AN EARLY BRONZE AGE UNENCLOSED CREMATION CEMETERY AND MESOLITHIC PIT AT SKILMAFILLY, NEAR MAUD, ABERDEENSHIRE

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1 ABSTRACT

An unenclosed Early Bronze Age cremation cemetery was excavated by CFA Archaeology Ltd (CFA) during a watching brief associated with the construction of a natural gas pipeline from St Fergus to Aberdeen, Aberdeenshire, in the summer of 2001. The cremation cemetery contained 41 pits, 29 of which contained cremated human bone, and 11 of these were associated with Collared or Cordoned Urns. The cremations have been radiocarbon dated, through a combination of charcoal and bone apatite, to 2040 to 1500 BC, and the cemetery is the most comprehensively dated in Britain of this period. A variety of grave goods were recovered, including a pair of Golden Eagle talons and a flint foliate knife. A large Mesolithic pit was found in the same location as the cremation pits and was dated to 4510–3970 BC.

2 INTRODUCTION

This report presents the results of archaeological excavations undertaken by CFA Archaeology Ltd (CFA) on the route of the St Fergus to Aberdeen Gas Pipeline during May to July 2001. The work was commissioned by Environmental Resources Management (ERM) on behalf of Transco (now National Grid).

An Early Bronze Age unenclosed cremation cemetery was identified to the north-east of Skilmafilly, to the south of Maud (illus 1), during a watching brief on topsoil stripping of the pipeline easement, conducted by Kirsty Sabine Archaeology acting on behalf of Nacap Lawrence. This site was not known previously and would have been directly affected by pipeline construction; therefore the aims of the excavation were fully to excavate and record the cemetery prior to its removal.

Further discoveries made during the pipeline watching brief comprised a ring-ditch of uncertain date, an arc of three large pits of likely Late Neolithic or Bronze Age date, and a chipped stone scatter containing lithics of both early and later prehistoric date. These were fully excavated and site reports and post-excavation results are contained within the site archive. Further details relating to isolated minor sites are also contained in the project archive.

The cremation cemetery site lay on a small saddle between two hills at about 135m OD, with a south-east facing aspect (NGR: NJ 9088 3990) (illus 1). The Hill of Skilmafilly lies to the west. The land in this area is currently used for mixed farming. In the local area, an extensive field system and settlement remains survive at Bellmuir to the south-west of Skilmafilly, and include a complex of burial mounds. The RCHAMS records numerous findspots in the surrounding area, including axe heads, flint tools, carved stone balls and cinerary urns, many of which are antiquarian finds, and antiquarian records of the removal of burial cairns and stone circles. A recumbent stone circle survives to the north-west at North Mains of Auchmaliddie, and the Candle Stone lies to the south-west at Drumwhindle House. Slightly further afield, between Mintlaw and Ellon, a number of stone circles, standing stones, burial cairns and prehistoric field systems and settlements are also Scheduled. Late Neolithic settlement remains were recorded at Auchmachar Clump during excavations for a pipeline. These sites attest to the richness of prehistoric activity in this area and the degree of survival of upstanding remains.

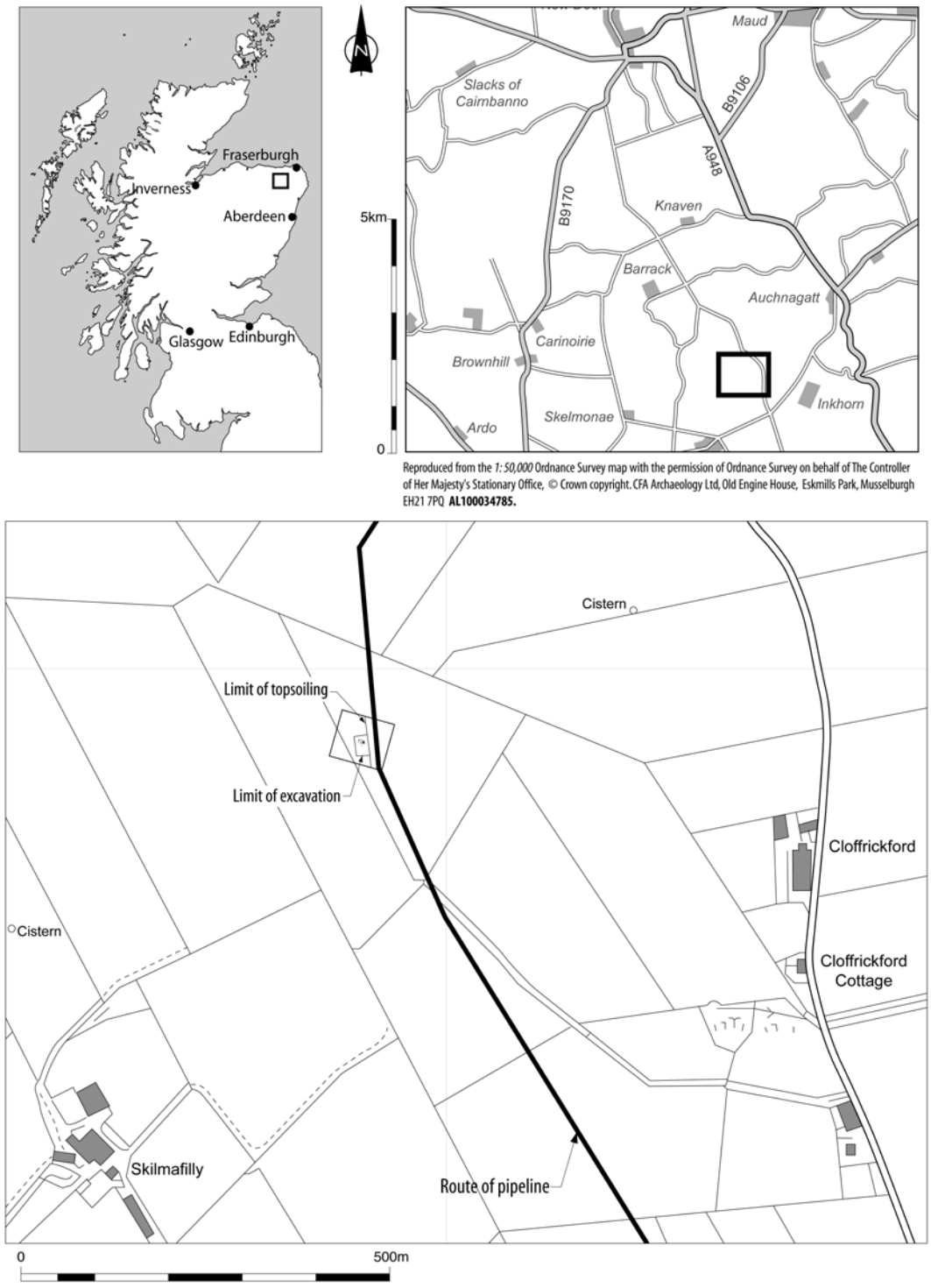
2.1 Working methods

Topsoil was removed by tracked earth-moving machines equipped with smooth-bladed ditching buckets, to reveal the subsoil surface. Once cleared of topsoil the area was cleaned by hand and all features were fully excavated. Sampling consisted of bulk samples for flotation and sub-samples for routine soil tests; these were taken from each context within a negative feature.

The subsoil consisted of compacted yellow-orange clay, in places leached to a grey-green colour ringed by iron panning. Modern ploughsoil 0.2m deep lay directly over the subsoil. Despite the shallow depth of the topsoil, there were few ploughscores visible on the subsoil surface across the site. Truncation of the inverted pots recorded in certain pits is a clear indication that some destruction had occurred, however.

2.2 Archive

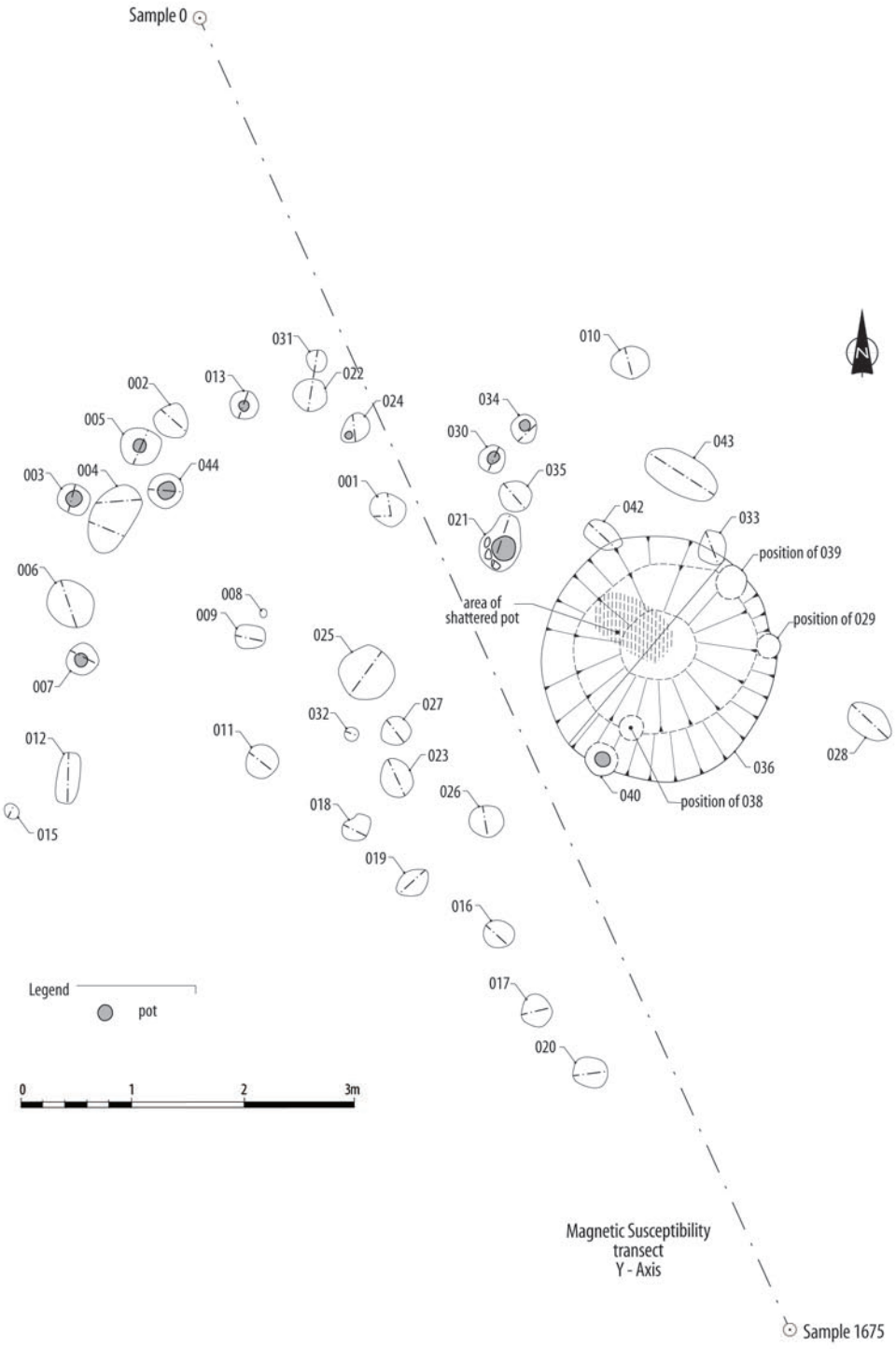
The project archive has been deposited with the RCHAMS. The finds have been claimed under Treasure Trove procedures and have been deposited with the Marischal Museum, Aberdeen.



Illus 1 Location map

3 UNENCLOSED CREMATION CEMETERY AND OTHER FEATURES

A tightly clustered group of 41 circular and oval pits, all lying within an area *c* 12m in diameter, was identified within the eastern half of the pipeline spread (illus 2 and 3). This group included 29 pits containing cremated human bone. There was no obvious overall spatial layout within the cremation cluster and various groupings could be postulated. Eleven cremation urns of both Collared and Cordoned Urn



Illus 2 Plan of cremation cemetery

Illus 3 General view of the site during excavation

type were found, ten of them in pits. The features had been truncated and there was no evidence for an enclosing bank or ditch; the cemetery is presumed to have been unenclosed. No trace of any covering barrow has been ascertained.

The cremations have been extensively dated and were found to be Early Bronze Age in date, falling in the first half of the second millennium BC. The single large pit (036) cut by later features was dated to the late Mesolithic through radiocarbon dating.

There are two distinct groups of burials – urned and un-urned cremations – and a group of pits without cremation deposits. These will be discussed in turn below. A summary of the human remains found within the pits is provided in Table 1, and a summary of the contents of the pits is provided in Table 9. Radiocarbon dates are detailed in Tables 6 and 7.

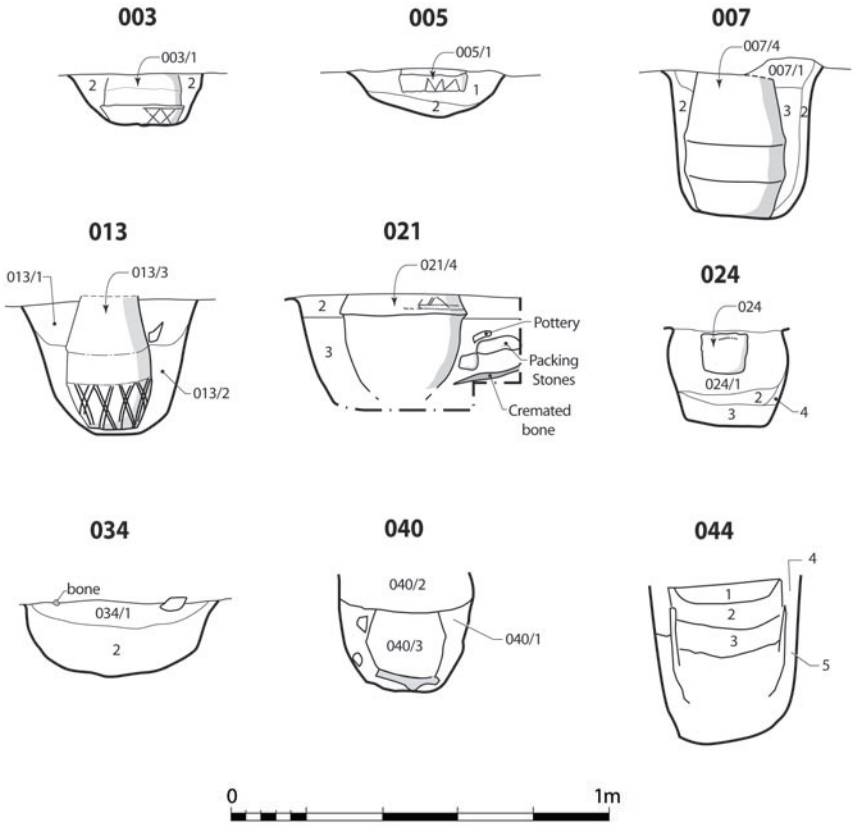
3.1 Urned cremation burials, with contributions by Melanie Johnson and Kathleen McSweeney

There were at least 11 urned cremation burials. Nine of the pits (003, 005, 007, 013, 024, 030, 034, 040, 044) contained inverted urns that varied in size, shape and decoration. A single pit (021) contained an upright urn. Many fragments of a single vessel were found on the surface of the late Mesolithic pit (036) and may have come from a further disturbed burial cut into this pit (illus 2). Two of the vessels were Cordoned Urns (013 and 030) while the remainder were Collared Urns. The pits and their associated vessels are described individually below.

3.1.1 Pit 003

This pit measured 0.35m across and 0.15m deep (illus 4). It appears to have been quite severely truncated. A single fill, consisting of compacted, mottled dark brown/black silt with redder (ashy) patches, was found surrounding the vessel (003/2).

It contained a tripartite Collared Urn (illus 5). The vessel has quite a pronounced overhanging collar, with an internal rim bevel. It most closely corresponds to Longworth's Secondary Series Form Va (1984). The entire circumference of the collar survives but there are portions of the rim missing. It was in a very poor condition when taken for conservation; the vessel was broken, with some sherds dislodged, and was otherwise badly cracked. Once the vessel was removed, the deposit below consisted of orange-coloured natural, perhaps heated or burnt, which contained bone and soil. There is no base and the vessel survives to a height of 180mm. The rim diameter is 210mm and the collar has a height of 70mm. It is decorated with impressed twisted cord, forming a single horizontal line below the rim and at the bottom of the collar, with linked lozenges between. On the internal bevel of the rim the decoration is again impressed twisted cord, forming a single horizontal line around the upper side of the bevel with short parallel diagonal lines beneath,



Illus 4 Sections of pits containing urns

fairly closely spaced. The decoration has been neatly executed.

No other artefacts were found in the pit or urn. The cremated bone was dated to 1880–1530 BC (GrA-26519), and comprised three individuals: two children (one aged 5–7 years and one aged about 12) and an adult; the adult, however, was represented by a single bone. There was no indication of the sex of any of these individuals. The significance of the mixed remains is not clear. The majority of the remains are from the two children, and the single mature bone may simply be a stray. There did not appear to be any layering of remains from different individuals to suggest that each was deposited in the pot at different periods. As there were no obvious differences in the colour or texture of the remains, it is possible that all individuals died at the same time and were cremated together: however, it is equally possible that the individuals died at different times and the remains were stored elsewhere until placed in the pot. The completeness of the remains indicates that it is likely that the entire skeletons of the two children were placed inside the pot.

3.1.2 Pit 005

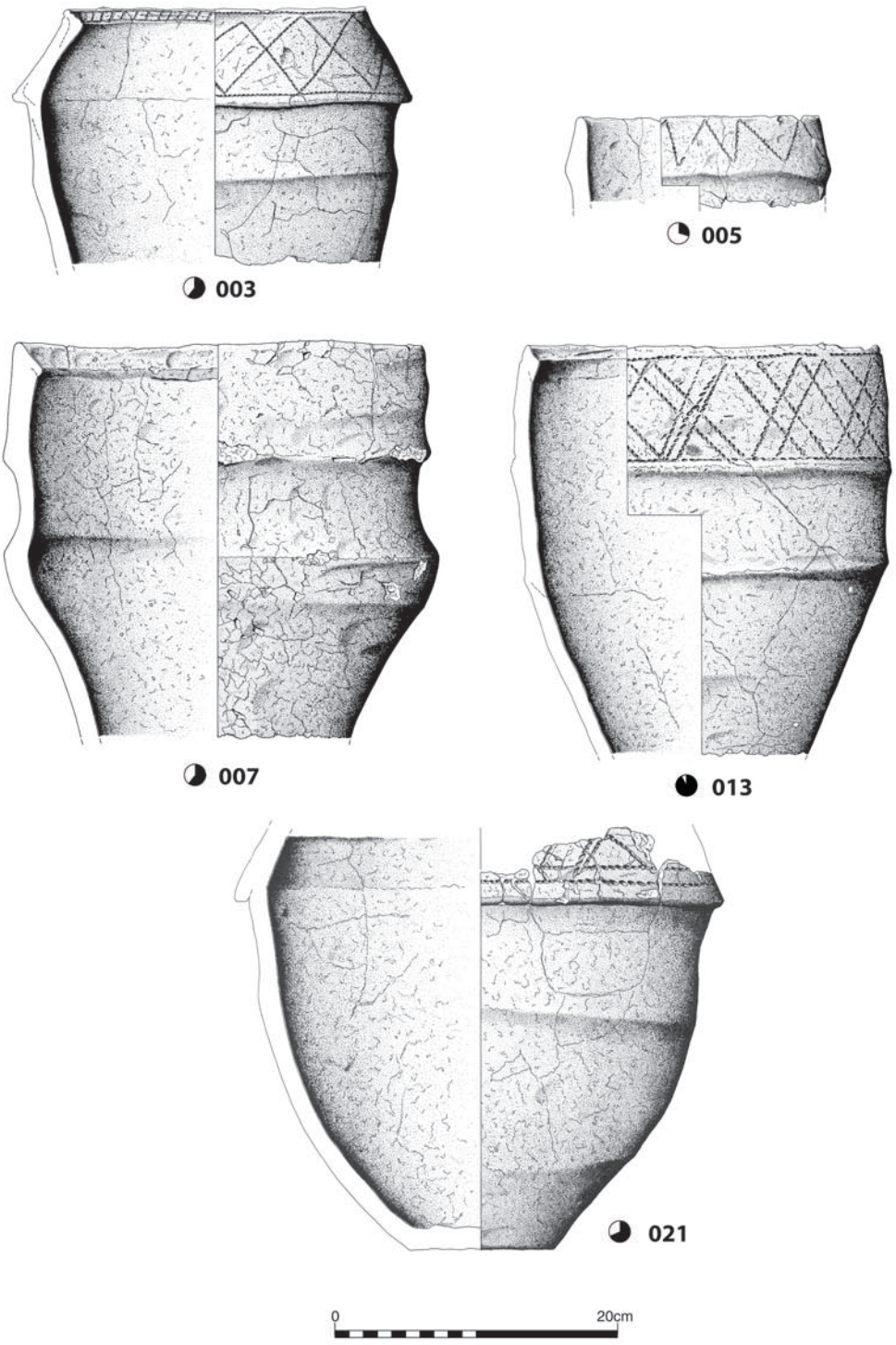
This pit measured 0.4m across by 0.13m deep (illus 4). The upper fill of the pit outwith the pot was compacted medium brown silt (005/1). Bone had spilled out from the vessel when it was placed in the pit, beneath which was a distinct layer of charcoal at the base of the pit (005/2).

It contained the remains of an inverted Collared Urn (illus 5). The vessel, badly cracked, survives as a complete rim and collar to a maximum height of 65mm. The simple rounded rim has a diameter of 170mm. It is decorated on the collar with a continuous running zigzag of impressed twisted cord.

A natural quartzite pebble was found below the mouth of the urn inside the pit. No artefacts were found in the urn or pit. The cremated bone, of an adult, has been dated to 1760–1530 BC (GrA-26520). Age at death was at least in the mid-20s and the individual had arthritis in the jaw; this would no doubt have caused pain while eating. There were no indicators of sex. The homogeneous nature of the remains indicates that burning was even throughout and the colour indicates that it was at a high temperature.

