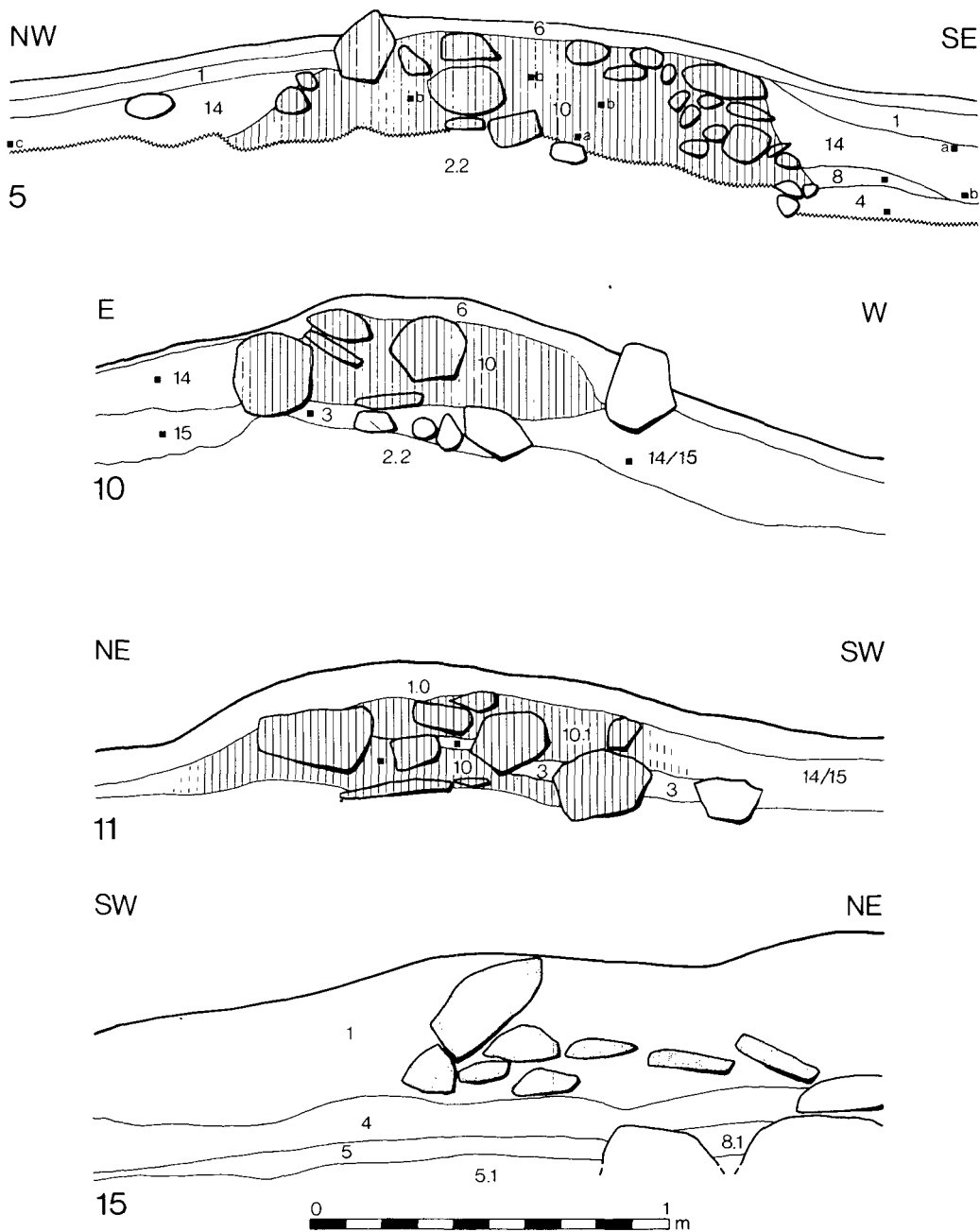
turn overlay the orange iron-enriched B horizon (2.2). Section 7 presents an altogether different picture. No 'natural' podzol profile survives beneath the bank. Instead a mound or bank of stone-packed soil (10 on illus 6), overlain by what appears to be an altered turf line (10.1) lies under the main bank and over the enriched zone of a podzol, ie a relict B horizon (5.1). These deposits are interpreted as comprising a primary bank, much denuded, with a turf line developed *in situ*. Only excavation could reveal whether this constitutes an element in an early enclosure or the fortuitous survival of an early field bank beneath a later enclosure. The stone and earth core of this early feature (10) was a grey/white silty loam, and it and the lower B horizon (5.1) display the brown mottling of

## An Sithean



ILLUS 6 An Sithean: sections 4, 6, 7

# An Sithean



ILLUS 7 An Sithean: sections 5, 10, 11, 15



translocated humus. The humus may derive from the buried soil horizon (10.1) which itself is medium- to dark-brown in colour. The stones of the core of this feature (10) had sunk through the original A and B horizons of the area and are resting on top of what is clearly the B horizon of a podzol. Furthermore, the core material (10) is itself quite strongly leached and seems to represent the A2 horizon of the podzol. Thus the anomalous situation arises that the buried podzolized soil profile in this instance had developed on a man-made feature.

