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The Early Bronze Age cairn at Sketewan, Balnaguard, Perth & Kinross

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ABSTRACT

The Early Bronze Age cairn at Sketewan, Balnaguard, Perth & Kinross, formed an important element in a funerary and ceremonial comlex in this part of Strathtay which began in the Early Neolithic and continued in use for at least two millennia. The excavation of the cairn, carried out in 1988, revealed a complex sequence of Early Bronze Age funerary activities. These comprised several episodes of pyre cremation, construction of a large central cist and six smaller satellite cists all of which had cremations deposited within them. This 'cemetery' area was later surrounded by an eccentrically positioned ring-cairn which, subsequently, was covered by a massive mantle of stones. Burial and other ceremonial activities continued in the vicinity of the cairn, taking the form of further cremation deposits within a succession of at least three ring-groove palisades, and a minor cairn finally covered these structures as well. Two final cremations in pits atop this cairn, marked by small upright boulders, attest the longevity of the funerary tradition associated with this monument. The excavation was funded by Historic Scotland.

INTRODUCTION

In 1987 Mr & Mrs Garbutt of Sketewan Farm, Balnaguard, notified Historic Scotland that a low mound on their land would be destroyed by them in the course of agricultural operations (illus 1 & 2). The site was not scheduled and was not recorded in any extant archaeological documentation. Preliminary investigation in May 1988 confirmed the likely prehistoric nature of the site. Total excavation took place between August and October of that year and recorded a substantial and complex kerbed cairn (illus 3). After a contour survey had been completed, initial clearance of modern agricultural ploughsoil showed that, unfortunately, structures adjacent to the south-east edge of the cairn had been largely destroyed by construction of the Ballinluig/ Aberfeldy railway line. It was also clear that an attempt had been made to remove the cairn, probably late in the 19th century, which had led to the kerb and a slim segment of the cairn being removed in the north-east sector.

The cairn was excavated by exposing alternate quadrants (south-west and north-east followed by north-west and south-east) and the whole external surface of the cairn was recorded

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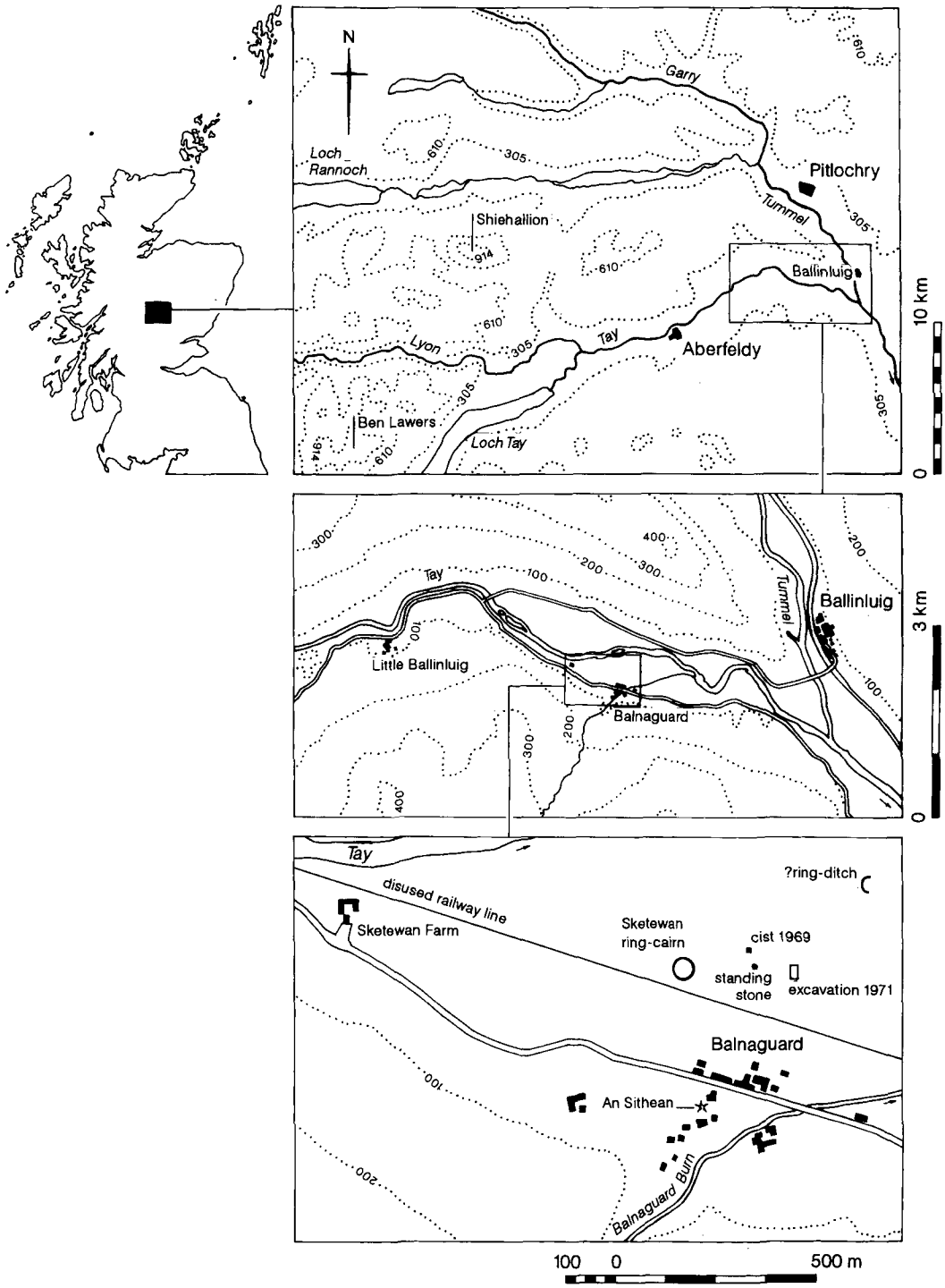
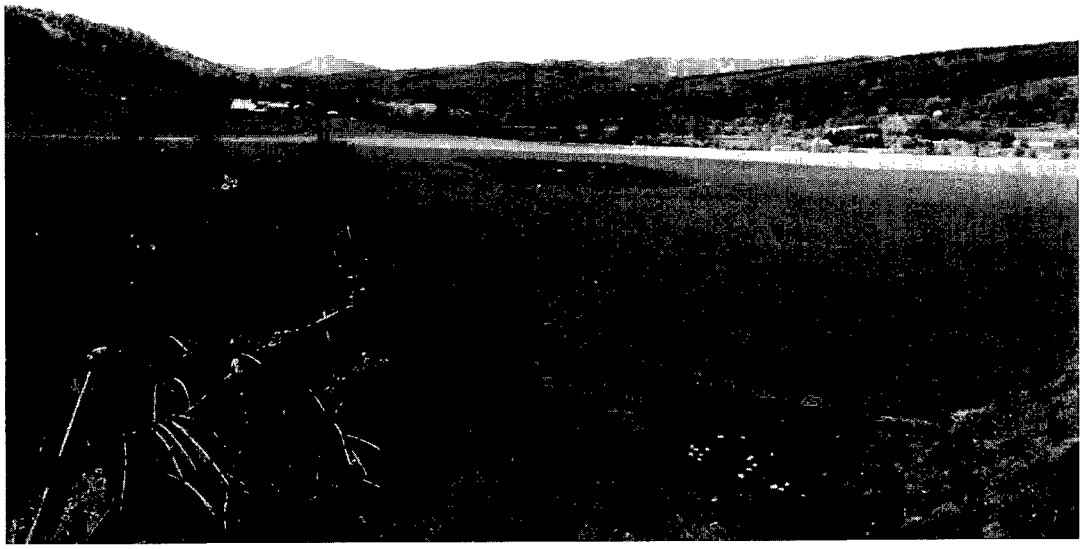


ILLUS 1 Location map (*Based on the Ordnance Survey Map © Crown copyright*)



ILLUS 2 The area around Sketewan cairn, looking west from the standing stone

by photography and drawing. Because of the nature of the site the removal of cairn material could not be carried out using mechanical aid and, consequently, every single stone and boulder was moved by hand. While laborious, this procedure gave an interesting insight into the problems of the original builders in transporting and subsequently incorporating the boulders into the body of the cairn. Only the capstone over the central cist (weighing over 2 tonnes) was lifted using ropes and a mechanical elevating bucket operated by Mr Garbutt and his son. All other stones were moved by two or three people using levers and a carrying-frame.

All internal and external features were excavated and the pre-cairn old land surface was removed to the natural subsoil horizon to reveal traces of earlier activities on site. After the excavation the site was levelled and nothing remains of it today. The boulders of the cairn were tipped into the adjacent, derelict railway cutting to allow farming activity to continue unimpeded.

SITE LOCATION AND SETTING

The cairn and the nearby standing stone at Sketewan stand at 71 m OD, some 300 m south of, and about 10 m above, the present River Tay. The subsoil is a fine, stone-free sand, variously orange, yellow or grey as the degree of oxidization varies. It is entirely stone-free and all the building material used in the construction of the cairn must have been brought to the site from some distance. All boulders used on the site are water-worn and similar material is encountered in the upper terraces of the river, 500 m to the south of the site, or in the River Tay itself, some 300 m to the north. The only other type of stone used on the site are the large flagstones

ILLUS 3 The cairn in an early stage of excavation; from west (*Reproduced by permission of the RCAHMS © Crown copyright*)

composing the central cist which can be procured in the Balnaguard Burn gorge, about 800 m further to the south.

The parent material of the buried soil profiles beneath the Sketewan cairn (see Tipping, below) is a structureless, stone-free fine sand, which becomes laminar-bedded at depth. This overlies an impermeable, coarse, clast-supported sandy gravel, which was investigated in section and by auger holes sunk after excavation. The surface of this gravel deepens northward towards the Tay, and represents the surface of a buried alluvial fan debouching from the Balnaguard Burn to the south.

The fan incorporates (and thus post-dates) Late Devensian fluvioglacial gravels within the Balnaguard Burn, but the overlying laminated sand is also thought to be of Late Devensian age, comparable with exposures on the valley side opposite Balnaguard (NGR: NN 9475 5282), and related to lacustrine sedimentation within kame-dammed lakes at a stage in deglaciation (Barrow *et al* 1905). The Sketewan cairn lies, then, on a much earlier alluvial fan, above the oldest Holocene terrace of the Tay. Since the Neolithic cairn at Pitnacree (Coles & Simpson 1965) sits on this oldest terrace, at 64.3 m OD (substantially lower than Sketewan, which is also downstream of Pitnacree), and is not overlain by alluvial sediments, it is likely that the Tay lay no nearer the Sketewan cairn in the period considered in this study than at present.

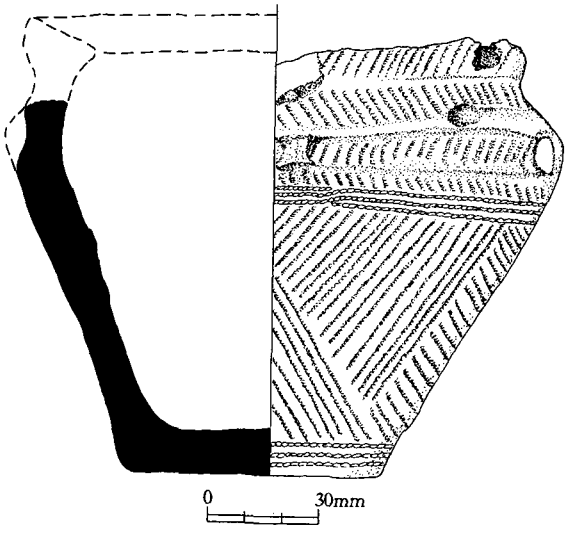
ILLUS 4 The porcellanite axe head from An Sithean (*Reproduced by permission of the RCAHMS © Crown copyright*).

ARCHAEOLOGICAL CONTEXT

This area was clearly a focus of ritual activity in early prehistory; 250 m south of the ring-cairn stands the very substantial mound — at least 35 m in diameter and 5 m high — known as An Sithean (NGR: NN 9450 5184). Until the 1950s it was under a sparse open cover of old Scots Pine (cf Dixon 1925, pl 48) but today, sadly, it is obscured by gorse and shrubs. This mighty mound had provided no archaeological evidence to date other than the discovery, during building operations on its southern flank, of a Group IX porcellanite axe (illus 4) (this was discovered by Mr Thomas MacDonald and donated by his family to the National Museums of Scotland; Reg No AF 1101; DES 1992, 76). This mound, on the grounds of its size alone, may be compared to the Late Neolithic cairn at North Mains, Strathallan, Perthshire (Barclay 1983), which it also resembles in size, shape and setting. Should this suggestion prove correct then it would provide the 'missing link' in a funerary succession which, within two square kilometres, contains the Early Neolithic mound at Pitnacree (Coles & Simpson 1965) and the Early Bronze Age cairn at Sketewan that is the subject of this report.

To the east of Sketewan, at a distance of some 100 m, stands the Balnaguard standing stone (NGR: NN 9462 5212), referred to by Dixon (1925, 66) as *Clach na Croiche* (illus 5). This is a block of whinstone some 2.2 m high. In or about the year 1887 a Food Vessel (illus 6) was found in a cist 'near the stone still standing' (Coles 1908, 138–40); it is now preserved in the museum at Blair Atholl Castle.

ILLUS 5 Balnaguard standing stone (*Reproduced by permission of the RCAHMS © Crown copyright*)

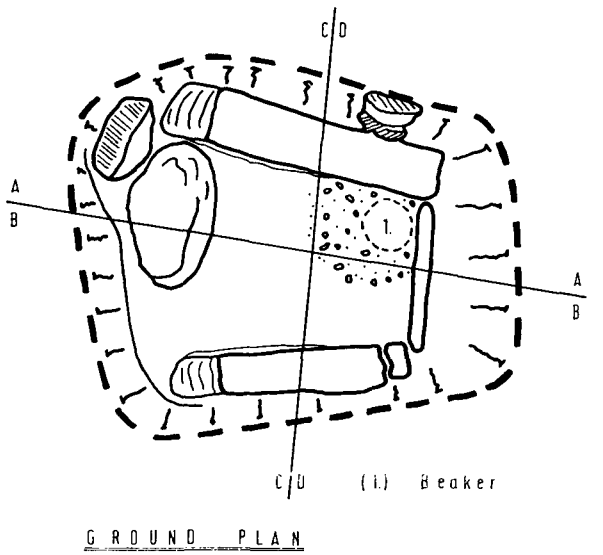


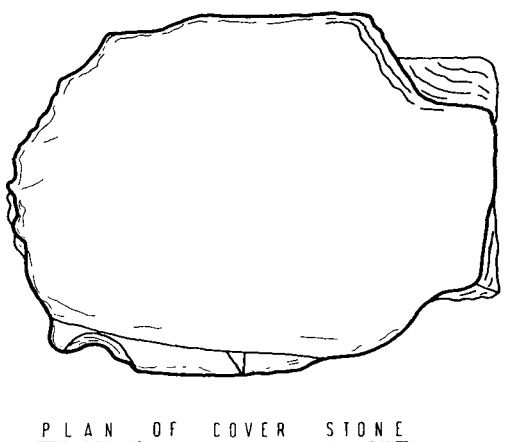
ILLUS 6 The Food Vessel discovered near the standing stone in 1887; now at Atholl Castle Museum

North-east of the Sketewan cairn, at a distance of about 380 m (NGR: NN 9485 5229), a possible ring-ditch is visible on aerial photographs (NMRS: NN 95 SW 35). Sketewan cairn, discovered, or perhaps rediscovered, in 1988 formed an hitherto unknown element of this complex.

Excavations by Dr Margaret Stewart in the 1960s & 1970s

Further sites are known from previously unpublished excavations by Dr Margaret Stewart (NMRS: MS/808). In 1969 the farmer of Balnaguard Farm ploughed up a cist slab, 12 m north-west of the standing stone, to reveal a stone-lined cist (illus 7). This cist had been most carefully built of slabs on three sides with boulders on the fourth. The capstone was very large indeed (1.5 m by 1.2 m by 0.1 m) and is now sited on the embankment of the track leading to the disused railway bridge, nearby. Excavation of the cist by Dr Stewart showed the floor of the grave to have been partly paved with cobbles; cremated bones lay directly on this surface and in the corner of



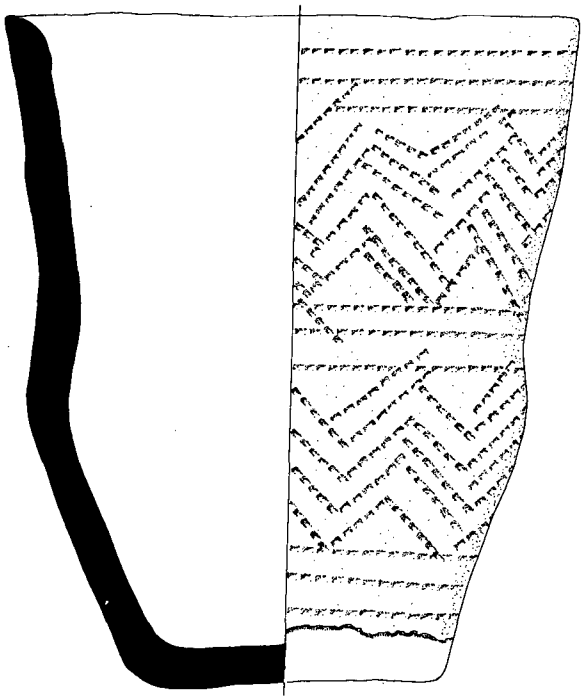


ILLUS 7 Dr Margaret Stewart's original plan of a cist excavated in the 1960s (*Reproduced by permission of the RCAHMS © Crown copyright*)

the grave stood an inverted beaker of Clarke's N4 type (Clarke 1970). The beaker is now in Perth Museum (illus 8).

The standing stone itself, which Stewart suggested may have been chosen for its 'shouldered' anthropomorphic form, is oriented (ie its long axis lies roughly east/west). Across its base on the southern side, though possibly not visible in antiquity, are seven simple cup-marks. Other such cup-marks occur on a rock outcrop 650 m south-west of Ballintaggart (NGR: NN 9375 5145) on the forward slope of the valley at a point intervisible with the site of Sketewan. Further cup-marks occur on the cist-slab removed by the farmer in 1969 near the Balnaguard standing stone, but these are on the concealed side as it lies at present.

Stewart also carried out an excavation, in September 1971, to the east and south of the standing stone, close to the eastern boundary of the field and approximately 190 m ENE of the Sketewan cairn. Two prostrate stones, 7.8 m and 12.15 m east of the standing stone, may once have stood upright forming an east/west alignment. Slightly to the south, a spread of small, waterworn cobbles extended over an area of c 6 m by 3.6 m, beneath a shallow depth of ploughsoil. This layer of cobbling was about 0.3 m thick and rested on a stone-free sandy loam that is, as we have seen, the characteristic subsoil of this locality. On the surface of the subsoil, in the north-east quadrant of the cobbled area, there were extensive patches of charcoal fragments or staining, a quantity of cremated bone, and a small rim sherd, possibly from a Food Vessel. Protruding through the cobbles were the tops of three large stones, 2 m and 2.5 m apart, set on an arc of a circle about 9 m in diameter. To the south of these a thin, flat slab, 2.3 m long, lay prostrate and was apparently *in situ*.



ILLUS 8 A beaker discovered during Dr Margaret Stewart's excavation of a cist in the 1960s

EXCAVATIONS IN 1988: SUMMARY OF THE STRATIGRAPHIC SEQUENCE

It may be helpful at this stage to sketch in outline the sequence of events at the site, as they are interpreted from the excavated data.

Phase I The first recognized activity on the site was revealed by a series of indeterminate soil features containing quantities of charcoal. Some of these may represent structures. Generally these features must be regarded as of early prehistoric date (see Radiocarbon dates; Table 1, below).

Phase II The features of Phase I were truncated and sealed by a layer of tilled soil. The surface of this layer saw the prosecution of the whole sequence of activities, many of which are clearly ordered stratigraphically, but some of which are not. The most significant of these activities are as follows.

Phase III A number of human bodies were cremated on a funeral pyre, fully extended and with arms stretching either to the side or beyond the head. The cremations may have occurred at intervals.

Phase IV Eccentrically set around the funerary pyre were six cists of polygonal form containing washed cremations which, it is assumed, were derived from the pyre.

(Phases III and IV are reversible, as there is no evidence to determine their sequence other than a likely functional relationship.)

Phase V Possibly sequential to the above, but certainly before Phase X, is the robbing(?) and disruption of the Phase IV cists.

Phase VI Lying over two of the Phase IV cists, both of which were intact, was the ring-cairn which was built concentrically around the funerary pyre.