3.1.3 Pit 007

This pit measured 0.4m across and 0.38m deep (illus 4). Around the top of the pit, the upper fill was very compacted re-deposited subsoil of yellow-orange clay. A charcoal-rich fill appeared to line the cut and could be seen on the surface as a faint ring of darker material by which the feature was



Illus 5 Cremation urns 003, 005, 007, 013 and 021

initially identified. It contained at least one obvious carbonised wood fragment that had been placed horizontally near the edge of the cut. The lower fill of this pit (context 007/3) lying outwith the pot was charcoal-stained dark grey-brown silt. It is possible that these charcoal-stained deposits may have corresponded to a wicker basket, within which the urn was originally set.

The pit contained an inverted tripartite Collared Urn (illus 5) which most closely corresponds to Longworth's Secondary Series Form Ia (1984). This vessel is almost complete but lacks its base, and was in poor condition when taken for conservation, with extensive cracking and surface crazing. The internally bevelled rim has a diameter of 280mm and it survived to a height of 280mm. It is not decorated. At the top of the uppermost spit (the base of the vessel), there were a few broken sherds and the fill

Illus 6 Urn 013 undergoing excavation

contained little charcoal or bone. It appeared as if the pot had been damaged; when the base fell in, soil was deposited on top. No artefacts were found in the pit or urn.

The cremated bone comprised an adult female and a foetus; the adult was dated to 1870–1530 BC (GrA-26521). The evidence for the sex of the adult was slightly conflicting, however on the basis of pelvic morphology this individual is more likely to have been female and in her late 20s at the time of death. The child was likely to be 35–40 foetal weeks. Although there is no indication of the cause of death of either individual, the presence of foetal remains in the same urn as a young adult who was probably female makes it tempting to speculate that death occurred during childbirth. Some patterning in the distribution of the remains from the two individuals suggest that the foetal bones may have been added to the urn after the adult remains, and that some subsequently filtered down to become mixed with the rest of the remains, which would indicate that the adult and child had been cremated separately. On the other hand, foetal remains were found throughout the pot and there are no doubt other immature bones among the unidentified remains, so both may have been commingled prior to insertion in the pot, or placed in the pot simultaneously.

3.1.4 Pit 013

Pit 013 measured 0.47m across by 0.35m deep (illus 4). There were some traces of heat changes, notably reddened scorch marks, around the top of the pit. The upper fill (013/1) was very compacted redeposited subsoil consisting of fine orange clay, only slightly pinker than the surrounding subsoil (illus 6). The rest of the pit was filled with fine dark brown silt with a high charcoal content (013/2). Traces of burnt bone within the lower fill and from beneath the vessel had perhaps spilled from the urn.

The pit contained an inverted Cordoned Urn (illus 5), almost complete but lacking its base. The vessel had a rim diameter of 260mm and survived to a height of 290mm. The rim has a small internal bevel, slightly concave. There are two cordons, the upper one slightly more pronounced. The vessel is decorated with impressed twisted cord, forming a lattice between two horizontal lines between the rim and upper cordon. The cord used was quite thick. It would appear that the vessel was only partially filled when it was inverted. The base either collapsed or was damaged by ploughing and thus earth from the immediate surroundings gradually infiltrated.

A natural quartzite pebble was noted in the fill beneath the urn. A fragment of calcined worked

bone, the point of a pin, was recovered from inside the urn (see McLaren below).

The cremated bone was that of an adult male and was dated to 1690–1500 BC (GrA-26523). Age at death was at least 25 years; however, the presence of widespread spinal degeneration points to a more advanced age, probably of at least middle or old adulthood. A number of pathological lesions were noted, including poor dental health, arthritis of the left thumb and possibly of the knee, advanced spinal lesions and a muscle injury on the right radius. The number of lesions present indicating toothache and joint pains suggest that this individual must have been incapacitated to some degree.

3.1.5 Pit 021

This pit was irregular on plan, and although the cut was clearly defined it had been damaged by plough-dragged stones. On plan it measured 0.5m across, extending to 0.7m where it was disturbed, with a depth of 0.25m (illus 4). The upper fill of the pit probably derived from the urn's contents, as this pot had lost the upper part of its rim, probably during plough disturbance. The upper fill (021/2) of the pit external to the pot consisted of compacted mixed medium brown silt and re-deposited subsoil. The lower and main fill (021/3) was dark brown silt with charcoal staining.

The pit contained an upright tripartite Collared Urn (illus 5). One side of the pot had been crushed and stones had been placed against it where parts of the wall were missing. There appeared to be four of these lining the inside of the vessel, set into the fill in vertical positions, while a fifth stone lay horizontally. These may have been inserted deliberately to seal the broken wall, which appears to have been damaged in antiquity. The area of missing wall appears to have been replaced by these stones and a layer of re-deposited natural placed around the inner wall of the vessel to seal in the cremation; then the rest of the vessel was filled with natural. As the re-deposited natural is clay and as the stones were so tightly packed within this material, it is possible that the clay and contained stones were wet when the stones were inserted into the vessel. The pot may have been broken before being placed into the pit or damaged while it was being inserted.

The vessel's rim diameter is about 260mm, basal diameter 105mm, and it survives to a height of 300mm. It is decorated with a double row of impressed twisted cord at the bottom of the collar, with a motif of twisted cord above which appears to be a lattice. The vessel corresponds most closely to Longworth's Form Va (1984).

No other artefacts were found within the pit or urn. The cremated bone was dated to 1890–1660 BC (GrA-26524), and comprised a child of about 10–12 years old. Two oak charcoal dates from the same pit calibrate to 1970–1740 BC (Poz-7690-1). A single odontoid process of axis vertebra that did not belong with the rest of the material was found. This bone belonged to an individual over 12 years and it would seem that this bone is a stray unassociated bone and that there were essentially only the remains of one individual present in the pot. No pathological lesions were found.

3.1.6 Pit 024

This pit lay close to 022 and was positioned between that pit and 030 and 034, which also contained urns. The pit was sub-rectangular on plan, measuring 0.36m by 0.52m by 0.3m deep (illus 4). It was steep-sided, with a rounded base. Its upper fill (024/1) was a medium brown silt with occasional fragments of burnt bone and charcoal. A fill of cremated bone (024/2), deeper on the south side, was present across the entire pit. Underlying this and lying on the base of the cut was a lens of burnt red ash (024/3). A trace of a charcoal-rich deposit (024/4) lying against the north side of the pit cut was noted on the surface as an arc of darker material marking the edge of the pit.

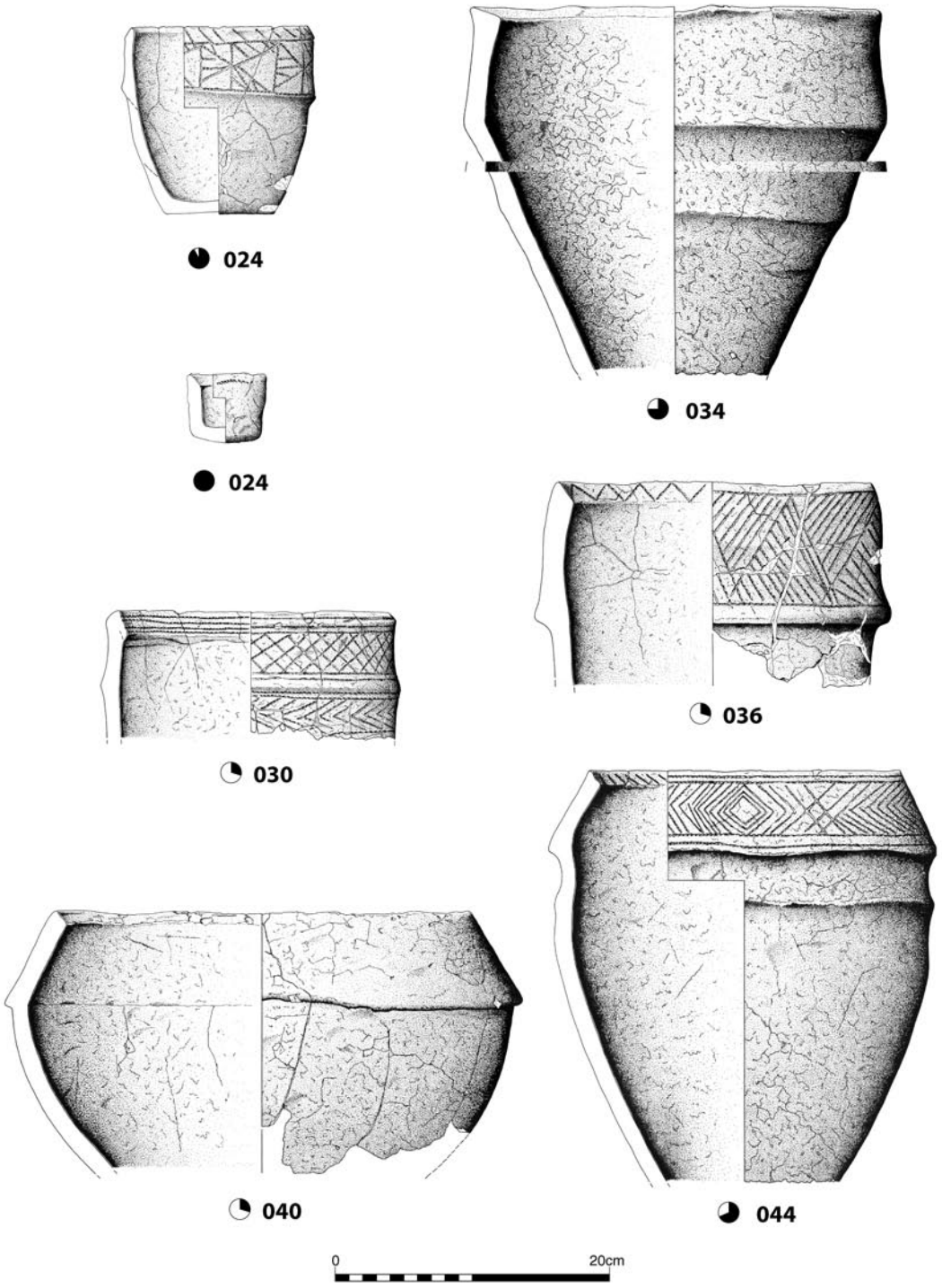
An inverted Collared Urn (illus 7–9) was found at the west side of the pit. Urn 024 is the smallest of all the urns, having a rim diameter of only 130mm, base diameter of 80mm and surviving to a height of 140mm. Its complete profile survived. It was too small to contain a complete adult cremation, and most of the cremation deposit was found spread between the basal fill of the pit and the fill surrounding the urn.

The vessel is complete and corresponds most closely to Longworth's Form IIIb (Secondary Series, 1984). It is decorated on the collar with twisted cord impressions forming panels of radiating triangles; each alternate triangle is filled with lines of cord. A single horizontal line is found at the top and bottom. Immediately below the rim are short diagonal lines.

Inside the urn was found an intact, small cylindrical accessory vessel (illus 7), straight-sided with a slightly rounded base, 60mm in diameter. It has one short length of whipped cord decoration on the exterior near the rim top. It was found lying on its side. Some of the cremated bone was contained within the accessory cup.

It appeared that the urn had been only partly full when it was inverted in the pit and had broken in antiquity; the basal sherds appear to have dropped into the urn, after which the pot gradually filled with soil. A perforated stone disc was found within the cremation material in the pit (see below).

The cremated bone was that of an adult male and was dated to 1750–1530 BC (GrA-26525). Although there were no paired or matching bones that would provide an indisputable link between 024/1 and 024/2, similarities in age and pathological lesions and the absence of duplicated bones suggest that the two sub-deposits were from the same individual. The



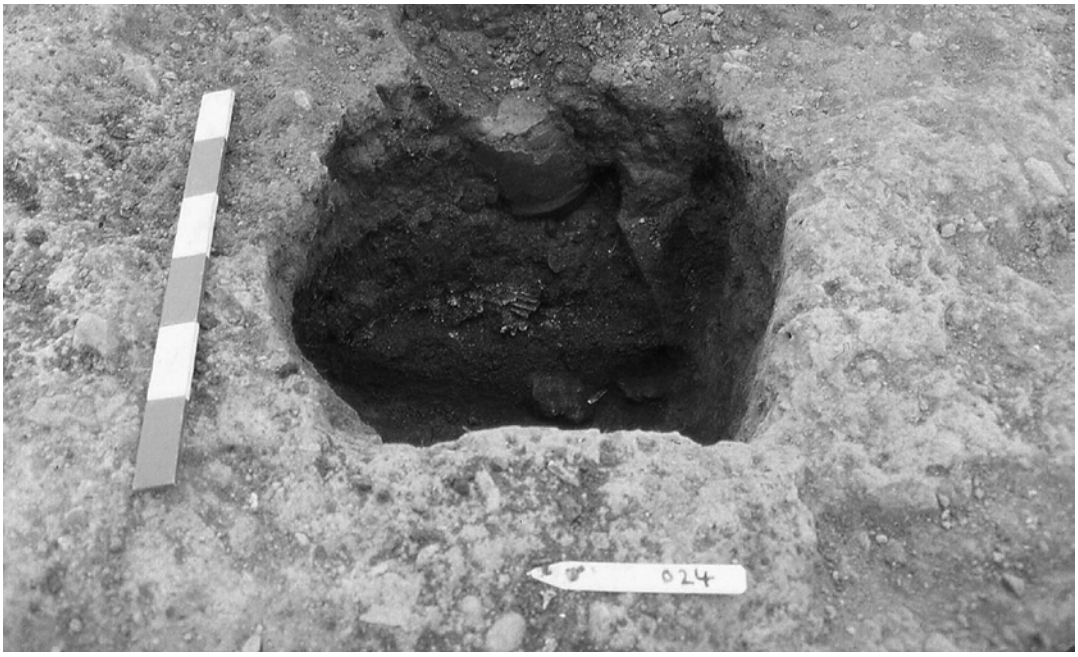
Illus 7 Cremation urns 024, 030, 034, 036, 040 and 044

small quantity of identified bone fragments from the pot make it difficult to say for certain whether they relate to that from 024/1 and 024/2. A single pair of duplicated bones is present within the remains found inside the pot, which may be evidence for a second individual or may simply be a stray bone. A number of pathological lesions were noted, comprising dental disease, arthritis of the hands and feet and spinal disease.

3.1.7 Pit 030

Pit 030, which lay very close to Pit 034, measured 0.35m across and contained a single fill of mixed redeposited natural with very little visible charcoal. Some cremated bone towards the base of the cut is likely to have spilled from the urn.

The pit contained an inverted Cordoned Urn (illus 7). The complete rim circumference survives



Illus 8 Urn 024 undergoing excavation

though part of the circuit has sprung. Its diameter is 200mm and it survived only to a height of 90mm. The vessel was very distorted and cracked. The rim of the pot was found to be covered with pink/orange-coloured natural, which had perhaps been heated or burnt. There is a cordon on the rim exterior at the top, with a second cordon 50mm below. Decoration, all impressed twisted cord, is found both above and below the second cordon in two separate panels, each defined by double rows of cord. The upper panel is decorated with a lattice while the lower has chevrons. There are four horizontal bands of twisted impressed cord on the internal rim bevel. The decoration has been carefully and evenly executed.

No other artefacts were found within the pit or urn. The cremated bone was dated to 1920–1690 BC (GrA-26528) and comprised an adult female. Age at death is likely to be the early to mid-20s. Fourteen fragments of cranium had slight pitting on the external surface, which may indicate the presence of iron-deficiency anaemia during childhood. The roots of the upper and lower third molars had fused into single conical masses; these are fairly common morphological variations.

3.1.8 Pit 034

Pit 034 lay very close to Pit 030. It measured 0.4m across. The upper fill (034/1) of the pit lying outwith the urn consisted of compacted re-deposited subsoil, with a limited charcoal content (illus 4). The lower fill (034/2) was dark brown-black silt containing charcoal chunks and burnt bone, which had possibly spilled from damaged parts of the vessel. The vessel was laid on a layer of stones placed at the base of the pit. This layer comprised six large and one smaller stone, all of which were sitting below the mouth of the vessel as excavated. The stones had been split from one larger rock that appeared to have been smashed; these stones were placed in the pit, making a platform for the vessel to sit on. However, the stones had not been placed in the pit in their original relative positions.

The pit contained an inverted bipartite Collared Urn (illus 7), largely complete except for its base. Its form corresponds most closely with Longworth's Form Vb (Secondary Series, 1984); it is not decorated. The rim diameter is *c* 300mm and the vessel survived to a height of 270mm. The vessel was in a very poor condition when taken to be conserved. The collar was much displaced, broken up and distorted: much of it was supported by the fill as the wall was missing.

An unburnt flint foliate knife (see Ballin below) was found in the centre of the urn, along with the cremated bone of an elderly man. The bone was dated to 1920–1690 BC (GrA-26529), while charcoal dates from the same context calibrated to 1940–1690 BC (Poz-7679-80). Several pathological lesions were noted, including cranial pitting which may signify the presence of anaemia during childhood, osteophytes of the knee and heel which may or may not have resulted in pain or stiffness, and spinal degeneration (osteophytosis).

3.1.9 Pit 036

This vessel was found as a scatter of sherds across the surface of Pit 036 (illus 2). The vessel does not originate from this pit, which is of late Mesolithic

date, but is likely to have been disturbed from another pit, perhaps by ploughing. The vessel is a Collared Urn (illus 7), and has a rim diameter of 235mm and surviving height of 150mm. It is decorated with impressed twisted cord. On the internal rim bevel there is a continuous zigzag. On the collar is a motif of opposed triangles infilled with diagonal parallel lines, which is bordered by a single horizontal line at both top and bottom. There was no associated bone nor any artefacts.

3.1.10 Pit 040

Pit 040 measured 0.34m across by 0.32m deep and was cut into Pit 036 (illus 4). The cut was relatively straight-sided with a flat base. Its upper fill was re-deposited natural (040/2), which masked the pot and appears to have filled the pit after the pot lost its base. The remaining lower pit fill surrounding the vessel was a medium brown silt containing occasional pieces of bone and charcoal (040/1).

The pit contained an inverted Collared Urn (illus 7). Although the full circuit of the rim is present with a diameter of 310mm, the base is missing (surviving height 190mm). The pot is not decorated. One side of the vessel had been crushed and a large sherd had broken off and had been pushed into a horizontal position. The pot was extremely distorted when removed.

The vessel was sitting on the naturally weathered side of a large piece of metamorphic schist, identified as andalucite spotted schist of local origin (Dr Nigel Trewin, Aberdeen University Geology Department, pers comm). It is not clear whether the slab was initially laid at the bottom of the pit, or whether it had been used to contain the urn's contents and was flipped over in tandem with the urn. No artefacts were found in the urn or pit.

There is evidence to suggest that there were two individuals, one inside the urn and the other from the surrounding pit fill. The individuals were both adults; the individual contained within the pot was male and was dated to 1900–1690 BC (GrA-26530). Oak charcoal from the same context was dated to 1900–1660 BC (Poz-7681–2). Although not entirely unambiguous, two molars appeared to have been lost during life. A Schmorl's node on a vertebral body surface probably signifies a traumatic injury to an intervertebral disc of the spine. There was one fragment of parietal bone with blue colouring on the internal surface. This colour-change occurs when bone is burned at a high temperature. Two bones had blue/green staining which is probably due to contamination with metal.

3.1.11 Pit 044

Pit 044 measured 0.4m across by 0.4m deep and the cut was steep-sided with a rounded base (illus 4). The upper contents of the pit and vessel were excavated prior to the lifting of the pot as the urn was not immediately visible. Three fills were evident within the vessel, the upper fill (044/1) consisting of re-deposited subsoil stained with charcoal, the middle deposit (044/2) comprising cremated bone, and the lower fill (044/3) charcoal-rich black silt. Surrounding the vessel and filling the pit was an upper fill (044/4) of clean re-deposited natural and a lower fill of black-brown silt with occasional traces of bone (044/5), again possibly spilled from the urn.

The pit contained an inverted Collared Urn (illus 7). The vessel was in very poor condition and its surface was extremely crazed with numerous cracks. The rim diameter is 230mm and its surviving height is 300mm. The collar is decorated with a motif of impressed twisted cord, bounded by double horizontal rows, and formed around lozenges. The internal rim bevel has short diagonal lines of twisted cord.

It appears that the vessel's base was already missing in antiquity. Its loss was not a product of the excavation and is unlikely to be due to ploughing, given the presence of undisturbed deposits at the top of the pit fills. It is possible that there was a primary cremation inside the pot and a secondary one inserted on top which resulted in the removal of the pot's base. There is however no clear evidence for a re-cut in any of the upper pit deposits. There were no artefacts within the urn or pit.