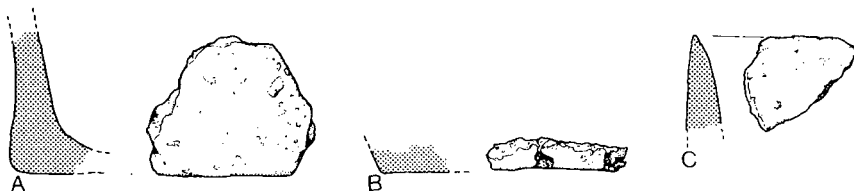
#### *The annexe bank*

A deposit of orange silty loam (10 and 10.1) with many stones overlies the Ao horizon of section 6. This in turn is overlain by a lens of black greasy soil (10.2) akin to the buried Ao horizon (2.0). Some at least of this black greasy capping consists of redeposited turves since small patches of white A2 soil could be detected adhering to it; however, the possibility that the lower part developed *in situ* could not be eliminated. A layer of grey silty loam, with brown mottles (10.4), extends SE from 10.2. It consists of decayed turves and may represent the continuation of 10.2 into an area where the condition for the survival of buried turf as a humified deposit did not exist. If this is the case, the difference between 10.3 and 10 may be due to no more than a slight staining of 10.3 by humus from 10.4. The upper part of the bank consists of 10.5, an orange silty loam, the top of which, 10.6, has been altered by the overlying peat. Thus 10.6 is a somewhat less well-developed version of 4, the gleyed podzol. In the case of section 6, therefore, it is possible that two phases of pre-peat bank exist. If layer 10.2 developed *in situ*, then this interpretation must be correct. It was not possible to show that this in fact occurred and therefore, on the field evidence, it must be concluded that the pre-peat bank is of one phase in section 6.

#### *Hut banks*

The hut bank revealed in section 4 varies upwards from a dark-brown, relatively stone-free silty loam (10.1) into a stone-packed loam (10). The amount of loam between the stones decreases from the base of the section upwards to be replaced with peat infiltrated between the stones. The primary hut bank in section 7, though not the primary bank in the section (see above), consists of a single deep deposit of medium- to light-brown uncompacted soil (11), overlain by a darker deposit (12) which is, itself, bisected by an iron pan. The boundary between the dark and light layers yielded sherds of coarse pottery. That part of the dark layer lying above the iron pan (12.1) is heavily mottled with translocated humus (ie a Bth layer). It is not necessary to see a chronological difference between layers 11 and 12, since the accumulation of pottery and of stones along the interface suggests that 12 is merely the worm-turned zone of the bank, and the interface the worm layer (*sensu* Atkinson 1957). The higher humus content of 12 tends to support this contention.

The pottery assemblage consists of 25 pieces, including one rimsherd (illus 8, C), two base sherds (A and B) and a piece of burnt clay. The sherds are similar in fabric, which feels rough due to inclusions, but is soft enough to be scratched by a fingernail. The colours of the exterior surfaces, pink and light-reddish brown, indicate that they were fired in an oxidizing atmosphere, although the dark grey of the interior surfaces of all but a few sherds suggests that the oxidization was incomplete. At least six vessels are represented in the assemblage. A few sherds appear to have been wiped with a soft material while wet, and one piece may have a grass impression. Both basal sherds are flat, with one exhibiting a slight protruding foot (illus 8, A). The single rimsherd may be from a straight-sided vessel which narrows to a pointed rim. (The authors are indebted to Miss J Lee for this pottery report.)



ILLUS 8 Pottery sherds from hut circle E, An Sithean

*The latest bank in sections 4, 6 and 7*

Part of a stone-built bank within the peat surmounts the hut bank in section 7 and, while only one stone is shown in the corresponding position in section 6, many stones were removed from the peat in the course of preparing the section. Thus both sections 6 and 7 were surmounted with a stone-built feature at some time after the peat had formed. Section 4 presents a similar appearance, but in this case it is hard to know whether the peat has simply infiltrated the existing stony capping or whether the upper courses were added after peat had begun to form in the area.

*Miscellaneous features in the Group 1(b) hut banks and annexe sections*

To the NW end of section 6 the waterlogged layers (4 and 8) dip into what must be a wide but relatively shallow ditch. The large number of stones revealed in the end of the section indicates that this is probably close to the centre or at least the deepest point. Thus its depth from the old ground surface (2.0 on illus 6) is unlikely to be much more than the 45 cm here revealed and its width may be close to 2 m. The large earthfast stone to the SW of section 7 has caused gleying on its E and W faces (8.1) and depressed the level of the iron pan. To the SW of this stone, the A2 (5 on illus 6) and B (5.1) horizons of a relict podzol profile survive beneath the gleyed podzol (4).