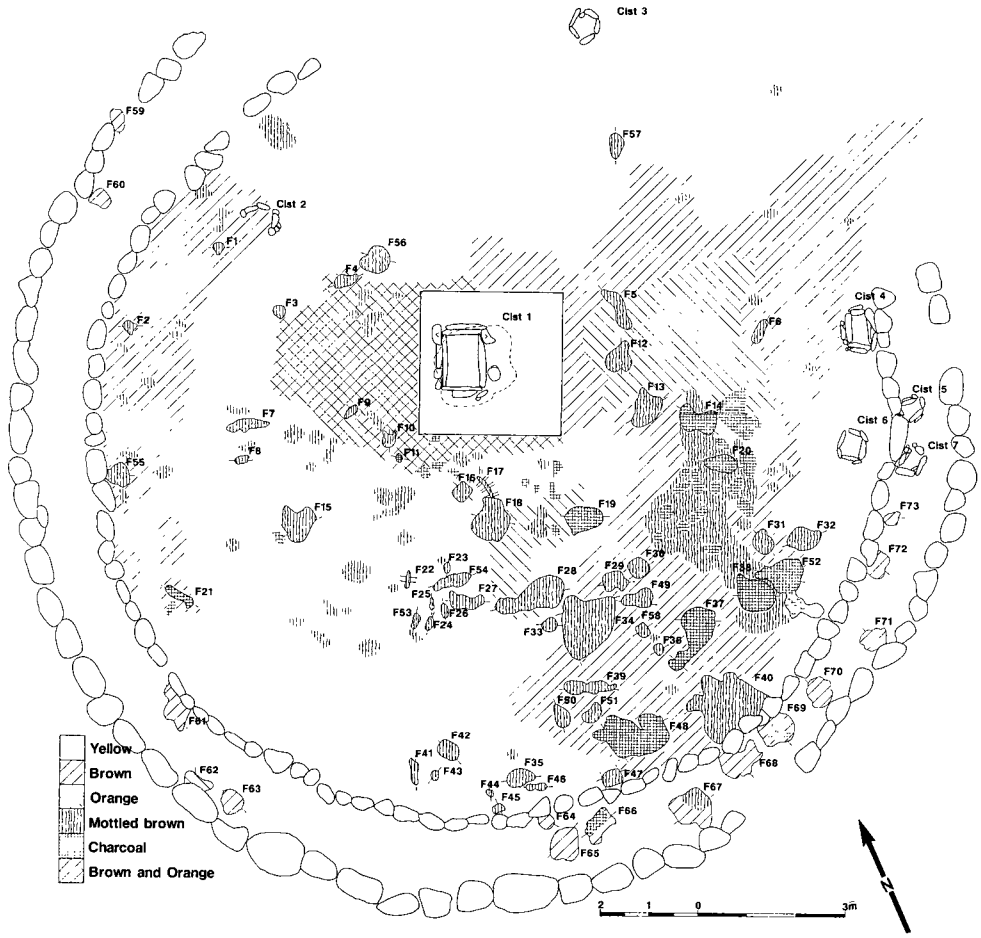
Phase VII Following Phase III by some uncertain period of time was the construction of a cist-pit which truncated the edge of the Phase III funerary pyre, the construction of a cist within it, and the slow and intermittent filling of that cist culminating in the marking of the cist site by a vertical post.

Phase VIII A cist slab was brought from the River Tay and placed in a trigged-up position over the cist.

Phase IX A smaller cairn was built within the ring-cairn; this was concentric with the cist and, therefore, eccentric to the ring-cairn.

Phase X The annular area between the Phase VI ring-cairn and the Phase IX cairn was filled with a platform of 'stacked' stones leaving, it is suggested, the cist slab revealed in the cairn summit.

Phases XI & XII Subsequent activities appear to have taken place just outside this cairn structure but there can be little doubt, in view of their close proximity, that they represent a degree of continuity in the site's function. Four ring-groove palisades, built sequentially and in one instance enclosing additional cremations, are among the most important features of this development.



ILLUS 9 Distribution of the pre-cairn features of Phase I

Phase XIII Two cremations were deposited in shallow pits marked in each instance by a single upright boulder 0.5 m high.

Phase XIV Finally, the southern side of the cairn was engulfed within a lynchet resulting, probably, from the incorporation of the cairn within a prehistoric field boundary.

PHASE I: EARLY PREHISTORIC ACTIVITY

The first recognized phase of activity on the site is represented by a number of structural and non-structural features, cut into the natural subsoil and truncated by later cultivation. Some rather ill-defined staining of the old land surface was observed outwith the ring-cairn to the SSE (in the area where palisades were subsequently built) but, due to the serious disturbance of this area, the original nature of these activities could not be ascertained.

Within the area defined by the ring-cairn, over 70 shallow features were observed on the old land surface (illus 9), mostly concentrated in the south-east quadrant of the excavation. Some of

the features contained considerable amounts of charcoal (nos 11, 14, 19–21, 37–8, 48, 52, 66); many of the others had a mottled yellow/brown loam fill which resembled the surrounding subsoil.

The entire area was subsequently truncated by the formation of a layer of tilled soil (Phase II). None of these features was visible prior to or during the removal of that layer so that all of the subsoil features would appear to pre-date the cultivation phase. The botanical and palynological analyses of samples associated with Phase I (below) suggest that deforestation in Strathtay may have begun quite early and that interference with the natural vegetation cover in a Mesolithic context is a likely interpretation. Some of the features, especially those that were charcoal-laden, may well attest this process.

It is reasonable, therefore, to suggest that at least some of the old land surface features may represent ancient tree-holes, with clearance associated with burning, although we must be aware of Rackham's strictures here (Rackham 1986). There was no discernible pattern to these features that would substantiate the suggestion of any definite structures attributable to the Mesolithic. The radiocarbon evidence (eg GU-2678; Table 1, below) suggests only that this location was subject to some form of anthropogenic activity in the seventh millennium BC.

That traces of Mesolithic activity should be sealed beneath a later prehistoric monument is not an unusual phenomenon. Indeed, in its broader European context, attention was drawn to this some time ago by Newall (1980, 237) who warned against too eager an interpretation of such features as structures since natural disturbances or land clearance activities may create similar patterns.

PHASE II: THE PRE-CAIRN CULTIVATED SURFACE

The features described above were all truncated and sealed by the formation of a homogeneous, loam soil layer, 0.3 m thick. This soil represents an ancient cultivated layer, an interpretation supported not only by its palynological analysis but, more emphatically, by the presence of V-sectioned scores preserved at the base of the layer. These were filled with the dark brown cultivated soil; their tilting was unique among all other features and suggests they were made by the use of a simple ard.

Palynological analysis of two soil profiles from sample sites beneath the cairn (profiles C & D) supports the interpretation of this layer as a cultivated soil. Details of this analysis are presented below. At this juncture it is sufficient to comment only upon the lack of a surviving turf-line atop the layer immediately beneath the boulders of the cairn. The turf may have been deliberately removed prior to the construction of the cairn in order to be used elsewhere, but it is also possible that it was disrupted by cultivation which was ongoing until immediately prior to the use of the site for funerary activities.

The presence of a high proportion of Gramineae in soil profile D argues for cereal cultivation taking place on or immediately near the site at this time. Unfortunately, only one pollen grain was sufficiently well preserved to be tentatively identified as *Avena/Triticum* (oats/wheat). None of the bulk soil samples from this horizon yielded macro-botanical remains, but samples from the area of the funerary pyre, set down immediately upon the cultivated surface (Phase III), revealed the presence of three burnt grains of *Triticum dicoccum* (emmer wheat). It is possible that a small quantity of cereal grain was accidentally incorporated into the pyre; however, the pyre fuel consisted, in high proportion, of wood associated with damp ground, such as alder, indicating an unlikely habitat for cereal cultivation. The soil-pollen analysis does not indicate that alder was growing anywhere near the cairn, so a wetland/riverine habitat at some distance is the most likely source of this material, possibly beside the River Tay, 300 m to the

ILLUS 10 Plan of funerary pyre prior to removal of central cist slab

north. Thus, a more likely explanation — supported by both palaeobotanical and excavation evidence — is that these grains of *Triticum dicoccum* originated from the cultivated soil directly beneath the funerary pyre, indicating that this surface was under regular cultivation until immediately prior to its burial under the pyre. However, as there is some evidence that the surface was stripped of sods prior to erection of the cairn (see Tipping: Soil stratigraphy, below), the possibility that these cereal grains were simply thrown onto the pyre should also be considered.

There is no direct evidence for the date of this cultivation. It directly pre-dates the construction of the funerary pyre and the main cist, events which, on the basis of radiocarbon dating, appear to have taken place before the late third millennium BC. Its duration is not clear, although palynological evidence tentatively suggests that it was short-lived.

PHASE III: THE FUNERARY PYRE

The construction of the funerary pyre must have been among the first ceremonial acts on the site. The pyre area reached a maximum size of 5 m east/west by 3.5 m north/south; the stone foundation which formed the base of the pyre was approximately rectangular in shape, being 2.5 m east/west by 2.3 m north/south (illus 10), and was probably quite carefully laid down to form a platform so that timbers could be laid across the stones, off the ground, thus facilitating a healthy draught. There was a marked concentration of stones towards the north, in the direction of the cist.

The spread of the charcoal to the south-east of the stone structure, with little or no spread to the north-west, may indicate that firing took place, consistently, in the face of the north-west

wind (little surprise to anyone accustomed to working in the strath). The average thickness of the remains of the pyre was 0.15 m, although in places it reached as much as 0.2 m and many of the stones at the base were cracked from the intensity of the heat. It was evident that the pyre had been built up over a number of firing episodes of which only two could be recognized archaeologically.

The pyre was stoked primarily with alder and only very small amounts of other timbers were identified (below). The choice of alder was almost certainly related to its excellent combustible qualities. Certainly, examination of the cremated bone (below) shows that consistently high temperatures were achieved in the pyre. It is also interesting to note the presence on the pyre of some grassy matter, perhaps evidence of damping down with turves to retain a dry bed for future fires. Exceptional care seems to have been exercised during the construction of the central cist (Phase VII) to ensure that none of the pyre-debris made its way into the cist; it is possible that during this time the pyre area was covered with the turves to prevent 'leakage'. The very clean, washed condition of the token bone deposit placed at the bottom of the cist again suggests that contamination by general pyre debris was scrupulously avoided.

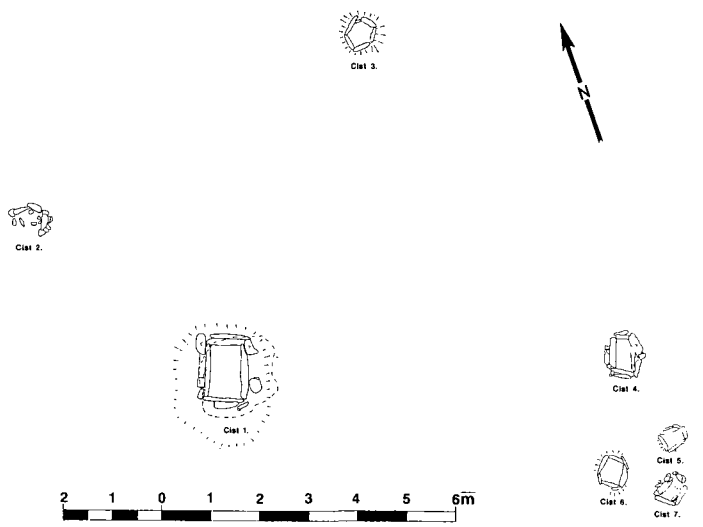
Some of the subsoil excavated during the preparation of the cist-pit was found to overlie the charcoal-stained soil to the east; thus, it appears that the construction of the cist was subsequent to the initial lighting of the pyre. However, some time after this, the pyre was lit for a second time, and on this occasion the flames extended for at least half a metre over the southern part of the cist — which still lay without its cover slab — so that a charcoal-stained layer of soil was clearly visible once the cover slab was lifted. As in the case of the smaller central cairn (Phase IX), the ashes must still have been very hot, as they partly scorched the underside of the cover slab. By the time the pyre was re-lit, the central cist could no longer accept any deposits of cremated bone, but it is possible that some of the cremations of this period were placed in the small polygonal cists which remained accessible within the central area surrounded by the ring-cairn (illus 11).

The condition of the cremated human bone indicates a fierce fire and also suggests that individuals were cremated fairly soon after death. Analysis of the varying effects of heat on different bones indicates that the bodies were laid in a supine position, with arms extended towards the limit of the fire, either to the side or beyond the head. Though it cannot be known how many individuals were cremated during each of the burning episodes, the accumulated human remains from this area probably represent several acts of cremation. At least six individuals — five adults and one child — can be identified within the assemblage of cremated bone collected from the pyre and its vicinity. It has not proved possible, however, to relate individuals to any of the phases of activity at the pyre.

PHASE IV & V: THE 'SATELLITE' CISTS (NOS 2–7)

Six small polygonal cists were set eccentrically around the funerary pyre. These contained washed cremations but not artefacts. There is tentative evidence that they were all disturbed prior to the construction of the (Phase VI) ring cairn.

Phase IV In comparison with the central cist (Cist 1) (illus 12), these 'satellite' cists were diminutive in size and more simply built. Cists 4 and 5 were rectangular, while the others were polygonal in form. None was wider than 0.7 m and they were all shallow, dug no more than 0.4 m into the ground. They were built of small water-worn slabs and in three cases (Cists 4, 5 & 7) extra stones were added as 'buttresses' outside the



ILLUS 11 Location of satellite cists in relation to central cist

exterior slabs. The floor of Cist 4 was paved with small cobbles. Its cover slab was disturbed; no other cover slab was identified for the other cists.

There were no artefacts in any of these satellite cists, but they all contained quantities of cremated human bone. In Cists 3 and 6 there were the remains of complete individuals, female and male respectively; the latter cist also contained mandibular and temporal bone fragments of a second person, possibly a young female. The other cists all contained material that represented females: in Cist 4 these were accompanied by partial remains of a child, a new-born infant and a foetus, possibly suggesting perinatal death; while in Cist 5 bones representing a new-born baby suggest that the young woman buried there also died in childbirth.

It is almost certain that all of the satellite cists were in place before the ring-cairn was built (two of the cists are directly overlain by it). The arrangement of Cists 3–7, in a semicircle to the north and east of the funerary pyre and at a distance of 7–9 m from it (illus 11 & 16), suggests that their placement is related to the position of this central feature. However, all of the cists are well outwith the confines of the central cairn, and one could argue that they, or at least those not covered by the ring-cairn, post-date its construction. In terms of their place in the overall sequence, the simplest solution is to assume that the cremations in these cists all originated in the first use of the pyre (though some of them, theoretically at least, could have come from its second lighting), before the central cairn was erected over the site of the funerary pyre.

Phase V The cover slab of Cist 4 appeared to have been deliberately moved (it was found tipped up on end beside it) and, as described above, no other cist had a cover-slab left *in situ.* As these include two cists which were later sealed by the construction of the ring-cairn, it can be suggested that the cists had been rifled by that stage, at least in a number of instances.

PHASE VI: THE RING-CAIRN

The construction of the ring-cairn is the next major phase of activity at the site. It was concentric with the funerary pyre (and thus eccentric to the central cist and cairn) and comprised a fairly elaborate structure. It was meticulously constructed by importing large quantities of stone, most probably from the hill-slopes to the south and the river to the north. It appears to have been constructed about a north-east/south-west axis, indicated equally by its varying width and by the careful gradation of the stones of both the inner and outer kerbs (illus 13 & 16). As indicated above, the fabric of the ring-cairn has been destroyed in the northern sector by later disturbance.

The outer kerb was c 19.5 m in diameter and the inner kerb c 16 m in diameter. The kerb boulders, carefully set up on their sides, stood between 0.3 m and 0.7 m in height. The distance between the two kerbs was not uniform but varied from 1.7 m in the east to 2 m in the south-east. The north segment of the ring-cairn does not survive but the progressive narrowing of the distance between the two kerbs towards the north-east suggests that it was at its narrowest there (an estimated 1.5 m). The void between the two kerbs was filled with relatively small cobbles of even size.

About 150 of the kerb boulders survived (illus 15 & 16). These were analysed with regard to their size, colour and rock type distribution (see Tipping, below: Stone kerb-settings). At this point it is interesting to note the seemingly deliberate selection in size: the boulders making up the inner kerb were consistently smaller than those which formed the outer kerb. Moreover, there was a concentration of markedly larger stones in the south-west sector of the outer kerb. The builders, however, appear to have made no conscious selection with regard to the types of rock used in the kerbs; dark and light coloured stones being used without any apparent preference for colour juxtaposition. Nevertheless, the deliberate choice and the gradation of larger stones for the outer kerb does suggest that its external appearance was significant and such evidence as there was suggested that the outer kerb almost certainly remained visible after the construction of the later 'drum' cairn.

The ring-cairn was disposed concentrically about the funerary pyre construction of Phase III and not about the later central cairn of Phase IX, the radial space between the ring-cairn and the central cairn varying from as little as 2.4 m in the north to as much as 5.5 m in the south. The ring-cairn was built very carefully and painstakingly and there is no apparent entrance through the ring — although the damaged northern sector could conceal the former existence of such a feature. The unfurnished cremation of a middle-aged adult male was incorporated in the make-up of the ring-cairn in its south-east sector.

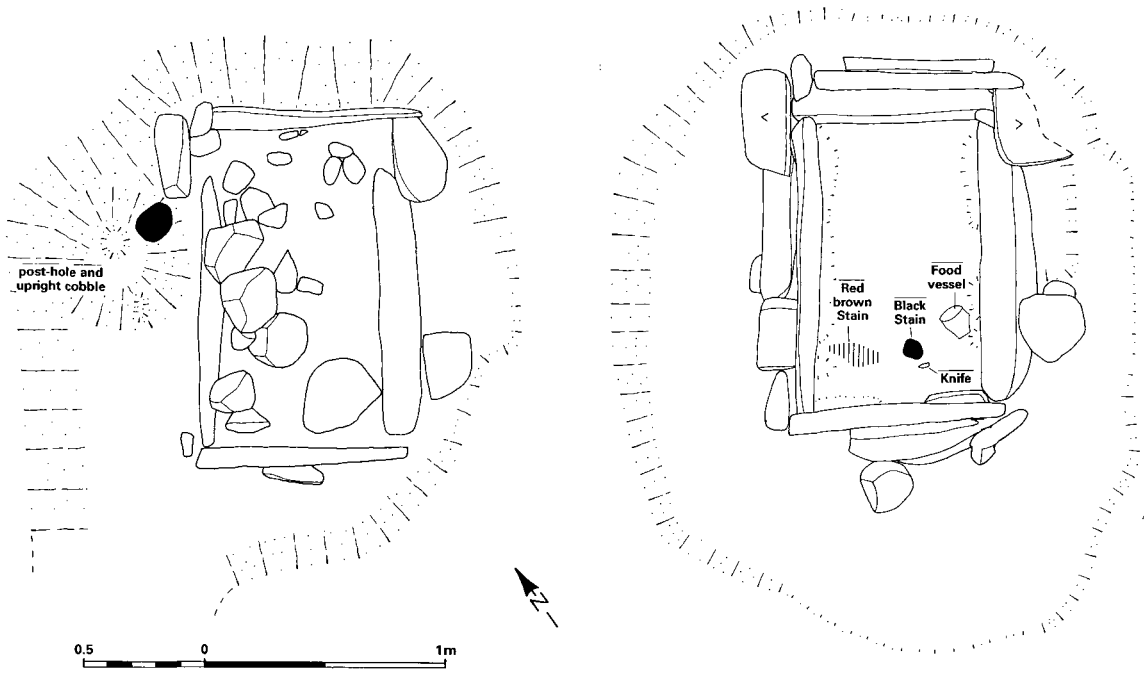
No evidence remained of a turf-line beneath the ring-cairn, which suggests that it, like the funerary pyre, may have been built on bare, recently tilled ground.

PHASES VII & VIII: THE CENTRAL CIST

The central cist was apparently constructed as the culmination of the foregoing sequence of funerary activities on the site. The cist-pit (Phase VIIa; illus 12), measuring 2.6 m north/south by 2.15 m east/west, was dug into the pale loamy subsoil. In plan it was sub-rectangular with fairly straight and vertical east and west sides, while, by contrast, the shorter north and south sides were slightly sloping, in all likelihood to facilitate the manoeuvring of the slabs into the pit. A dump of dug loam was formed on the northern side of the pit.

Phase VIIa The central cist represents a formidable construction employing four massive laminar slabs of schist and a number of subsidiary slabs of the same material. As stated above, there are outcrops of schist 0.5 km to the south of the site but it cannot be certain that these were the source of the building material. Four of the slabs were set vertically into the pit to create a stone box, measuring 1.2 m north/south by 0.7 m east/west and 0.8 m in depth (illus 12). All the slabs were very smooth and none was thicker than 0.16 m. None of the slabs displayed carved decoration of any kind on any facet.