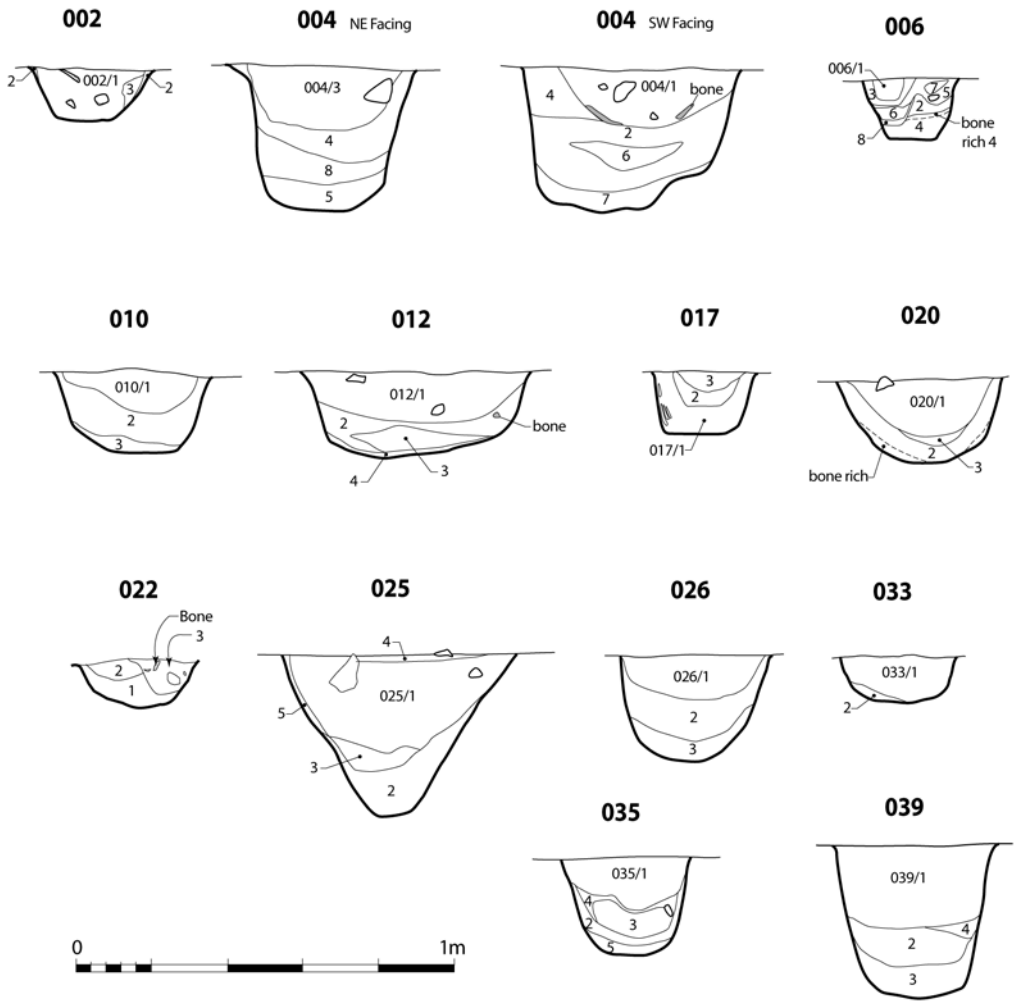
There was clear evidence that there were two individuals in two separate deposits, one from inside the urn and one from the surrounding pit fill. They were both male, the individual inside the urn being an adult in his mid to late 20s, while the individual in the pit fill was a sub-adult aged 12–16 years old. The adult male was dated to 1890–1680 BC (GrA-26531). Oak charcoal from the same context was dated to 2870–2490 BC (Poz-7706) and 1930–1740 BC (Poz-7708). No pathological lesions were noted on the child while on the adult there was cranial pitting that may indicate iron-deficiency anaemia. A pair of upper second premolars belonging to the adult had partially bifurcated roots, a common variation. The same individual had a large vastus notch on the right patella, again a fairly common variation.

3.2 Un-urned cremations

Nineteen further pits yielded a cremation deposit. Most of these were circular on plan, but there are some exceptions. Pit 043 was oval and, at 0.92m by 0.48m, was one of the largest pits on site (illus 2).

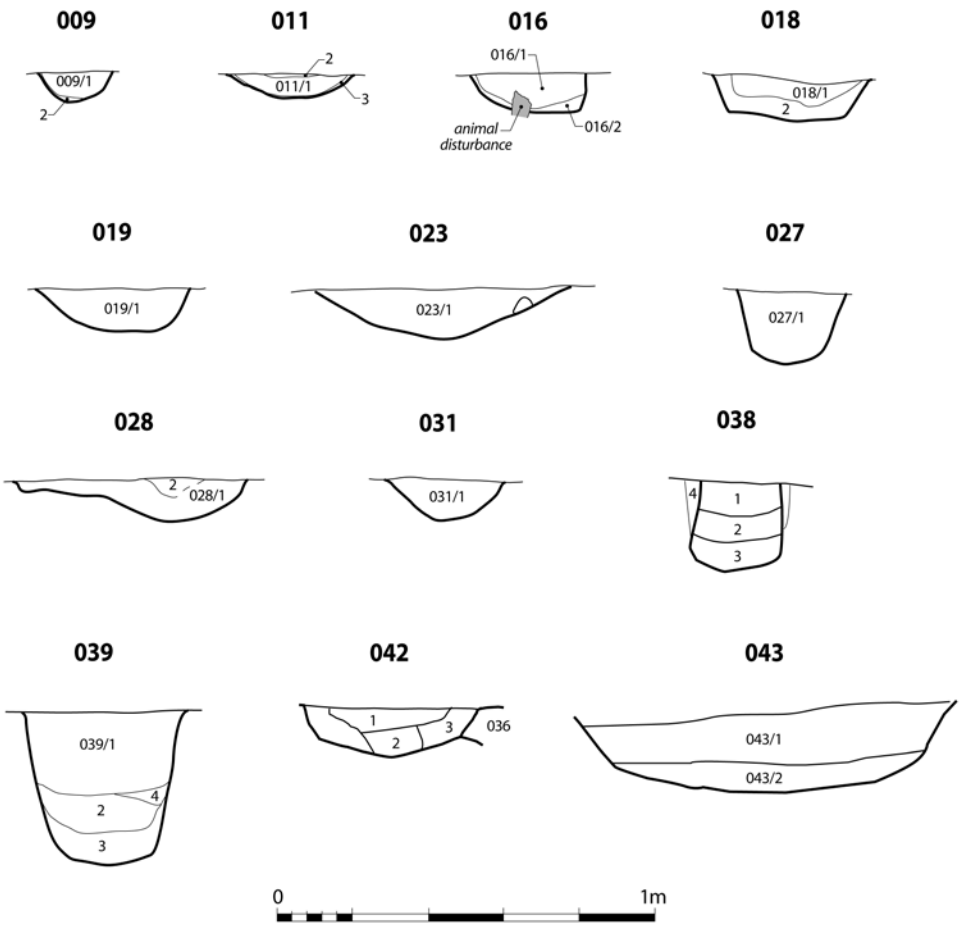
3.2.1 Excavation and filling of the pits

The fills of these pits varied, but most contained a charcoal-rich deposit as well as a cremation deposit and an upper fill of redeposited subsoil. Although similarities occurred, the pit fill sequences differed and some were stratigraphically more complex than the others (004, 006). The presence of redeposited



Illus 9 Cremation pits containing a charcoal-rich deposit

Illus 10 Pit 010 showing the sequence of fills



Illus 11 Pits containing only a cremation deposit; pits with undifferentiated fills; and other pits

natural as the upper fill of these cremation pits was common, being noted in the majority of the pits, which often made locating them very difficult.

The pits can be divided into three broad types, differentiated on the basis of their fills:

1. containing a charcoal-rich deposit as well as a cremation deposit (illus 9–10);
2. containing only a cremation deposit (illus 11);
3. with undifferentiated fills (illus 11).

Most of the pits fall into the first category. In this group (001, 002, 004, 006, 010, 012, 017, 020, 022, 025, 026, 033, 035, 039) it was common for the fill to consist of a charcoal-rich deposit, which extended up the sides of the pit and in some cases (010, 020) caused a dark ring to be visible on the (surviving) surface of the pit (illus 10). Deposits of this kind often contained bone fragments and, in the case of 039, burnt soil (039/3) (illus 9). The upper fill often consisted of re-deposited subsoil and the cremated bone deposit was found either between these two fills or right on the base of the pit, with the charcoal-rich deposit lining the cut above, surviving as a loose fill almost solely of cremated bone.

This sequence of fills suggests that once the pit was excavated, charcoal-rich material perhaps taken from the pyre was added to the pit first; then the cremation was placed in the pit, perhaps inside an organic container (eg a leather bag); thereafter more pyre material was added around this bag to fill the pit. Alternatively, the charcoal fill was dished to accommodate the cremation or compressed by the weight of the cremation. Finally, the rest of the pit was backfilled with the soil that had been excavated from the hole.

This burnt deposit lining the pit was, in the best preserved examples, seen to include charred vegetation placed horizontally around the cut. One such deposit (Pit 006/8) was so clearly preserved as to suggest a roughly woven basket lining the re-cut. Laying such a deposit would seem to indicate that extreme care was taken or that the charred remains were fairly robust. The deposit did not appear to have been burnt in situ.

The largest of the cremation pits (025; illus 9) showed evidence for burning around the pit cut and contained five separate, clearly defined fills including a charcoal-rich pit lining (025/2, 025/5), a cremated bone deposit (025/3), a bone-free charcoal-rich soil

(025/4) and reddish ashy material with both bone and charcoal traces (025/1).

The second group of pits is a small group. The fills of these pits (029, 042, 043) did not include a charcoal-rich deposit. For example, Pit 042 had a discrete, tightly-packed cremation deposit at its base (042/2); this was surrounded by a pale brown-orange fill of mixed re-deposited subsoil and brown medium-textured silt (042/3) containing occasional fragments of cremated bone, and was capped with redeposited natural (042/1; illus 11). This sequence suggests that the pit was backfilled only with the material which came out of it and that no pyre material was added to the fill.

A further type of pit may be represented by Pits 027 and 031 (illus 11). These pits contained a single fill of soft dark brown and black silt with an occasional patch of re-deposited subsoil. Charcoal and cremated bone were present, suggesting no differentiation between fills, and no sorting of the contents prior to deposition. However, in Pit 027 there was clear evidence of animal disturbance, which may have caused the mixing, and in Pit 031 root intrusion was noted.

3.2.2 Re-cutting

Despite the close association of the pits, there was little evidence for re-cutting. This may be seen in just three pits: 004, 006 and 022.

Pit 004 was oval on plan and contains eight fills (illus 9). It appeared to have a secondary cremation re-cut into its northern end. This pit, measuring 0.48m by 0.97m by 0.35m deep, was the largest on plan in the cemetery. Its northern and southern portions had different sequences of fills. The upper fill (004/1) to the north consisted of pale grey clay with dispersed chunks of cremated bone and small patches of re-deposited subsoil. Underlying this was a deep ashy fill (004/2) consisting of burnt red, fine-textured silt containing dispersed fragments of strips of charcoal, and a small pocket of cremated bone (004/6). The basal deposit here (004/7) was similar to the overlying 004/2 but contained a greater proportion of charcoal. The main upper fill of the southern part of the pit (004/3) consisted of re-deposited subsoil. Underlying this was 004/4, a charcoal-rich deposit of mottled black, brown and burnt red compact silt. 004/1 was possibly cut through this layer. This deposit lined the edges of the cut to form a dark peripheral ring visible on the surface. Below 004/4 but overlying the basal fill was a compacted deposit of mixed brown silt and re-deposited subsoil (004/8). The basal fill (004/5) of the pit here consisted of loose cremated bone.

The majority of the cremated bone from this feature was recovered from contexts 004/1 (an adult female) and 004/5 (an adult male). The remains from contexts 004/2 and 004/6 were from a single child.

Pit 006 (illus 9), which measured 0.48m by 0.32m deep, appeared to display three episodes of re-cutting. The primary fill was represented by contexts 006/4 and 006/2, cremation deposits contained within dark brown and black silts with occasional speckles of reddish ash. The first re-cut appeared to be represented by contexts 006/8 and 006/6, forming a shallow U-shaped cut through context 006/2. A second re-cut was represented by context 006/5 which truncated contexts 006/6 and 006/8. The final re-cut was defined by a thin layer of charcoal-rich soil (006/3) forming a U-shaped cut towards the top of the pit, and containing a fine-textured brown silt (006/1).

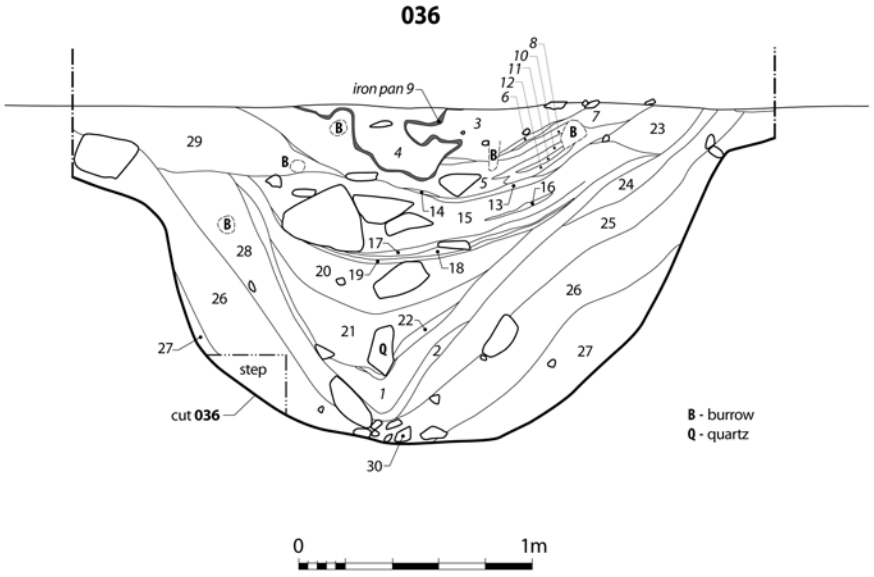
Despite the apparent re-cutting, there is only slight evidence for the presence of two individual cremations (see McSweeney below). Two cases of duplicated bones were found, in 006/1, the final re-cut, and 006/4, the basal pit fill. Similarities in the morphology and pathology observed indicate the deposits found in 006/2, 006/3, 006/4 and 006/5 were from the same individual. Perhaps the complex stratigraphy seen in the pit section was a result of the cremated bone having been deposited in a series of organic containers, around which were packed pyre material and soil.

Pit 022 perhaps also containd a re-cut (illus 9). The shallow bowl-shaped cut measured 0.29m across by 0.12m, its depth giving the impression of truncation so that the entire sequence of fills may not have survived. The basal fill (022/1), extending up one side of the cut, was a dark brown-black fill of crushed charcoal fragments and grit containing most of the bones, and above this was a deposit of brown clay (022/2). A clearly defined deposit of compacted clay containing bone fragments and charcoal (022/3) was possibly cut into the top of the pit.

3.3 Other pits

A number of other small pits did not appear to hold cremations: these were 008, 009, 011, 015, 016, 018, 019, 023, 028, 032 and 038.

A single bone was found in 009 (illus 11). This may be residual and relate to another cremation but, recovered from a depth of 0.16m, it may also be the only surviving evidence for a ploughed-out cremation pit. Some of the others may be the ploughed out remnants of cremation pits on account of the nature of the surviving fills (011, 015, 016, 018, 019, 023, 028). These features were only 0.01m to 0.16m in depth, suggesting that they were severely truncated. Pit 016 (illus 11), for example, was very similar in profile to the definite cremation pits. It contained a thin lining of charcoal-rich material, but as the pit was only 0.1m deep, it had lost any trace of a cremation, if there ever was one. Pit 023 (illus 11) contained a single fill of dark grey-brown silt with large charcoal flecks but only survived to a depth of 0.07m; the remnants of both pyre material and cremation may have been ploughed away. Pit 028 (illus 11) contained a black charcoal-rich deposit but no cremated bone.



Illus 12 Section of Pit 036

Illus 13 Pit 036 with Pit 040 cut into its upper edge

Two pits, 019 (illus 6) and 038 (illus 11), lacked cremated bone but did contain artefacts. Three burnt flints and one unburnt quartz piece were identified in 019, and one burnt flint in 038. Pit 038 was dated from charcoal to 2040–1690 BC (Poz-7704-5) and therefore certainly seems to be contemporary with the cemetery. This vertical-sided pit, measuring 0.28m across by 0.24m deep, appeared bell-shaped in section. It contained three deposits: an upper fill (038/1) of mixed re-deposited natural with some charcoal staining; a middle fill of reddish-brown fine textured silt with charcoal

(038/2); and a basal deposit (038/3) consisting of a mixed fill of dark brown and black silt with red ashy patches and charcoal. A peripheral fill occupying the remainder of the feature consisted of clean redeposited natural.

A small pit (008), possibly a stakehole, was found beside 009. It measured 0.09m across by 0.19m deep and had vertical sides with a tapered base. Its fill contained charcoal. This may indicate the former position of a wooden marker.

Other features are likely to have had other origins; for example Pit 032 appears to have been caused by animal disturbance.

3.4 Mesolithic pit

This large and stratigraphically complex pit (036) measured 3.2m by 2.8m and had a depth of 1.4m (illus 12). Six cremation pits (029, 033, 038, 039, 040, 042) had been cut into its upper surface (illus 2 and 13) and post-dated its upper fills.

The surface of the pit (036) was poorly defined. Its upper fills (036/3, 036/4, 036/5, 036/23, 036/29) consisted of deposits similar in colour and make-up to subsoil. The main fill sequence (contexts 036/1–2, 15–22, 24–28, 30) consisted of steep tip-lines forming a roughly V-shaped profile in the centre of the pit (illus 12). These fills consisted of pale brown, orange and purple clays and silts, often sterile though some contained charred organic remains; 036/2, for example, lay towards the base of the pit and was a charcoal-rich layer with small reddish burnt stones. Micro-banding visible throughout some of the contexts (036/15) indicates a gradual fill process. A patch of stones (036/30) measuring 0.25m by 0.4m at the base was composed of small densely packed sub-angular stones. These could have been deliberately placed or trickled in when the pit was freshly dug. The latter suggestion is favoured, as a number of other fills here contained large stones and their angle of rest indicates tipping.

This pit appeared to have two re-cuts within its upper layers (illus 12). The first contained fill 036/29 – and perhaps 036/23 – a mixed, mottled deposit containing redeposited subsoil, which appears to have been cut into the top of the pit to a depth of 0.3m. The second re-cut appears to have cut through 036/29 and 036/23, and contained contexts 036/3–14, thereby forming a pit measuring 1.7m across by 0.4m deep. These upper fills contained many small bands of charcoal and ash, and were generally more burnt, charcoal-rich and ashy in appearance than those forming the primary fills.

It was assumed during the excavation that this pit was part of the cremation cemetery and that it had perhaps held a pyre. However, the radiocarbon dates from charcoal in both lower and upper fills indicate that it is late Mesolithic in date (see Section 6 below), with a calibrated date range of 4510–3970 BC for the six dates obtained. Only one small piece of cremated human bone was recovered, from fill 036/15, while small quantities of poorly preserved oak, birch and hazel charcoal were present. No other artefacts were recovered. The Bronze Age cremation pits cut into its upper surface are, on balance, simply coincidental.

4 THE FINDS

The following reports are in some cases abridged versions of more comprehensive reports which include tables of numerical data. All this additional data is accessible in the site archive deposited with RCAHMS.

4.1 Pottery, by Melanie Johnson

The group of vessels comprises both Collared and Cordoned Urns. Only two of the vessels are Cordoned (013, 030) while the remainder are certainly or very probably Collared (003, 005, 007, 021, 024, 034, 036, 040, 044). However, Urns 005 and 024 have strong similarities with Cordoned Urns in some respects. The incomplete profile of Urn 005 makes its inclusion in the Collared Urn group less certain. Urn 024, despite having a full profile, is also not firmly attributable to the Collared rather than Cordoned Urn series.

The distributions of Collared and Cordoned Urns in Britain have distinct regional patterns. While Collared Urns are common throughout Britain in the Early Bronze Age, Cordoned Urns have a more restricted distribution, largely limited to Scotland and Ireland.

Collared Urns have received considerable study, particularly with the publication of Longworth's (1984) corpus, but Cordoned Urns have been rather more neglected in recent prehistoric studies. The consideration of Cordoned Urns has swung from a belief that they were simply a degenerate form of Collared Urn, and thus later in date (eg Abercromby 1912), to a hypothesis that they were a distinctive regional form with close links to Collared Urns (eg Burgess 1986; Gibson & Woods 1990), with a few writers suggesting that Cordoned Urns were an unrelated and completely separate archaeological tradition (Longworth 1984; ApSimon 1969).

More recently, Waddell (1995) has lent support to the argument that Cordoned Urns are a distinct group, stating 'it is difficult to identify any significant Collared Urn contribution' (ibid, 116), before going on to discuss a number of urns which have proven difficult to classify.

The uncertainty surrounding the positive identification of Urns 005 and 024 as Collared Urns would seem to suggest that, here at least, there is a considerable degree of overlap in form and design between Collared and Cordoned Urns, in contrast to Waddell's (ibid) interpretation. The closest parallel that has been identified for the decoration on Urn 024 is found on a Cordoned Urn from Ireland (unprovenanced; in the Ulster Museum), illustrated by Waddell (ibid, 117, fig 11.1:5).

The accessory vessel, or pygmy cup, is one of a well-known group of such small pots generally found inside urns during the Early Bronze Age. These vessels can replicate urns, such as miniature Food Vessels (Scott 1951), be perforated, decorated or plain, and there has been much speculation as to their function, with recent residue analysis being undertaken (Gibson & Stern 2006). About 90 examples are known from Scotland.

Three of the vessels, all Collared Urns, are undecorated (007, 034, 040). The decorated urns (003, 005, 013, 021, 024, 030, 036, 044) all display impressed twisted cord. On the majority of the vessels the decoration is based around lattices, chevrons and triangles, while decoration on the internal rim bevel is based on lines and zigzags. All these motifs are common on Collared and Cordoned Urns.

More unusual is the decoration on Urn 044, a motif of multiple lozenges with lattice which is difficult to parallel. It has some similarities with vessel 1017 in Longworth's corpus (1984, pl. 146), a pot from Rothwell, Northamptonshire.

Vessel 024 also has unusual decoration, a radiating triangle motif set in panels. This is not paralleled within the vessels illustrated by Longworth (ibid). It is, however, very similar to an unprovenanced Cordoned Urn from Ireland in the Ulster Museum, illustrated by Waddell (1995, 119, fig 11.1:5).

The two Cordoned Urns are simple forms. Urn 013 has an internal rim bevel on a slightly inturning rim. The bevel is undecorated but the upper panel of the pot, as defined by the upper cordon, is decorated with a double lattice. There is evidence of a mistake having been made with the decoration, one of the portions of double lattice having an extra, third line, placed slightly crookedly. This may have been the starting point for the decoration and when the potter completed the design the decoration did not quite match up. Urn 030 has an internal bevel and an external moulding to the rim, suggesting an upper cordon. Its decoration is not typical of Scottish Cordoned Urns as it occurs on the internal rim bevel and both above and below the cordon, where both lattice and chevrons are displayed. The cordons have been defined by having a line of twisted cord set either side of them.