## Group 2 The later field banks sections 5, 10, 11 and 15 (illus 7)

Section 15 differs significantly from all the other sections. It seems to consist simply of a stone wall erected on the edge of a natural terrace after the peat had begun to form. The geological edge of the terrace is marked by the very large earthfast boulders visible at the NE end of the section. Section 5 presents the pedological absurdity of cultivated soils (14) resting directly on a continuous iron pan. The pan can only have been formed beneath a leaching profile, ie in a podzol profile or beneath a bog. Clearly then cultivation must have amalgamated the natural soil strata here into the single cultivated layer. The field bank also seems to rest directly on the iron pan, and it is hard to see how this could have happened. It is probable that the large worm population which survives in this area has intermixed the bank material and the buried soil profile which ought to survive beneath it. Two layers, or rather lenses of soil (4 and 8), survive beneath the cultivated soil in section 5. Both show signs of gleying and the upper is mottled with humus. A thin humus layer (6) overlies the section with a deposit of humifying material (1) beneath.

Section 10 is similar to section 5 in that it has apparent cultivated soils on either side of it. On its E side two layers may be noted within the cultivated soil and these have been sampled separately. The lower of the two is somewhat lighter than the upper and this constitutes the only observable difference between them. A layer of medium-brown silty loam (3) was preserved beneath the bank. This did not differ markedly from the cultivated soil W of the bank, and since the bank's edge is partially enclosed within this cultivated soil, it may well be that the bank was erected after these soils had been brought back into cultivation. The bank (10) consists of large boulders set in a matrix of moderately loose, medium-brown, silty loam. It is much infiltrated with bracken rhizomes and is covered by a thin layer of grassy humus (6). Section 11 is similar to section 10 except for its covering of peat (1.0) However, a discontinuous horizon was visible running through the bank (3), which may be a much altered turf line. If this is correct the bank may be of two phases.

## PALAEOBOTANICAL REPORT

S Greshon

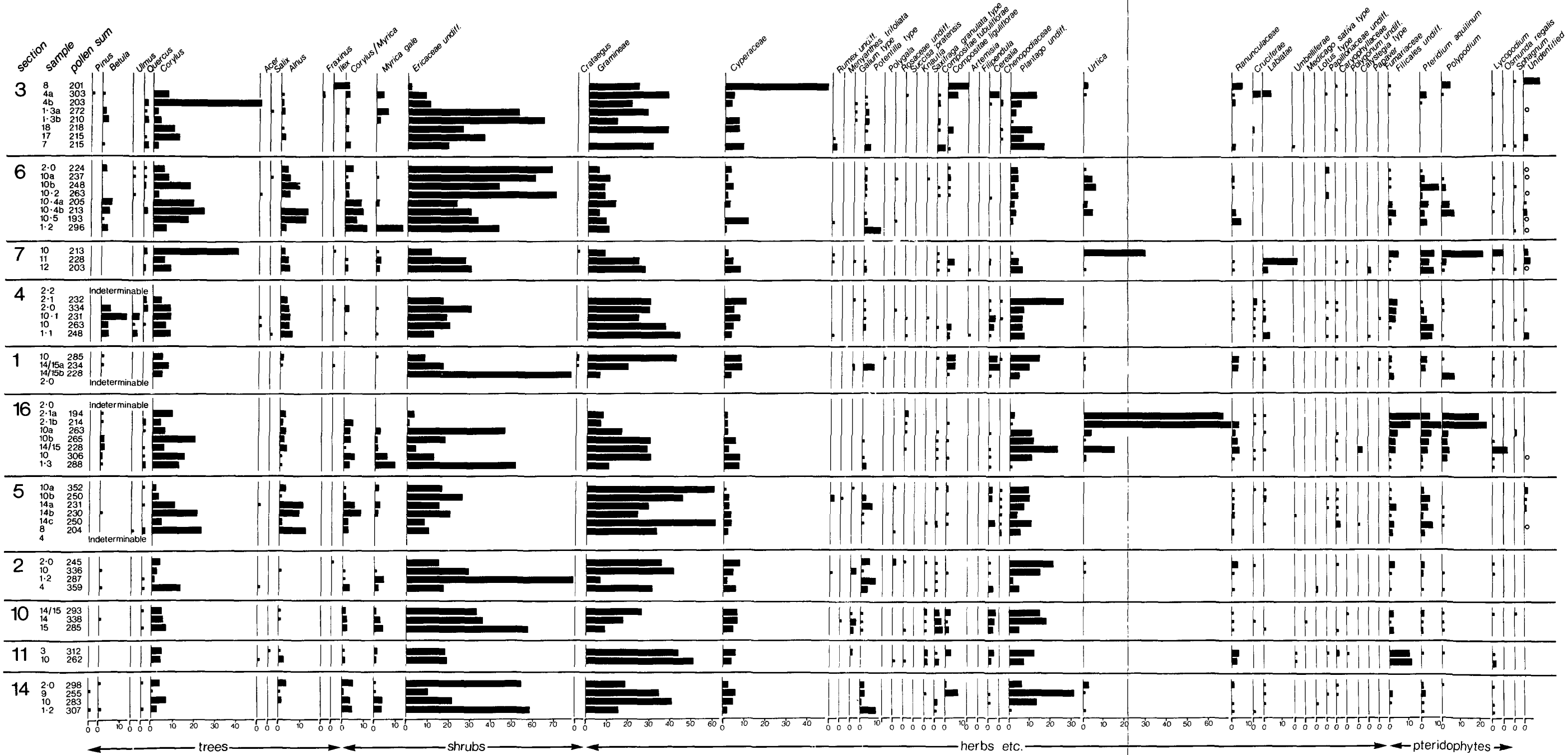
The layers in the sections were sampled at the points indicated on the drawings. The aim of the analysis was to record the pollen content of the various layers, firstly to discover their associated vegetation and from this to infer land use, and secondly from this to build up a biostratigraphy, which might show chronological diversity. The results of the pollen analysis are presented in the illustration (illus 9) with the methods employed and the detailed commentary on each sample presented in microfiche (fiche 3: B1-C4). The implications of the results for the archaeological interpretation are dealt with below, where the general conclusions are also recorded.