The slabs of the long sides were lowered into position first, followed by the short end-slabs. Once these were in position, the recesses behind the slabs were backfilled partly with the previously dug loam and partly then with more varied material gathered from around the cist, including some pyre debris, the surplus of which was, as we have seen, left as a truncated pile to the north and east of the pit. Additional, smaller



ILLUS 12 Plan of the central cist prior to excavation (left) and fully excavated (right), showing the positions of finds and organic staining

'buttress' slabs were placed against all sides of the cist so that the external dimensions of the cist were much larger than those of the interior which were 1.6 m by 1.05 m. All of the central cist slabs were inclined inwards towards the top of the cist, the difference between the base and top, off-vertical, being in the range of 0.03 m to 0.05 m. This is probably the result of movement after construction, but before the cist itself was backfilled and before the enormous weight of the cover slab was applied to the surface — a possible witness to the period during which the cist remained unfilled.

Phase VIIb The floor of the cist consisted of heavily trampled sand. A token amount of calcined human bone, representing partial remains of a young adult female, was presumably derived from the adjacent funerary pyre. The fragments were sprinkled around the edges of the cist and mostly concentrated in the southern corner. They were entirely charcoal-free and must have been thoroughly washed and sieved prior to deposition in the cist. A freshly made, apparently unused, plano-convex flint knife and an equally fresh Food Vessel were also placed, close to one another, in the south-east part of the cist (illus 12, 21 & 25). Originally the Food Vessel probably stood upright, but appeared to have been toppled northward as the cist slowly became filled with lenses of brown sand.

There were small areas of organic staining, one red-brown and one black in colour. Upon analysis, the red-brown stain was shown to have contained exceptional quantities of pollen of *Filipendula vulgaris* (dropwort). This phenomenon will be considered in more detail below (see Discussion), but it is worth noting here that, if an offering in bloom had been placed within the cist at the same time as other deposits, this must have occurred in mid-Summer. On the other hand, dried dropwort flowers or leaves may have been placed within the cist at any season.

Phase VIIc The cist remained uncovered over a considerable period of time and became filled to a depth of 0.3 m with lenses of brown sand, derived from weathering of the soil dumps (excavated from the cist-pit) to

the north and east. After a time, the remaining void in the cist was deliberately back-filled to a level well above the upper edges of the side slabs, first with more sand, then with large cobbles. The inclusion of the cobbles at the top of the filling was evidently quite deliberate, as sufficient surplus soil was available from the adjacent soil dumps. The cobbles were probably imported from the River Tay.

Phase VIId After the cist had been filled and buried a timber post (illus 12) was set up in the north-west corner of the cist-pit, outside the limits of the cist itself. This measured 0.15 m in diameter; it was wedged at the base with small cobbles and a large upright cobble was set beside it. It was subsequently removed and the remaining post-hole became filled with clean brown sand.

Phase VIII After all the activities around the cist had ceased — including the second lighting of the pyre which had scorched the soil at the top of the cist — a mighty cist slab was dragged from the north and 'trigged up' with cobbles to come to rest about 0.4 m above the upper surface of the cist side-slabs. The effect was to ensure that the cist-slab was sufficiently elevated to remain visible at the summit of the central cairn which was constructed around it (Phase IX).The slab weighed approximately 2.2 tonnes, and may well have been brought from the River Tay.

Phase VIII: chronology

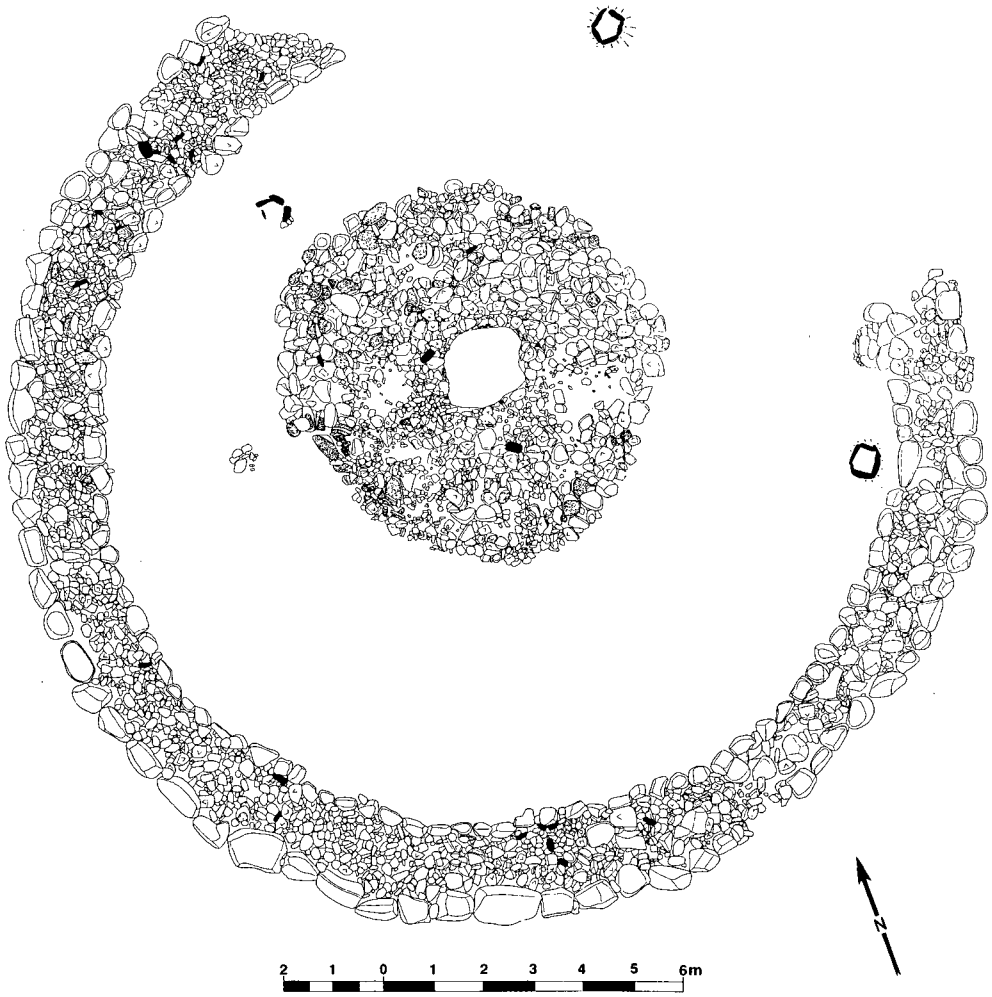
The chronology of these events can be assessed on typological grounds as well as on the basis of radiocarbon determinations. The Food Vessel deposited within the central cist has been assigned, on typological grounds, to the transition between EBA1/EBA2 (in Burgess' typo-chronology; see Pottery, below). A charcoal sample from the base of the funerary pyre yielded a radiocarbon date of (GU-2676) 3950 $\pm$ 50 BP, which corresponds very well with the likely date range of the Food Vessel in the late third to early second millennium BC. For present purposes, there cannot have been a significant interval between the use of the funerary pyre and the depositions within the central cist; consequently these events may be seen as nearly contemporary, taking place within the first two centuries of the second millennium BC.

PHASE IX: THE CENTRAL CAIRN

The construction of a small cairn of about 7.5 m in diameter is the closing stage in the sequence of activities around the central cist and the funerary pyre. The cairn was built of small stones arranged concentrically around the cist (illus 13 & 15) with no recognizable outer kerb of any kind. The inner edge of the cairn overlapped the edges of the cist capstone, but there was no evidence that it ever extended over the slab itself and the cist slab almost certainly remained visible, if perhaps somewhat recessed. The scorched nature of the stones lying directly over the area of the funerary pyre suggest that the pyre, after its second burning, had only just been abandoned and the ashes were still sufficiently hot to scorch the stones laid on its surface.

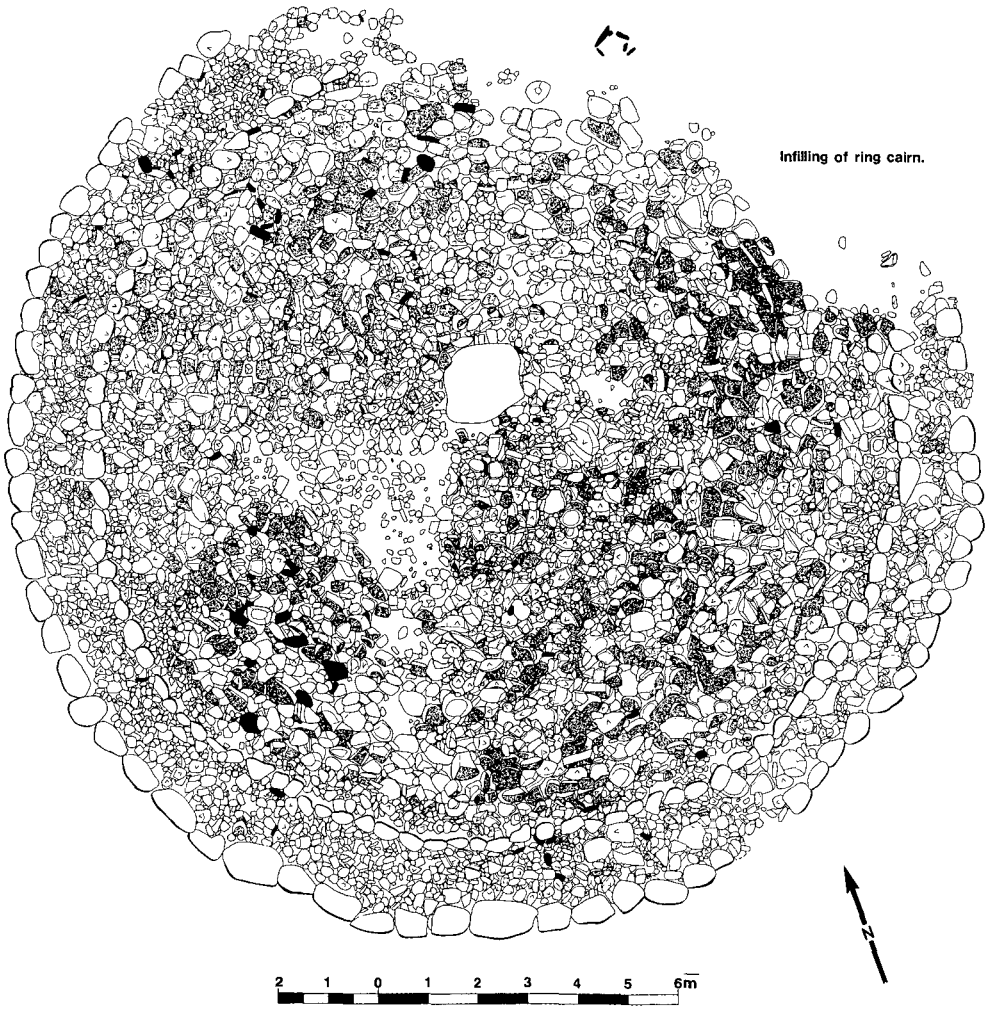
PHASE X: THE MAIN CAIRN

After the passage of an unknown interval, the roundel of open ground formed between the central cairn and the ring cairn was filled with boulders. The effect was to create a unified cairn, with a roughly level surface, incorporating both the central and ring-cairn, and with the outer kerb of the ring-cairn forming its visible outer boundary. The Phase VIII cist slab in all likelihood remained visible. While impaction by weight rendered any search for a turf-line beneath the



ILLUS 13 Plan of the ring-cairn and central cairn with the central cist cap-stone *in situ*

stacked boulders of the interior of the ring-cairn difficult, it is certainly the case that no trace of a relict turf-line was located there. This may well indicate that the interval between the construction of the ring-cairn (followed by all subsequent activities including the central cairn construction) and the blocking of the roundel of open space was not a protracted one. Whatever the case, this intervening space was blocked by a mass of carefully stacked boulders (illus 14) which were generally less even in shape than those used in the construction of the ring-cairn (illus 15). This stacking began at the edge of the inner, central cairn, largely overlying it. Then the individual boulders, standing to about 0.5 m in height, were stacked on their ends, leaning inwards against each other at an angle of about 30 from horizontal, until the bases of the outermost boulders were within half a metre of the inner kerb of the ring-cairn. The manoeuvring of large boulders into this narrow slot was apparently considered unnecessary and, instead, this space was filled with evenly sized small stones. There is no evidence that an entrance was forced through the ring for the introduction of these boulders to the central area, and then made good; as many hundreds of



ILLUS 14 Plan of the cairn in early stages of excavation

boulders were involved, each one must have been lifted over the ring during construction. Such an entrance may have existed in the north sector, however, where the cairn had been damaged.

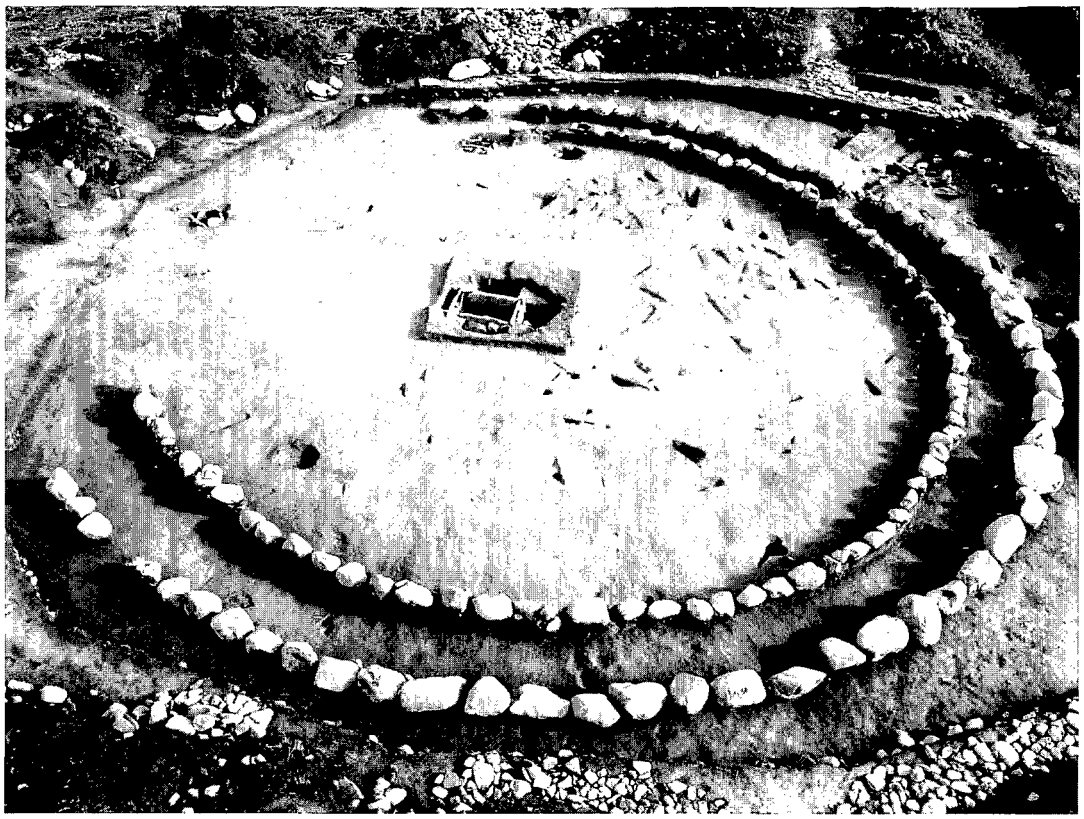
The considerable care exercised in the construction of this 'blocking' would appear to have been directed towards the creation of a very stable structural base which, in turn, could be raised a little higher still. This was achieved by a covering of small cobbles, thus creating what might be termed a 'drum' cairn, a relatively flat cairn revetted by the outer kerb of the ring-cairn, 20 m in diameter and up to 1.3 m high, with the 'central' cist slab probably revealed in its surface. The stability of such a structure has quite clearly stood the test of time with relatively little dislodged tumble occurring outwith the cairn (Phase XI) and even then, it seems, only after the formation of a substantial turf against the kerb stones. Unless substantial bodies of stone were removed entirely from the site at an early date, it is unlikely that the cairn ever stood to a significantly greater height than it did at the time of its excavation.

ILLUS 15 The cairn during excavation, revealing the construction of the central cairn and ring-cairns; from west (*Reproduced by permission of the RCAHMS © Crown copyright*)

PHASES XI & XII: PALISADES AND OTHER FEATURES OUTWITH THE CAIRN

The activities of these phases were carried out immediately to the south-east of the cairn where only a slender berm of ground survived intact by 1988, between the cairn and the 19th-century railway cutting. Even this opportunity for any understanding of these events was much curtailed by animal burrowing, fence construction and numerous other disturbances. Nevertheless it is clear that this area saw the construction of a complex sequence of three ring-groove palisades (Phase XI) which enclosed a group of shallow cremation pits (Phase XI) (illus 17 & 18).

Phase XI: palisades The first palisade (XIa) was evidently a circular structure which originally may have enclosed an area of about 7 m in diameter. The palisade trench was on average 0.4 m wide and no more than 0.25 m deep. The surviving traces suggest that it was not a substantial structure; most probably it was dismantled after a period of use. This was succeeded by a circular palisade (XIb) of about 10 m in diameter. The trench was on average 0.8 m wide and 0.5 m deep; its stone packing lay dislodged and disordered, suggesting that this structure was also deliberately dismantled before the third palisade was constructed. This last enclosure (XIc) was no more than 4 m in diameter. Evidently it was also dismantled, with the consequent disordering of the stone-packing of its foundation slot.

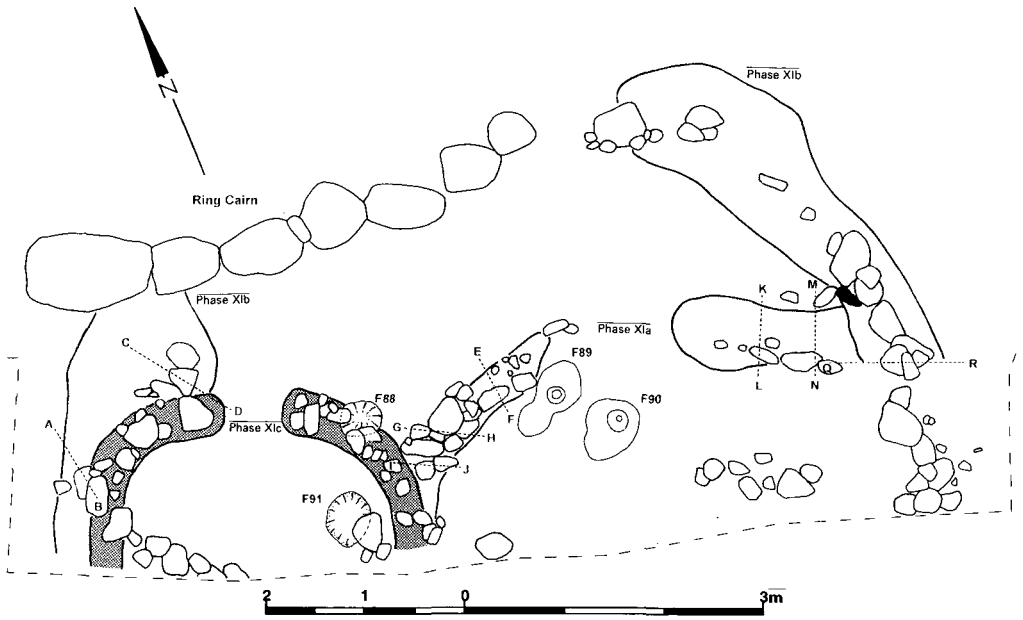


ILLUS 16 A view of the ring-cairn and excavated central cist; from west (*Reproduced by permission of the RCAHMS © Crown copyright*)

Phase XI: cremations Within the excavated area enclosed by the palisades were four cremation deposits, representing five individuals altogether (F88–91). These were placed in vertically sided pits: one pit (F88) was quite shallow, of c 0.3 m in depth, while the others were more than 0.5 m in depth. The shallow pit contained the washed, cremated fragments of a middle-aged male and a child. In the other examples the bones were mixed with large quantities of charcoal, and were probably token materials simply gathered from a funerary pyre. (This, of course, cannot have been the Phase IV pyre described above, which was now buried under the 'drum' cairn.) The remains of an adult male were placed directly at the bottom of one of the deeper pits (F91), but in the other two, the cremated remains of an adult male and a child no more than four years of age (F89 & F90 respectively) were each placed within a cinerary urn before deposition in the pits.

A radiocarbon date of (GU-2674) 3520 ± 50 BP — from a charcoal sample from the upper part of the first palisaded enclosure (Phase XIa) — may well indicate a chronological focus of these activities outside the main cairn. The cremation in the shallow pit (F88) — which was dug into the Phase XIc palisade slot — yielded a radiocarbon date of (GU-2677) 3350 ± 50 BP. This latter date is in excellent accord with the probable date of the collared urns.

Phase XII cairn It is unfortunate that this remnant of land, truncated by the railway cutting immediately to the south of the cairn, was so narrow and had suffered from such extensive disturbance. However, the



ILLUS 17 Plan of features encountered to the south-east of the ring-cairn

massive, though disordered, presence of stone in this area (illus 19) suggests that this phase of activity terminated in the construction of a small cairn, 8 m in diameter.