The vessel fabrics are very similar, the urns tending to be buff or orange-brown in colour, with thick walls (up to 15mm) and coarse fabrics with hackly fractures. Inclusions of local rock and quartz were noted, generally at less than 2% of the fabric. The surfaces, where sufficient detail remained, were carefully finished and smoothed, some perhaps even polished. There were no differences noted between

urn types, suggesting that they were all made locally from the same clay sources.

There was no positive evidence of the urns having been used in a domestic context prior to their deposition. Some slight sooting was noted on the external rim of Urns 003, 005, 030 and 036, suggesting that perhaps these vessels had been sitting by the pyre and had come into contact with the fire. The external surface of Urn 044 may have been scorched.

The survival of the urns was variable. Only Urn 024 had a complete profile, probably due to its being much smaller than the other urns and therefore more fully protected by its pit. The remaining urns had lost their bases and in some cases quite a large portion of their profile, resulting in the vessel being reduced to a surviving ring of collar and rim. Urn 021, unusually placed upright within its pit, had lost its rim.

A number of objects were found within the urns, most notably a flint foliate knife (034), a small pinch accessory pot (024) and a bone point or pin (013). A stone disc was also found associated with 024.

Most of the pots had been carefully placed within the pits but the reality of placing such a heavy object upside down within a pit of similar dimensions meant that some of the pots may have been dropped lightly into position. Some of the cracking and distortion visible on some of the urns may bear witness to this procedure. Two of the pots had been placed on stones; Urn 040 was set on a flat slab, that may have acted as a lid during inversion and placement; and Urn 034 was positioned on a bed of angular stones. The upright urn in Pit 021 was pressed hard against the side of the cut and propped up by a series of angular stones, including some large quartz pieces.

It is likely that some form of organic lid was attached to some of the urns, such as a piece of leather tied on and secured under the collar or cordon, to prevent the contents from spilling when the urn was inverted. However, there is no archaeological evidence to support or refute this as it would not have survived.

The sequence of fills in each of the pits was very similar, often with an upper fill of re-deposited subsoil and a lower fill of charcoal-rich soil also containing some bone fragments. This sequence of fills suggests that as the urn was placed upside down, some spillage of its contents occurred or subsequently, once the organic cover had rotted, settling of the contents took place. Once the vessel was in place, the pit was then backfilled with the material which had come out of it, presumably resulting in a small mound.

A detailed conservation report and a full catalogue of the urns have been deposited with the site archive.

4.2 Human bone, by Kathleen McSweeney

4.2.1 Background and methods

Cremated human remains from 31 contexts were examined. The results are summarised here and a full catalogue is included with the site archive. Table 1 summarises the findings from the anthropological analysis of the cremated human remains from Skilmafilly. Table 2 summarises the identifications made.

The un-urned material had been sieved prior to receipt in 10mm, 4mm and 2mm sieves. In most cases, there were small flakes of bone in the material from the 2mm sieve and residue. These were checked so that any small diagnostic pieces, such as tooth roots, could be extracted. The remainder of the bone flakes was not otherwise removed from the residue. The contents of the urns had been excavated by the conservator in spits of varying depths, and sieved in 2mm mesh.

Regardless of the method for extracting the bone, each fragment of bone from each context was examined and sorted according to anatomical area. In some instances, only a general area of origin could be established. For example, some fragments, which, from their size, shape and fracture pattern, clearly originated from one of the six major long bones of the body, but were too incomplete to be more positively identified, have been classified simply as 'long bone'. Where, because of size or distortion, even a general anatomical provenance could not be established, fragments have been classified as 'unidentified'. Once identified, the bones were weighed.

General methods of ageing and sexing used are those outlined in Bass (1995), Brothwell (1981) and White & Folkens (2000), for sub-adults Scheuer & Black (2004) and for foetal remains Fazekas & Koza (1978). Grading used in the assessment of sex is based on the method advocated by Buikstra & Ubelaker (1994). The sexing of immature remains is problematic, even with intact skeletons, and has not been attempted here. The identification and assessment of age of the dental remains is based on van Beek (1983).

The condition of the remains in terms of the degree of fragmentation is compared with McKinley's findings in her analysis of 15 modern cremations (1993, 284), where pieces of skull of up to 95mm and long bone fragments of up to 195mm were found. As cremated bone is very fragile and further post-depositional disintegration may well have occurred, a smaller fragment size than that originating from recent cremations is to be expected. Mays (1998, 209) reports that, in his experience, fragments of up to 100mm are only occasionally found.

The weight of the remains is also compared with those of McKinley's study of modern cremations (1993, 284). Total weight ranged from 1227.4g for an 83-year-old female, to 3001.3g for a 90-year-old male. She estimated that, in an archaeological setting, a realistic range would be 1001.5g to 2422g.

It has been well established that the colour of bone changes with increasing temperature (Ubelaker 1978, 34; Mays 1998, 217). Burnt bone can occur in shades of red, brown, black, blue, grey, yellow or white. Although there are some slight differences in reported results, in the main, the higher the

Table 1 Summary of human remains

Pit	Wt (g)	Max. Frag. Size (mm)	% Id (g)	No. Indiv.	Age	Sex	Pathology
Urned cremation burials							
003	1991	70	42	3?	5–7, *c* 12 + adult ?	?	*ante mortem* tooth loss
005	1091	50	29	1	adult	?	arthritis of the jaw
007	1225	80	58	2	adult + foetus	?F +	lesion of sacroiliac joint
013	2051	90	53	1	older adult	M	poor dental health, arthritis of the left thumb, advanced spinal lesions, muscle injury right radius
021	848	80	42	1+?	12 + ?		none
024	1062	70	48	1+?	mid-adult	M	dental disease, arthritis of hands and feet, spinal lesions
030	1179	40	41	1	adult	F	cranial pitting
034	1869	70	37	1	elderly adult	M?	cranial pitting, osteophytes knee and heel, spinal degeneration
040	1517	110	40	1+1?	2 adults	M + ?	*ante mortem* tooth loss, spinal injury
044	1883	110	55	1	Young adult	M?	cranial pitting
Un-urned burials							
001	427	50	48	1	adult	?	none
002	544	40	32	1	adult	M	cranial pitting
004	4318	120	44	3	9, adult, adult	M + ?F + ?	2 adults with cranial pitting, 2 adults with spinal lesions
006	1245	90	59	1+	older adult	?M	orbital and cranial pitting, ischial bursitis?, sub-gingival calculus, spinal lesions
010	318	30	19	1	adult	?	none
012	561	40	42	1	*c* 10		none
017	211	40	41	1	12–13		cranial pitting
020	946	30	30	1	?	?	cranial pitting
022	280	30	44	1	young adult	M	none
025	809	90	51	1+?	adult	?	cranial pitting
026	781	30	35	1	14–16	?	cranial pitting
027	91	70	81	1	?	?	none
029	576	50	47	1	adult	M	none
031	44	40	75	1	sub-adult	?	none
033	375	40	35	1	?		none
035	801	40	33	1+?	10–12 + 5?		none
039	398	40	45	1	16–20	?	none
042	359	30	26	1	adult	M	none
043	2779	50	39	2	2 adults	M + ?	none
044	1470	80	46	1	12–16	M?	
Single bones							
009							1 eroded fragment, not identified
036							1 undiagnostic piece of cranium

temperature, the lighter the colour. Light grey or white colouring occurs with temperatures in excess of 645°C (Mays 1998, 217). Shipman et al (1984, as cited by Mays) found that white or light grey colouring occurred with temperatures of 645–940°C, while Mays' experiments showed no change in

Table 2 Summary weights of identified bone types

Pit	Skull	Trunk	Limb bones	Hands/feet	Immature bones	Sub-total	Unident.	Total
Pit 001	127	6	71	0		204 (48%)	223 (52%)	427
Pit 002	69	14	86	3		172 (32%)	370 (68%)	542
Pit 003	300	150	340	39		829 (42%)	1162 (58%)	1991
Pit 004	581	372	860	73		1886 (44%)	2432 (56%)	4318
Pit 005	92	17	193	10		312 (29%)	779 (71%)	1091
Pit 006	195	90	439	6		730 (59%)	515 (41%)	1245
Pit 007	326	362	477	50	10	1225 (58%)	870 (42%)	2095
Pit 010	30	4	26	0		60 (19%)	258 (81%)	318
Pit 012	64	50	115	6		235 (42%)	326 (58%)	561
Pit 013	242	207	602	37		1088 (53%)	963 (47%)	2051
Pit 017	24	12	48	2		86 (41%)	125 (59%)	211
Pit 020	101	4	176	1		282 (30%)	664 (70%)	946
Pit 021	118	28	199	9		354 (42%)	494 (58%)	848
Pit 022	67	5	48	2		122 (44%)	158 (56%)	280
Pit 024	152	38	292	25		507 (48%)	555 (52%)	1062
Pit 025	177	19	211	6		413 (51%)	396 (49%)	809
Pit 026	62	29	164	17		272 (35%)	509 (65%)	781
Pit 027	36	3	35	0		74 (81%)	17 (19%)	91
Pit 029	92	33	135	8		268 (47%)	308 (53%)	576
Pit 030	132	89	259	6		486 (41%)	693 (59%)	1179
Pit 031	3	9	20	1		33 (75%)	11 (25%)	44
Pit 033	31	6	92	4		133 (35%)	242 (65%)	375
Pit 034	112	62	492	31		697 (37%)	1172 (63%)	1869
Pit 035	70	43	143	7		263 (33%)	538 (67%)	801
Pit 039	59	30	87	4		180 (45%)	218 (55%)	398
Pit 040	249	83	264	19		615 (41%)	902 (59%)	1517
Pit 042	38	14	37	3		92 (26%)	267 (74%)	359
Pit 043	218	77	752	34		1081 (39%)	1698 (61%)	2779
Pit 044	383	427	859	82		1751 (52%)	1602 (48%)	3353

colour over 645°C. Wells found that black colouring occurs with temperatures of less than 800°C, while temperatures above 800°C produced calcined bone, which ranged in colour from bluish-grey to white. Furnaces in modern crematoria were said to operate at between 820°C and 980°C (Wells 1960, 35). The colour of the Skilmafilly remains is compared with these findings.

4.2.2 Burial type

The examined remains originated from nine urned cremations, nineteen un-urned cremations, one context consisting of both an urned and an un-urned cremation and two single bones that were presumably stray losses.

4.2.3 Weight of the remains

Total weight of any single context varied from 44g to 4318g, those at the lower end of the range either presumably being token deposits or cremations where the original deposits have been vastly depleted, and those at the upper end containing multiple cremations. There were four of the latter – 003, 004, 043 and 044, as well as 007 that contained an adult and a foetus.

Taking into account only those deposits that appeared to consist of single full cremations, the average weight for un-urned cremations was 905g. This is clearly below McKinley's (1993) estimated range of 1001.5g to 2422g; indeed there was only one deposit that fell within the range, 006, which had 1245g of cremated remains. Although there were

varying quantities of tiny fragments of bone mixed with the soil matrix that could not be extracted and were therefore not included in the total bone weights, it is unlikely that these would make much difference to the results.

Of the urned cremations, the average weight was 1462g, well within the estimated range. Indeed the weights of all of the urned cremations, which ranged from 1062g to 2051g, fell within the estimated limits. A higher weight for urned cremations is expected because of the protection from post-depositional erosion and disturbance provided by the urn.

It is interesting to note that none of the single cremations from Skilmafilly was anywhere near McKinley's (ibid) upper range.

4.2.4 Identification rate

The rate of identification is closely related to the size of the surviving fragments – the larger the fragment, the more chance of identifying it – and is an indicator of general condition. McKinley (1994a) associates fragment size with two factors: burial method and post-depositional disturbance.

The overall identification rate of the Skilmafilly remains, based on the relative weights of the identified to unidentified remains, varied from 19% (010) to 81% (027). The average for the urned cremations was 44.5% and that of the un-urned cremations was 43.6%. The small difference between the two is surprising. From personal experience (see, for example, McSweeney 1997) the identification rate from urned cremations is normally much better than that from un-urned cremations. In this case, the poor rate of identification in the urned cremations probably relates to the condition of the urns, most of which were damaged, some severely.

4.2.5 Total number of individuals

There is a minimum of thirty-five individuals present from all of the contexts, with a probable further seven whose presence could only be confirmed from one or more duplicated bones. It is likely, therefore, that 42 individuals were present, at least in part.

4.2.6 Age at death

There were thirteen sub-adults: one foetus, eight children (5–12 years), three adolescents (12–17 years) and one sub-adult whose age could not be accurately determined. No neonates or infants were present.

There were twenty-two adults: two young adults (17–35 years), three middle-aged adults (35–45 years), one old adult (45+) and sixteen who were adults but whose age could not be accurately determined.

4.2.7 Sex

Of the twenty-nine adolescents and adults for whom sexing could have been attempted had the relevant bones survived, there were one female, two possible females, nine definite males, four possible males and thirteen adults whose sex was unknown. The high number of males is probably not of great significance; male characteristics, generally more pronounced than those of females, are more likely to be recognised in cremated remains.

4.2.8 Pathology

A fairly large number of pathological lesions, normally difficult to detect on cremated remains, were identified. These can be grouped roughly as follows: cranial/orbital pitting, dental disease, spinal degeneration, arthritic and miscellaneous conditions.

The presence of pitting on the external surfaces of the cranium (porotic hyperostosis) and/or orbit (cribra orbitalia) from 11 contexts, roughly a quarter of the individuals, is high. Such changes may be caused by iron-deficiency anaemia during childhood. The presence of such changes, however, may not necessarily indicate an iron-deficient diet, as disease may also play a part in the development of such bony changes (Roberts & Manchester 1995).

Dental disease was noted in five individuals and included teeth lost during life (003 and possibly also 040), sub-gingival calculus indicating severe recession and possibly also periodontal disease (006) and two cases of dental abscesses (013 and 024).

Spinal degeneration (osteophytosis) was present on seven individuals. Degeneration of the spine is a normal part of ageing and in many cases can be asymptomatic. The presence of the condition is used in the assessment of age in adults. In some cases the degree of degeneration can be accelerated by heavy manual work or injury, and there was evidence of a traumatic link with disc herniations having occurred in four of the seven affected individuals.

There were three cases of arthritis, probably osteoarthritis: one of the jaw (005), one of the thumb (013) and another case of widespread lesions on several hand and foot bones in the male from 024. Because of the fragmented nature of the remains, arthritic changes would be difficult to detect and the prevalence of arthritis was probably greater than indicated.

Of the miscellaneous conditions, the most interesting is the case of the large protrusion of bone on the medial side of a left ischial tuberosity (the lower portion of the pelvis) of the individual from 006. This may indicate the presence of a condition known as ischial bursitis or 'weaver's bottom', thought to be caused by long periods of movement whilst sitting – hence the name (Kennedy 1989). Alternatively, it may be an enthesophyte, associated with bone formation in old age.

Table 3 Lithic artefact list by pit. Numbers in bold represent burnt artefacts.

Pit	004	019	020	027	033	034	035	038	039	Unstrat.	Total
Débitage											
Chips, flint		**3**									**3**
Chips, quartz		1									1
Flakes, flint	**2**		1	**1**	**1**		**1**	**1**	**3**	2	**9**/3
Indeterminate pieces, flint									**1**	**1**	**2**
Indeterminate pieces, quartz							1				1
Platform rejuv. flakes, flint	**1**										**1**
Tools											
Foliate knives, flint						1					1
Truncated pieces, flint										1	1
Edge-retouched pieces, flint	**1**										**1**
TOTAL	4	4	1	1	1	1	2	1	4	4	23

4.2.9 Cremation technique

In most cases it was quite apparent that cremation technique was well understood and that high and even temperatures were achieved during the burning process. There were very few instances of uneven burning, and curved lateral splintering, thought to indicate that the body was burned while fresh, was present on most limb bones. In many cases there were high degrees of distortion such as splitting of the tables of the cranium, and in at least two cases there were several bones that had folded completely inside out. Most deposits included small hand and foot bones and tooth roots were often present in large numbers, indicating that the remains had been carefully collected before being placed in the urn or pit. Full details are recorded by individual skeleton in the archive report.

4.3 Lithic artefacts, by Torben Bjarke Ballin

4.3.1 Introduction

Twenty-three lithic artefacts were recovered, one (a foliate knife) from an urned cremation (Pit 034) and eighteen from un-urned cremations, and four lithic pieces were unstratified (Table 3). This report characterises the lithic assemblage, with special reference to raw materials, typological composition and technology. A full catalogue has been deposited with the site archive. Numbers in square brackets below correspond to catalogue numbers.

Table 3 shows the general typological composition of the Skilmafilly assemblage. The definitions of the main lithic categories are as follows:

Chips: All flakes and indeterminate pieces the greatest dimension (GD) of which is ≤ 10 mm.

Flakes: All lithic artefacts with one identifiable ventral (positive/convex) surface, GD > 10mm and L < 2W (L = length; W = width).

Indeterminate pieces: Lithic artefacts which cannot be unequivocally identified as either flakes or cores.

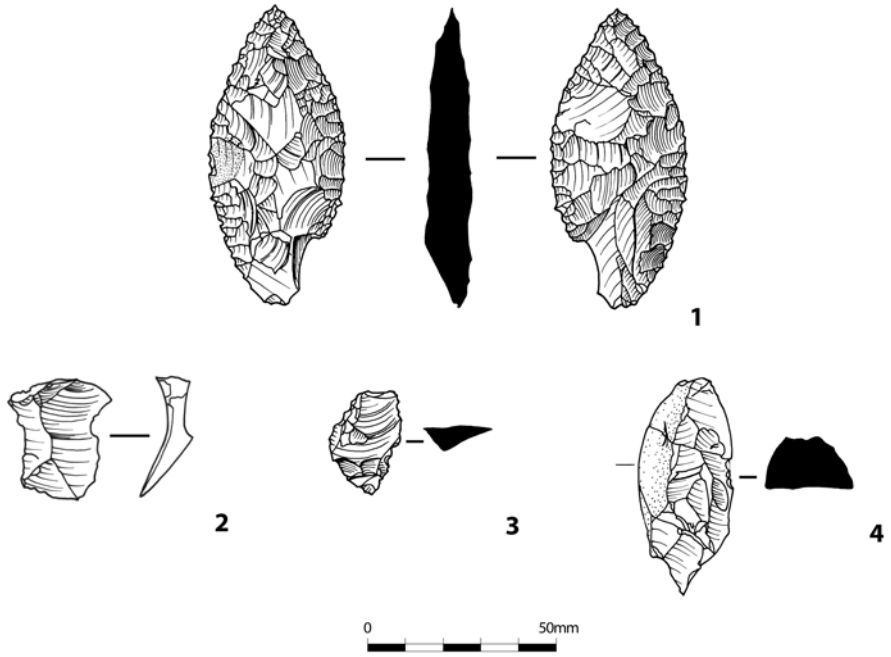
Tools: Artefacts with secondary retouch (modification).

4.3.2 Raw material

The lithic assemblage consists entirely of flint and quartz, with the majority in flint. The site's 23 pieces of worked flint are primarily débitage (20) and expedient flake tools (2), supplemented by an exceptionally fine foliate knife, whereas the small quartz sub-assemblage consists of one chip and one indeterminate piece.

The flint items are mainly in fine-grained, homogeneous flint without impurities. Five have abraded cortex, indicating procurement from a local pebble source (beach or inland gravel deposits; Wickham-Jones & Collins 1978; Saville 1994 and 1995), but the relatively large size of the foliate knife (illus 14.1) suggests that raw material for this piece may have been procured from the nearby Buchan Ridge Gravels. These gravel beds, between Ellon and Peterhead, were probably mainly exploited during the late Neolithic and Early Bronze Age periods (Saville 1995, 365–8), and the nearest known quarry (Skelmuir Hill; Saville 1995, fig. 1) is located less than 10km east of the Hill of Skilmafilly. However, material from this source tends to be compromised by inherent cracks (A Saville, pers comm), and the flawless character of the foliate knife's raw material makes importation from a more southerly source likely.

Most of the worked flint from Skilmafilly is burnt (*c* 70%, Table 3), and it is in most cases impossi-



Illus 14 Lithics

ble to assess the colours of the raw material. The burning is generally severe, and most of the affected pieces are crackled and heavily discoloured (completely white). Practically all the white-burnt flint is vitrified, which means that it has been exposed to such high temperatures that its surfaces melted in places and turned glass-like. These pieces are clearly more highly burnt than one would expect from ordinary settlement contexts, where flints may have fallen into the ashes during knapping by the camp fire. Most likely the vitrified pieces represent grave-goods that accompanied the deceased onto the funeral pyre. The flint knife is unaffected by fire and must have been placed in Urn 034, from which it was recovered, after the cremated material had been recovered from the pyre.

The two faces of the knife (illus 14.1) display a slight gloss, which may be due to deposition in a sandy matrix ('glossy patina', Keeley 1980; Donahue & Burroni 2004), but it may also be due to the application of heat-treatment. SF 3136 from Fordhouse Barrow in Angus (Ballin forthcoming) is a related flint object (see below), also deposited in a Collared Urn, but in this case the lustre has, in certain areas, altered from typically vitreous to shiny and chert-like. This lustre is characteristic of intentionally heat-treated flint (Price et al 1982; Eriksen 1999). It is possible that lithic heat-treatment was used to allow the production of thin, invasively retouched prestige objects, such as arrowheads, daggers and knives.

The two quartz artefacts (contexts 019/1 and 035/4) are both in white milky quartz and without cortex; they both appear unburnt. As indicated by the frequent combination of abraded surfaces and irregular shapes, most of the quartz was acquired in the form of erratic blocks or nodules.