## Soil status

The status or fertility of the soils at An Sithean was not determined. The acidity of a wide range of the strata was measured, primarily to indicate which strata would preserve pollen, but this also

# An Sithean: pollen analysis

• indicates less than 1% of total  
 ○ indicates a single grain



ILLUS 9 An Sithean: pollen analysis

[facing page 178]

TABLE 2  
Sensitivity of cultivated plants to soil acidity  
(after White 1979, 148)

Species	pH below which growth is restricted
Rye	4.9
Potatoe	4.9
Ryegrass	5.1
Wheat	5.4
Maize	5.5
Oats	5.5
White clover	5.6
Barley	5.9
Sugar beet	5.9
Trefoil	6.1
Lucerne	6.1

serves as a gross indicator of soil status, in that it limits the range of crops which may be profitably grown (see table 2, after White 1979, 148). Acidity is measured in units of 'pH' (the inverse of the log of the hydrogen ion concentration) and neutral solutions have a value of 7.0. Values descending logarithmically from 7.0 reflect increasing acidity. Acidification of the soil is both a precursor and a concomitant of podzolization, and the development of an acidophilous flora contributing a more acid litter, rich in leachettes, intensifies the trend towards podzolization.

The range of values is quite wide, even for particular classes of strata, eg 4.4 to 5.3 for buried Ao horizons, but three classes can be determined on the basis of pH. The first and most acidic are the peat layers with a mean pH of  $4.04 \pm 0.29$ . The buried soil layers are the least acidic with a mean of  $4.99 \pm 0.37$  and the redeposited bank strata are intermediate to these with a mean of  $4.53 \pm 0.37$ . The pH values of the developed podzol profile are quite high, with many over 5.0 for the A2 and B horizons. This is typical of peaty podzol profiles (Glentworth & Muir 1963, 294-5) even where the pH value of the litter layer is lower than 4.0.

The importance of this fact lies in the relatively low acidity of soils compounded of ploughed-in litter, Ao horizon, mixed with the A2 and B material. The addition of calcium, from calcareous sands or sea shells, would restore the basis of fertility to the podzolized soils in return for relatively little labour. This is not merely a theoretical judgement, since such plaggen or man-made soils are well known from the recent past (see Conry & Mitchell 1970). The greater acidity of the group 2 banks and plough soils may have resulted from the intermixture with them of the very acidic peat, which presumably covered their location in the recent past. It must be assumed that the earthworms which survive in some of these banks were re-introduced to this area at the time of its more recent, but probably post-medieval, cultivation. The encroaching peat will undoubtedly eliminate their habitat in due course.

## PART 4: CONCLUSIONS

### GROUP 1 (A) THE FIELD-BANK SECTIONS 1, 2, 14 AND 16 (illus 4 & 5)

#### Buried soil profiles

The buried Ao horizon (2.0) under each of the banks was sampled for pollen analysis. It is significant that the Ao layer in section 14, which alone of the four survived as a black greasy deposit, preserved pollen well and in large numbers. Pollen from the corresponding layers in sections 1 and 16 was not preserved in countable numbers and pollen from the Ao layer of section 2 was sparse, though well preserved. Both of the analysed Ao layers contain plantain pollen with cereal pollen occurring in section 2. Grass and heather pollen predominate in both samples, giving the overall impression of the environs as one of heathland with rough pasture and some local cultivation. The pre-field bank history of cultivation is extended back to an even earlier period, possibly pre-podzol, by the occurrence of pollen of plants which favour nutrient-rich soils,

eg *Urtica* (nettles) in the A2 layer of section 16. Bracken spores and *Succisa* (Devil's bit scabious) pollen in this layer may have derived from a nearby bog. The general picture is one of cultivation in the area possibly before the regional podzolization, evidenced in the A2 of section 16, and cultivation again taking place during the podzolizing period, at least before the erection of field-banks 2 and 14.

#### Primary field banks

Three samples of the primary bank (10) were examined from section 16 with one each from sections 1, 2 and 14. The pollen was numerous, although that from section 1 was poorly preserved; all reveal the presence of cereal pollen and the pollen of weeds of cultivation against a background of heathland types dominated by grasses and heathers. The weeds of cultivation, notably plantain, are also strongly represented. Pollen types suggestive of the existence of hedgerows were recovered from the primary bank of section 1. These include pollen of *Crataegus* (hawthorn) and of the Fumariaceae, a family of annual weeds commonly found in hedgerows but also found on cultivated ground (M Jones pers comm). This conjures up a picture of field banks crested at least in part with hedgerows set in a landscape within which cereal cultivation was carried out *on podzolized soils*. Rough pasture merging into heathland formed the background for this activity.