PHASE XIII: CREMATION PITS WITH SMALL ORTHOSTATS

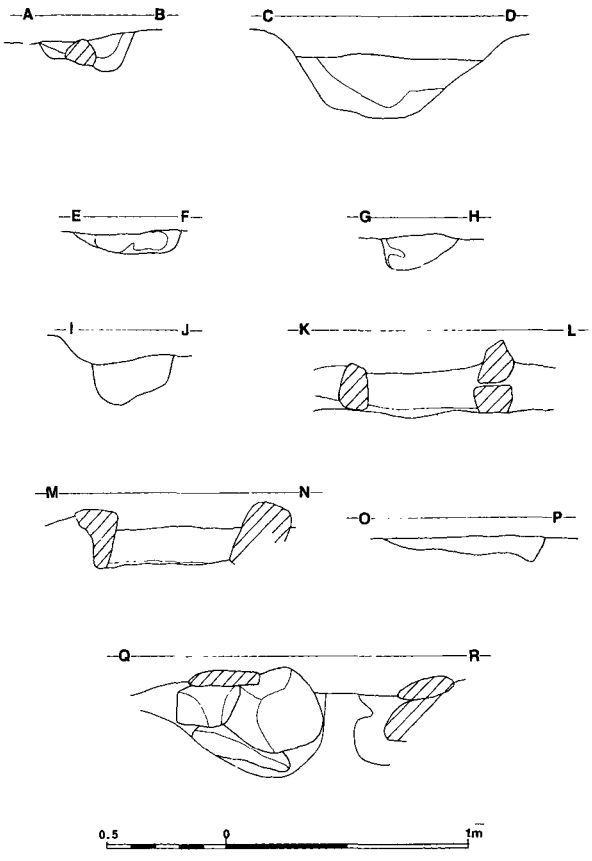
This phase witnessed the collapse of both the main cairn and the subsidiary cairn described above. However, more or less immediately after the initial collapse of the main cairn, two further cremations were deposited above the north-east sector where the first palisaded enclosure once stood. These cremations (F95 & 96) (illus 20) appear to have been composite deposits and seem to have been performed directly on top of the collapsed cairn rubble, with token amounts of charcoal and bone then gathered together and placed in shallow pits. In both instances a water-worn, oval-shaped boulder was placed in an upright position to serve as a marker. Charcoal from within one of the pits (F95) yielded a radiocarbon date of (GU-2673) 3170 $\pm$ 50 BP.

PHASE XIV: LYNCHET FORMATION

Finally, the south side of the main cairn seems to have been engulfed in a cultivation lynchet and it is very likely that the entire structure became incorporated at this time within a prehistoric field boundary. This accumulation of soil — leading to a fairly pronounced lynchet — may have continued, judging by the present field pattern, until very recently. Certainly the railway was engineered to follow land divisions current in the 1850s.

RADIOCARBON DATES

The following radiocarbon determinations were obtained from charcoal samples submitted to the Scottish Universities Research & Reactor Centre (SURRC) at East Kilbride, Glasgow.



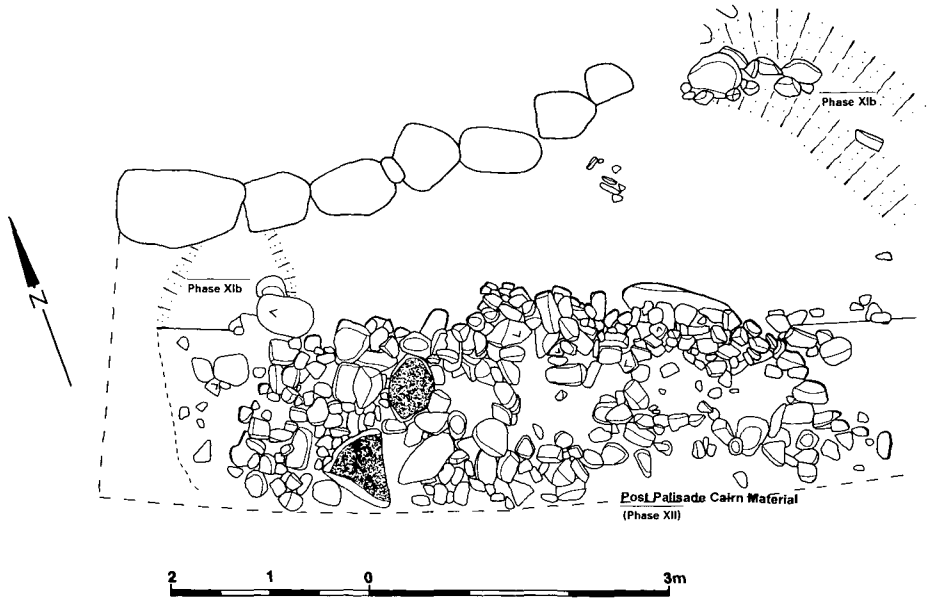
ILLUS 18 Cross-section of palisades in the area south-east of the ring-cairn

TABLE 1
Radiocarbon dates

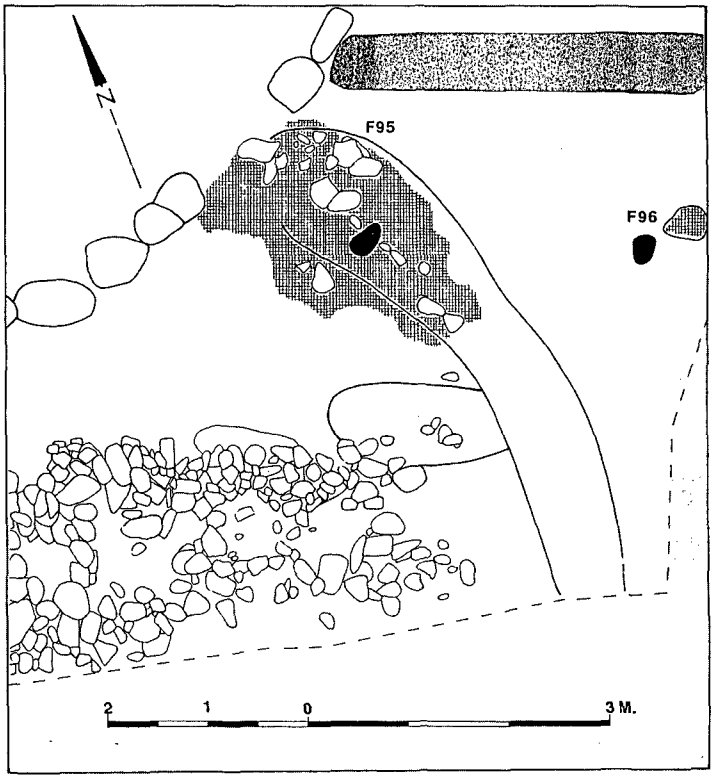
Lab no	Yrs BP	Calibrated to 2 sigma	Relative contribution to probabilities	Context
GU–2678	7500 ± 80	6458–6172	1.0	charcoal from pre-cairn soil layer (Phase I/II)
GU–2676	3590 ± 50	2116–2087	.03	base of the funerary pyre (Phase III)
		2040–1854	.78	
		1849–1769	.19	
GU–2675	2890 ± 50	1252–1246	.01	bulked charcoal sample: funerary pyre and central
		1209–919	.99	cairn (Phases III/IX)
GU–2674	3520 ± 50	1955–1734	.96	charcoal from the first palisade (Phase XIa)
		1721–1689	.04	
GU–2677	3350 ± 50	1738–1711	.07	bone from cremation F88 (Phase XIV)
		1708–1519	.93	
GU–2673	3170 ± 50	1522–1313	1.0	charcoal from cremation F95 (Phase XIV)

Sample GU-2675 combined 12 small charcoal samples from the area of the funerary pyre and the somewhat anomalous determination may relate to the bulked condition of this submission.

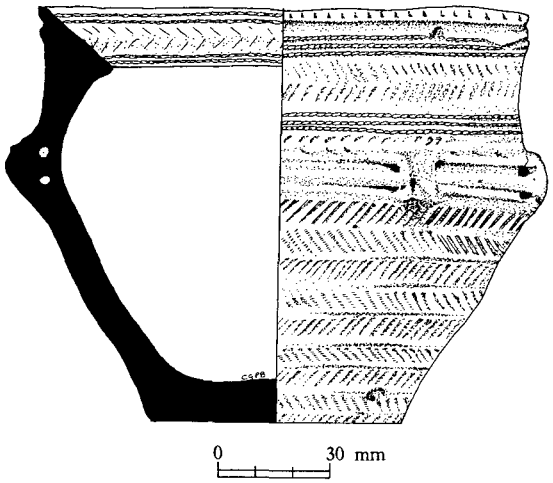
Calibration has been undertaken using the University of Washington Quaternary Isotope Laboratory Radiocarbon Calibration Program Version 3.0.3c (Stuiver & Reimer 1993). Calibrated dates are shown as date ranges indicating 2 sigma (95.4%) probability.



ILLUS 19 The final stone construction (post-dating the palisades and secondary cairn material) in the area south-east of the ring-cairn



ILLUS 20 Cremations F95 and F96



ILLUS 21 The Food Vessel from the central cist

THE POTTERY

Colin Burgess

The Food Vessel from the central cist (Phase VII)

The difficulty of assigning this vessel (illus 21) to a specific type (cf Burgess 1980, 86–9), or even deciding whether it should be termed a vase or a bowl, only reflects the inadequacies of existing classification schemes.

Form The rim expands on the interior to form a sharply sloping internal bevel. There is no expansion or elaboration on the exterior, apart from a slight chamfer, below which an upright neck descends to a shoulder emphasized by two channels encircling the pot, one above the other. Six stops of variable profile are placed at intervals around the shoulder, each perforated above and below by the two encircling channels. Below the shoulder the body is trunconic, tapering to the flat base.

Fabric The fabric is typical of Food Vessels, as of much Early Bronze Age pottery: smooth-surfaced on the exterior, with some grits breaking the surface, yellowish-buff in colour with a pink cast. The interior is less well-finished, of similar hue, and with angular grey and white grits breaking through a generally crackly surface.

Decoration On the internal bevel, a herringbone pattern of twisted cord impressions is bounded by two horizontal lines of twisted cord above and below. The exterior rim chamfer is decorated with vertical short whipped cord impressions ('maggots'). These are underlined by a deep groove, which has been emphasised by a sharp tool, and bears lengths of fine whipped cord ornament. Below this, three horizontal lines of twisted cord encircle the upper neck, with three more above the shoulder. The space between is filled with a herringbone pattern of twisted cord lengths. A narrower zone of twisted cord herringbone motif is placed where the bottom of the neck curves out to the shoulder channels. The shoulder lugs are impressed with horizontal maggots. Below the shoulder, the body is decorated with rows of whipped cord herringbone impressions extending to the base.

Typology & chronology It is difficult to find Food Vessels which approximate the Sketewan example in form and decoration. Vessels with this upright neck form are known, notably from Denovan, Stirling (Hunter 1971), Edington Mill, Berwick (Craw 1914, 330–3), Parkburn Quarry, Midlothian (Henshall 1966, 210–11), Glenhead, Perthshire (NME, EQ 66), and the Haddo House Estates, Aberdeen (NME EE 117). These all tend to be relatively taller, however, being more vase-like in their proportions, and differ in a variety of other respects: Denovan, particularly, in having only whipped cord ornament and only a single broad shoulder channel without stops; Parkburn, Edington and Glenhead in their decoration — single channel and solid stops; the Haddo House vessel has the double channel but solid stops and, in any case, it has a completely different decoration.

Associations, now supported by radiocarbon dates (the unpublished work of Brindley & Lanting), are unequivocal in placing Food Vessels in the early part of the Early Bronze Age. Their *floruit* was in the Early Bronze Age 1 (the Fargo phase, c 18th–17th centuries uncal BC; Burgess 1986, 350), when they overlapped with 'late'-style Beakers. In this phase both inhumation and cremation were practised, but cinerary urns were rare outside southern Britain. As the succeeding Bush Barrow phase advanced (Early Bronze Age 2), inhumation and Food Vessels began to lose ground to cremation and, by its end, Food Vessels had disappeared and cremation and cinerary urns were entirely dominant. The Sketewan Food Vessel must then be assigned to Early Bronze Age 1 — Early Bronze Age 2. A detailed typology and chronology of Food Vessels has yet to be published, and any estimate of the Sketewan vessel's position must be largely guesswork. It appears not to be among the earliest examples, but its form and fine decoration nevertheless suggest a place earlier rather than later in the series, in the later part of Early Bronze Age 1 or early in Early Bronze Age 2. Radiocarbon dates in the range c 3600–3500 BP would be appropriate.

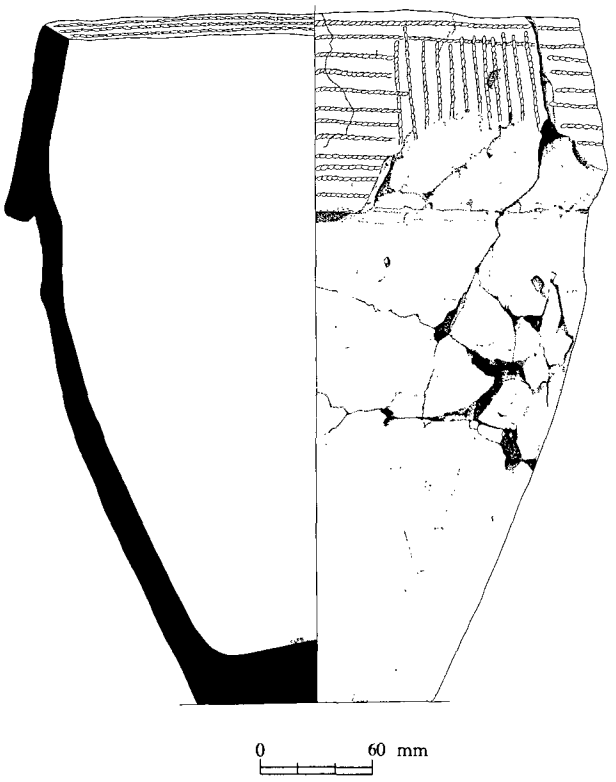
Urn from cremation pit F89 (Phase XI)

Tripartite collared urn (illus 22)

Fabric This is typical of Early Bronze Age urns. The exterior has a carefully smoothed, yellow-buff surface, while the interior is rougher, with grey grits appearing at the surface in the manner characteristic of Early Bronze Age wares.

Decoration This is confined to the simple, unexpanded, internal rim bevel and the collar. At the internal bevel are twisted cord lines extending round the bevel, in places three lines, in some stretches two. On the collar are horizontal twisted cord impressions at top and bottom, framing panels of alternately vertical and horizontal cord lines. Inspection of the decoration makes it possible to suggest the sequence in which the decoration was carried out. For the most part the horizontals at top and bottom were impressed first, though in two places lengths of border horizontals were applied after panels of verticals. It is possible to determine the panel which was applied first: a panel of verticals which is overlaid by panels of horizontals on both sides. The panels were impressed from right to left. Whether the pot was turned in order to decorate it (in which case it would have been turned anti-clockwise) or whether the potter moved round the pot, the right to the left sequence is consistent with the vessel being decorated by a left-handed person; assuming it was decorated in the upright position.

Form There is considerable variation in the profile, especially of the collar which has a decidedly 'peaked' overhang in places. The neck is broad and internal rim bevel unexpanded.



ILLUS 22 The Urn from cremation F89

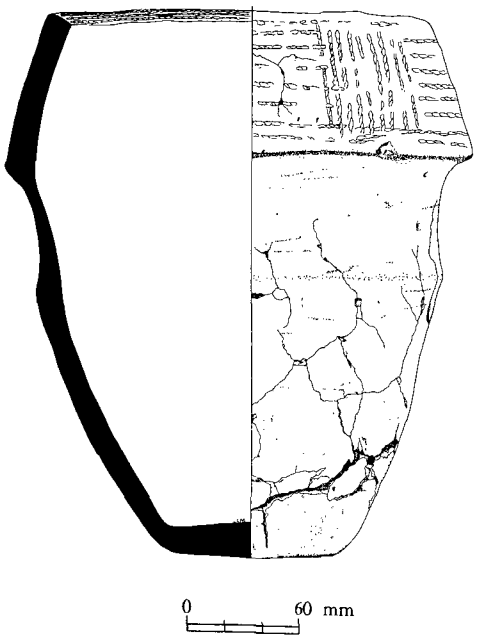
Typology & chronology In terms of Longworth's (1984) division of Collared Urns into a 'Primary Series' and a 'Secondary Series', as adapted by the present writer (Burgess 1986), the typological position of the vessel is not in doubt. It has no 'Early' traits, but does have three 'Late' traits: bold decorative patterns, no decoration below the collar, and a 'peaked' collar base ('Late' traits 1, 2 & 5 of Burgess 1986, 345). This Collared Urn must thus be classed as a 'Late' vessel, though reference to Burgess (1986, figs 1 & 2) suggests it is by no means among the latest, most developed Collared Urns, and is not too far removed from 'Middle' vessels.

The urn from cremation pit F90 (Phase XI)

Tripartite Collared Urn (illus 23)

Fabric The exterior surface is mottled pink and yellow-buff in colour, carefully smoothed. The interior is rougher and duller in colour, with grits frequently breaking the surface. Again, the treatment is typical of Early Bronze Age urns.

Decoration This is confined to the simple unexpanded rim bevel an the collar. Three twisted cord lines extend all round the internal bevel. There are two horizontal twisted cord lines at the upper and lower margins of the collar, which were impressed first. These frame panels of alternately vertical and horizontal cord lines. Again, it is possible to determine the earliest and latest panels, suggesting the sequence of execution. In this case the ornamentation proceeded from left to right, suggesting the pot was turned clockwise or the potter worked round the pot in an anti-clockwise direction. In either case a right-handed potter is indicated.

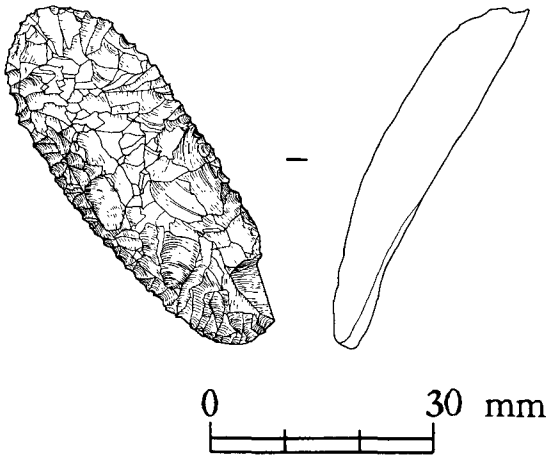


ILLUS 23 The Urn from cremation F90

Form The collar is deep and prominent, overhanging a slight, narrow neck and conspicuous shoulder. In terms of Burgess 1986, this vessel has no 'Early' traits and four 'Late' traits: bold decorative pattern, no decoration below the collar, a deep hat-like collar, and 'peaked' collar base ('Late' traits 1, 2, 4 & 5 in Burgess 1986). This qualifies, therefore, as a 'Late' vessel, typologically close to the other Urn, but like that vessel, not amongst the latest, most developed Collared Urns.

Longworth's tables of ranges of Collared Urns (1984, 33 & 38) are not particularly convincing or helpful to use, but in so far as the Sketewan urns can be found places there, they appear to fit better with the north-western than the south-eastern styles. Surprisingly, close parallels for the Sketewan vessels are not easy to find, in Scotland or outside. Comparatively tall and narrow vessels with even approximately similar characteristics are rare. For both Urns, vessels from the Forgan cemetery, Fife (Longworth 1985, nos 1818–22), provide general comparisons which are not too distant geographically, but there are many differences in details of form and the decoration is also completely different. For the Urn from feature 89, some morphological similarities also exist with vessels from Edinburgh (*ibid*, nos 1919 & 1921), and from North Yorkshire (*ibid*, nos 1132 & 1322), but all have different decoration apart from the Urn from Egton Moor, Yorkshire (no 1132). The Urn from feature 190 bears some resemblance to Urns from Leuchars, Fife (*ibid*, no 1853), and Largs, Ayrshire (*ibid*, no 1971; also with similar decoration), but its combination of features, especially its narrow, slight upright neck and slight shoulder, is hard to match. Clearly the Sketewan urns are not typical of any regional style. Indeed, if such exists in Scotland or north Britain, it has yet to be defined. Variability and individuality are the norm, which should say something about the production of the vessels.

Collared Urns appear to have come comparatively late to Scotland, when the Early Bronze Age was already advanced (Early Bronze Age 2, the Bush Barrow phase), and Collared Urns were already in their Middle stage of development (Burgess 1986, 350). The Sketewan urns, nevertheless, are not amongst the most developed, and appear to fit best earlier rather than later



ILLUS 24 The plano-convex knife from the central cist

in the late series; early in Early Bronze Age 3, the final, Aldbourne-Edmondsham stage of the Early Bronze Age. Radiocarbon dates around 1400 uncal BC would be appropriate.