4.3.3 Débitage and expedient tools

Most of the artefacts recovered are débitage (Table 3): four are chips, twelve are flakes, three are indeterminate pieces, and one platform rejuvenation flake was found. One chip and one indeterminate piece are quartz, the remainder are flint. The average dimensions of the intact flakes are 25mm × 24mm × 8mm; and the average dimensions of the indeterminate pieces are 22mm × 15mm × 8mm.

Two of the flakes are bipolar, with four having been detached by the application of hard percussion; in six cases it was not possible to determine the applied percussion technique. A flint platform rejuvenation flake (illus 14.2) is a partial core tablet from a large regular platform core, and was recovered from Pit 004 (004/5).

Only two plain flake tools were recovered. One of these is an unburnt piece (illus 14.3) with a concave truncation at the proximal end, most probably representing blunting. Fine macroscopic use-wear along the right lateral side, proximal end, suggests use as a knife. This implement was made on an indeterminate flake (27 × 18 × 8mm). The other flake tool is a fragmented indeterminate flake (58 × 25 × 14mm) with fine retouch along one lateral side (illus 14.4). It is heavily burnt. The unburnt piece (illus 14.3), was recovered from a level between topsoil and subsoil and does not relate to any cremation burials, whereas the burnt piece was retrieved from Pit 004 (004/2).

The finds from Skilmafilly combine a number of technological approaches, such as hard platform technique, bipolar technique and bifacial knapping (only the knife, see below). In general, the relatively low quality of the débitage and the flake tools define this industry as an expedient one, but the presence of core tablet (from a regular platform core) and foliate knife (produced by the application of invasive retouch) adds elements of control and sophistication. Blades and blade tools are absent.

4.3.4 The foliate knife

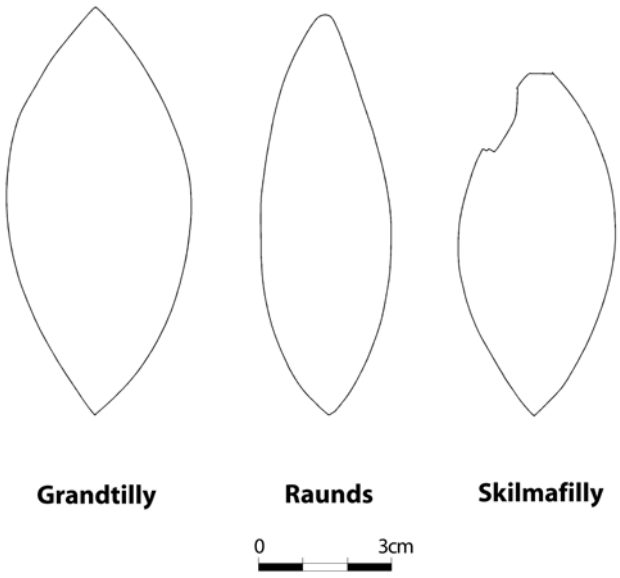
The lithic object from urned burial 034 is best characterised as a foliate (or bifacial) knife, which measures 79 × 35 × 12mm (illus 14.1). Its outline is a pointed oval, with the broadest point approximately central to the piece, and the cross-section is bi-convex, distinguishing it from plano-convex knives. One end (the tip) is acutely pointed, the other (the base) blunt. One corner of the base has broken off, but this probably happened during production, rather than during use; without this damage, the piece may have been double-pointed, as similar pieces tend to be (illus 15). Both faces are completely covered by scars from invasive retouch, with no cortex surviving. The lateral edges are regularly serrated, with three to four teeth per cm. It is not possible to say whether the serrated edges represent the end status of a reduction process aiming at producing an implement for sawing, or whether the piece is an unfinished implement for cutting, which has not yet had its edges 'smoothed out' by final fine retouch. There is no visible edge damage or other indication that this implement was used.

If the object had been recovered during field-walking it would most probably have been characterised as a leaf-shaped point, but the discovery of the piece inside a Collared Urn rules this out. Leaf-shaped points were produced during the Early Neolithic, after which period they were replaced by chisel-shaped and oblique points (cf Harding & Healy 2007).

A close parallel to the Skilmafilly piece is the foliate knife from a Collared Urn inserted in Barrow 5, near Raunds in Northamptonshire (ibid). This implement is, however, slightly narrower (90 × 30 × 7mm) and double-pointed, and as the broadest part of the piece is shifted slightly towards one end, it displays the shape of a miniature dagger (illus 15).

A similar object (Simpson & Coles 1990, 40–41, illus 10), classified as a Bronze Age leaf-shaped point, was recovered from a Collared Urn (Pit 1) near Grandtully in Perthshire. It is relatively broad (86 × 39 × 10mm) and double-pointed. Unlike the Skilmafilly piece, this object had been burnt before deposition in the urn.

In terms of formal development, the foliate knives clearly do not derive from the Early Neolithic leaf-shaped arrowheads, though they are morphologically similar to double-pointed leaf-shaped points. Leaf-shaped arrowheads are an entirely Early Neolithic artefact type, and the Late Neolithic period and the initial parts of the Early Bronze Age constitute a hiatus, during which time leaf-shaped forms were not produced. The foliate knives are thus more likely to have developed from plano-convex knives; alternatively, they may have developed as a form of 'miniaturisation' of Early Bronze Age daggers (eg the piece from Raunds). At present, the evidence links the foliate knives with Early Bronze Age Collared Urns.



Illus 15 Comparison between the Skilmafilly knife and other foliate knives from the British Early Bronze Age.

4.3.5 Conclusion

This lithic assemblage makes an important contribution to the understanding of lithic artefacts in Early Bronze Age ritual or burial contexts. It appears that some selection took place prior to deposition in the Skilmafilly cremation pits.

More than 90% of the lithics are flint, and over 80% of those from the cremation pits are burnt. The quartz appears not to have been exposed to fire. Some of the unburnt lithics found in the pits, including the quartz, may have been incorporated during back-filling.

It is quite likely that an elegant piece such as the apparently unused foliate knife may have been produced specifically for deposition in Pit 034. Foliate knives are quite rare, but the few known specimens are from burial contexts. It is thought that the best of the known plano-convex knives, a related type, may have been manufactured for immediate deposition in burials rather than domestic use (Finlayson 1997, 311), as they usually show no or little use-wear.

Though it is thought that some of the simpler unburnt pieces may have entered the cremation

pits as part of the back-fill, the Skilmafilly foliate knife is evidence that unburnt as well as burnt lithic artefacts were deposited as a component of the funerary ritual. If the unburnt lithic items can be discounted as residual, almost all the lithic burial goods had accompanied the deceased onto the funeral pyre, and the foliate knife clearly represents an exception, having been deposited after the pyre. The fact that some plano-convex knives recovered with 'sepulchral deposits' had been burnt and others not (ibid, 309), suggests that some degree of choice may have existed as to how burial goods were treated and deposited in the Early Bronze Age.

4.4 Worked bone and antler objects, by Dawn McLaren

4.4.1 Burnt pins, probably of bone

A curved and calcined incomplete pin was recovered as three conjoining fragments from context 004/5 (illus 16). The fragments are from the head, shaft and point, and their overall length is 148mm, and weight 7.8g. The head and shaft are oval-sectioned, measuring 7.5 × 5mm and 6.5 × 5mm respectively, and the pin tapers to a fine narrow point 0.5mm in diameter. The pin's original length is unknown but in size and shape it conforms to Longworth's definition of a Type 1 skewer pin (Longworth 1984, 63). The pin's surfaces, particularly its edges and inner surface, are covered in fine striations, resulting from abrasion during manufacture. Despite comparing the artefact with skeletal specimens derived from modern animals it was not possible to determine the raw material with certainty, other than to say that it is composed of burnt mammalian bone or antler (C Smith, pers comm); it is likely to be bone, since a slight concave bevel on the inside surface towards the head of the pin may be the remains of an original articular surface like that seen in a more pronounced fashion at Burnfoot Plantation, Dumfries and Galloway (Cowie et al 1981, 34), Brackmont Mill, Fife (Mears 1937, 266) and Kirkbean, Dumfries and Galloway (Bishop 1919, 46), suggesting that the pin was made from a splinter of long bone. Areas of slight polish remain on the shaft, indicating that the pin was originally highly finished.

That the pin had passed through the pyre, probably as a fastener for a shroud or garment worn by the deceased, is clear from its calcined appearance: it is white, brittle, and has transverse crescentic cracks near its point (as seen elsewhere, for example on the aforementioned pin from Burnfoot Plantation and on pins from Cairnpapple Hill, West Lothian: Piggott 1948, 110). Its curvature is also almost certainly a result of heat distortion. The head has lost some of its surface through flaking, and it may be that, being more exposed during the conflagration than the rest of the pin (which would mostly have been covered by the funerary garment), it has suffered greater heat damage.

A fragment of the point of another probable bone pin was found in urn 013, spit 5. It is circular sectioned, measuring 19mm long by 3mm thick, tapering to a blunt point which appears to have a slight bevel on one side. The pin's original length is unknown. The surface of the fragment appears to have been polished. Like the example from context 004, the pin is calcined and so has also passed through the pyre, again probably on the shroud or garments of the deceased. It is white and brittle and has a long crack present running along the shaft of the pin from where it has broken. Some abrasion and surface loss around the break indicates that it was broken in antiquity, perhaps during its cremation. Although the object is broken at both ends, its small diameter indicates it may have been made from a pig fibula (C Smith, pers comm). Although it could feasibly have originated from a long bone splinter from any large mammal, a pig fibula is ideal raw material because of its long, slim shaft and solid structure.

4.4.2 Burnt perforated object (short pin, toggle or pendant) of bone or antler

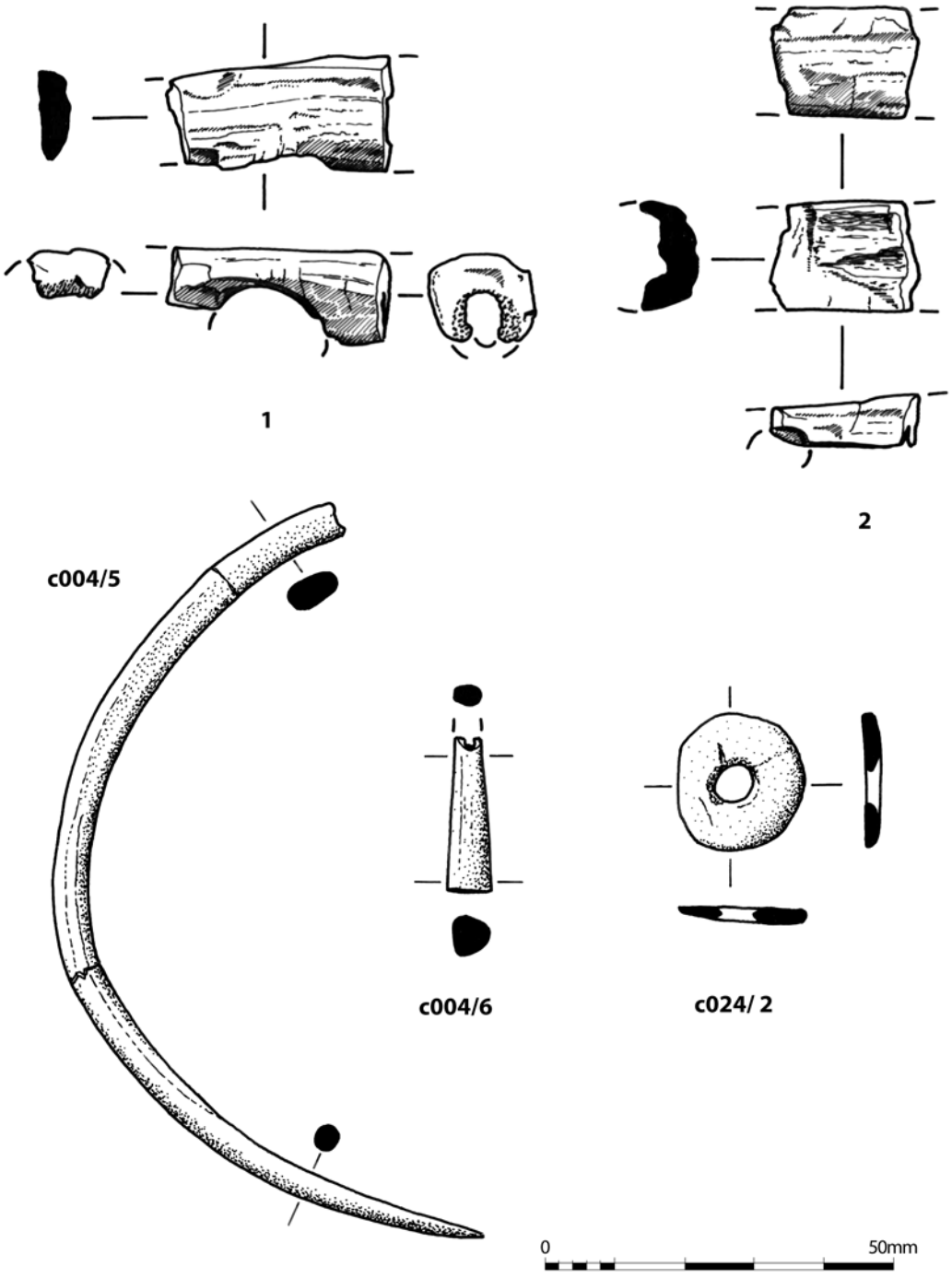
An incomplete, tapering object of bone or antler, burnt, broken across its narrow transverse perforation, was found in context 004/6 (illus 16; length 23mm, width 6mm, tapering to 3.5mm, thickness 6.8mm, tapering to 3mm; diameter of perforation 1.2mm; weight 0.8g). The wide end has been squared off, leaving a smooth, slightly rounded surface; the shaft is triangular in section. The surface does not appear to have been polished, and faint striations resulting from the process of abrading it to shape are visible. As none of the original surfaces of the parent material remain it is not possible to determine with certainty whether this item is of bone or antler.

This artefact is difficult to parallel but it is likely to have been a garment fastener – a short pin or a toggle – worn by the deceased on the pyre. One other possibility is that it was a pendant; a burnt, polished bone object of roughly similar shape but larger, rounder and more bulbous, was found in a barrow cemetery at West Ashby in Lincolnshire (Field 1985, 123, 125, fig 13:1). Unfortunately, the West Ashby example was not in situ.

4.4.3 Antler toggles

Six fragments of burnt antler from up to four artefacts, including two probable toggles, were found in 012/3:

1. Half of a toggle with transverse and longitudinal perforations, both with crescentic heat-cracks around their edges; length 31.5mm; width 16.5mm; thickness 12.6mm (original thickness estimated at *c* 24mm); diameter of perforations 13.5mm and 5mm respectively. The



Illus 16 Antler, bone and stone artefacts

object's width suggests that it was manufactured from the tip of an antler tine. The shape of the material has been heavily modified, with its ends and sides squared off and with little of the original surface remaining. The central porous arterial channel has been deliberately hollowed out to create the longitudinal perforation (A Kitchener, pers comm). This may have been done when the spongy channel was still soft but there is no way of confirming this. The larger, transverse perforation has been bored horizontally through the tine. Its interior surface is smooth towards the edges, perhaps through wear but more likely as the result of tooling during manufacture. Although of less elaborate shape, and of antler rather than bone, this object is reminiscent of the barrel-shaped collared bone toggles from Seggiecrook, Aberdeenshire (Callander 1908, 218), Dalmore, Highland (Jolly 1879, 257), Mains of Carnousie, Aberdeenshire (Longworth 1984, 305), Over Migvie, Angus (Callander 1930, 30–31), and two tubular bone objects from New Kilpatrick, East Dunbartonshire (Callander 1908, 218) and Brackmont Mill, Leuchars, Fife (Waterson 1941, 205–8), all with transverse and longitudinal perforations (illus 16).

2. Possible toggle, with possible transverse and longitudinal perforations; length 20.7mm; width 15.5mm; thickness 8.9mm. One end has been cleanly squared off and the edges may have been modified. A small bevel can be seen on the edge, coinciding with an abrupt stop in the spongy interior surface, which is of similar character to the beginnings of the horizontal perforation on the toggle above, but there is not enough of the artefact remaining to enable clarification. This may be of similar form to 1); the different thickness of the parent material makes it clear that it is a discrete artefact, and not part of 1 (illus 16).
3. Three conjoining fragments. Little of the spongy bone interior remains but it is not possible to confirm whether this is the result of deliberate modification. L 29.8mm; W 21.1mm; T 12.9mm.
4. Small elongated narrow fragment of antler with spongy bone interior intact. Width of fragment indicates that this was manufactured from a thin tip of an antler tine. No evidence to indicate perforation. Original ribbed surface of the tine remains over most of the artefact. L 28mm; W 14.9mm; T 8mm.

4.4.4 Discussion

Seven burnt bone/antler ornaments from four burial contexts comprise a large and interesting assemblage. The burnt bone pin was associated with an un-urned adult cremation in the lower deposit of 004/5; this deposit was later re-cut for the deposition of the cremated remains of a child accompanied by a bone toggle/pendant/short pin. Although the relationship between the three individuals within this deposit is unknown it is interesting that, being one of only three re-cut burials in the cemetery, two of the individuals were accompanied by burnt bone ornaments. The association of the possible bone pendant with the nine-year-old child is particularly interesting in light of the recovery of burnt eagle talons from the same deposit (see below). This association could suggest that the bone object and the talons formed part of a necklace. However, as the form of the perforated bone object is not definitely known, this interpretation is necessarily conjectural.

The un-urned pit burial (012/3) of a ten-year-old child was accompanied by four burnt antler objects, two of which have been identified as toggles. The bone pins from burials 004/5 and 013 and object from 004/6 can do little more than suggest a simple shroud, but the potential four toggles from 012/3 suggest that the garment worn by the deceased on the pyre may have been far more elaborate.

Identification of these objects as non-human bone was made during skeletal analysis of the cremated remains. It is well attested that in the past a general lack of care and attention was taken to the recovery and identification of cremated bone in burial deposits which has not only led to the loss of information in regard to the human remains but also the potential loss of similar worked bone artefacts. It is often only through the thorough, systematic analysis of the cremated remains that such artefacts are identified: how many of these objects have been missed in the past?

None of the artefacts from this assemblage are complete, suggesting the possibility of their partial destruction during cremation, or of a lack of care during the recovery of the material from the pyre, with only token or selected items retrieved from the pyre for deposition. Unfortunately, the scope of this report does not allow for further discussion of this topic.

Ornamental objects made from antler are rare in Scottish burial contexts and no further antler toggles are known. The base of an antler from cist 6 at Barns Farm, Fife (Barnetson 1982, 100–1) has been rejected as being a fossil coral (Clutton-Brock & MacGregor 1988, 27) although late Neolithic antler skewer pins are known from Cairnpapple, West Lothian (Piggott 1948, 101). Fragments of burnt antler are known from cremation 2 at Horsbrugh Castle Farm, Peeblesshire (Petersen et al 1974, 47), worked fragments are noted amongst the remains of an adult within cremation burial 3, cairn 1 at Lairg, Highland (McKinley 1998, 119) and a burnt antler pin came from a cremation deposit at Seafield West cemetery, Highland (Cressey & Sheridan 2003, 66, illus 13:1).

The Skilmafilly perforated antler fragments are comparable to barrel-shaped bone examples noted previously and discussed extensively by Piggott (1958). Several functions have been proposed for these objects such as beads (Callander 1923, 156), ornaments (Callander 1930, 30), buttons (Callander 1908, 218) and toggles (Waterson 1941, 205): however the second perforation at right angles to the first makes the interpretation of these being simple beads unlikely and the function as toggles is favoured. Multiple burnt bone/antler items are also known from New Kilpatrick, East Dunbartonshire (Callander 1908, 218–20) where two tubular bone toggles with transverse and longitudinal perforations, two segmented cylindrical bone beads and five flint arrowheads accompanied a cremation deposit contained within a Collared Urn; all had been burnt. A single grave deposit at Moncreiffe in Perthshire (Close-Brooks 1985) is another example: a perforated bone pin and two perforated flat plate bone toggles were associated with a cremation within a Cordoned Urn. Unfortunately the cremated remains were not identified at the time of the original report and have since apparently been lost (A Sheridan, pers comm). Close-Brooks identified the vessel as a Cordoned Urn but noted that aspects are similar to a Collared Urn from Cairnpapple Hill (Piggott 1948, 143) and it should perhaps be regarded as a Collared/Cordoned Urn not unlike some of the urns from Skilmafilly. The majority of the collared bone toggles with transverse and longitudinal perforations are associated

with Collared Urns. The Collared/Cordoned Urn from Seggiecrook (Callander 1908, 213, fig 1) and the Enlarged Food Vessel from Dalmore, Highland (Cowie 1978, 133) are notable exceptions. Radiocarbon dates for cremated remains associated with bone toggles from Mains of Carnousie, Aberdeenshire (1960–1690 cal BC at 2-sigma: Sheridan 2003, 218), Lesmurdie Road, Elgin (1890–1680 cal BC at 2-sigma: Suddaby forthcoming) and from Collared Urn cremation burial 1 at Seggiecrook, Aberdeenshire (1940–1680 BC at 2-sigma: Sheridan 2003, 220) show the use of these ornaments to be contemporary with the Skilmafilly antler toggles of which the associated cremated remains have provided a date of 1880–1520 BC (GrA-24021).

Comparable pins to the Skilmafilly example come from Cairnpapple Hill, West Lothian (Piggott 1948, 110), Burnfoot plantation, Dumfries and Galloway (Cowie et al 1981, 34), Brackmont Mill, Fife (Mears 1937), Kirkbean, Dumfries and Galloway (Bishop 1919), Muirkirk, East Ayrshire (Fairbairn 1924, 338), Seafield West, Highland (Cressey & Sheridan 2003, 66, illus 13:1) and from cremation 3 at Lairg, Highland (McCullagh 1998, 92). Fragmentary curved pins come from cremation burials at Aberdour Road, Dunfermline, Fife (Close-Brooks et al 1972, 129), Hill of Doune, Aberdeenshire (Cowie 1978, 113), and an inhumation burial at Beech Hill House, Perth and Kinross (Stevenson 1995, 219). Due to their fragmentary nature it is not possible to be more precise in identifying their form but their general shape and dimensions can be seen to be similar to the Skilmafilly pin. Unfortunately, bone pins of this form are only broadly datable. They are generally, but not exclusively, found in association with Collared Urns. The cremated remains from Burnfoot plantation have recently been radiocarbon dated to 1880–1630 BC (Sheridan 2007) and those from cremation 3 at Lairg give a date of 1945–1520 BC (McCullagh 1998, 94), indicating that their use is broadly contemporary with the Skilmafilly pin.