#### Possible ploughsoils

Pollen preservation was rather variable in the three sampled layers, but all of the samples were countable. Plantain and cereal pollen, the latter in amounts ranging from about 1% to 5.5% were found in layers of ploughsoil (14) or ploughsoil/run off (14/15) from sections 1 and 16 and from the gleyed equivalent in section 2; section 14 was not analysed. These levels of cereal pollen indicate that cultivation of cereals took place on these soils. The presence of nettle pollen, and to some extent of bracken spores in section 16, is indicative of a nutrient-rich environment and suggests that the land may have been manured. In section 1 the ploughsoil/run off layers to the SW of the bank provided a strong contrast with the NE side, which did not contain any cereal pollen, but was rich in types indicative of heathland or rough pasture.

#### The latest bank

While the stratigraphic relationships between these stone banks and the basal peat are not without problems, it is clear that the basal peat (1.2) ought to preserve a pollen record of the associated activities. Analysis of basal peat samples from sections 2 and 14, however, reveals the acidophilous flora which occurs naturally in such peat environments. While plantain and grass pollen were observed in section 14, they, and the herbaceous taxa in general, were present in very small numbers and do not materially influence the environmental interpretation as one of a peat-covered landscape, albeit compartmented by roughly built stone walls. However, two grains of cereal pollen were located in a basal sample from the buried peat (1.3) in section 16. Thus some cultivation continued in the area even after the initiation of the blanket peat.

#### Miscellaneous features in the Group 1 (a) field bank sections

The pre-bank feature (9) in section 14 was rich in pollen which was slightly corroded. Grass and plantain predominate, though the very high plantain value (30%) may be caused by the local deposition of flowering heads. The single grain of cereal pollen from this feature completes the picture of localized small scale cultivation in an area of grassland with some heather cover. On the

stratigraphic evidence such cultivation took place after the initiation of podzolization and before the construction of the primary bank.

#### GROUP 1 (B) THE HUT BANK AND ANNEXE SECTIONS 4, 6 AND 7 (illus 6)

##### Buried soil profiles

The A2 (2.1) horizon of section 6 and the B (2.2) horizons of sections 4 and 6 were uncountable. The visible grains in the A2 of section 6, though uncountable, none the less suggest a very different flora than that represented in the Ao horizon. The A2 horizon of section 4 suggests the existence of open grassland with herbaceous taxa like Cruciferae, Papilionaceae and Caryophyllaceae, typical of open pastures, also occurring. A single cereal pollen-grain was found in this sample. The representative flora of the Ao horizons of sections 4 and 6 indicates a heathland background. Pollen of plantain, suggestive of cultivation, and of the Papilionaceae, indicative of open meadows, were found in section 6. Pollen of plantain and a single grain of cereal pollen were found in the Ao horizon of section 4. It therefore seems that the local environment of An Sithean at a time when the podzol profile was well developed was one of cultivation, including cereals, with pasture set in the midst of heathland. Only one sample from the early feature (10 and 10.1) in section 7 was examined by pollen analysis. This reveals a flora rich in hazel (41.8%) and nettles (29.5%) with hawthorn present; this may well represent a hedgerow assemblage.

##### Hut banks

Comparative analyses of the pollen from layers 10, 10.2, 10.4 and 10.5 of section 6 were undertaken, since distinct differences between them would have supported the case for interpreting this as a multiphase bank. However, all the analyses suggest a heathland environment in which some cultivation is taking place. In this respect section 6 closely parallels section 7, and the location of cereal pollen in layer 11 of the latter section confirms the presence of local cultivation. The levels of cereal pollen in the bank of section 4 are consistently high and may arise from the immediately local cultivation of cereals or the use of the hut for storing or treating the cereal crop or its by-products. This activity was again taking place within an environment dominated by heathland and where, on the evidence of the buried soil profiles, the process of podzolization was well advanced if not fully developed. A sample from the material between the stones of the capping on section 4, believed to be peat, was also analysed. This proved to contain few pollen and spores of heath/bog flora, but grass pollen was most numerous and plantain was well represented. It seems that this material is related to the main bank and that the stone capping is a feature of the original bank. This pollen assemblage may be contrasted with that of the basal peat (1.2) from section 6, which has a typical peat-forming pollen flora (eg 44% heathers, 10% grass, 8% *Potentilla*, etc). There is no evidence for cultivation in this basal peat sample, and thus the function of the post-peat stone settings in sections 6 and 7 cannot be determined, although the possibility exists that they represent simple enclosure of the moorland, perhaps for grazing.