At first glance the two vessels appear quite similar, and possibly from the same workshop if not the same hand. Study of their decoration suggests, however, that they were made by different potters, one right-handed, one left-handed, though there is nothing in their typology that forbids their contemporaneity or origin in the same workshop or area. More cannot be said in the current, slight, state of knowledge of Early Bronze Age pottery manufacture.

THE PLANO-CONVEX KNIFE

Bill Finlayson

Associated with the Food Vessel and cremation in the central cist (Phase VII) was a very 'fresh' plano-convex knife (illus 24). The freshness of this implement and the frequent association of such pieces with funerary deposits prompts the suggestion that the knife may never have been used, or may have been made specifically for inclusion, unused, in the burial. In studying the function and use-history of this implement from Sketewan, a small comparative sample of similar pieces was studied from the collections of the National Museums of Scotland.

Plano-convex, or 'slug' knives, are a well-known type (described by Clark 1932) and include a wide range of pieces unified by invasive retouch over all or most of the dorsal surface, and a largely unmodified ventral face, producing the plano-convex appearance. Their association with graves, and particularly with Food Vessels, is also well documented (Simpson 1968). It should be noted that a number of plano-convex knives from funerary contexts were burnt, in contrast to the very fresh examples discussed here.

The method used to study the pieces is a 'microwear' technique: wear traces are studied with the aid of a microscope. All aspects of functional evidence are used, tool morphology, placement of traces and types of traces. The technique is not designed to produce highly specific information on tool use, but works at a lower interpretative level.

Of the pieces examined, none of those found in cists exhibit traces that can be interpreted as use-wear. Traces are present, but are largely the result of the knapping processes of tool manufacture. Most of the Museum collection has traces that are associated with Museum handling. One piece (AA 268) has weak linear polish features running diagonally from the edge.

This feature may be indicative of use, but is isolated and therefore difficult to interpret. It may also be the result of a pressure flaking.

Hope (in Shepherd & Cowie 1979, 118) examined a plano-convex knife from Kiltry Knock, Banff, and, using a low magnification method, interpreted scar damage as evidence of cutting or slicing 'a soft material for a short time'. The low magnification examination of retouched pieces is, however, difficult and the fact that, apparently, both lateral edges have similar traces, with damage slight all over, suggests these traces may be the result of knapping. The determination of brief use on soft materials is always problematic.

It is, of course, very difficult to demonstrate that no use has been made of a tool, the use possibly being so marginal that it would have left no traces. These pieces are not obviously designed for 'light' work. Their generally thick edge angle, and thick cross section, preclude light cutting work and furthermore they vary considerably in shape. If plano-convex knives are a single broad type, it seems that the practical aspects of functionality were not the most important part of the design.

The knife from Sketewan is a particularly fine example of flint knapping, but would appear to be of little 'use'. The overall retouch on the dorsal face serves no obvious purpose and the combination of the very fine serrations (suitable for light work) with the thick edge angle (suitable for heavy work) is simply not practical.

RESULTS OF ANALYSIS

Museum artefacts found with 'sepulchral deposits' are labelled EQ.

Sketewan knife 51 mm by 20 mm by 8 mm; edges thick, 65 mm; fine serrations all round perimeter, except at proximal end. Finely flaked all over dorsal surface, unflaked on ventral, except for a few flakes over bulb. Very rare, randomly scattered, micro-chipping on ventral surface. Occasional small patches of polish scattered near edges on ventral surface. One small bright spot on interior of dorsal face. The fineness of denticulation with the thick edge angle suggests a lack of use. All the micro features noted fit with the range of expected technical effects. The location of most polish spots is too random around the edge to suggest use and most likely represents retouch platform marks. Unused.

EQ 422 From Rumgally, Fife (Tennant 1932), described as 'end scraper', found in a cist associated with a Food Vessel. 42 mm by 17 mm by 7 mm; edges thick, 60 mm; serrated around perimeter, except at proximal end. Flaked nearly over all dorsal surface, except near proximal end at ridge; ventral surface unflaked. Four discrete polish zones correspond to position of pins from a display mounting. Some diffuse polish on ventral surface corresponding to area previously labelled. Some scattered scars (rare) and occasional small patches of polish around ventral edges. On surviving dorsal ridge a well developed, smooth flat polished area. Most traces result from handling in the Museum. Some traces fit technical effects. Cause of smooth flat polish unclear, possibly the result of pressure flaking over ridge; hard to see how it could have been caused by use. Unused.

EQ 380 Found in a cist at High Cocklaw, near Berwick (Callander 1929); 65 mm by 21 mm by 6 mm, edges thick, 55–60 mm; + distal point. Very finely flaked all over dorsal surface. Irregular flaking on ventral margins (possibly accidental during pressure flaking on dorsal). Fineness of flaking produces a slight serrated effect. Some diffuse polish in old label area. In two areas on ventral, where there was no scarring, patches of poorly developed scattered polish. On dorsal along ridge zone scattered smooth polish. Polish on ventral surviving part of retouch platform. Polish on dorsal is where pressure flakes overlap from two sides, probably a technological effect. Unused.

EQ 423 From Rumgally, Fife (Tennant 1932); 47 mm by 21 mm by 5 mm; edges medium, 45 mm; + distal point. Very finely flaked all over dorsal surface. Some flat retouch on ventral surface (possibly accidental during pressure on dorsal). In parts retouch produces slight serrated effect. Distal is a straight 'chisel' end. On both, dorsal and ventral, at edges discrete marks. Diffuse polish on ventral. Polish at edges appears to be the result of pinning. Ventral polish is in area of old label. Unused.

AA 268 Newton Stewart, Kirkcudbrightshire; 37 mm by 18 mm by 5 mm; edges thick 55 mm; + distal point. Proximal end steeply retouched, fine retouch on left dorsal face, with some shallow scarring on ventral aspect. This is not a plano-convex knife. Diffuse polish on ventral opposed to steep retouch. Scattered patches of smooth polish on ventral edges near proximal end proximal end, opposed to fine retouch. Faint linear polish lines running predominantly parallel at 45° to edge; do not start at edge but from, or near, scars opposed to fine retouch. Polish opposed to steep retouch is technological. Polish patches opposed to fine retouch probably the same. Linear features problematical. Possibly part of pressure retouch technical features, may indicate use of retouched side in a cutting motion. Isolation of features, and absence of polish near edge at that point, or any traces on dorsal surface, make this interpretation difficult.

EQ 69 Found in a cist at Stenton, Haddington, near another cist which contained an inverted Urn (Marjorie-Banks 1880). 70 mm by 21 mm by 5 mm, edges medium-thick, 45–55 mm; + distal point. Finely flaked all over dorsal face. Ventral face unflaked, except for a few shallow scars over bulb. Fine retouch produces a slightly serrated effect. Almost completely fresh appearance except for three polished spots matching around circumference. Polished spots probably from pinning. Unused.

AA 267 Denholm, Roxburghshire; 62 mm by 23 mm by 6 mm; edges medium, 35 mm. Finely retouched all over most of dorsal surface, surviving part appears polished. Some flat retouch on ventral face at both ends and on right side associated with a concave area formed by steep retouch. Atypical piece. One bright spot on ventral edge. A rough gloss over dorsal scar ridges. Piece seems partially weathered. Bright spot and rough gloss on raised parts of topography both look like depositional and post-depositional effects.

AA 269 'Probably Angus'; 51 mm by 17 mm by 5 mm; edges thick, 60–70 mm; + point at proximal. Retouched all over dorsal face, steeply at both edges, then flat across area between two dorsal ridges Atypical piece. Some poorly developed, scattered polish around ventral perimeter. Probably technological effects from retouch platform.

On close inspection all the AA pieces (i.e. the non-sepulchral examples) turn out to be poor or atypical examples of 'knives'. The significance of this should not be exaggerated with so few pieces, but it does reinforce the idea that the 'proper' plano-convex knives are for ritual purposes and do not exist outwith that context, and that within that context they show little evidence of use prior to deposition.

CREMATED HUMAN REMAINS

Katherine McSweeney

The following summary is based on more detailed report on the human remains from Sketewan which has been deposited with the archive of the project records at the National Monuments Record of Scotland.

TABLE 2
Total number of individuals per context

Context	Number of individuals	Weight (g)	Comments
Central cist	1	900	Young adult female
Pyre	?	300	Several individuals, none complete
Pyre	1?	240	One? incomplete adult
Pyre	2?	1230	Adult and child?
Cist 2	?	3	Few frags of bone
Cist 3	1	1150	Middle-aged adult
Cist 4	4	1340	Adult, child, neonate and foetus
Cist 5	2	1570	Adult female with foetus?
Cist 6	2	1590	2 bodies, one (or both) adult
Cist 7	1	800	Adult, possibly female
Palisade 1	?	–	Few frags of bone
Cremat. F88	3	1720	One, possibly two, adults and foetus?
Cremat. F89	1	2060	Adult male
Cremat. F90	1	570	4 year old child
Cremat. F91	1	1830	Adult male
Cremat. F95	?	430	Number unclear. Possibly several incomplete individuals
Cremat. F96	1?	280	Incomplete adult?
South-east sector of the ring-cairn	1	640	Middle-aged adult

Number of individuals

A total of 21 complete, or almost complete, cremated bodies was identified. In addition, two areas each contained the partial remains of a single individual. Some deposits of bone, including the pyre itself, contained the mixed remains of an unknown number of bodies while others had only a few fragments of bone. As there is no way of knowing whether any of these were stray fragments from the other main cremations or whether they represented additional individuals, they have been discounted for the purpose of assessing the size of the buried population. Therefore, at least 23 individuals had been cremated and buried on this site.

Age at death

Age was assessed for 22 individuals: 14 adults, seven children and one who could have been either a child or a young adult. Of the 14 adults, one was aged 18–25 years; two were in the range of 25–35 years; two were middle-aged; four were over 25 years; and five could be assessed only as adult or probably adult. There was no indication of very advanced adulthood. Evidence for this normally comes from the degree of tooth attrition, pelvic morphology and the degree of osteoarthritis present. With the Sketewan material all erupted permanent teeth had lost their enamel because of high cremation temperatures; pelvic bones were poorly preserved and, although there was some evidence for osteoarthritis of the spine, most vertebral bodies had disintegrated. Therefore, while there is no direct evidence for individuals in this community surviving into old age, any evidence that had existed may have been destroyed by the intensity of cremation.

Of the seven children, three were between the ages of two and six years, one was newly born, two appeared to be either foetal or neonate and another was probably foetal. No individuals between the ages of seven and 17 were identified although two bodies, where age could only be assessed as 'child or young adult', may have belonged to older children.

Age assessment of immature human remains is difficult but there were at least four individuals who could be classed as neonate or foetal. This may appear a relatively high number

but cremated immature human remains are rarely reported and, until more cremations are analysed in greater detail, it is not possible to determine whether the evidence from Sketewan is unusual in this respect or not.

In the light of the limited nature of the evidence it would appear there was a high rate of mortality during the first five or six years of life but that, if survival past this age was achieved, the chances of living into adulthood were good. No signs of advanced old age were noted and it would appear that life expectancy did not extend beyond middle adulthood.

TABLE 3
Age at death

Context	Age	Ageing criteria
Central cist	young adult, 18–25?	eruptuion of M3; open sutures; unossified costal cartilege
Pyre	adult?	suture closure
Pyre	adult	epiphyseal fusion
	child, age 2–6?	single deciduous tooth!
Cist 3	middle-aged adult	epiphyseal fusion; degeneration of the spine
Cist 4	adult	epiphyseal fusion
	child, 2–5	central development
	neonate	occipital development; size
	foetus	size
Cist 5	Adult	epiphyseal fusion; Sacral development
	foetus or neonate?	size
Cist 6	adult, 25–35?	epiphyseal fusion
	adult?	not obviously immature
Cist 7	adult, over 25	epiphyseal fusion
Cremat. F88	adult, over 25	epiphyseal fusion
	young adult or child?	cranial wall thickness
	foetus or neonate?	size
Cremat. F89	adult, 27–30?	pelvic morphology
Cremat. F90	child, 2–5	dental development
Cremat. F91	adult, over 25	epiphyseal fusion
Cremat. F96	adult, over 25	epiphyseal fusion
South-east sector of the ring-cairn	middle-aged adult	degeneration of the spine; sutural closure

Sex

The sexing of cremated remains is always difficult. Estimations of sex were attempted for 13 of the 23 mostly complete bodies, but only in four instances could sex be assigned with any degree of confidence. The 13 sexed individuals include six adult males, six adult females and a child who may have been female. The sexing of children is notoriously difficult and controversial, but it is considered by some that the pelvis is sexually diagnostic from an early age (Brothwell 1981, 62). In this case, the remains of a well preserved four-year-old child from the Collared Urn in cremation pit F90 had a wide-angled pelvic sciatic notch and, therefore, may possibly have been a girl.

The sexed adults, six of each, attest that the burial site at Sketewan was used for both males and females; from this small sample it appears that there was no bias towards either sex. To speculate further, it might also be argued that the presence of males, females and children suggests that this site was a burial place for the community as a whole, or at least for all members of one part of the community, and was not reserved for any particular group of individuals.

Pathology

Much of the evidence for disease or trauma was unrecognizable due to the poor condition of most of the bones; where pathological lesions were detected, their true extent and diagnosis could often only be guessed at.

TABLE 4
Sex

Context	Sex	Sexing criteria
Central cist	female?	small mastoid process
Pyre	?	adult?, sex unknown
Pyre	male?	skull morphology
	?	child, sex unknown
Cist 3	female?	morphology of eye orbits
Cist 4	?	adult, sex unknown
	?	child, sex unknown
	?	neonate
	?	foetus
Cist 5	female	pelvic morphology; gracileness
	?	foetus
Cist 6	male?	pelvic morphology
	female?	chin morphology
Cist 7	female?	small mastoid process
Cremat. F88	male	robustness; skull morphology
	female?	gracileness
	?	foetus
Cremat. F89	male	skull morphology; pelvic morphology
Cremat. F90	female?	child, pelvic morphology
Cremat. F91	male	skull morphology
Cremat. F96	?	adult, sex unknown
South-east sector of the ring-cairn	male?	skull morphology

There were three cases of degenerative arthritis of the spine, from the adult female from Cist 3, on two fragments of intervertebral articular facets from the pyre, and the adult male (?) from a deposit of bone found within the south-east sector of the ring cairn. In the case of the first individual osteophitic formation was slight and may have been asymptomatic. The extent of arthritic change on the second individual is unknown. There is clearer evidence of the effects on the third individual, as osteophytic growth was quite marked; this individual must have had difficulty moving his neck and mid-spine and probably suffered fairly considerable pain. Arthritic changes of the spine may occur as a result of trauma, may be occupationally related or, more commonly, may simply be the result of the normal degeneration associated with ageing.

Back trouble and arthritis also affected the male whose remains were found within the Collared Urn (cremation F89). Arthritic change was present on at least one costo-vertebral joint and the presence of Schmorl's Nodes on several vertebral body surfaces indicates intravertebral disc herniations on at least two levels of the spine, in the thoracic and lumbar areas, which must have resulted in considerable back pain and periods of immobility. While disc herniation can be associated with normal degeneration, aetiology was probably different in this case. This was a fairly young adult, probably under 30; there was no associated osteophitic formation of the vertebral bodies, and the cause of his back trouble is more likely to have been traumatic in origin or linked to heavy physical work.

This individual also suffered from a deformity of the foot. The first cuneiform, one of the tarsal bones, was partly bifurcated across the surfaces for articulation with the avicular and the metatarsal of the great toe. Corresponding malformations could also be seen on the articulations of these bones, although there was no evidence of arthritic alteration. The deformity may have been traumatic or, perhaps more likely, developmental in origin.

There is some evidence to show that dental health was poor. Three adults had lost teeth at some time during their lives, probably because of periodontal disease, and a third suffered from decayed teeth. The position of these carious lesions suggests that this last individual also suffered

from periodontitis. A major cause of periodontal disease, which causes infection and resorption of the alveolar bone surrounding the teeth, is poor dental health and, while it has been identified in approximately 10% of the Sketewan population, poor survival of mandibular and maxillar bone and the complete loss of tooth enamel indicate that the true incidence may have been much higher.

There was a hint of the presence of metabolic disease, possibly anaemia, in one individual. Some cranial fragments belonging to the child or adult from cremation F95 were pitted on the external surface. Although this is often an indication of the presence of some types of anaemia, the diagnosis is tenuous at best.

Many of the bones of one individual, the male from cremation F88, displayed evidence of hyperostosis. The skull, upper jaw and spine were affected, as well as some unidentified bones. The bony changes took the form of a general thickening of some areas of the skull, and areas of pitting and osteophytic formation. The changes may represent the early stages of diffuse idiopathic skeletal hyperostosis (DISH) or Paget's Disease. Both of these conditions lead to a gross overgrowth and deformity of bones. However, because of the poor condition of his remains, the true extent and aetiology of the disease suffered by this individual cannot be assessed.

In no case was the cause of death identified.

TABLE 5
Pathology

Context	Age/Sex	Pathology
Pyre	adult	osteoarthritis of spine
Cist 3	adult female?	slight osteophitic growth at neck and lower back
Cist 4	young adult	ante mortem loss of one tooth
Cist 5	adult female?	ante mortem loss of 3 teeth
Cist 6	adult	ante mortem loss of 2 or 3 teeth
Cist 7	adult female?	carious lesions on two teeth
Cremat. F88	adult male	hyperostosis of skull and spine
Cremat. F89	adult male	arthritis of costo-vertebral joint; foot deformity; herniated intravertebral discs
Cremat. F91	adult male	anomaly of temporo-mandibular joint
Cremat. F95	child or adult	pitting on external surface of some cranial fragments
South-east sector of the ring-cairn	adult male?	osteoarthritis of neck and mid-back

Burial practices and cremation technology

Discounting the bone from the pyre and some isolated fragments, total weights of individual deposits of cremated bone varied from 240 g to 2060 g. Surprisingly, the largest weight represented one individual only — a robust adult male — while some smaller groups of bone contained several individuals. The greater weight of the former is probably due to the large body mass of the individual and to the bones being protected from post-cremation deterioration by deposition in an urn. Final weight may also depend on the efficiency and temperature of cremation but, assuming cremation methods used on all of these individuals were similar, 2060 g of cremated bone would appear to represent the optimum for a robust adult male on this site. It is likely, therefore, that all of the other bodies are less than complete and the smaller amounts of bone represent only token deposits (with the obvious exception of the lighter remains of a child contained in the other urn: cremation F90).

Table 6 shows, not surprisingly, some correlation between average fragment size and the percentage of the total weight identified. These percentages varied between 40% and 88%, while average size varied from 10 mm to 45 mm. Unexpectedly, the deposit with the highest proportion

TABLE 6
Cremated fragments: general data

Context	No	Age	Sex	Wt (g)	Size	Unc?	%Id
Central cist	1	A	F?	900	30 mm	no	66
Pyre	1	A	?	240	30 mm	yes	88
Pyre	2?	A+Ch?	M+	1140	10 mm	no	32
Cist 3	1	A	F?	1150	25 mm	no	68
Cist 4	4	A+Chx3	?	1340	25 mm	no	48
Cist 5	2	A+Ch	F+?	1570	25 mm	yes	55
Cist 6	2	Ax2	M+F?	1590	40 mm	yes	59
Cist 7	1	A	F?	800	25 mm	yes	40
F88	3	Ax2+Ch	M+?	1720	40 mm	no	65
Cremat. F89	1	A	M	2060	45 mm	yes	80
Cremat. F90	1	Ch	F?	570	30 mm	yes	81
Cremat. F91	1	A	M	1830	40 mm	yes	52
Cremat. F95	1	Ch/A	?	430	10 mm	no	49
Cremat. F96	1?	A?	?	280	10 mm	no	40
South-east sector of the ring-cairn	1	A	M?	640	10 mm	no	53

Key
No = number of individuals
A = adult Ch = child
Unc? = uncalcined fragments
Wt (g) = total weight in grams
Size = average fragment size
%Id = percentage of identified fragments

of identified fragments (88%) did not have the highest average size (30 mm). As this deposit weighed only 240 g it must be assumed that these larger fragments were selected for token deposition.

There appears to be a direct correlation between weight, sex and age. The second largest weight, of 1830 g, was also that of a single male and the weight of single females tended to be lower than those thought to be male. The other bones contained in an urn, those of the four-year-old child from cremation F90, which also appear to be fairly complete, weighed 570 g; this is just over a third of the weight of the bones in cremation F89, a proportionally normal weight for children of that age when compared to adult males. If some of the above comments appear to be obvious, at least they help to confirm some of the tentative assessments of age and sex.

There is a great variation in fragment size. Most of the cremated remains included at least a few large longbone fragments, some around 100 mm long. But with several, a large proportion of the total amount took the form of tiny, gravel-like fragments. Whether these tiny fragments had been subjected to deliberate crushing or were an effect of the intensity of the firing is not clear; on the whole, deliberate crushing seems the less likely explanation as most of the cremations contained many larger pieces of denser bone as well as tiny fragments.