Kavanagh (1976, 312) has suggested that the curved form was achieved deliberately by soaking the bone in water to make the material more malleable; however, it may simply be the result of distortion during cremation. The skewer pin from Muirkirk (Fairbairn 1924, 338), although similar in form, is not curved like the other examples noted above, making it impossible at this stage to confirm whether the curvature is a natural feature of the bone, the result of calcination or deliberate modification.

4.5 Perforated stone disc, by Melanie Johnson

A perforated stone disc was found in context 024/2 (illus 16). The disc measures 19mm by 17mm by 2mm thick, and weighs 1.1g. It is circular, with one flattened side. The circular perforation measures 5mm across and lies off-centre. It is made of a light brown, soft stone, probably sandstone, and does not appear to have been burnt. This object is likely to have been a personal ornament, worn on the individual buried in this pit. No ready parallels for this object were found, although an oblong sandstone pendant was recovered from a cremation deposit at the enclosed cemetery at Loanhead of Daviot (Kilbride-Jones 1936) and a decorated oblong pendant of slate was found within a pit containing an upright Cordoned Urn at Seggiecrook (Callander 1905).

5 ENVIRONMENTAL EVIDENCE

5.1 Bird bone, by Catherine Smith

Two bones from 004/6 (child, nine years) were positively identified as talons (third phalanges) of Golden Eagle (*Aquila chrysaetos*), after comparison with specimens of that species and the White-tailed Sea Eagle (*Halieetus albicilla*) in the collection of the National Museum of Scotland. Part of a second phalange of the foot was also recovered (context 004/2) and found to articulate with the more fragmentary of the two talons (illus 17).

The talons appear to be burnt, but they are not as badly affected as the other bone artefacts. They were not calcined but had certainly been affected by heat; the pinkish-yellow colour and the chalky texture of the bone indicate some degree of firing. They appeared to be identical in size to the comparative eagle specimen so did not seem to have shrunk much, if at all, and they did not seem distorted.

Although no other skeletal parts were recovered which might indicate the burial of a complete bird, the second phalange indicates a whole or partial foot was originally present, rather than a collection of disarticulated talons. If the talons formed part of a necklace or other item of personal adornment, they may still have been encased in the horny outer sheath of the claw, which would serve to hold the articulating phalanges together. Alternatively, the bones may have been placed in a bag or pouch which did not survive cremation and burial. The find is unusual, and seems to indicate some association between the buried individual and the eagle. Whether this association was an indication of the occupation or preferences of the dead person or was of a purely symbolic nature cannot be known.

Illus 17 Golden Eagle talons

At Skilmafilly, the association between the eagle bones and the buried human need not necessarily have been emblematic, however. A parallel may exist at Kellythorpe in Yorkshire. Here, a beaker grave group excavated in 1851 contained a male crouched inhumation whose grave-goods included a stone wristguard and the 'head and beak of a hawk', possibly indicating a falconer (Clarke et al 1985, 263–4). Eagles may be used in falconry, although males are preferred since they weigh less than females and are thus less exhausting to carry on the wrist (Parry-Jones 2003, 58). Although the associated burial at Skilmafilly was that of a child, making it unlikely that the child was the falconer, there may have been a family connection or apprenticeship in place.

Sea Eagle bones found in the chambered tomb at Isbister on Orkney had previously been interpreted as having had a totemic significance for the community who used the tomb. However, recent radiocarbon dating of two samples of Sea Eagle bone have produced dates with the range 2450–2050 BC, indicating that they were not contemporary with the original construction of the tomb and were added to the tomb at a much later date (British Archaeology 2006). At Isbister the bones came from all parts of the skeleton, not just the talons, and represented at least eight individual birds (Bramwell 1983). However, at both Isbister and a stalled cairn at Point of Cott, Westray (Harman 1997, 50), where Sea Eagle bones were found, it might perhaps be noted this was not the only bird species found, nor indeed the only vertebrate species. Sea Eagle bones have also been found at the Neolithic habitation site at the Links of Noltland, Westray, where the species was part of a large assemblage of birds and mammals (Armour-Chelu 1985).

At the present day, the breeding density of the Golden Eagle in Scotland varies widely, depending on availability of food and the level of persecution the species receives from humans (Thom 1986, 144–5). It is currently more abundant in the west of the country than in the east. In 1982 there were thought to be only 30 breeding pairs in an area approximating to the former counties of Angus and Aberdeenshire (ibid). Victorian gamekeeping practices did much to reduce the population, and there can be little doubt that in prehistoric and even Early Historic times the species was more widespread than it is today. Archaeological evidence of the Golden Eagle

has been noted at two sites of medieval date in the north-east of Scotland, at 16–18 Netherkirkgate within the burgh of Aberdeen (Hamilton-Dyer et al 2001) and at Perth High Street (Smith & Clark forthcoming).

Seton Gordon, in his classic work on the species in Scotland, has said 'there are more myths woven around the eagle than any other bird', which he attributes to the power of its wings (Gordon 2003, 152). Eagle feathers must have been regarded as possessed of some of this power, and were worn as a badge of rank in the Highlands (ibid, 157). A more practical use was in arrow flights, but it is also easy to impute magic to the arrow which is carried aloft by the feather of such a powerful bird. Thus the talons at Skilmafilly may have had dual meaning: they may have been symbolic of the power of the dead person with whom they were buried, yet they may also have been a sign of his earthly occupation.

5.2 Archaeobotany, by Mhairi Hastie

The bulk samples were all fully processed, through a system of wet sieving and flotation, and each flot was divided into two main fractions, 1F (1mm mesh) and 0.3F (0.3mm mesh). The available flots from 25% of the cremation pits (nine pits) were randomly selected, including some which contained several discrete fills. Flots were available from each discrete fill and in total 30 flots were assessed. Each flot was scanned using a binocular microscope to assess the preservation and quantity of palaeoenvironmental remains present.

All the flots were dominated by wood charcoal and modern plant remains. Occasional degraded charred seeds of *Spergula arvensis* (corn spurrey) and nutlets of wild taxa including Chenopodiaceae (goosefoot) and *Carex* sp. (sedge) were found. In addition, small quantities of fungal sclerotia were recovered from nine samples.

The wild taxa are species commonly associated with arable land and waste places. The quantities present are extremely small. There are two probable explanations for the presence of carbonised seeds/nutlets within the pyre remains: either the cremation pyres were placed on grassland where the seeds were burnt in situ, or dried grass was used for kindling. Small quantities of charred fungal sclerotia were also present. These hard spherical mycelia are usually present in soil or turfs and the presence of such material suggests that the cremation pits contained burnt soil. There is no evidence to suggest that any of the archaeobotanical remains were the result of deliberate ritual deposits, the material present being derived from natural accumulation.

5.3 Charcoal, by Mike Cressey

Analysis was undertaken to obtain an insight into local woodland cover and to identify suitable specimens for radiocarbon dating. The entire >4mm charcoal assemblage recovered from flotation samples has been assessed to determine the relative frequency of the species exploited for pyre fuel. The degree of abrasion was also noted; where soil mass-movement is evident, typically the charcoal will be rounded and the edges worn.

Charcoal was collected by hand during the excavation and by post-excavation flotation of bulk soil samples. Large samples of charcoal (over 100g) were split in a riffle-box to produce sub-samples. Smaller samples were processed using routine methods. In all cases, counts were limited to 25 identifications per sub-sample using a binocular microscope at magnifications ranging between ×10 and ×200. Generally, identifications were carried out on transverse cross-sections. Anatomical keys listed in Schweingruber (1992) and in-house reference charcoal were used to aid identifications. Asymmetry and morphological characteristics were recorded. Vitrified charcoal fragments, possibly a result of secondary burning, were recorded but this material is not usually identifiable, owing to increased fusion of the vascular structure. Where applicable, wood-working evidence such as squaring and trimming has been noted. Samples <4mm are considered to be below the level of identification (BLOI).

5.3.1 Late Mesolithic Pit 036

Pit 036 yielded 25.7g of charcoal (Table 4). This assemblage was extremely poor in both the quality of the charcoal and the volume of material recovered during the flotation process. Oak and birch with small quantities of hazel are represented. In general the charcoal was amorphous in shape, suggesting some reworking during deposition, presumably by earthworm activity. None of the material from the pit provided evidence of trimming.

5.3.2 Cremation pits

Charcoal from the cremation pit assemblage has produced 802.65g of charcoal and 3708 individual identifications were obtained from this material. The detailed results are listed in the project archive and summarised in Table 4 and Table 9.

The assemblage is dominated by *Quercus* sp. (oak). *Betula* (birch) attains the second highest frequency followed by *Corylus avellana* (hazel). *Alnus glutinosa* (alder) is present but only in trace amounts. The level of preservation within the charcoal assemblage was very good, with only a minimal amount of abrasion or degradation recorded in one or two samples. No extraneous non-charcoal (cinder/coal) was present and very little iron (Fe) staining was recorded.

The oak charcoal assemblage is dominated by mature material that has fragmented into multiple blocky fragments. Mature oak charcoal tends to fracture along its large multiseriate rays and

Table 4 Charcoal species, weight and number of identifications

Context	Species	Weight (g)	No. of identifications
Pit 036	*Betula*	8.2	15
	Corylus avellana	0.6	4
	Quercus	17	95
		25.8	**114**
Cremation pits	*Alnus*	0.6	3
	Betula	154.05	379
	Corylus avellana	41.9	53
	Quercus	606.1	3273
		802.65	**3708**

commonly forms regular uniform blocks. The birch and hazel assemblage is much smaller and is represented by small branch and twig material.

The cremation pit assemblage included eight oak fragments and one birch fragment that provided positive evidence of tooling, in the form of a single oblique cut. This form of cut is typical where a sharp blade has been used to slash the branch from living stems.

5.3.3 Cremation fuel

The results from identification of the cremation pit assemblage confirm that oak was the most abundant species exploited for pyre fuel. Birch, hazel and alder are represented but in lower amounts. All four species are native to NE Scotland and were well-distributed within Bronze Age Scotland. Oak, birch and hazel thrive on well-drained soils, whereas alder is a tree found alongside rivers and streams. Oak is at the apex of climax forest and would have been an abundant source of local fuel. Birch is a light-demanding pioneer typical of open areas such as glades. Hazel is an under-storey shrub that can form small trees if not altered by trimming.

Oak is thought to have been commonly used during the cremation process as spars placed across cremation pits to support a body (J McKinley pers comm). Multiple spars of only small diameter oak would support a body as this particular species is very strong, even when it is not green wood (ie deadwood). This might explain why oak was selected. Cremation Pit 027/1 produced three fragments of hazelnut shell. Unfortunately there is insufficient material here to assess whether this was part of the funerary ritual or whether the shells were simply attached to smaller tinder material. Hazelnuts mature by autumn, although they could have been stored from the previous year.

The results of pollen analyses from three of the cremation pits have provided an insight into the types of material exploited for fire starting fuel (Cressey below). The pollen results strongly suggest that both ferns and heather formed the main tinder component in at least two of the cremations examined.

5.3.4 Charcoal conversion

The charcoal surviving in any cremation pit is likely to be only a small fraction of the original volume of wood required to cremate a body. The reducing conditions necessary to produce charcoal could occur deliberately if the pyre were clamped by throwing soil on top of the fire, or could occur naturally within a disintegrating pyre. This would produce the smouldering anaerobic conditions that would help convert wood to charcoal.

5.3.5 Conclusion

The charcoal assemblage from the cremation pits is dominated almost exclusively by oak, most of which appears to have been derived from mature wood. The quality of preservation within the pits is very good, with very little evidence of abrasion. Soil pollen (see below) obtained from the urns included heather and fern pollen (probably bracken). Both plants will burn well if dry, and it is highly likely that these plants, along with grass, were selected for tinder fuel.

5.4 Pollen, by Mike Cressey

5.4.1 Introduction and method

Scientific analysis associated with cremation pit fills has in the past mainly been confined to biostratigraphic descriptions and, later, charcoal analysis during post-excavation. Previous work elsewhere has shown that pyre deposits more often than not contain well-preserved human bone, artefacts and an abundance of charcoal and plant macrofossil remains. To date, however, very little work has

Table 5 Summary of the pollen assemblage

Context	Arboreal	Shrub	Herb	Spores	Microscopic charcoal
Pit 002 Sample 1	*Betula* (birch) and *Pinus* (pine) in trace amounts	Coryloid at 9%, heather at 55%	Poaceae (grasses), and Cyperaceae (sedges) are present. Caryophyllaceae, *Rumex*, Saxifragaceae and *Plantago lanceolata* at <1%	*Polypodium* at 11%	5–50μm size class is the most abundant
Pit 002 Sample 2	*Pinus*, *Alnus glutinosa* (alder) and *Betula* at <9%	Coryloid type is present, heather at 64%	Grasses at 18%, other herbs <4% (Caryophyllaceae, *Galium* type and *Taraxacum* type)	Filicales and *Polypodium* at 26%	5–100μm size class is the most abundant
Pit 005 Sample 1	*Betula* (birch) is present along with *Alnus glutinosa* and *Pinus*	Coryloid at 12%, heather at 16%	Grasses at 16%, Caryophyllaceae, *Filipendula*, *Galium* type and *Taraxacum* at <1%	*Typha latifolia* (bulrush), Filicales, *Sphagnum* and *Polypodium* are present but low in frequency	5–100μm size class is abundant
Pit 005 Sample 2	*Betula*, *Alnus glutinosa* and *Salix* (willow) are all low	Coryloid at >55%, heather at 8%	Grasses at 16%, *Taraxacum* low	*Polypodium* at 22%	Abundant in the 5–10μm and 50–100μm class
Pit 005 Sample 3	*Pinus*, *Betula* and Acer (maple) type at <3%	Heather at 41%, coryloid present in lower amounts	Grasses abundant, Caryophyllaceae and *Rumex* in low amounts	*Polypodium* abundant	50–100μm is abundant
Pit 005 Sample 4	*Acer* type, *Betula*, *Pinus*, *Quercus* (oak) and *Ulmus* (English elm) at <4%	Heather at 35%	Grasses at 15%, Caryophyllaceae at 9%. *Circium* type, *Chenopodium* (fat hen), *Filipendula* and *Galium* type pollen are represented by single grains	Fern spores are low	
Pit 022 Sample 1	*Alnus glutinosa* at 54%	Coryloid at 35%, trace amounts of heather (1%)	Grasses at 51%, Caryophyllaceae, *Rumex* and Saxifragaceae at 1%	Filicales at 64%, *Polypodium* at 35%	5–100μm size class is abundant
Pit 022 Sample 2	*Alnus glutinosa* and *Quercus* at <7%	Coryloid at 70%	Herbs are low (<1%)	Filicales and *Polypodium* at 50%	Only abundant in the 5–10μm class; 10–100μm or greater was rare
Pit 022 Sample 3	*Alnus glutinosa*, *Betula* and *Quercus* at <5%	Coryloid at 80%	Herbs are low (<1%)	Filicales attain 67% and *Polypodium* is represented by 32%	Abundant only in the 5–10μm size class
Pit 022 Sample 4	*Betula* (12%), *Alnus glutinosa* (3%)	Coryloid at 73%	All other herbs are below <1%		Virtually absent in all size classes

been undertaken on the examination of soil pollen obtained from these types of deposit.

Ten samples were extracted from three cremation burials (002, 005, 022). The samples were processed using acetolysis and hydrofluoric acid according to the method described by Moore et al (1991). Pollen was identified using an Olympus BX40 light microscope at ×400 magnification with critical identifications made at ×1000 and assisted by a pollen reference collection and photomicrographs (Moore et al 1991).

The preservation assessment method using five categories: normal, broken, crumpled, corroded and degraded (Berglund & Ralsa-Jasiewiczowa 1986; Tipping 1987) was initially adopted but was abandoned when it was found that most of the pollen grains had undergone some form of degradation. Where pollen was found to be low in frequency within a sample then that sample was considered to be barren and no further work on it was undertaken: only those samples that were considered to contain enough pollen grains to provide a valid statistical sample are considered here. A summary of the results is provided in Table 5.

5.4.2 Preservation factors

In most cases the pollen samples contained pollen with variable preservation. Many of the grains were poorly preserved. Factors influencing the preservation of soil pollen are varied and include the resistance of pollen grains themselves, soil microbial activity, oxidisation and desiccation.

5.4.3 Principal differences in pollen types and uses of tinder

There are some interesting differences between the three soil pollen assemblages derived from the three cremation pits (002, 005, 022). The first point is that arboreal pollen is very low throughout. It is interesting to note that charcoal analysis (Cressey above) identified, in decreasing order of abundance, oak, birch and hazel. Within the shrub pollen component, hazel is well represented with the Coryloid group (Pit 005). Hazel was identified within the charcoal assemblage and shows that this species was probably local. Within the same group, Ericaceae (heather) type pollen dominates the assemblage from Pit 002. No heather was identified within the charcoal assemblage from this context. The absence of this particular shrub might be explained by the fact that dry heather burns ferociously and in the right conditions, with plenty of wind, it is likely that heather would not survive as a macrofossil, albeit represented in the surviving pollen. That it was a useful tinder material would not have gone unrecognised. A small quantity of heather in flower during late summer and early autumn could produce a large amount of pollen that was readily released, for example during its collection as tinder for igniting the cremation pyre. This may give an indication of the time of year for the cremation within Pit 002.

Grasses are present within all three cremation pits but other herbaceous plants are low, all being below 4% TLP. Pollen derived from spores is high, especially in Pit 022. Filicales and *Polypodium* pollen are well represented. The latter is a fern reaching fair altitudes, growing on peat banks, trees, drystone walls and on the tops of rocky outcrops and cliffs. Its spores ripen in the summer (Jermy & Camus 1991). Dry fronds of this fern would also have made a suitable tinder material.

5.4.4 Conclusion

The results of pollen analyses from three of the cremation pits have provided an insight into the types of material exploited for igniting the pyres.

It is likely that the local environment close to the cremation site provided all the wood and tinder to supply the cremations. The pollen evidence strongly suggests that both ferns and heather formed the main tinder component in at least two of the cremations examined. The pollen results are also in accord with the charcoal record, showing that hazel was abundant in the surroundings.

5.5 Magnetic susceptibility, by Lucy Verrill

5.5.1 Introduction

Magnetic susceptibility samples were taken along two axes at Skilmafilly, an X-axis and a Y-axis; the material examined comprised only the Y-axis (illus 2). Distances along the axes are in centimetres (eg Y0100, Y1250).

Magnetic susceptibility measures the level of magnetic particles within a sediment body. Many of these particles are fixed in archaeological soils and sediments through human activity. By comparison with background measurements from non-anthropogenic sediments or soils away from the area of human activity, it is often possible to identify phases or areas of concentrated human activity. Magnetic susceptibility measurements therefore aid recognition and description of context types on archaeological sites (eg Peters et al 2004).

Two measurements of magnetic susceptibility were used: mass specific magnetic susceptibility and frequency dependent susceptibility. Mass specific magnetic susceptibility (χ) gives a rough indication of magnetic concentration or enhancement within a given sample (Peters et al 2004, 87–8) thus providing a quick, easy comparison between samples. Percentage frequency dependent magnetic susceptibility (χfd %), is used to detect the presence of superparamagnetic (SP) grains, which are common in archaeological sediments (ibid, 88), particularly those originating from burning and bacterial activity (Dearing 1994, 42). The percentage contribution of

SP grains to the sample can be estimated by the percentage value of frequency dependent susceptibility (ibid, 43). Dearing (1994, 43) has produced classificatory bands of χfd; interpreting low values (<2%) as containing less than 10% SP particles, medium values (2–10%) as containing a mixture of SP and larger grains, and high values (10–14%) as containing virtually all SP grains, probably >75%. An χfd value of 8% is equivalent to around 50% SP grains. Values of χfd higher than 14% are usually interpreted as erroneous measurements, contaminated or weak samples or anisotropy.