#### GROUP 2 THE LATER FIELD BANKS SECTIONS, 5, 10 AND 11 (section 15 was not sampled)

The two lenses of soils, undisturbed by cultivation, surviving SE of the field bank in section 5 were analysed but the pollen in the lower lens (4) was not countable. Grass pollen was dominant in the upper lens (8), which has a high arboreal content and provides no evidence for cultivation. One sample from the base of the bank, close to the iron pan (10a), and one compounded from three separate sub-samples of the bank material (10b) were examined. The

lower sample (10a) contained 1% cereal pollen and a variety of herbaceous pollen types; grass pollen dominated the sample (60%). In contrast, the main bank sample (10b) was devoid of Compositae pollen, and had more heather and less grass pollen. *Potentilla* pollen, absent from sample 10a, occurred at 2%. It would therefore seem that the interpretation offered above in explanation of the apparently absent buried soil profile is strongly supported by the pollen evidence. The buried soils are present, but altered, and are only identified by their surviving pollen (Dimbleby & Speight 1969, 203). Samples of the cultivated soil were prepared for pollen analysis; one each from the top and bottom of the layer SE of the bank (14a and 14b respectively) and one from a point close to the bottom of the layer NW of the bank (14c). Both of the SE samples revealed a heathland pollen flora with grass pollen dominant (26%). The NW sample contained 3% cereal and 11% plantain pollen and displayed a general increase in herbaceous taxa. Clearly the land NW of the bank has been used for cereal cultivation and, while the evidence for the area SE of the bank does not reveal cereals, it must, on the pedological evidence, have undergone at least some cultivation in the recent past. Pollen of heather and grass dominated the assemblage from the apparent buried humus beneath the bank in section 10; however, it also contained plantain pollen and a grain of cereal pollen. The sample from the cultivated soil W of the bank contained 3% cereal pollen and 15% plantain in an assemblage where heather and grass again dominate. While this does not indicate a sharp difference between the two layers, it does little to confirm their similarity, and the differences between them in arboreal and Compositae pollen content rather militate against viewing them as two samples from the same deposit. The pollen assemblage of the upper layer (14) E of the bank is very similar to that on the W side, and it seems reasonable to deduce that they reflect the same environment and the same phase of cultivation in this area. The assemblage of the lower layer (15) E of the bank differs somewhat from both the above, and, given the loss in colour of this layer, it may be that incipient leaching of the layer has contributed to differential erosion of some pollen types. In general, it reflects a similar environment to the other cultivated layers; one of local cereal cultivation in a heathland environment dominated by heathers and grasses. Two samples from section 11 were examined, one from the much degraded bank itself and the second from a possible buried layer within it. Both suggest the same type of environment as that indicated in section 10. If two phases existed in the construction of the section 11 bank they are unlikely to differ greatly in date. The altered layer (3) may consist of turves used in a single episode of construction. It is probable that sections 10 and 11 are at least approximately contemporary.

#### PHASING

The phases outlined below are defined by a range of types of evidence including archaeological stratification, radiocarbon dating, pedogenesis and pollen content. However, these differ from the more usual archaeological sources only in kind, since the latter are highly varied, incorporating elements of stratification, absolute dating and typological dating, as well as more general considerations such as morphological comparanda. The proposed phases are of variable, and in the main unknown, duration and may subsume further phasing which only excavation would reveal.

#### Phase 1 Pre-podzol

The early feature beneath the hut bank in section 7 (illus 6) contained pollen indicative of nutrient enrichment and also pollen of the weeds of cultivation. The stones of this feature had sunk through the A horizon of its old ground surface in a manner typical of the action of earthworms. Both of these factors suggest that it was placed in position before the acidification of

the soil prior to podzolization. It must be concluded that this pollen represents a pre-podzol phase of local cultivation.

#### Phase 2 Post-podzol and pre-huts and group 1 field banks

The developed Ao horizons (layer 2.0 in illus 4, 5 & 6) beneath the annexe, hut banks and the group 1 field banks contain pollen indicative of arable and pasture cultivation. These represent a phase of local cultivation at a time when podzolization was well advanced in this area. This phase of cultivation may have been long, and may even incorporate several separate phases. Indeed there is some indication that this is the case, since the pollen spectra from beneath hut E (section 7) and its annexe (section 6), some few metres distant, clearly reflect radically different environments. The buried Ao horizon beneath the annexe bank contains some pollen of grassland and meadow species against a background of heathland species. The pre-hut feature (10) beneath the hut bank contains 42% hazel/bog myrtle and 30% nettle pollen and must either have bounded a coppice or been surmounted by a hedgerow.

#### Phase 3 Post-podzolization and pre-peat

The primary field banks of group 1 give evidence of a phase of cereal cultivation in fields separated by low banks of stone and earth surmounted by hedgerows. The adjacent plough soils bear out this interpretation and the primary banks of the two huts that were examined also fit into this phase. It is not possible to show that any two of the examined sections were contemporary, but all are post-podzolization and pre-peat.

#### Phase 2/3

The pre-bank, man-made feature in section 14 (coded 9) could belong to either phase 2 or 3; the latter is more probable since no Ao horizon overlies it.

#### Phase 4 Post-peat

Both the huts and the group 1 field banks were refurbished by the addition of stones after the peat had begun to form; the stone bank in section 15 belongs to this phase. There is no conclusive evidence for cultivation in the basal peat.