With the exception of some of the smaller deposits of bone, the cooled bone appears to have been carefully collected from the pyres before burial. The general correlation of the weight of the remains with age and sex, the presence of all skeletal elements in most of the burials, including tiny hand and foot and, in some cases, foetal and neonate bones, and the large proportion of gravel-like fragments all attest to this.

Fragments were generally well calcined and a light beige in colour, although seven of the 15 larger deposits did contain some poorly calcined bones. These consisted of a few blue calvarium or blackened hand- and foot-bones indicating that, in these cases, temperatures were lower at the top and back of the head and at the extremities. The presence of blue calvarium fragments may also be partly due to the denseness of the bone at the occiput and the need for greater or longer incineration in this area.

Preservation of vertebral fragments was generally rather poor with very few vertebral bodies surviving. This was also true of pelvic and scapular bones. The reason for this may be that bodies were cremated on top of the pyre, on their backs and, if so, these would be the areas subject to the most intense heat and greatest disintegration. In one case, the left humeral head was blackened while the right was the same colour as the rest of the body, implying that this individual may have been cremated lying on one side (or had rolled over following partial collapse of the pyre). In addition, there was unusually good preservation of the spine suggesting that body position in this case was different. The occurrence of poorly calcined, bluish calvarium fragments and blackened hand- and foot-bones in some of the remains is consistent with cremation of the body in an extended position on its back on top of a pyre. In this position the head and feet would be at the periphery of the fire where the heat would be less intense. In three instances blackened hand-bones were noted. This suggests that in these cases the hands were not bound to the bodies and may have been extended out from the sides.

Many of the fragments were greatly distorted. There had been a marked degree of twisting and curved lateral splintering, particularly evident in many of the larger longbone fragments. In addition, many cranial fragments had warped, causing the inner and outer tables to separate. These occurrences indicate that high temperatures were achieved during firing. Wells (1960, 35) suggests that the corpulence of the individual can have an effect on the degree of distortion, leaner bodies burning quickest and suffering the greatest distortion; Ubelaker (1984, 35) adds that curved lateral splintering and marked warping can be indicative of bone being burnt while still 'fresh', or soon after death. It is possible that both or either were factors, but such suggestions are difficult to address on present evidence.

The high degree of distortion, the generally light colour of the remains and the almost complete disintegration of some bones are all suggestive of high temperatures being achieved during firing. Studies of modern cremation methods and experimental burnings suggest that light-coloured well-calcined bones occur when temperatures in excess of 800°C are reached and that blackened bones, still containing organic material, have been burned at temperatures of less than 800°C (Ubelaker 1984, 34). In modern furnaces, average temperatures are said to be 900°C and incineration by way of gas jets, which enter the sides of ovens at a height of 18 in. from the floor, takes on average 75 minutes (Wells 1960, 35). The Sketewan cremations would have been carried out in the open, some, at least, on top of a low stone platform pyre. Most of the bone was well calcined, indicating that temperatures similar to modern incinerations must have been achieved. Cremation technology and the necessity for well-controlled and efficient oxygenation was therefore clearly understood, although cremation times may have been longer than modern ones. It is possible that those cremations containing poorly incinerated fragments had been prematurely terminated by poor weather.

To summarize, total weight varied considerably between cremations, the greatest being that of an adult male contained in an urn. It is clear that some bodies were almost complete with some loss of bone because of the nature of burial, while others were only token deposits. Generally, remains of adult males weighed more than those of females. The great variation in fragment size may have been caused by the differential effects of firing on dense and soft bone, rather than by deliberate crushing. The ratio of large-to-small fragments had a direct bearing on the percentage of fragments identified. Cremation technology appeared to be well understood with high temperatures being achieved throughout the body in most cases. There is reason to believe that individuals were cremated, soon after death, in an extended position on their backs while placed on top of the pyre.

Animal bone Finally, burnt animal bones were identified in three deposits; the urn containing remains of a child (cremation F90) also contained two trout vertebrae. These had not been pierced or otherwise altered and there is no evidence to suggest deliberate deposition. It is possible that inclusion was accidental or even that they had been ingested prior to death. Both the central cist and Cist 6 contained what appeared to be cremated foreleg remains, possibly a red deer. There may have been some ritual significance to the presence of remains of this animal.

PLANT REMAINS

Camilla Dickson

The samples submitted for analysis principally contained wood charcoal, though a number of seeds were also present. Plant identifications are tabulated according to stratigraphic Phases I–XIII in Table 7, where similar samples from the same event are amalgamated. The nomenclature of the wild plants follows Clapham *et al* (1987). All disseminules, whatever their precise botanical nature, are described as seeds. The following summarizes a more complete catalogue of the carbonized plant remains which has been deposited with the archive of the project records at the National Monuments Record of Scotland.

Possible contaminants

A number of unburnt, mainly arable, weed seeds were recovered and are most unlikely to have survived for long in aerated soil. The loose sandy nature of the soil and the presence of earthworm egg capsules in several samples suggests that these seeds have been brought down to the archaeological levels by earthworm activity. All inclusions thought likely to be contaminants are identified by square brackets in Table 7, including grains of *Avena* (oats) and *Hordeum* (barley). Both burnt and unburnt seeds of *Chenopodium album* (fat hen), *Galeopsis* subg. *Galeopsis* (hemp-nettles), *Polygonum lapathifolium* (pale persicaria) and *Rubus idaeus* (raspberry) were found, as was burnt and unburnt straw of cf *Hordeum* (cf barley). Finds of *Avena* (wild/cultivated oat) and *Hordeum* (barley) are of single grains, accompanied in three out of four instances by both burnt and unburnt arable weed seeds. *Avena* grains are rarely found before the Iron Age and are likely, therefore, to be of modern origin.

The three grains of *Triticum dicoccum* (emmer wheat) from Phase III pose another problem. One of them is accompanied by a burnt arable weed seed and two are from the main funerary pyre, with both burnt and unburnt weed seeds. From the evidence of the pollen analysis beneath the pyre, Tipping (below) suggests that the old ground surface beneath the cairn had been cultivated, so it is not unreasonable to assume that these cereal grains derive from this earlier cultivation. *Triticum dicoccum* seems to have died out in England during the Saxon period and no post-Iron Age finds from Scotland are known to the author. There seems no reason to assume that the exclusively burnt seeds of the grassland species present in this case are contaminants.

Results

Phase I The 13 samples from contexts of possibly Mesolithic date all contained *Quercus* (oak) charcoal. *Betula* (birch) was present in two samples and single finds of *Alnus* (alder), cf *Populus* (cf aspen or poplar) and *Prunus spinosa* (blackthorn, sloe) were also recorded.

Phase III Of the 48 samples taken from various areas of the funerary pyre, 44 consisted wholly or mainly of *Alnus* charcoal. *Quercus* was present only in five samples, *Betula*, *Corylus* (hazel) and *Sorbus* (rowan or whitebeam) in two and *Pomoideae* (apple or hawthorn type) with *Viburnum* (probably guelder rose, the only native species) and *Prunus padus* (bird cherry) as single finds. As has already been discussed three grains of *Triticum dicoccum* are probably contemporaneous. Two tubers of *Arrhenatherum elatius* ssp. *bulbosum* (onion couch) were identified. Similar charred tubers have been found in Bronze Age cremation sites in particular and Robinson (1988) concluded that grassy material from abandoned cultivated ground or grassland had been burnt on funerary pyres. Small unidentified rhizome fragments and a possible tuber, with perhaps a similar origin, were recovered from other phases. *Galium aparine* (goosegrass) seeds were present in three samples; *Galium aparine* is a plant of waste places. The single seeds of *Eleocharis palustris* (common spike-rush) and *Ranunculus flammula* (lesser spearwort) represent wet ground or streamside habitats.

Phase IV Samples from six satellite cists showed the use of *Alnus*, present in eight of the 10 samples, but with *Quercus* also present in seven of them. *Corylus* and *Prunus spinosa* were found associated with two of the cists with *Prunus* cf *avium* (cf gean, wild cherry) and *Ulmus* (elm) as single occurrences. The few seeds found suggest various habitats. *Ajuga reptans* (bugle) is a plant of open woods and damp soils. *Ranunculus repens* (creeping buttercup) is commonly found in damp grassland and *Plantago lanceolata* (ribwort plantain) is characteristic of better soils and is usually associated with pasture.

Phases XI & XII Of the 12 samples associated with activities of these phases, including charcoal from inside the two urns and from the palisaded enclosures, 10 contained *Alnus* and five *Quercus* charcoal. *Ulmus* and *Prunus spinosa* were each found in one sample. *Salix* (willow) was recovered from the palisade. Seeds of *Ajuga reptans, Plantago lanceolata, Ranunculus repens, Ranunculus acris* (meadow buttercup) and *Rumex* cf *acetosa* (cf sorrel), a plant of heath, grass and cultivated land, were also recorded.

Phase XIII The 18 samples associated with this phase all derive from cremation F95; 14 contained *Alnus* and 11 burnt *Quercus* wood, five *Corylus*, four *Prunus spinosa* and one sample *Sorbus aucuparia* or *south. aria*. The numerous seeds of *Carex muricata* (prickly sedge), an uncommon plant of dry open banks and heaths, could have been produced by one or two vigorous plants and do not necessarily imply that the plant was an important component of the vegetation. *Carex pilulifera* (pill sedge), represented by a single nutlet, is a plant of sandy or peaty soils.

Discussion

The wildwood in this part of Scotland would have consisted mainly of *Quercus* and some *Betula* on the drier ground with a wider variety of trees on the better soils. *Alnus* and *Salix* would have grown in damp areas, especially by the water courses.

At least one of the pre-cairn samples (Phase I), where *Quercus* with a little *Betula* wood was used chiefly for possible structural and non-structural features, has been shown by radiocarbon dating (GU-2678) to be Mesolithic in age. This Phase was truncated by the cultivated soil of Phase II so we have no charcoal record of any local woodland immediately preceding the much later funerary activities. Pollen of cereal grain size was recorded by Tipping (below) from Phase II and the three burnt grains of *Triticum dicoccum* wheat from Phase III probably originated from this underlying cultivated soil. The very high proportion of *Alnus* wood used in the central pyre (Phase III) must have come from damp or wet ground. The use of *Alnus* suggests that woodland has been removed from nearby dry ground which accords with Tipping's conclusion (below) that the immediate environment of the cairn was treeless. Evidence from the satellite cists (Phase IV)

TABLE 7

			PHASE I	PHASE III	PHASE IV						PHASE XI–XII					PHASE XIII				
			Pre-cairn	pyre	Small cists						Palisade					+				
		Feature			3	2	6	4	5	7	5.35	32	88	89	90	95	below 95	94	96	
		Find number(s)		115		17, 19	18	25–28	36, 333	37, 334		38–40	41	29,1002	30,1001		11, 12	13, 3	61	
		No. of samples examined	13	1 46	3	2	1	4	2	2	7	1	1	2	2	14	2	2	1	
Ajuga reptans	(Bugle)	nutlet		1					1			16								*Ajuga reptans*
Alnus	(Alder)	charcoal	1	1 43	2	2		3	1	1	6	1	1	2	1	10	2	1	1	*Alnus*
Arrhenatherum elatius ssp. bulbosum	(Onion Couch)	'tuber'		2																*Arrhenatherum elatius ssp. bulbosum*
Avena sp.	(Wild/ Cultivated Oat)	grain				[1]			[1]							[1]				*Avena* sp.
Betula	(Birch)	Charcoal	2	1 1																*Betula*
Cf. *Calluna*	(cf. Heather)	charcoal											1							Cf. *Calluna*
Carex muricata	(Prickly Sedge)	nutlet														124				*Carex muricata*
C. pilulifera	(Pill Sedge)	nutlet														1				*C. pilulifera*
Carex sp.	(Sedge)	nutlet				1						1								*Carex* sp.
Cereal indet.		culm, fr		5																Cereal indet.
Chenopodium album	(Fat Hen)	seed										[2]								*Chenopodium album*
Corylus	(Hazel)	charcoal		2	1			1							1	3	2			*Corylus*
Corylus	(Hazel)	nut, fr		1				1				1				1				*Corylus*
Eleocharis palustris	(Common Spike-rush)	nutlet		1																*Eleocharis palustris*
Fallopia convolvulus	(Black Bindweed)	nutlet								1										*Fallopia convolvulus*
Galeopsis subg. Galeopsis	(Hemp-nettles)	nutlet	[1]													[18]	[4]			*Galeopsis subg. Galeopsis*
Galium aparine	(Goosegrass)	fruit		12 7	8											2				*Galium aparine*
Gramineae	(Grass)	caryopsis		1	1							1				1				Gramineae
Hordeum vulgare cf. *vulgare*	(cf. Hulled six-row Barley)	grain														[1]				*Hordeum vulgare* cf. *vulgare*
H. vulgare s.l.	(Six-row Barley)	grain	[1]													[1]				*H. vulgare s.l.*
Hordeum sp.	(Barley)	grain	[1]																	*Hordeum* sp.
Juncus sp. or spp.	(Rushes)	leaf/stem, fr										34								*Juncus* sp. or spp.
Lathyrus sp. or *Vicia* sp.	(Vetchling or Vetch)	seed	1			1				1										*Lathyrus* sp. or *Vicia* sp.
Plantago lanceolata	(Ribwort Plantain)	seed		3				1	3	13		19								*Plantago lanceolata*

Polygonum aviculare s.s.	(Knotgrass)	nutlet																										1	*Polygonum aviculare s.s.*
P. lapathifolium	(Pale Persicaria)	nutlet			[1]	[2]			[1]		[5]		[3]			[2]	[1]			[14]			[1]					*P. lapathifolium*
Pomoideae (Crataegus/ Malus)	(Hawthorn/ Apple type)	charcoal			1																							Pomoideae (Crataegus/ Malus)
Cf Populus	(cf. Aspen, Poplar)	charcoal	1																									*Cf. Populus*
Prunus cf. avium	(cf. Gean, Wild Cherry)	charcoal							2				1															*Prunus cf. avium*
P. padus	(Bird Cherry)	charcoal			1																							*P. padus*
P. spinosa	(Blackthorn, sloe)	charcoal	1						1				1			1				2	2							*P. spinosa*
P. spinosa	(Blackthorn, sloe)	fruitstone, fr		1	1	1					1					1	1			1			2					*P. spinosa*
Quercus	(Oak)	charcoal	13	1	4		1		4		1		1	5		1	1		1	7	2		1	1				*Quercus*
Ranunculus acris	(Meadow Buttercup)	achene											[1]			[4]												*Ranunculus acris*
R. acris or *repens*	(Meadow or Creeping Buttercup	achene														[4]				[1]								*R. acris* or *repens*
R. flammula	(Lesser Spearwort)	achene		1							1																	*R. flammula*
R. repens	(Creeping Buttercup)	achene			[1]						[3]					[11]				[4]								*R. repens*
Rubus cf. *fruticosus agg.*	(cf. Bramble)	fruitstone			1																							*Rubus* cf. *fruticosus agg.*
R. idaeus	(Raspberry)	fruitstone		2	2						1									1								*R. idaeus*
Rumex cf. *acetosa*	(cf. Sorrel)	nutlet														13				1								*Rumex* cf. *acetosa*
Rumex sp.	(Dock or Sorrel)	nutlet															1											*Rumex* sp.
Salix	(Willow)	charcoal												1														*Salix*
Sorbus	(Rowan or Whitebeam)	charcoal			2															1								*Sorbus*
cf. *Stellaria* sp.	(cf. Stitchwort)	seed		1																								cf. *Stellaria* sp.
Triticum dicoccum	(Emmer Wheat)	grain		2	1																							*Triticum dicoccum*
Ulmus	(Elm)	charcoal											1			1												*Ulmus*
Viburnum	(Guelder-rose or Wayfaring tree)	charcoal		1																								*Viburnum*
Viola palustris	(Marsh Violet)	seed	3		2						1																	
Unidentified		rhizome, fr	1	11									12							2			1					Unidentified
		seed	1	1		1					3		6			5				2			1					
		tuber/turion														1												

Key: fr, fragment(s) (), possible contaminant; charcoal numbers refer to the number of samples in which the taxon was identified

suggests that *Quercus* seems to have been more readily available than in Phase III; its charcoal is associated with four of the six cists. The tree types represented from the urn cremations and palisades (Phases XI & XII) and from the final cremations (Phase XIII) suggest that the composition of the local woodland was not very different from that of Phase IV. Both *Quercus* and *Alnus* were associated with most features. From Phase III onwards the presence of *Corylus, Prunus avium* and *Sorbus aucuparia* or *south. aria*, none of which will grow well in dense shade, suggests that the regenerated woodland could have been more open than the original wildwood. The presence of *Ulmus, Prunus padus* and *Corylus* in particular indicate better soils.

THE SOIL & POLLEN STRATIGRAPHY BENEATH THE CAIRN

Richard Tipping

Soil stratigraphy

Four representative soil profiles were described in the field. Descriptions follow Hodgson (1976). Particle sizes were assessed in the field, and Munsell colours obtained on fresh dry soil. Soil classes are those of Avery (1980).

In Table 8 the profiles are arranged in order of increasing complexity. Profile A, a currently forming soil, is from the north edge of the site, cut through the post-cairn lynchet. Profile B is comparable with this in its uppermost two horizons (0–400 mm), but these overlie a complete buried profile. Profiles C and D are soils buried by stones of the central cairn and the inner kerb of the ring-cairn respectively.

The soils are all typical brown sands, acidic to slightly acidic, and free-draining. Differences between modern and buried soils are seen in the blocky structure of the modern soils, perhaps produced through the use of agricultural machinery, and their greater stoniness; soil erosion subsequent to the cairn's construction probably allowed the introduction of formerly deep-buried fan gravels from upslope. Profile B was buried by slopewash, within which the modern soil has developed.

The surface (bAp) horizon of Profile C is partly buried by discontinuous shallow pockets of pale yellow fine sand, possibly derived from the digging in prehistory at the central cist pit. The underlying bAp horizon is similar to that in the modern profiles, but is thinner and less organic-rich. It has no visible turfline, and this may have been truncated by turf-stripping or been destroyed by cultivation prior to cairn construction. At Profile D the soil is clearly truncated, preserving no bA horizon beneath the stones of the ring-cairn.

TABLE 8
Soil profiles

Profile A (currently forming)

0–110 mm: 10 YR 3/2 very dark, grey-brown silty fine sandy loam; moderately developed medium subangular blocky peds; dry, moderately weak, slightly sticky; few medium rounded and sub rounded stones, few to common fine
Ap	prominent bioturbated channels of 10 YR 4/6 dark yellowish brown loamy fine sand; few fine prominent charcoal flecks: lower boundary sharp, wavy-irregular.
110–200 mm: 10 YR 4/6 dark yellow-brown structureless to weakly developed medium subangular blocky loamy fine sand; dry, very weak, slightly sticky; few medium rounded and subrounded stones, common fine prominent rootlet
Bw	channels containing 10 YR 3/2 very dark greyish brown silty fine sandy loam, few to common fine and medium prominent bioturbated channels of 10 YR 8/8 yellow fine sand: lower boundary sharp, irregular-broken, rising in places to base of AP horizon.
>200 mm: 10 YR 6/6 olive yellow structureless stoneless fine sand' dry, very weak, non-sticky; few to common fine and
Cu	medium prominent bioturbated channels containing 10 YR 4/6 dark yellowish brown loamy fine sand.

Profile B (beneath the central cairn)

0–100 mm: 10 YR 3/2 very dark greyish brown silty loamy fine sand; common medium subrounded and subangular stones; weakly developed medium subangular blocky peds; dry, moderately firm, slightly sticky; common very
Ap fine to fine rootlet channels, few to common fine fleshy roots and rare medium fibrous roots; few fine and medium charcoal flecks; common subrounded to subangular small stones: lower boundary sharp, smooth

100–400 mm: 10 YR 5/6 yellowish brown structureless loamy fine sand; moist, very weak, slightly sticky; common subrounded to subangular very large stones; few charcoal flecks; common very fine to fine rootlet channels; few
Bw to common fine fleshy roots and rare medium fibrous roots: lower boundary abrupt, wavy.

400–440 mm (horizon can be cut out completely through erosion): 10 YR 4/4 dark yellowsh brown silty sandy loam; moist, loose; strongly developed fine granular fragments/peds; common medium subrounded small stones and
bAp common subrounded large stones: lower boundary abrupt, wavy.

440–700 mm: 10 YR 5/6 yellowish brown structures stoneless loamy fine sand; common bioturbated channels of 2.5 Y 6/
bBw/C 6 olive yellow fine sand; rare to common fleshy live roots: lower boundary sharp, irregular

> 700 mm: 2.5 Y 6.6 olive yellow structureless stoneless fine sand; moist, very weak, slightly
Cu sticky

Profile C (beneath the ring cairn)

0–45 mm: 5 Y 8/4 pale yellow structureless stoneless fine sand in shallow pockets; dry, loose to weak, sligtly sticky; common very fine to fine prominent channels of 10 YR 3/3 dark brown loamy fine sand: lower boundary sharp, broken

45–95 mm: 10 YR 3/3 dark brown structureless stoneless loamy fine sand; dry, moderately weak, slightly sticky; common fine prominent charcoal flecks; few coarse rootlet channels filled with 10 Yr 2/2 very dark brown loamy fine
bA sand: lower boundary sharp, wavy.