5.5.2 Methodology

Sixty-six transect samples were submitted for analysis. The samples were dried and sieved at 2mm (Peters et al 2004, 89). Magnetic susceptibility of 10cm^3 samples was measured at low frequency (LF; 0.46kHz) and high frequency (HF; 4.6kHz) using a Bartington MS2 dual frequency sensor on the 0.1 multiplier range (Dearing 1994). The readings were corrected for instrumental drift to give corrected LF and HF values; κlf and κhf. Two equations are used to obtain χ and χfd% (Dearing 1999, 46-47):

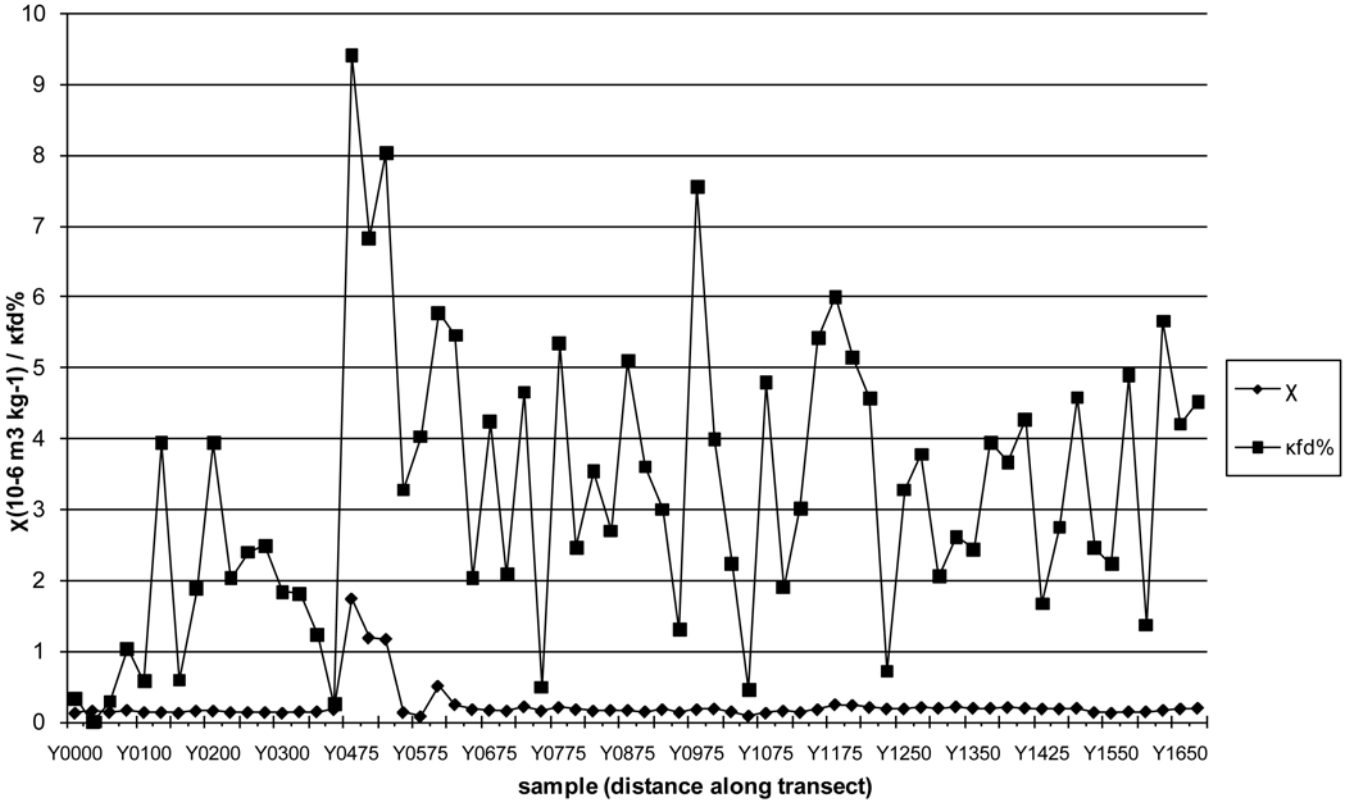
Mass specific (χ) magnetic susceptibility: $\chi = \{(\kappa lf/mass)/10\}$

Frequency dependent susceptibility measurements: $\chi fd\% = \{(\kappa lf - \kappa hf) / \kappa lf\} \times 100$

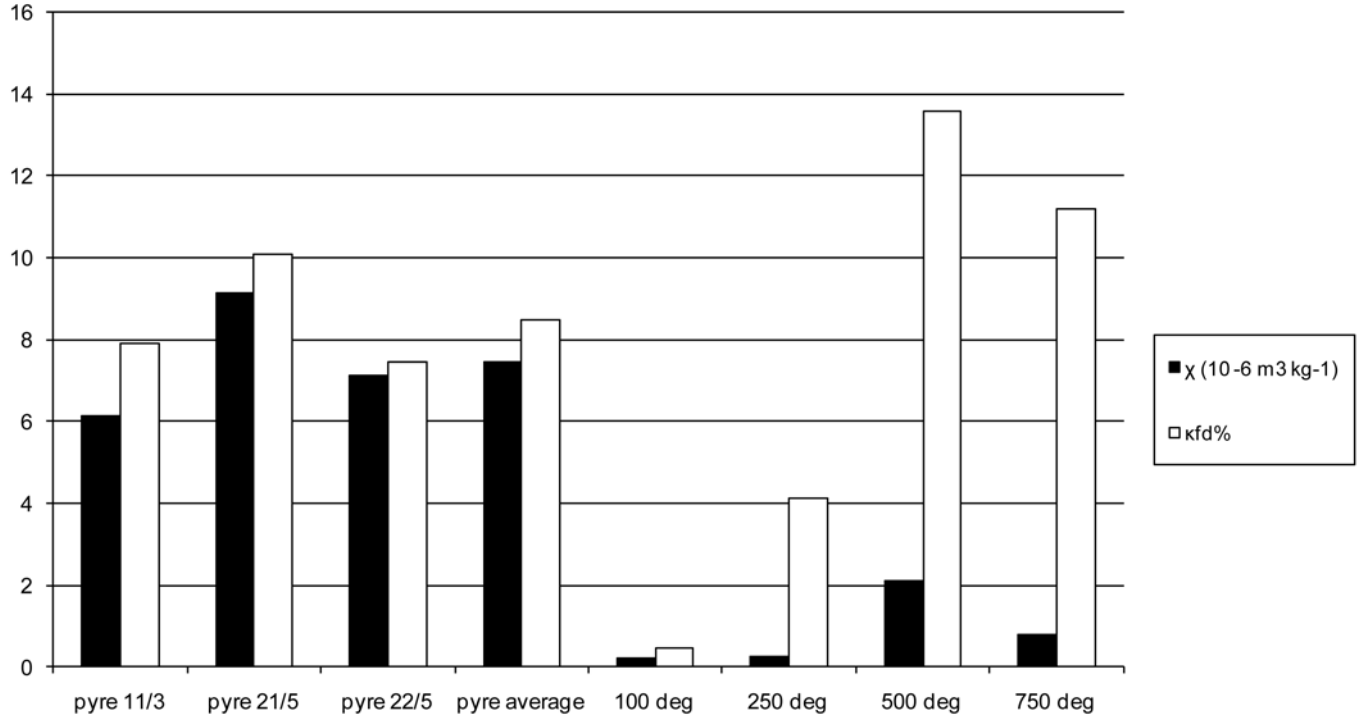
To ascertain whether pyres were built along the transect site, three samples from known cremation deposits were also analysed for χ and χfd% (pyre samples 022/5, 011/3 and 021/5). In addition, subsamples of the Y-axis samples were subjected to incineration at various temperatures: 100°C, 250°C, 500°C and 750°C for one hour each. It was hoped that these controls would provide different magnetic susceptibility values with which to compare and contrast any transect values exhibiting magnetic enhancement.

5.5.3 Results

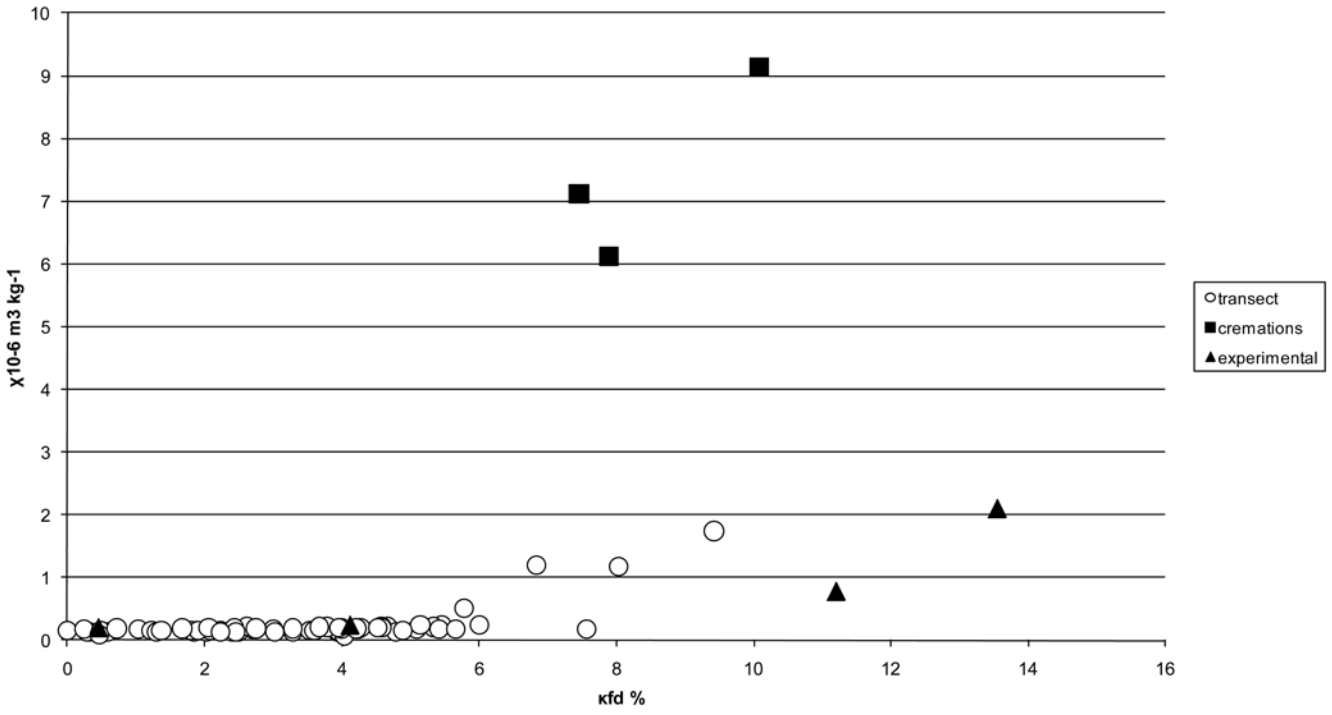
Illus 18 shows mass specific and frequency dependent susceptibilities of the transect samples. It is evident that the majority of the samples show susceptibility of between 0.1 and 0.25 × 10^{-6} m^3 kg^{-1}. These fall into the range of values commonly encountered for topsoil (Dearing 1994, 32). Four samples have significantly higher χ values: transect samples Y0475 (1.74 × 10^{-6} m^3 kg^{-1}), Y0500 (1.19 × 10^{-6} m^3 kg^{-1}), Y0525 (1.17 × 10^{-6} m^3 kg^{-1}) and Y0600 (0.51 × 10^{-6} m^3 kg^{-1}). These values are all within the range encountered for burned soils (ibid). When examining the χ values obtained by burning one of the soil samples at various temperatures (illus 19) similar results are seen, suggesting the transect samples with elevated susceptibilities may have been subjected to burning. By contrast, the cremation samples show



Illus 18 Mass specific and frequency dependent magnetic susceptibility of transect samples



Illus 19 Mass specific and frequency dependent magnetic susceptibility of cremation and experimental samples



Illus 20 Biplot of κfd % vs χ for all samples

much higher susceptibilities than both the transect and the experimental samples (illus 19).

The transect samples contain a range of κfd% values (illus 18), with most samples containing medium, and several containing low, SP concentrations. No samples contained high SP concentrations. The percentage frequency-dependent susceptibilities of the experimental and pyre samples are presented in illus 19. While some variation is evident, it can be seen from the experimental samples that χfd % values are positively correlated with burning temperature.

Illus 20 shows a biplot of χfd% and χ for all samples, enabling discrimination between different sample types. This method is commonly used to discriminate between grain-size and domain-state (Dearing 1999, 61).

5.5.4 Interpretation

While most have χfd values indicative of medium SP content, as might be expected in archaeological contexts, only four of the transect samples (Y0475, Y0500, Y0525 and Y0600) show enhanced magnetic concentration (χ). Although the samples with higher χ values also contain high χfd values, the relationship is not linear or clear. The experimentally ignited samples display similar χ values to the transect samples and the χfd values appear to be related to burning temperature. This suggests that the transect samples consist of soils variously subjected to modification, including burning.

The cremation samples display similar SP content to, but higher χ values than, the magnetically enhanced transect samples. Variations in values of χ have been correlated to the amount of, for example, ash dumped in archaeological contexts, with taphonomy also a crucial factor (Peters et al 2004, 90–91). Therefore the cremation fills may consist of concentrated, re-deposited selected material derived from the pyres, with the pyre material comprising burnt soil.

As three of the four magnetically enhanced transect samples are adjacent, and the other 0.75m away, it might be interpreted that this locality represents an area of former pyre activity, where efforts were made to clear away the resultant debris soon after the cremation process was completed.

5.5.5 Conclusion

Two different measurements of magnetic susceptibility were undertaken for sixty-six samples from a soil transect, and compared to results obtained from archaeological cremation deposits and from a series of experimentally heated soils from one subsample. The results indicate that there is evidence of admixture of heated soils along the transect, however this is of a different nature to the cremation deposits. The cremation deposits probably consist of intentionally re-deposited soils burnt along with the bodies and fuel. There is a possible indication of small amounts of pyre deposits being incorporated into the soils along the transect in the immediate locality of the Y0500 samples.

6 RADIOCARBON DATING

Dating samples were identified by Mike Cressey (charcoal) and Kathleen McSweeney (human bone). Radiocarbon assays of human bone were carried out at the Centre for Isotope Research, University of Groningen, and charcoal assays were carried out at Poznań Radiocarbon Laboratory, Poland. Dates were calibrated using OxCal Version 3.10 (Bronk Ramsey 1995 and 2001, with atmospheric data from Reimer

Table 6 Radiocarbon dates obtained from un-urned cremations cremated human bone (GrA) and charcoal (Poz). Calibrated using OxCal version 3.10.

Context	Description	Material	Lab Code	Uncal BP	Calibrated 1-sigma	Calibrated 2-sigma
001/2	Primary fill	Cranium	GrA-24029	3455 ± 40	1880–1690 BC	1890–1660 BC
002/1	Main fill	Tibia	GrA-24030	3450 ± 40	1880–1690 BC	1890–1660 BC
004/5	Primary fill	?Humerus	GrA-24031	3445 ± 40	1880–1690 BC	1890–1660 BC
004/4	Upper fill	*Betula* sp.	Poz-7688	3540 ± 30	1930–1780 BC	1960–1750 BC
004/4	Upper fill	*Betula* sp.	Poz-7689	3555 ± 30	1950–1820 BC	2020–1770 BC
006/4	Primary fill	Femur	GrA-24019	3460 ± 40	1880–1690 BC	1890–1680 BC
006/4	Primary fill	*Corylus avellana*	Poz-7685	3330 ± 35	1670–1530 BC	1730–1510 BC
006/4	Primary fill	*Quercus* sp.	Poz-7686	3305 ± 35	1620–1525 BC	1690–1500 BC
010/3	Primary fill	Petrous temporal	GrA-24020	3495 ± 40	1880–1760 BC	1930–1690 BC
012/1	Upper fill	Femur	GrA-24021	3395 ± 45	1750–1630 BC	1880–1530 BC
017/1	Primary fill	?Femur/humerus	GrA-24024	3470 ± 40	1880–1740 BC	1890–1680 BC
020/2	Primary fill	?Femur	GrA-24025	3385 ± 40	1740–1620 BC	1770–1530 BC
022/1	Primary fill	?Frontal bone	GrA-24026	3415 ± 40	1770–1640 BC	1880–1610 BC
025/1	Upper fill	?Femur	GrA-24027	3560 ± 45	1980–1780 BC	2030–1760 BC
025/2	Primary fill	*Quercus* sp.	Poz-7683	3410 ± 35	1750–1640 BC	1880–1610 BC
025/2	Primary fill	*Quercus* sp.	Poz-7684	3455 ± 35	1880–1690 BC	1880–1680 BC
026/2	Middle fill	Scapula	GrA-24039	3485 ± 40	1880–1750 BC	1920–1690 BC
027/1	Single fill	?Femur	GrA-24040	3545 ± 40	1950–1770 BC	2010–1750 BC
029/2	Primary fill	?Femur	GrA-24041	3510 ± 45	1900–1760 BC	1950–1690 BC
029/1	Upper fill	*Quercus* sp.	Poz-7692	3520 ± 35	1900–1770 BC	1940–1740 BC
029/1	Upper fill	*Quercus* sp.	Poz-7694	3505 ± 30	1890–1770 BC	1910–1740 BC
031/2	Single fill	?Humerus	GrA-24043	3430 ± 40	1870–1680 BC	1880–1630 BC
033/1	Main fill	?Humerus	GrA-24045	3455 ± 40	1880–1690 BC	1890–1660 BC
033/1	Main fill	*Quercus* sp.	Poz-7695	3430 ± 35	1870–1680 BC	1880–1630 BC
033/1	Main fill	*Quercus* sp.	Poz-7696	3395 ± 35	1740–1630 BC	1870–1600 BC
035/3	Middle fill	?Humerus	GrA-24046	3485 ± 40	1880–1750 BC	1920–1690 BC
038/3	Primary fill	*Quercus* sp.	Poz-7704	3495 ± 35	1880–1760 BC	1920–1690 BC
038/3	Primary fill	*Quercus* sp.	Poz-7705	3590 ± 35	2010–1890 BC	2040–1820 BC
039/1	Upper fill	?Tibia	GrA-24047	3380 ± 45	1740–1620 BC	1870–1520 BC
039/1	Upper fill	*Quercus* sp.	Poz-7676	3415 ± 35	1760–1640 BC	1880–1620 BC
039/1	Upper fill	*Quercus* sp.	Poz-7677	3695 ± 35	2140–2030 BC	2200–1970 BC
042/1	Upper fill	Femur	GrA-24034	3365 ± 40	1740–1610 BC	1750–1530 BC
043/2	Primary fill	?Humerus	GrA-24035	3390 ± 40	1740–1630 BC	1870–1530 BC

Table 7 Radiocarbon dates obtained from urned cremations cremated human bone (GrA) and charcoal (Poz). All samples recovered from within the urns. Calibrated using OxCal version 3.10.

Context	Material	Lab Code	Uncal BP	Calibrated 1-sigma	Calibrated 2-sigma
003/1	Long bone shaft	GrA-26519	3400 ± 40	1750–1630 BC	1880–1530 BC
005/1	?Tibia	GrA-26520	3375 ± 40	1740–1620 BC	1760–1530 BC
007/4	Humerus	GrA-26521	3390 ± 40	1740–1630 BC	1870–1530 BC
013/3	?Ulna	GrA-26523	3320 ± 40	1660–1520 BC	1690–1500 BC
021/4	?Humerus	GrA-26524	3455 ± 40	1880–1690 BC	1890–1660 BC
021/4	*Quercus* sp.	Poz-7690	3505 ± 30	1890–1770 BC	1910–1740 BC
021/4	*Quercus* sp.	Poz-7691	3540 ± 35	1940–1770 BC	1970–1750 BC
024/5	Femur	GrA-26525	3360 ± 40	1740–1600 BC	1750–1530 BC
030/2	?Tibia	GrA-26528	3490 ± 40	1880–1750 BC	1920–1690 BC
034/3	Humerus	GrA-26529	3490 ± 40	1880–1750 BC	1920–1690 BC
034/3	*Quercus* sp.	Poz-7679	3465 ± 35	1880–1730 BC	1890–1690 BC
034/3	*Quercus* sp.	Poz-7680	3515 ± 35	1900–1770 BC	1940–1740 BC
040/3	Femur	GrA-26530	3480 ± 40	1880–1740 BC	1900–1690 BC
040/3	*Quercus* sp.	Poz-7681	3445 ± 35	1870–1690 BC	1890–1660 BC
040/3	*Quercus* sp.	Poz-7682	3480 ± 35	1880–1740 BC	1900–1690 BC
044/6	Fibula	GrA-26531	3470 ± 40	1880–1740 BC	1890–1680 BC
044/6	*Quercus* sp.	Poz-7706	4090 ± 35	2850–2570 BC	2870–2490 BC
044/6	*Quercus* sp.	Poz-7708	3505 ± 35	1890–1770 BC	1930–1740 BC

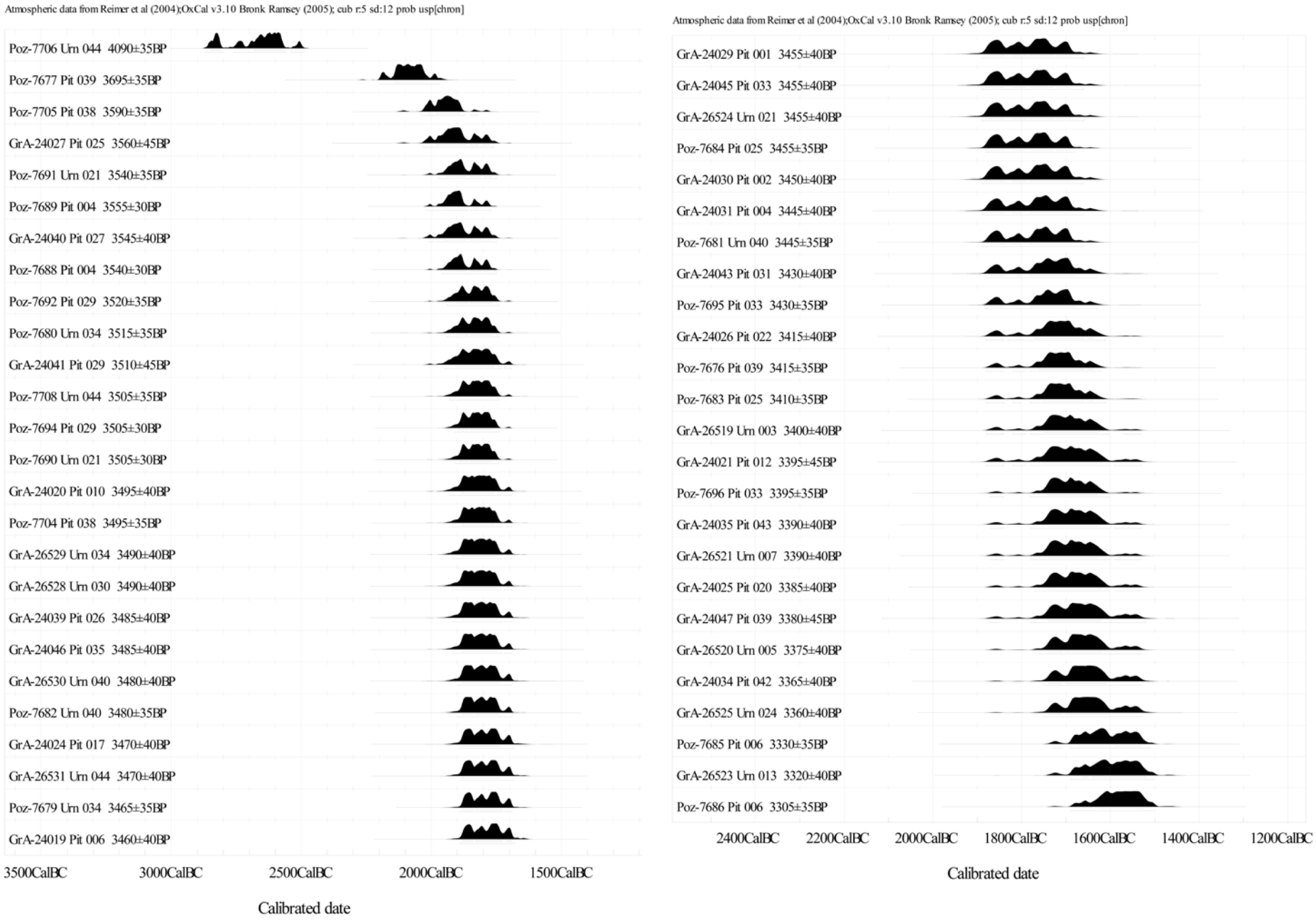
et al 2004). Single samples of bone were dated from each context while pairs of samples of charcoal were dated from each context.