#### Phase 5 Recent

The presence of a non-peat humus beneath some of the group 2 banks (eg 3 in section 10) demonstrates that part of the area had been cultivated before some of the group 2 banks were erected. This is unlikely to have occurred very long before the setting up of the banks, since the peat would otherwise have regenerated over the area.

#### Phase 6 Recent

These banks and the ploughsoils which abut them represent the latest phase of activity seen in the excavated sections. The earthworms which currently help to maintain the status of the soils on and about these banks cannot survive much longer in the face of the increasing acidity, and peat will finally cover An Sithean.

#### CHRONOLOGY

The six phases outlined above can be grouped into four periods for which some chronological guidelines can be advanced.



### Period 1

#### *Phase 1 Late Neolithic/early Bronze Age*

The pre-podzolization phase of cultivation must on our model be assigned to the early Bronze Age or earlier. The separate elements in phase 1 cannot be shown to be contemporary but it is unlikely that any of them is substantially earlier than the initiation of podzolization, since biological activity in the non acidic pre-podzol soils would have operated continually to erase the incoming pollen record. Thus the surviving assemblages must, in general be typical of the flora, including cultivars, present either shortly before or during the process of soil acidification leading on to podzolization. It is reasonable, therefore, to suggest that this period was occurring in the late Neolithic period or the early Bronze Age.

### Period 2

#### *Phases 2 and 3 Late Bronze Age*

The podzolized profiles preserved beneath the hut banks and the group 1 field banks are very well developed, and on the basis of pedogenesis alone significantly post-date the initiation of podzolization. A sample of the Ao horizon from beneath the annexe bank in section 6 (2.0 in illus 6) has provided a radiocarbon date of  $975 \pm 60$  bc (GU-1474). The phase 2 episode of cultivation may therefore be thought of as earlier than c 1000 bc, and the phase 3 activity as later, but both within the later Bronze Age. The separate elements of each phase cannot, on the present evidence, be shown to be contemporary. Although, on the present evidence, proof is lacking, it seems probable that the separate elements of each phase are contemporary and that during phase 3 in particular the huts and group 1 field banks constitute a late Bronze Age settlement complex.

### Period 3

#### *Phase 4 Iron Age, Dark Age or Early Christian*

The rough refurbishment of some of the earlier banks, and the building of new ones with large stones after the peat had begun to form, suggest a period of Iron Age or later settlement in the area. Whether this was permanent or temporary in nature cannot be judged on the available evidence, but the absence of evidence for cultivation rather suggests the latter. The date of this settlement is not clear. A basal peat sample returned a date of ad  $810 \pm 60$  (GU-1475). It is likely that this dates a period of regeneration of the peat after stripping for fuel or the clearing of land for agriculture or settlement. This 'basal' peat cannot be shown to date the period 3 field banks, which may be considerably earlier.

### Period 4

#### *Phases 5 and 6 Medieval/Post-Medieval*

That phases 5 and 6 represent recent cultivation is demonstrated by the fact that the elements they include are located in islands of grass-covered, worm-turned soils in a sea of heather-covered peat. The encroachment of the peat upon these islands is obvious and continuing, and they will be engulfed in a few decades. The date of this settlement is unknown, but it must be relatively recent. If Pennant's observation of 1772 was made in respect of An Sithean, he may well have been looking at the recently deserted period 4 cultivation fields.

## DISCUSSION

### HUT CIRCLES

Some 28 hut circles or groups of hut circles have been recorded on Islay by the Commission. Only six have field banks nearby, which, on the basis of field survey alone, it may be suggested were in use as part of a contemporary agricultural system. They are scattered over all of the island, but rarely above 100m OD, and are usually sited on level areas. Some of the sites at lower altitudes, such as those at Smaull (NR 209 684), Goirtean Dubh (NR 359 461) and Glacan Daraich (NR 261 666), have been disturbed by later cultivation. Architecturally simple and superficially similar, the Islay hut circles display all the variations in size, proportion and building-materials typical of hut circles elsewhere in Scotland. The enclosing banks range in height from 1 m to less than 0.3 m, while the area enclosed varies from 16 sq m at Carn Bhioghairt (NR 256 665) to 67 sq m at Duich (NR 319 546). The enclosing banks at Duich and at Margadale River (NR 400 741) appear to be stone-free while those at Carn Mor (NR 405 470) and Gleann Buidhe (NR 410 475) have stone-built walls. In a majority of cases, the entrances lie in the SE quadrant; several sites have external annexes, often in the area of the entrance but their contemporaneity with the hut circles cannot be assumed. At Tormore, Arran, aerial photography and ground-survey have revealed several instances of the imperfect superimposition of one hut upon another; the part of the earlier hut circle that lay within the later having been removed, the other part survived apparently attached to the exterior of the later hut circle bank. It has been shown that the annexe to hut E, cut by section 6, cannot be contemporary with the bank of the hut. Further, the section through the annexe bank revealed a complex structure, which may itself have been multi-period. Section 7 through the adjacent bank of the extant hut circle shows that a feature earlier than the hut circle underlies its bank at that point. Only excavation could reveal the true natures and relationships between the early feature and the annexe and hut banks, but the present exercise has served to show that the apparent simplicity of these sites not only masks morphological variation but also conceals chronological depth. This exercise further suggests that, on the available evidence, 'annexes' are more likely to demonstrate reuse of some of these sites and, possibly, continuity of settlement rather than minor variations on a simple theme.