95–275 mm: 10 YR 5/6 yellowish brown structureless stoneless loamy fine sand; dry to moist, very weak, slightly sticky; few fine prominent charcoal flecks; coarse rootlet channels filled with 10 YR 2/2 very dark brown loamy fine
bBw sand; extensive channelling of 10 YR 6/6 olive yellow fine sand: lower boundary gradual, irregular

275–670 mm: 10 YR 6/6 olive yellow structureless soneless fine sand, becoming paler with depth; few fine prominent charcoal flecks; extensive channelling of 10 YR 5/6 yellowish brown fine sand in uppermost 30 mm: lower
Cu boundary abrupt smooth

670–850 mm: 10 YR 7/3 very pale brown stoneless silty fine sand with faint grain-size differentiated plane bedding: lower boundary abrupt, smooth

> 850 mm: coarse sandy gravel

Profile D

0–230 mm: 10 YR 5/6 yellowish brown structureless stoneless loamy fine sand; dry, very weak, slightly sticky; few fine prominent charcoal flecks; common fine fleshy live roots; common fine rootlet channels with dark greyish brown
bBw/C fill; few to common prominent channels of 2.5 Y 6/6 olive yellow fine sand: upper surface rises to c. 8 cm above datum between stone settings: lower boundary shapr to abrupt, irregular.

> 230 mm: 2.5 Y 6/6 olive yellow structureless stoneless fine sand; dry, very weak, slightly
Cu sticky

Pollen stratigraphy

Samples of the uppermost horizons of the three buried profiles (B, C & D) were prepared for pollen analysis by conventional chemical techniques (Moore *et al* 1991). The majority of samples proved to contain pollen at too low concentrations to make counting viable. The methodology employed is detailed in Tipping *et al* (1994). Counts from four spectra from Profile C are provided in Table 9, although only the topmost sample is at all statistically satisfactory. Only two spectra from Profile D proved polleniferous. Pollen-bearing spectra are only from the uppermost few centimetres of Profiles C and D (Table 9), and there is a sharp 'cut-off' with depth between countable and non-polleniferous sediment despite the sediments' acidity (cf Tipping *et al* 1994). Pollen was found in relative abundance within the bBw horizon at Profile D, in contrast to the same horizon at Profile C, which proved non-polleniferous. The pollen spectra from the two profiles are quite closely comparable, however. This is taken to indicate that at Profile D the turf was stripped prior to ring-cairn construction, and in this period the underlying bBw horizon

formed the ground surface, and was exposed to the same pollen 'rain' as received at Profile C. Palaeoecological reconstruction rests on the interpretation that all pollen preserved at Profile D relates to a brief time between turf-stripping and cairn construction; pollen assemblages from earlier periods are assumed to have been largely destroyed (as in the bBw horizon at Profile C).

Pollen preservation is generally poor (Table 9), but while the majority of grains were either crumpled or split, comparatively few were corroded, and aerobic decay within the buried profiles appears to have been greatly reduced. Beneath the cover-slab of satellite Cist 7 a well-developed 'micro-podsol' was developed, and this suggests that after burial conditions of soil chemistry, within and under the cairn, were very different to those outside, retarding aerobic pollen deterioration.

The pollen spectra are argued to relate directly to the time of human activity at the site, an assumption perhaps most easily argued for at Profile D (above). The spectra also probably relate to an area of only a few tens of metres around the site (cf Dimbleby 1985). The immediate surroundings of the cairn were almost certainly treeless. *Corylus/Myrica* (hazel/bog myrtle) is the only tree or tall shrub likely to have grown nearby. The buried soils or those adjacent to the site were almost certainly cultivated. Cereal-type grains (Gramineae >40μm) represent 3–4% tlp at Profile D (only one grain was sufficiently well preserved to be classified (Andersen 1979) as either oat or wheat (*Avena/Triticum*), and these are accompanied by bare ground, 'arable indicator', taxa such as *Artemisia (wormwood)*, Chenopodiaceae (fat-hen type), Caryophyllaceae (pinks) and *Vicia cracca*-type (vetch). 'Pastoral' indicator taxa, *Plantago lanceolata* (ribwort plantain), *Ranunculus* (buttercup) and *Rumex* (dock) are also recorded.

Cereal-type pollen is much better represented at Profile D (Table 9), but this is unlikely to be through closer proximity to crops, since the profiles are only 8 m apart. Nor is increased deterioration at Profile C likely, since pollen in this profile is better-preserved (Table 9). Instead it is suggested that this difference implies slight diachroneity between profiles in the receipt of pollen from surrounding 'fields'. Profile C is argued to have been sealed beneath the central cairn slightly prior to Profile D beneath the ring-cairn. The much greater proportion of cereal-type grains at Profile D is ascribed to an intensification of arable agriculture during this latter phase (Phase VI–X).

TABLE 9
Pollen stratigraphy

Soil Profile C

From beneath the central cairn, 45–85 mm; see Table 8.
For Profile C, where the numbers of grains are low, the counts are presented as numbers of grains per sample and summed in the final column as a percentage of total land pollen, or %tlp, and as %tlp + spores.

Sample depths (mm)	45–55	55–65	65–75	75–85	Combined
∑ Pollen counted	102	11	42	21	174
Alnus (alder)	6		1		7(4.0)
Betula (Birch)	3				3(1.7)
Pinus (Pine)	1				1(0.6)
Quercus (oak)	1		1		2(1.1)
Tilia (lime)				1	1(0.6)
Ulmus (elm)			1		1(0.6)
Corylus/Myrica (hazel/bog myrtle)	30	2	18	6	56(32.2)
Ericaceae undiff. (heathers)	1				1(0.6)
Calluna (ling heather)	6				6(3.4)
Gramineae <40μm (grasses)	30	2	14	4	50(29.9)
<40μm (cereal-type)	1				1(0.6)

Armeria maritima (thrift)	1				1(0.6)
Caryophyllaceae (pinks)	11	5	7	7	30(17.2)
Compositae undiff.	2				2(1.1)
Artemisia (wormwood)	3				3(1.7)
Cruciferae (cabbages)	1				1(0.6)
Plantago undiff. (plantains)	1				1(0.6)
P. lanceolata (ribwort plantain)	1			2	3(1.7)
Ranunculus (buttercups)				1	1(0.6)
Rumex (docks)		1			1(0.6)
Urtica type (nettles)	2				1(1.1)
					(%tip)
Ferns undiff.	62	7	42	60	171(41.7)
Huperzia selago			1		1(0.2)
Polypodium vulgare	24	1	19	18	62(15.1)
Sphagnum	2	1	7	2	12(2.9)
					(%tip + spores)
% well preserved	37.2	27.3	28.6	14.3	
% crumpled/split	42.1	63.6	57.1	42.8	
% corroded	18.6	9.1	14.3	42.8	
					(%tlp)

Soil Profile D

From beneath the central cairn, 0–40 mm; see Table 8.
Counts respresent percentages (in brackets) for each of the two polliniferous samples.

Sample Depths (cm)	0.0–1.0	1.0–2.0	2.0–3.0	3.0–4.0
$\sum$ pollen counted	176	252	non-poll	non-poll
Alnus (alder)	16(9.1)	13(5.1)		
Betula (birch)	2(1.1)	4(1.6)		
Pinus (pine)	1(0.5)	1(0.4)		
Quercus (oak)	2(1.1)	2(0.8)		
Tilia (lime)		1(0.4)		
Ulmus (elm)		2(0.8)		
Corylus/Myrica (hazel/bog myrtle)	27(15.3)	54(21.4)		
Calluna (ling heather)	1(0.5)	3(1.2)		
Gramineae <40μm (grasses)	87(49.4)	96(38.1)		
>40μm (cereal-type)	4(2.3)	12(4.8)		
Campanula type (bellflower)	1(0.5)			
Caryophyllaceae (pinks)	13(7.4)	11(4.4)		
Compositae undiff.	2(1.1)	4(1.6)		
Artemisia (wormwood)	1(0.5)	2(0.8)		
Chenopodiaceae (fat-hen type)	3(1.7)			
Galium type (bedstraws)	1(0.5)	1(0.4)		
P. lanceolata (ribwort plantain)	2(1.1)	5(2.0)		
Rumex (docks)		1(0.4)		
Succisa (devilsbit scabious)		1(0.4)		
Vicia cracca type (vetch)		1(0.4)		
		(%tlp)		
Ferns undiff.	75(23.6)	49(13.1)		
Huperzia selago	1(0.03)			
Polypodium vulgare	44(13.9)	50(13.4)		
Pteridium	2(0.06)	5(1.3)		
Sphagnum	19(6.0)	18(4.8)		
		(%tlp + spores)		
% well preserved	11.4	14.7		
% crumpled/split	76.7	65.1		
% corroded	11.9	18.6		
		(%tlp)		

PALYNOLOGY OF THE CIST DEPOSITS

Richard Tipping

Four samples from deposits within the central cist were prepared for pollen analysis using the methods described above (see Pollen stratigraphy). These sediments were: two organic-rich stains on the sandy floor (Sp-1 & Sp-2); the fine sandy fill of the Food Vessel found within this cist; and a dry black crust lining the inside base of the Food Vessel. The latter two samples proved to be entirely non-polleniferous.

Table 10 shows the marked differences in pollen counts between the two organic stains, differences induced by the very high values of *Filipendula* (meadowsweet/dropwort) in sample Sp-2. Re-calculation of this count omitting *Filipendula* (resultant n = 113) suggests that differences persist in the 'background' pollen assemblage between, for instance, *Corylus/Myrica* (hazel/bog myrtle) and numbers of fern and moss spores. Undifferentiable fern spores might be of significance in ascribing a source for the sediment comprising Sp1, in that both buried soils have comparably high proportions of these highly resistant grains (Tipping *et al* 1994): other elements of the pollen

TABLE 10
Pollen analysis of the organic stains within the central cist

	Sp-1	Sp-2	
∑ pollen counted	118	248	
Alnus (alder)	10.2	2.8	
Betula (birch)		0.4	
Pinus (pine)		0.4	
Quercus (oak)	0.8		
Ulmus (elm)	1.6		
Corylus/Myrica (hazel/bog myrtle)	30.5	5.6	
Salix (willow)		0.4	
Ericaceae undiff. (heathers)	0.8	0.4	
Calluna (ling heather)	0.8	0.8	
Gramineae <40μm (grasses)	35.6	21.3	
Campanula type (bellflower)	0.8	0.4	
Caryophyllaceae (pinks)	2.5	1.2	
Compositae Liguliflorae	1.6	0.4	
Anthemis type	0.8	1.6	
Cruciferae (cabbages)		0.4	
Filipendula (cf. meadowsweet)	0.4	8.4	*3
cf. *Filipendula*		45.9	*3
Galium type (bedstraws)	0.4	1.6	
Plantago undiff. (plantains)		0.4	
P. lanceolata (ribwort plantains)	6.8	6.0	
P. major/media (plaintains)		0.4	
Ranunculus (buttercups)	2.5	0.4	
Succisa (devilsbit scabious)		0.8	
			(%tlp)
			*3 = 3 pollen 'clumps'
Ferns undiff.	10.0	1.5	
Polypodium vulgare	10.5	1.1	
Sphagnum	22.9	3.0	
Potamogeton	0.2		
			(% tlp + aquatics & spores)
% well preserved	29.7	54.6	
% cumpled/split	50.0	39.9	
% corroded	17.8	4.0	
% amorphous	2.5	1.2	
			(%tlp)

assemblage can be favourably compared with the buried soil profiles (Table 9), and Sp-1 may simply be soil from the edge of the central cist. The origin of Sp-2 is not established, but in the correspondence of the majority of pollen types with Sp-1 might still be seen as deriving from soil.

The *Filipendula* pollen within Sp-2 is very much better preserved than other pollen types, and this emphasises the differences in preservation characteristics between the two samples: 78.5 % of *Filipendula* grains in Sp-2 were well preserved, compared to 25.7 % of all other grains. Not only does this make the two 'background' assemblages even more comparable, but it also makes it most likely that the *Filipendula* grains were derived from a separate source. The occurrence of six clumps of immature *Filipendula* grains strongly suggests that *Filipendula* flowers were deposited at the site of the organic stain. The species of *Filipendula (Fulmaria,* meadowsweet; or *F vulgaris,* dropwort) could not be determined (Tipping 1994), and the two types distinguished in Table 10 may represent mature (*Filipendula*) and immature (cf *Filipendula*) pollen grains. Bohncke (in Barclay 1983) made apparently similar differentiations but did not explain their significance (cf Tipping 1994).

The significance of the predominance of *Filipendula* pollen at this and other Bronze Age burials in Scotland has been comprehensively discussed by Tipping (1994) and is not reviewed here. In summary, the evidence at Sketewan, as at other Food Vessel burials, is best seen as representing a floral 'tribute', and not a drink such as mead, which seems the most reasonable explanation for a similar deposit, though rich in *Tilia* (lime) pollen, at a Beaker burial at Ashgrove in Fife (Dickson 1978).

MINERALS

J G MacDonald

Samples of construction material from the site — including garnets, mica and carbonaceous material — were submitted for analysis to establish whether they were native or foreign to the site locality. A complete description of the materials present has been deposited with the archive of the project records at the National Monuments Record of Scotland. This summary report will be confined to commenting on possible sources of the principal materials present.

Geology & geomorphology

At Sketewan the River Tay flows in a broad flat-bottomed valley, almost 1 km wide, which is infilled by glacial and postglacial sedimentary deposits. The river is confined within banks, having eroded a channel into a clay-rich substratum. Except in times of major flood the flatlands on either side of the river are free from inundation and are cultivated except in areas where the river approaches close to the valley slopes at Sketewan. These slopes are covered by glacial deposits which conceal the underlying bedrock except where tributary streams have cut through the drift as, for example, at Balnaguard burn (NGR: NN 940 513) where the local Dalradian schists are exposed. Outcrops of bedrock in the bed of the River Tay are not encountered downstream from the rapids at Grandtully. Bedrock in the area is composed of quartz-mica-garnet-schist belonging to the Southern Highlands Division of the Dalradian Supergroup. This rock has been subjected to regional metamorphism which has altered the original pelitic sediments to schists of garnet-amphibolite facies.

Garnets Though it is unlikely that the samples found on the archaeological site would have been collected from the Tay channel itself, there is no reason to doubt that they are of local origin, as they fall within the

range of sizes which occur in the bedrock. Such garnets could easily have originated from the beds of minor tributaries which enter the Tay on both sides of the area. All these tributaries are draining areas where the bedrock consists of quartz-garnet-mica-schist, and the overlying drift contains detritus derived from the same type of bedrock. Undamaged crystals could have been collected from localities where the schist has weathered *in situ*, or in pockets of grit bordering minor streams where transport from the original site of erosion has been minimal.

Carbonaceous material Black, often cuboidal fragments (variously described as coal, pitchstone or jet in field records) all appear to be fragments of coal. The larger pieces have the conchoidal fracture combined with bedding cleavage associated with bituminous coal, which often breaks up into cuboidal fragments of the type under investigation. None of the material examined has a specific gravity high enough to be pitchstone and it appears to be too friable to be jet. The site was situated close to the course of the abandoned Ballinluig/Aberfeldy single-track railway branch line. This line was operated using coal-burning locomotives until its closure, some decades ago, and it is possible that the site has been contaminated by coal debris from locomotives.

KERB STONES OF THE RING-CAIRN: SIZE, TYPE AND COLOUR

Richard Tipping

Size differentiation

The inner and outer kerbs of the ring-cairn comprised c 150 large, well- to sub-rounded boulders (illus 25). The long- or 'a-axes' of these boulders were measured from the site plan (scale 1:20). Stones 1–76 inclusive are from the inner kerb, with Stone 1 being the first stone west of north. The sequence continues at the equivalent position within the outer kerb, with Stones 77–137; the two stones of the outer kerb in the north-east quadrant are not included. Statistical comparisons of average a-axis length of stones were made between, firstly, the inner and outer kerbs, and secondly, between the three near-complete quadrants, the north-west, north-east and south-west quadrants, in order to test intuitively recognized variations in stone size throughout the ring-cairn (Table 11).

TABLE 11
Size statistics for stones of the inner and outer kerbs of the ring-cairn

Quadrant	Kerb	No	mm	σ(mm)
north-west	inner	13	58.46	7.41
south-west	inner	31	48.90	13.25
south-east	inner	32	48.85	12.69
$\sum$	inner	76	50.49	12.72
north-west	outer	12	66.77	9.94
south-west	outer	19	86.10	21.31
south-east	outer	26	62.90	24.19
$\sum$	outer	57	71.47	23.35

A Mann-Whitney test comparing the a-axis lengths of stones between the inner and outer kerbs suggested a significant difference (z-score of -6.3308; significant at the 0.001 level). This indicates that there was a conscious selection of stones with regard to size, the largest forming the outer kerb.

A Kruskal-Wallis analysis of variance test, performed to investigate possible differences in stone size between arbitrary quadrants of the inner kerb, failed at the rejection level of $\alpha = 0.05$. The same test on arbitrary quadrants of the outer kerb resulted in significant differences. The south-west quadrant has

significantly larger stones. These size differences between quadrants can be emphasized by regarding the very large Stones 90 and 111–12, which all lie contiguous to the arbitrary south-west quadrant, as a natural grouping (see Table 11).

The north-east quadrant of the inner kerb comprises nine large boulders (mean a-axis of 489 mm). These do not appear to continue the circumferential pattern of adjacent quadrants, and are rather a jumbled pile of stones. They comprise a higher proportion of flaggy muscovite-schist (55 %) than the remainder of the inner kerb (Table 12). It is possible that these represent slabs available for incorporation in yet-to-be constructed cists, though this interpretation presumes the need to 'stockpile' suitable stones.

Rock type differentiation

Lithological determination of each of the 147 stones of the inner and outer kerbs was undertaken on site (illus 25). The proportions of different rock types represented are summarized in Table 12. The lithologies of a non-random selection of 50 of the largest stones comprising gravels exposed in a railway-cutting 30–40 m south-east of the cairn were similarly recorded for comparison; these stones were, nevertheless, significantly smaller (150–200 mm mean a-axis length) than stones comprising the ring-cairn.

Statistical analysis (Table 12) indicated that there was no significant difference between the lithologies found in sample populations of natural gravels and those comprising the ring-cairn. The builders of the ring-cairn did not select rock types in proportions other than those found in fluvioglacial gravels. Bedrock sources may have been utilized, but the well-rounded appearance of almost all the ring-cairn stones, and the occurrence of glacial striae on at least one stone, suggests that gravel sources were exploited or, alternatively, river bed sources where such material also occurs.