The floors of some of the hut circles at An Sithean are slightly, but clearly, dished as though they had been scoured, and this characteristic has been noted at other sites on Islay. The phosphate levels from soils inside the huts at Kilphedir, Sutherland (Fairhurst & Taylor 1971, 95–6), were not significantly greater than levels from the surrounding fields. Dr Fairhurst has suggested that the absence of what must have been phosphate-rich soils from within the huts was caused by the removal of the flooring perhaps on a regular basis when, in Ruskin's phrase, it became 'noisome and pestiferous'. The incorporation of large quantities of flint and pottery in the banks of one hut circle on Arran, together with the stratigraphic evidence, suggests that the floor material was often incorporated into the hut banks – perhaps when the thatch was being repaired or the entire roof renewed. The exceptionally high concentrations of cereal pollen in the enclosing banks of huts on Arran are perhaps also best explained by such periodic removal of the flooring and dumping of this material on their banks. Thus, although the covering blanket of peat rounds and smooths the profiles of the huts, the existence of such 'dished' sites is perhaps further indication of chronological depth.

### FIELD BANKS

The field banks at An Sithean are a mixture, sometimes over a short length, of firmly set orthostats and linear arrangements of boulders. These usually constitute the only element visible

through the peat, although the earthen banks on, in or against which they are set, are sometimes visible as slight ridges. They are occasionally discontinuous, and, where gaps occurred, the usual technique of probing could not be applied because the boulder fringing of the terraces might provide a misleading result. In all cases the physical remains would not have been effective in restraining livestock unless they had been surmounted with fencing of some type, a hedgerow, or a capping of turves. The pollen evidence from section 1 suggests the possible existence of hedgerow-type vegetation. This interpretation, based on the presence of pollen of *Crataegus* and the Fumariaceae, should be regarded as indicative of the possible presence of a hedgerow, rather than as conclusive proof of its existence. It is possible that the wide squat forms of the banks have resulted in part from the accumulation of debris along the line of a fence or hedge and in part from lynching along such a line. Thus interpreted, not only the variable forms of the banks, but also their incompleteness become somewhat more comprehensive. Field systems along the west coast of Scotland lack the coherence and apparent systematic planning of the well-known English examples such as the Dartmoor reaves.

The field survey identified two types of banks and could only identify two fields of a possibly early date, but the two 'fields' have been shown to consist of disparate elements since the relevant sections (14, 15 and 5) have been attributed to three different phases ranging from the late Bronze Age to the post-medieval period, and two of these lie on the same apparent field bank. It can be argued that the refurbishment and replacement of late Bronze Age and later field banks occur, especially in the north and west of Scotland, because the best, often the only, cultivatable land occurs in discrete packages and the landscape thus imposes itself upon the settlement pattern and ensures continued reuse of that part of it available for cultivation. The present study has borne out this contention and has suggested that the repeated use of elements in the Scottish landscape lends an additional uncertainty to chronologies based on field survey.

The radiocarbon date of  $975 \pm 60$  bc is not significantly different from the date of  $1015 \pm 95$  bc (GU-1074) from the final phase of site 10/1 on Tormore, Arran. It must be remembered that the Islay date is a *terminus post quem* so that the site itself may be somewhat later in date. Thus the use of hut circles on Islay may well have extended over a considerable period, a factor implied by the chronological depth displayed at An Sithean. The late first-millennium dates for the Kilphedir sites (Fairhurst & Taylor 1971, 96) suggest that a long period of hut circle usage is not restricted to Islay.

In conclusion it may reasonably be claimed that the bringing together in this study of two different approaches to a complex settlement site has led to the acquisition of certain specialized types of information regarding it, as well as a general picture of its form and structure. The long-established technique of earthwork surveying (the survey drawing was produced by plane-tabling with a Wild Heerbrugg RKI self-reducing alidade, which enabled the main part of the exercise to be completed within three days) yields a plan of the site and suggests a sequence of events for which there is surface evidence. Employing selective sampling (with a field time of four man-days) rather than excavation as a method of extracting information about the progress of cultivation, and as a means of relative dating, is an economical measure that is of particular value when approaching a large site. In no way can it be regarded as a substitute for excavation; the nature of the feature discovered below the bank in section 14 (illus 5) could not be established, although its presence was detected, and the existence of the early bank in section 7 (illus 6) and its relationship to the pre-peat bank in section 6 (illus 6) raise questions about occupation of the site prior to the construction of the hut circle that cannot be resolved without excavation. Although not a substitute for excavation, selective sampling is clearly a valuable means of establishing the nature, extent, chronology and complexity of large or 'landscape' sites. Thus it

provides a cost-effective mechanism for the accumulation of sufficient information to enable decisions on the conservation of the site to be made; where conservation is not possible, it provides a basis for the formulation of excavation strategies.

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