TABLE 12
Percentages of lithologies recorded from natural fluvio-glacial gravels, from all stones of the ring-cairn, and from the stones of the inner and outer kerbs

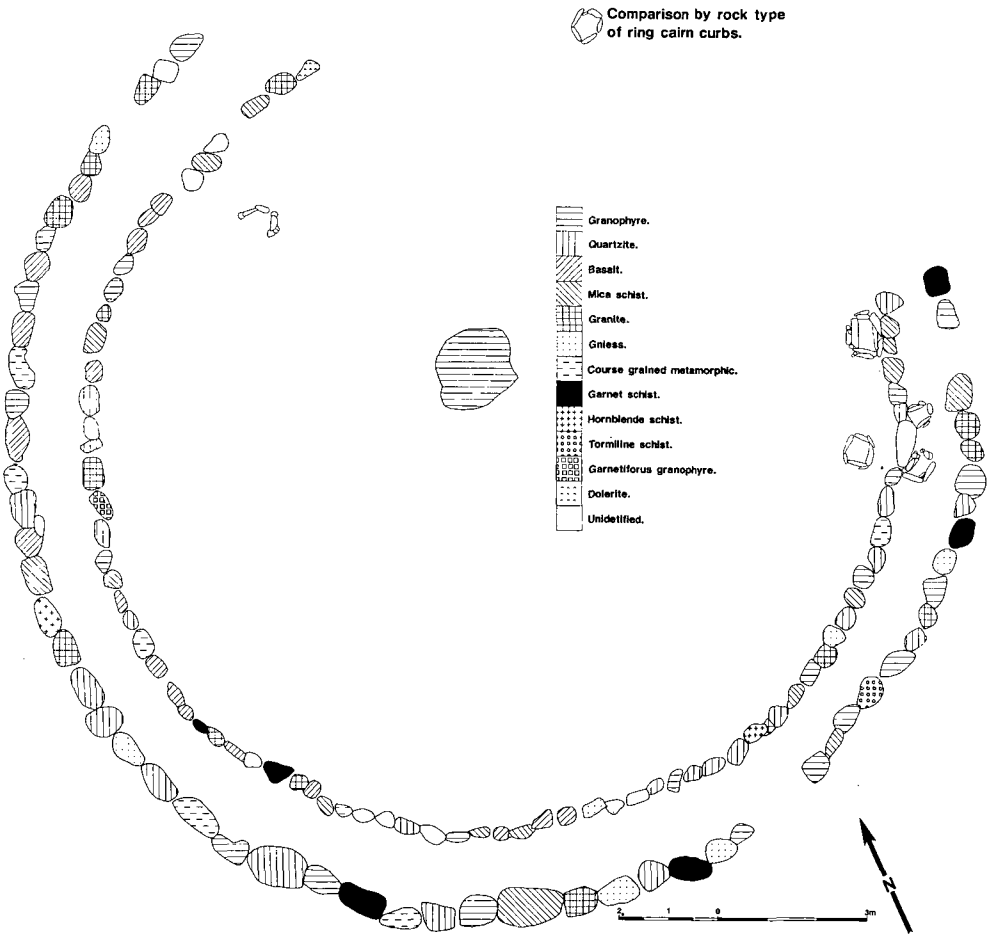
Lithology	f/g gravel	∑ ring-cairn	Inner kerb	Outer kerb	∑ stones
basalt/dolerite	10.0%	15.3%	22.8%	10.2%	49
coarse green ?metamorphic	–	4.8%	4.3%	6.8%	14
diorite	20.0%	15.3%	12.8%	22.0%	54
granite	8.0%	11.9%	10.0%	16.9%	38
gneiss	6.0%	7.5%	8.6%	8.6%	25
quartzite	24.0%	17.5%	21.4%	15.3%	61
muscovite-schist	14.0%	15.3%	15.7%	11.8%	47
epidote mica-schist	2.0%	0.7%	–	1.7%	3
garnet mica-schist	6.0%	3.6%	2.8%	5.2%	13
hornblende/mica-schist	8.0%	1.4%	1.4%	1.8%	8
unknown	2.0%	6.2%	–	–	–

Colour differentiation

To explore the degree to which the appearance of particular rock types might have determined their position within the ring-cairn, lithologies were assigned to one of two colours, 'light' and 'dark'. For the majority of lithologies this was relatively easy: light rocks are granite, gneiss and quartzite; dark rocks are basalt/dolerite, ?diorite and all schists (although the glint of muscovite-schist is certainly attractive, it is regarded here as a dark rock). Table 13 gives the proportions of dark to light stones between inner and outer kerbs, and between the different arbitrary quadrants of each kerb. Only in one quadrant (north-west; inner kerb) is there a distinct imbalance in

TABLE 13
Spatial distribution of 'light' and 'dark' stones in the inner and outer kerbs of the ring-cairn

Quadrant	Kerb	'light' stones	'dark' stones
north-west	inner	1 (7.7%)	12 (92.3%)
south-west	inner	13 (41.9%)	18 (58.1%)
south-east	inner	14 (42.4%)	19 (57.6%)
Σ	*inner*	*28 (36.4%)*	*49 (49.6%)*
north-west	outer	4 (33.0%)	8 (67.0%)
south-west	outer	8 (34.8%)	15 (65.2%)
south-east	outer	11 (44.0%)	14 (56.0%)
Σ	*outer*	*23 (40.0%)*	*37 (60.0%)*
Σ	both kerbs	51 (37.2%)	37 (62.8%)



ILLUS 25 Comparison of different rock types used in the construction of the inner and outer kerbs of the ring-cairn

colours. Overall there is no suggestion that colour was of importance in the location of stones in the kerbs.

DISCUSSION

Within the Scottish tradition of the late third and second millennia BC, ring-cairns represent only one of many categories of funerary and ceremonial sites. While, perhaps significantly, a precise definition is lacking, ring-cairns have been described as monuments 'which involved the construction of a circular ring or bank, inside which various rituals associated with burial were undertaken' (Ritchie & MacLaren 1972, 1). This point was recently re-emphasized by Barclay (1992, 78) who argued that the most significant aspect 'was the stage where an open space was surrounded and defined by a high ring-bank, but where provision was made for continued access to the area prior to a further alteration'. In his recent discussion of the ring-cairn from Balfarg Riding School, Barclay (Barclay & Russell-White 1993) has, in addition, raised the fundamental issue of the broad function of ring-cairns which, apparently, has to extend beyond the provision of an enclosed area for funerary activity.

The superficial impression of the Sketewan monument was, prior to excavation, that of a simple round cairn. Yet, upon excavation the site soon revealed an extraordinarily complex structural sequence; the monument's appearance changed radically several times during its use, and its construction involved elements which elsewhere may be found singly, in different combinations, or executed in other media. Indeed, it is clear that the constructional and architectural elements encountered at Sketewan draw upon a wide-ranging 'grammar' of architectural characteristics current during the third and second millennia BC. With hindsight, the site can be described at its various stages as a 'cairn', a 'cist cemetery', an 'enclosed cemetery' or a 'ring-cairn'; the list reads like a typology of Bronze Age funerary sites. At Sketewan all of these elements are represented and repeated within one monument-complex.

The stratigraphic account (above) draws attention to the difficulties of establishing a clear chronological relationship between all aspects of the monument's development. The central cist, and the satellite cists surrounding it to west, north and east form a cist cemetery devoted exclusively to burial in the form of cremation. Unlike many other Bronze Age funerary sites, Sketewan offers unequivocal evidence of *in situ* cremation preceding the actual burial, although it cannot be proven that individuals cremated on site were actually interred there.

Although it is impossible to prove, it appears reasonable to suggest that initially the cremations were deposited in the satellite cists, which could have been built simultaneously with the pyre or as they were required. Similarly, the final cremation before the closing of the central cist — accompanied by grave goods in the form of a Food Vessel, an unused plano-convex knife and a floral tribute (evidently *Filipendula*: dropwort or, more probably, meadowsweet) — was placed in the central cist. The construction of the central cairn — encircling the central cist and extinguishing the last of the funerary pyres — brings the first funerary disposal stage of the monument to a close.

Tipping (1994) has recently presented palynological evidence from a number of Bronze Age cists in Scotland, which highlights the recurrent presence of pollen of *Filipendula* in Bronze Age funerary contexts, and suggests possible explanations for this. He has argued that tributes of flowering and pleasantly scented bunches of *Filipendula* offer an attractive interpretation for the pollen data from a number of Bronze Age cists. Such an interpretation is in keeping with the evidence of organic staining at the bottom of Sketewan cist and a scented offering of meadowsweet flowers may well have been placed in the central cist at the time of deposition of the

cremation. The significance of the flowering *Filipendula*, a plant encountered in a number of Bronze Age contexts in Scotland, is difficult to determine and evidence from Ashgrove, Fife — where the interpretation for a fermented liquid flavoured with *Filipendula* has hitherto been generally accepted — suggests a culinary familiarity with this plant among the Bronze Age population in Scotland. However, the pleasant scent of *Filipendula*, whether in bloom, or in the form of dried and crushed leaves (whereby the scent would be enhanced), may in itself have been sufficient to justify the choice of this plant in funerary ceremonies.

The cist was left open long enough for considerable silting to occur and once half-filled, the remaining void was packed with cobbles and soil. The cist was then marked by an upright post, possibly to allow the dragging of the great covering slab to be accurately directed up the convex slope from the river. The slab was ramped up onto a mass of stone trigging and positioned well above the level of the cist-slabs below. The central cist was sealed by this capstone immediately after the last lighting of the funerary pyre; thereafter, the central cairn was built over the remains of the pyre (while still very hot) which probably left the upper surface of the cist-slab visible in its surface.

There are a number of constructional aspects of the ring-cairn which merit discussion. Because of the sheer magnitude of the central cist, an initial impression could be formed that the ring-cairn is related to this cist. However, the ring-cairn is eccentric to this cist; yet the architectural and constructional skills evident in all its elements are of such a degree that attribution of this eccentricity to error, or to the builders' inability to relate structures to one another, seems inappropriate. The eccentric position of the ring-cairn relative to the central cist must, therefore, result from a different relationship. The ring-cairn is, in fact, not centred on the cist, but on the funerary pyre beside it. This interpretation is corroborated by the proposed sequence of events in which the funerary pyre, and at least some of the small satellite-cists, are earlier than the central cist. In this context it is an inevitable conclusion to regard the ring-cairn as being relatively early in the sequence of the site, built in relation to the already existing funerary pyre.

If this interpretation of the spatial relationship between the funerary pyre and the ring-cairn is correct — with the ring-cairn being centred upon it — then at least some of the early funerary activities at Sketewan (which resulted in the use of Cists 5, 7 and possibly 3) would have taken place in an unenclosed space. On the other hand, the arrangement of five of the cists (3–7), in a semicircle to the north and east of the funerary pyre, suggests that their construction is related to the central position of the pyre and they should be considered contemporary. There, however, does exist an equally valid possibility that they were built over a more extended period of time: Cists 5, 7 and 3 being constructed and used for funerary deposits early in the sequence and, upon their closure underneath the ring-cairn, the remaining cists having been built to facilitate further burials. The chronological relationships between the satellite cists themselves cannot be ascertained.

However, we do know that the ring-cairn, initially at least, would not have been built to define an area for funerary purpose — such being already in existence through the presence of the funerary pyre and Cists 5, 7 and 3. On the contrary, it may have been constructed to mark a cessation of burial rituals in this phase, in an hitherto unenclosed area, symbolically sealing off from general access the funerary area exposed to view. This event would have marked a change in the funerary focus of the site prior to the construction of the central cist (which contained fragments of one cremation only) from multiple to single burial, or would possibly have emphasized a change in the function of the site from funerary to more general ceremonial purposes.

There is no evidence to indicate how long the ring-cairn stood as a visible feature although, as far as can be established, no developed turf-line formed within the enclosure. The very elaborate process of in-filling has already been described, but the appearance of the ring-cairn itself — with its inner and outer kerbs — suggests that, for some of the time at least, it must have been an imposing, free-standing monument. The apparent lack of any designed access to its enclosed open space (noting, however, the *caveat* relating to the missing northern sector) suggests that formal access to the interior was not required. Thus, it can be suggested that the open annular space which existed for a period within the ring-cairn was designed to be a symbolically exclusive or prohibited area.

Comparison with other Scottish sites is difficult. The published accounts of those investigated in the late 19th and early 20th century do not provide sufficient detail to determine the precise sequence of construction nor do they enlighten us upon possible functions. Thus, only the most general comparisons can be made with sites such as Sands of Forvie, Aberdeenshire, or Sundayswells Hill, Aberdeenshire (Henshall 1963; Ritchie & MacLaren 1972, figs 1 & 2), though there is a distinct impression that these are both rather late within the overall series. The *corpus* of recorded ceremonial/ritual sites of the late third and second millennia BC, in Scotland and elsewhere in Britain, has increased considerably over the last two decades, through ground survey, aerial photography and excavation (eg Barclay 1983; Barclay & Russell-White 1993; Barnatt 1990; Russell-White *et al* 1992). Yet, as at Sketewan, results of recent investigations at other sites emphasize the complexity and individuality of the funerary and ceremonial monuments of this period. Elements typical of a ring-cairn are present within a wide range of sites, extending over a considerable period of time, encompassing embanked and recumbent stone circles, henges, barrows, cairns and enclosed cemeteries.

In Scotland, the earliest ring-cairn group comprises those best represented at the 'passage-grave' cemetery at Clava (Piggott 1956; Henshall 1963). They combine many elements that are present in Scotland during the third and second millennia (uncal) BC, which appear to have been adapted to a number of specific traditions already present in the Moray Plain. However, closely related or unrelated they may appear by chronology and geography to developments in Perthshire in the mid-second millennium (uncal) BC, an architectural tradition seems to have prevailed nevertheless, unbroken, for a millennium.

During that period the idea of the ring-cairn seems to have denoted the secondary state of site-use as its occurrence evidently indicated a change of function (or at least a new emphasis) within a multi-phased site-sequence. Ring-cairns associated with stone circles offer good examples here. At Loanhead of Daviot, Aberdeenshire, the construction of a ring-cairn within the recumbent stone circle may have coincided with the abandonment of activities in the centre of the monument (Kilbride-Jones 1935, 174). At Balbirnie, Fife, although the site was badly disturbed, Ritchie (1974, fig 1a, pl III:c) was able to recognize a bank of stone adjoining two of the standing uprights. Whether the remainder of this bank was destroyed or whether it was never completed could not be determined; what is of interest here is Ritchie's suggestion that, as at Loanhead of Daviot, the joining of the uprights by the stone bank appeared to mark the cessation of activities in the centre of the monument. Nearer Sketewan, at Croft Moraig, Perthshire (Piggott & Simpson 1971), a roughly circular stone bank ('phase II') appears to have played a role in re-defining the orientation of the monument and possibly its function also (though again, this was not a ring-cairn proper).

At a number of sites the 'central' burial pit is not placed in the middle of the ring-cairn but off-centre: eg Woodhead in Cumberland, Whitestanes in Dumfriesshire or Weird Law in Peeblesshire (Ritchie & MacLaren 1972, fig 3). The burial evidence from the ring-cairn at Balfarg

Riding School, Fife, cannot easily be associated with any of the phases of the monument, but the pit containing the cremation was markedly off-centre (Barclay & Russell-White 1993). Unless protected, as at Sketewan, evidence of a pyre would be impossible to detect and one is brought to wonder whether apparent eccentricity might be related to a similar sequence of events at these other sites.

Stevenson (in Russell-White *et al* 1992, 287) has recently pointed out that Scottish enclosed cemeteries, on the whole, do not reveal a well-defined 'central' burial but rather groups of burials (in pits or cists) scattered throughout the enclosed area; this is much as Sketewan would have appeared at the end of Phase IV. Excavations at Loanleven, Perthshire, recorded a partly destroyed cist cemetery surrounded by a ring-ditch filled with earth and stones, and revealed a diffuse cist distribution (although the centre of this complex was damaged; *ibid*, fig 9). Even more pertinent are the excavations at Park of Tongland, Kirkcudbright (*ibid*, 312–15), where activity involving a series of pits with cremations (either in urns or deposited directly into the pits) was followed by the erection of stone uprights and subsequently by the construction of a kerbed cairn. The excavators, following the interpretation of the Royal Commission (RCAHMS 1914), suggested that the cairn was robbed in the centre. While this is possible, the published plan (*ibid*, fig 13) reveals a fairly regular and stone-free interior, and an alternative suggestion would be that of a wide ring-cairn capping a previously undefined cemetery area.

Looking further afield, Lynch (1993, 142) in discussing the Brenig 44 ring-cairn, Denbighshire, perceives a lack of significant similarities between Welsh and Scottish ring-cairns. Nevertheless, it is interesting to note the alternation between the ceremonial and funerary phases on the Welsh sites, with the former apparently of much greater significance than the latter. Such may well prove to be the case in Scotland. While evidence of burial activity is indeed present at the two most recently excavated Scottish ring-cairns — at Sketewan and Balfarg Riding School (Barclay & Russell-White 1993) — in neither case does it appear to relate directly to the construction of the ring-cairn. Ultimately, the assumption of a primarily funerary function for the ring-cairn element may have to be reviewed.

Another problem which remains unresolved is the in-filling of the interior of ring-cairns. Barclay pertinently observes that on many Scottish sites, the space defined by the ring-cairn, or a related feature, is absorbed by subsequent modifications; sometimes, as at the North Mains barrow, Strathallan, Perthshire (Barclay 1983, 235), the image of the lost space is preserved in the shape of the subsequent structures (whether internal embankment or fences); but on other sites it becomes buried under a cairn or mound. This is what took place at Sketewan, though one wonders whether those who subsequently built the palisaded enclosures adjacent to the cairn were conscious of the basic elements of the ring-cairn tradition, a tradition potentially reaching back to Clava, and beyond.

It is to this series of ring-groove palisades abutting the south-east side of the cairn that we must now turn our attention. The series of broadly circular timber palisades annexed to a cairn, with associated deposits of urned and unurned cremations, is not difficult to parallel elsewhere. Perhaps the most obvious parallel can be drawn with the site of South Street Farm in North Yorkshire (Vyner 1988) where there is a palisaded sub-circular enclosure (Vyner's 'wossit') of roughly comparable size and of the same chronological horizon. The evidence here suggested an enclosure of easterly aspect, constructed of timbers of varying height (*ibid*, fig 15). The latter feature is of particular interest as it evokes a tradition familiar at some henge monuments (Mercer 1981) and ultimately, perhaps, recalling, once again, with Clava-type cairns and Scottish recumbent stone circles. While the evidence from Sketewan is too meagre to pronounce on the

height and arrangement of the timbers, the deliberate dismantling of the palisades and the subsequent deposition of cremations is common to both sites.

Loanhead of Daviot also offers interesting parallels, if one allows some reinterpretation of the excavated evidence. South-east of the ring-cairn and stone circle, Kilbride-Jones (1936, 281) described a cemetery enclosed by a circular boundary ditch, with a stone dyke 'confined within its limits'. The ditch was variable in width and depth, and traces of 'fires kindled within the ditch' were observed for most of its length. The erect positions of the stones of the 'dyke' suggest remnants of a timber palisade with packing stones wedged into the slot, similar to those at Sketewan. The 'fires kindled within the ditch' may well reflect the accidental or deliberate firing of the palisade or, indeed, deliberate charring of the post ends before setting them in the earth; unfortunately, the published description and plans are not detailed enough to allow any certainty. At least 12 Collared Urns with deposits of cremated human bones were inverted in individual pits, and nine additional pits contained unurned cremations. This arrangement, of an enclosed urn and cremation cemetery next to an earlier, locally significant monument, corresponds well to the circumstances encountered at Sketewan. A small cairn appears to have been erected on both sites upon the cessation of burial deposits.

While information relating the Sketewan cairn to other monuments in the area around the modern village of Balnaguard is far from complete, it is possible, nevertheless, to reconstruct the overall picture. In discussing the early Neolithic mound at Pitnacree, Coles & Simpson (1965, 43) emphasized the richness of the prehistoric landscape in Strathtay; the area around Balnaguard was, without any doubt, one of the major local centres of settlement and ceremonial/ritual activity during the Neolithic and Early Bronze Age. There is virtually no information on local settlement in the periods under consideration, but the ceremonial sequence may well have begun with the early/middle Neolithic activities attested at Pitnacree, moving onto the southern bank of the river during the later Neolithic. While the Pitnacree barrow stands in an area peripheral to agriculture, the evidence for ploughing and deforestation recovered from beneath the Sketewan cairn reveals that the southern bank of the River Tay was of considerable agricultural importance before the Early Bronze Age. The possible ring-ditch to the north-east of the Sketewan site (known only from aerial photographs) may belong to this period; complementing this picture is the impressive, unexcavated barrow at An Sithean, Balnaguard, with its find of the Group IX axe-head, as this fills an apparent gap in the ceremonial activities of the late Neolithic. Barclay (1983, 276) comments on the massive barrow at North Mains as 'a late but very vigorous reflection of the burial tradition of the mid to late Neolithic'; it is just this tradition which may represented by mound at An Sithean.

There can be little doubt that the remaining Standing Stone to the east of the Sketewan cairn is but a sad remnant of a ritual complex which unites the late Neolithic mound at An Sithean and the Early Bronze Age cairn in a long sequence of burial and ceremonial events. The presence of the cremated Beaker burial in a cist adjacent to the standing stone, as well as the cobbled area with charcoal and cremated human bone (a possible funerary pyre) to the east and south of the standing stone, the possible east/west alignment of three standing stones and the discovery, in the late 19th century, of a cist with a Food Vessel all combine to suggest that this area was used for cremation and ceremonial activities pre-dating and perhaps contemporary with ceremonies at Sketewan. These sites, as well as the Sketewan cairn itself, can therefore be viewed as 'satellite' monuments of the central mound at An Sithean, with the Sketewan cairn being the culmination of a prolonged burial sequence in the immediate locality, with its own 'tail' of ceremonial use reaching to the turn of the first millennium (uncal) BC.

The final activities at the Sketewan cairn (Phase XIII) included two more cremations, this time performed on top of the already dilapidating subsidiary cairn. In each instance the spot was marked by a large, upright water-worn boulder. It is not too far-fetched to suggest that this arrangement replicates, on a diminutive scale, the situation found about 200 m to the east of the cairn. There Dr Stewart encountered burials placed in close proximity to the east/west alignment of the standing stones which, among other things, may have served as funerary markers. That the final users of the Sketewan monument should have recognized the significance of the standing stones and arranged their own rituals accordingly is surely a testimony to the long funerary/ceremonial tradition associated with this location. The move from a peripheral to a central location for ceremonial activity is a well-recognized feature of the period between the middle Neolithic and the Early Bronze Age in northern Britain. At Pitnacree, Balnaguard and Sketewan this progression is well demonstrated. At Sketewan itself, within a radius of 200 m, nearly every aspect of late Neolithic and Early Bronze Age funerary and ceremonial practice is represented, both in terms of ceramic association and in terms of architectural motif. There is evidence that the funerary association of Sketewan continued until the turn of the first millennium BC, when the monument finally became absorbed into a new, re-structured economic landscape. The lynchet which formed on the site from that time coincides with a field boundary which ultimately determined the positioning of the railway line built beside the site in the 1890s of the present era.

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