In total, 57 radiocarbon dates have been obtained. Thirty-three dates, nineteen of these from cremated bone and fourteen from charcoal, were obtained from the un-urned cremations (Table 6). Eighteen dates, ten of these from cremated bone and eight from charcoal, were obtained from the urned cremations (Table 7). Six charcoal dates were obtained from Pit 036 (Table 8). The dates are presented in date order, and the cremated bone and charcoal dates are combined on the same illustration (illus 21). In 2003 (Sheridan 2003) there were just 13 dates from Scottish Collared Urns and 13 from Cordoned Urns and so the Skilmafilly dating programme is a significant boost to this particular radiocarbon corpus.

With the exception of Poz-7677 and Poz-7706, the dates range from 2040 BC to 1500 BC. This supports an Early Bronze Age date for the cemetery. The two earliest dates, Poz-7677 (2200–1970 BC; context 039) and Poz-7706 (2870–2490 BC; context 044) are both from charcoal and as such may relate to old wood, although Poz-7677 does overlap with the rest of the dates and corresponds to the earliest date obtained for Collared Urns in Scotland, from Grandtully, dated to 2130–1740 BC (GrA-21743; Sheridan 2003, 207).

The Skilmafilly dates are largely statistically indistinguishable, so it is not possible easily to identify any earlier or later burials or a sequence of burial apart from between the very earliest dates (eg Poz-7706, Poz-7677, Poz-7705) and the very latest dates (eg Poz-7685, Poz-7686). However, these dates are from charcoal samples and may be considered to be more susceptible to error than the human bone dates. The human bone dates, when considered in isolation, are not statistically distinguishable between the oldest and youngest dates. No attempt has been made to tighten the individual dates as there was no *a priori* information (eg layout of cemetery, ordering within burials) upon which to base a Bayesian analysis of the dates (Buck et al 1996).

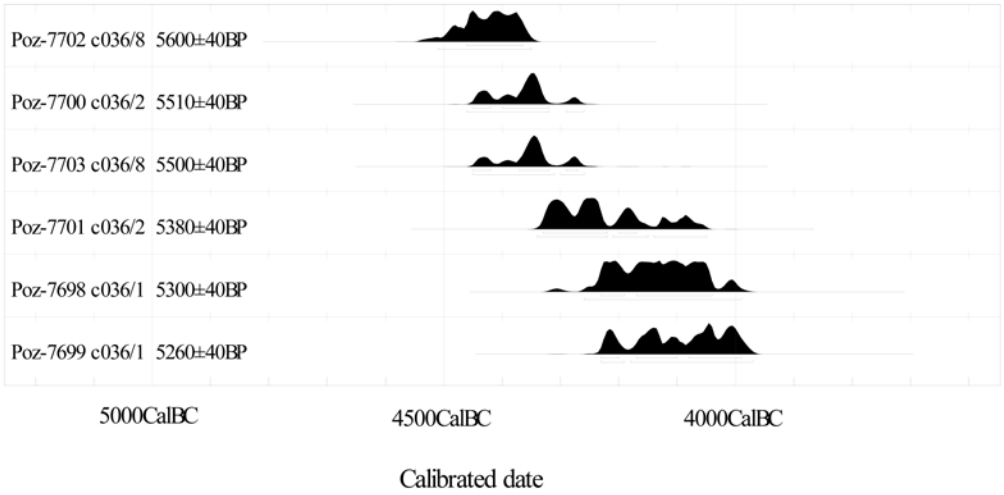
The dates obtained for Pit 036 (Table 8; illus 22) indicate a date range of 4510–3970 BC and appear to tie in with the pit's internal stratification; the oldest dates are from a context lower in the pit, the youngest dates from an upper fill. This range indicates a *terminus post quem* in the Late Mesolithic, possibly just stretching into the Early Neolithic. It remains possible that the pit was filled later than the Late Mesolithic and that earlier material has simply been incorporated into its fill.



Illus 21 Radiocarbon determinations for the urned and un-urned cremations in date order: cremated human bone (GrA) and charcoal (Poz)

Table 8 Radiocarbon dates obtained from charcoal, Pit 036. Calibrated using OxCal version 3.10.

Context	Material	Description	Lab Code	Uncal BP	Calibrated 1-sigma	Calibrated 2-sigma
036/1	*Corylus avellana*	Lower fill	Poz-7698	5300 ± 40	4230–4040 BC	4260–3990 BC
036/1	*Corylus avellana*	Lower fill	Poz-7699	5260 ± 40	4230–3990 BC	4230–3970 BC
036/2	*Quercus* sp.	Lower fill	Poz-7700	5510 ± 40	4450–4320 BC	4460–4260 BC
036/2	*Quercus* sp.	Lower fill	Poz-7701	5380 ± 40	4330–4170 BC	4340–4050 BC
036/8	*Betula*	Upper fill	Poz-7702	5600 ± 40	4460–4365 BC	4510–4350 BC
036/8	*Quercus* sp.	Upper fill	Poz-7703	5500 ± 40	4450–4270 BC	4450–4260 BC



Illus 22 Radiocarbon determinations for Pit 036

7 DISCUSSION

Table 9 provides a summary of the cremations found at Skilmafilly, detailing the dates, artefactual associations and anthropological characteristics of each.

7.1 The people

Of the 41 pits excavated at Skilmafilly, 29 contained cremated bone. The remains originated from nine urned cremations, nineteen un-urned cremations, one deposit consisting of both an urned and an un-urned cremation; and there were two single human bones that were presumably accidental deposits. Most of the cremation burials were of single individuals in pits. A minimum of thirty-five individuals were present, with a possible further seven whose presence could only be confirmed from one or more duplicated bones. It is likely, therefore, that up to 42 individuals were represented by the cremated bone assemblage. There were five certain multiple burials (003, 004, 007, 043 and 044), three of which were associated with an urn.

A range of ages and sexes was represented, with 13 sub-adults and 22 adults. Of the sub-adults whose age could be determined, one was a foetus, eight were children (5–12 years old), and three were adolescents (12–17 years old). Of the adults whose age could be determined, two were young adults (17–35 years old), three were middle-aged (35–45 years old), and one was elderly (over 45 years old). Of those adolescents and adults whose sex could be determined, there were two possible females, one definite female, four possible males and nine definite males. The high number of males is likely to be a factor of ease of identification within the cremated bone assemblage.

The multiple burials include two children and an adult (003), a child and two adults (male and female) (004), a female adult and a foetus (007), two adults (one male) (043), and a male adolescent and male adult (044). The possible burial of a mother and her foetus (Urn 007) is paralleled in the isolated find at Findhorn (Shepherd & Shepherd 2001) of a Cordoned Urn containing the cremated remains of an adult female (aged between 18 and 25 years) and an infant either in the third trimester of pregnancy or newborn. That urn also contained the largest deposit of faience beads known in Britain, unlike Urn 007 at Skilmafilly, which contained no grave goods.

Multiple cremations are not unknown in Scotland and Petersen et al (1974) listed those 98 known at the time of writing. A number of the double burials recorded at that time contained an adult female and a young child/infant, indicating that there is perhaps a slight bias towards mothers and children being buried together, although of course it remains possible that such a familial bond is merely assumed due to the age and sex of the remains and that DNA testing may indicate no such relationship. Other multiple burials must represent other types of either blood or social relationship, due to the sex and relative ages of those buried. There is no evidence at Skilmafilly to suggest that bones were

Table 9 Summary of contents of cremation pits

Pit	Cal. date range at 2-sigma	Burial Type	No. Indiv	Age	Sex	Vessel type	Charcoal	Other finds
001	1890–1660 BC~	un-urned	1	adult	?		Birch 11.8g Hazel 32g Oak 4g	
002	1890–1660 BC~	un-urned	1	adult	M		Oak 2.4g	
003	1880–1530 BC~	urned	3?	5–7, *c* 12 + adult ?	?	Collared	Oak 8.25g	
004	1890–1660 BC~ 2020–1750 BC#	un-urned	3	9, adult, adult	M + ?F + ?		Birch 35.05g Hazel 0.65g Oak 50.59g	4 burnt flints Golden Eagle talons 1 burnt perforated bone object 1 burnt bone pin
005	1760–1530 BC~	urned	1	adult	?	Collared	Oak 22.7g	
006	1890–1680 BC~ 1730–1500 BC#	un-urned	1+	older adult	?M		Birch 14.3g Hazel 1.1g Oak 63.7g	

Table 9 (*cont.*) Summary of contents of cremation pits

Pit	Cal. date range at 2-sigma	Burial Type	No. Indiv	Age	Sex	Vessel type	Charcoal	Other finds
007	1870–1530 BC~	urned	2	adult + foetus	?F +	Collared	Birch 8.5g Oak 101.5g	
009		1 bone					Birch 11.95g Hazel 0.4g Oak 23.8g	
010	1930–1690 BC~	un-urned	1	adult	?		Oak 32.6g	
012	1880–1530 BC~	un-urned	1	*c* 10			Oak 27.7g	4 burnt antler toggles
013	1690–1500 BC~	urned	1	older adult	M	Cordoned	Birch 1.3 Hazel 2.6g Oak 19.15g	Worked bone fragment
017	1890–1680 BC~	un-urned	1	12–13			Oak 2.7g	
019							Oak 5.8g	3 burnt flints 1 unburnt quartz
020	1770–1530 BC~	un-urned	1	?	?		Birch 8.1g Hazel 0.7g Oak 15.5g	1 unburnt flint
021	1890–1660 BC~ 1970–1740 BC#	urned	1+?	12 + ?		Collared	Oak 21.05g	
022	1880–1610 BC~	un-urned	1	young adult	M		Oak 5.6g	
024	1750–1530 BC~	urned	1+?	mid-adult	M	Collared	Birch 6.4g Oak 33.1g	Small vessel Perforated stone disc
025	2030–1760 BC~ 1880–1610 BC#	un-urned	1+?	adult	?		Birch 4.7g Oak 70g	
026	1920–1690 BC~	un-urned	1	14–16	?		Birch 0.05g Oak 18g	
027	2010–1750 BC~	un-urned	1	?	?		Birch 22.5g Hazel 0.4g	1 burnt flint
029	1950–1690 BC~ 1940–1740 BC#	un-urned	1	adult	M		Hazel 3.4g Oak 1.4g	
030	1920–1690 BC~	urned	1	adult	F	Cordoned	Oak 0.15g	
031	1880–1630 BC~	un-urned	1	sub-adult	?		Oak 1.9g	
033	1890–1660 BC~ 1880–1600 BC#	un-urned	1	?				1 burnt flint
034	1920–1690 BC~ 1940–1690 BC#	urned	1	elderly adult	M?	Collared	Birch 22.2g Oak 26.7g Alder 0.6g	Flint foliate knife
035	1920–1690 BC~	un-urned	1+?	10–12 +5?			Oak 12.5g	1 burnt flint 1 unburnt quartz
036		1 bone				Collared	Birch 8.2g Hazel 0.6g Oak 17g	
038	2040–1690 BC#						Oak 4.9g	
039	1870–1520 BC~ 2200–1620 BC#	un-urned	1	16–20	?		Hazel 0.05g Oak 2.3g	4 burnt flints
040	1900–1690 BC~ 1900–1690 BC#	urned	1+1?	2 adults	M + ?	Collared	Oak 2g	
042	1750–1530 BC~	un-urned	1	adult	M		Oak 1.8g	
043	1870–1530 BC~	un-urned	2	2 adults	M + ?		Birch 0.1g Oak 1.4g	
044	1890–1680 BC~ 2870–1740 BC#	un-urned + urned	2	12–16; 26–27	M?, M?	Collared	Oak 5.2g	

~ human bone date # charcoal date

being curated and that the two or more individuals present in a burial did not die at the same time, although there is some evidence for this at other sites (eg Tynings Farm, Somerset; Taylor 1951).

7.2 Cremation rite

The evidence obtained from the palaeoenvironmental analyses, the cremated bone analysis and the nature of the deposits filling the pits can be collated to provide an indication of the cremation and burial rites.

The condition of the cremated human bone suggested that the cremation technique was well understood and that high and even temperatures were achieved. It would appear that the bodies were fresh when placed on the pyre, as indicated by curved lateral splintering present on most limb bones, and in some cases by high degrees of distortion. Such observations support the theory that corpses were not curated for any length of time but were cremated within a short time after death.

Greater quantities of charcoal, in better condition, were recovered from the urns rather than the pits. The charcoal assemblage from the cremation pits is dominated almost exclusively by oak, most of which appears to have derived from mature wood. Soil pollen obtained from the urns included heather and fern pollen (probably bracken). Both plants will burn well if dry and it is highly likely that these plants, along with grass, were selected for tinder. The pollen strongly suggests that both ferns and heather formed the main component of the tinder in at least two of the cremations examined. It is likely that the local environment close to the cremation site provided all the wood and tinder to supply the cremations.

The presence of carbonised seeds/nutlets within the cremations suggests that either the cremation pyres were placed on grassland where the seeds were burnt in situ, or dried grass was used for kindling. There is no evidence to suggest that any of the archaeobotanical remains were the result of deliberate ritual deposits, the material present being derived from natural accumulation.

The magnetic susceptibility results indicate that there is evidence of direct heating of soils on the site, but that this is of a different nature from the cremation deposits. There is no indication of pyre deposits being incorporated into the soils along the transect, or of pyres being constructed directly on the transect site. This ties in with the presence of small quantities of charred fungal sclerotia. These are usually present in soil or turfs and the presence of such material suggests that the cremation pits contained burnt soil.

7.3 Treatment of the cremated bone

Many of the pits clearly showed that the cremation fills, including diagnostic and large pieces of bone, had been separated from other pyre deposits. In the un-urned pits, the cremated bone deposit was usually found to be very pure, often without a soil matrix and with voids present. In some cases, as discussed above, it can be argued that other pyre remains, including ash and charcoal deposits, were also selected, separated and placed within the pit. The clear distinctions between the contexts filling the pits indicates it is conceivable that the cremation deposits had been held within an organic container, possibly a cloth or a bag, of which no trace now survives. Only one pit (006) showed enough evidence for a more substantial organic container, possibly a basket.

It has been suggested at a number of excavated cremation sites (eg Kirkton, Fife, MacGregor 1998, 70; Findhorn, Moray, Shepherd & Shepherd 2001; Glennan, Argyll & Bute, MacGregor 2003) that the cremated bone found had been carefully collected or picked over and that the lack of any obvious pyre material in these deposits indicated that it may have been washed prior to deposition. At Kirkton, in the case of one of the pits, the cremated remains had perhaps been held in an organic container. A more extreme example of the sorting of bones is suggested by the urn found at Howford Farm (Shepherd 1987), where it was noted that the cremation deposit was carefully organised, with skull bones placed inside first, followed by other larger bone fragments, and finally charcoal pieces; the pit had also been packed with pyre debris. Another example at North Straiton (Burial 110; Stronach et al 2006) also suggests some selection during the process of gathering the bones and placing them in the container, with larger pieces collected first. The separation of bone can be argued for at Skilmafilly too, though there is no reason to assume washing of the bones was necessary for their collection.

There is often not as much cremated bone present as would be anticipated from the incineration of an entire body. There may be several reasons for this. Plough truncation may have removed part of the cremation, though this is unlikely in those cases where the upper fill of re-deposited subsoil was still in place above the cremation deposit. Alternatively, there was some degree of selection involved, with bones collected from the pyre as a token rather than the meticulous collection of every bone, possibly even that some of the smaller cremations were only intended as token deposits. Although many of the cremation deposits were smaller than would be expected from a full cremation, many included small hand and foot bones, and tooth roots were also present, often in large numbers, indicating that the remains may have been carefully collected before being placed in the urn or pit. There was also a higher average bone weight for the urned cremations, suggesting the urns afforded some protection from plough damage and other deleterious effects.

In some instances there was evidence for a second individual in some cremation deposits, which was represented by only one or two bones. If the pyre

site was re-used, the extra and/or stray bone fragments found in some of the deposits could be due to admixture during subsequent collections of cremated bone. It is also possible that these additional bones acted as a token or were heirloom relics previously circulated amongst the community or recovered from earlier burials (Brück 2004). So-called 'token' cremations are known from other sites in the Bronze Age (eg Horsbrugh, Petersen et al 1974; Knighton Heath, Petersen 1981).

The series of deposits contained within a bell-shaped feature, Pit 038, seemed to indicate that a bag of charcoal had been deposited in the pit, without any cremated bone. The lack of bone in this pit is unusual, as the nature of the deposits would suggest that pyre material, or some other burnt item, was carefully selected and placed in an organic bag before being buried. Perhaps this feature symbolically represented the interment of a cremation of a person whose actual body was unavailable, for example the person had drowned at sea. This feature also contained a burnt flint object, which perhaps symbolically represented the person in the absence of a body.

7.4 Pyre and grave-goods

There is a distinction to be made in the case of cremation burials between pyre goods and grave-goods (McKinley 1994b). Pyre goods are items which were added to the pyre with the deceased and thus were burnt or destroyed. Some pyre goods may survive the process, such as stone and flint; others will not survive, such as wood, textiles and foodstuffs. McKinley points out (ibid, 133) that even when pyre goods survive, they may not appear in the burial; not all pyre debris is automatically included. It has been noted that there may be a certain degree of selection of cremated bone; small objects may be lost within the ashes or not selected for further treatment. Grave-goods are unburnt and added only at the time of burial. The ritual distinction between these two types of goods must have reflected different ritual practices. It is traditional to see grave goods as a signal for the social status of the deceased person, with items of a perceived intrinsic value (such as gold) suggesting high status, or other goods referring to the person's gender or age. However, more recently it has been argued that grave goods may not have belonged to the deceased at all and instead may have been gifts from the mourners, which could reflect the interpersonal relationships between the living and dead or the impact the death had on the community, or were objects used in the mortuary rite to perform specific ritual functions, and therefore may bear no relation to the deceased's social status or identity (Brück 2004).

At Skilmafilly, the majority of objects found with the cremations are pyre goods. Of course, there may have been other grave-goods consisting of organic materials which have not survived. Pyre goods included bone pins and toggles, which may have been worn by the deceased as shroud pins or other garment fasteners. Burnt flints were found, which are noted as being severely burnt and vitrified, suggesting that they were deliberately included on the pyre. The Golden Eagle talons were also burnt, suggesting that they were included in the pyre with the individual, perhaps as a necklace.

The addition of animal remains with cremations is well attested during this period. Eagle talons, however, are more unusual. Sea Eagle talons were found in the tomb at Isbister on Orkney, as a secondary deposit to the original use of the tomb, and the talons were dated to 2450–2050 cal BC (British Archaeology 2006). This is slightly earlier than the Skilmafilly cemetery, but indicates the possible longevity of a tradition of associating eagle remains with human burials. The cremated remains of part of an immature sheep/goat were included in the urned cremation burial at Glennan, Argyll and Bute (MacGregor 2003) and MacGregor notes that it is not uncommon for Bronze Age burials to be accompanied by butchered portions of domestic animals, particularly goat/sheep with cremations and pig with inhumations. Other Bronze Age examples include sheep/goat within cremations at Cloburn Quarry, Lanarkshire (Lelong & Pollard 1998) dated to 1910–1620 BC; sheep bones with a cremation at Horsbrugh Castle Farm, Peeblesshire (Denston 1974); and apparent pig joints accompanying inhumations at Uppermill, Aberdeenshire (Harman 1977), Grainfoot, East Lothian (Dalland 1991), Aberdour Road, Fife (Close-Brooks et al 1972) and Gairneybank, Perth & Kinross (Cowie & Ritchie 1991). Other more unusual animals include sea urchin spines along with pig bones and a flint knife within an inhumation at Muirhill, Perth and Kinross (Stewart & Barclay 1997), and the cremated foreleg of red deer in two cremation deposits at Sketewan, Perth & Kinross (Mercer & Midgley 1997). At this latter site two trout vertebrae were found within the cremated remains of a child but it is unclear if they were a deliberate deposit.

MacGregor suggests that the presence of these animals could relate to feasting, particularly where only joints or parts of animals are included in the burial, animal sacrifices, or use in other ceremonies/rituals associated with the mortuary rites, and that certain animals were associated more strongly with different burial rites, and he sees the inclusion of domestic animals as being related to the dominance of an agro-pastoral economy.

The grave-goods include the pottery containers themselves which, although it is not clear why some burials warranted a vessel and others did not, must have formed an important part of the burial ritual. The grave goods also include the foliate knife from Pit 034, which must have been added to the urn with the individual after cremation had taken place. Other unburnt flint and quartz pieces were recovered from Pits 019, 020 and 035. Some of the unburnt lithics

found in the pits, including the quartz, may have been accidentally incorporated during back-filling. The majority of the flint and quartz pieces found were débitage (see Ballin above). Of the three flint tools, two were unburnt and one was burnt.

It is quite likely that such an elaborate and elegant piece as the foliate knife was produced specifically for deposition in Pit 034. Foliate knives are quite rare, but the few known specimens are from burial contexts. It is thought that the best plano-convex knives, a related type, may have been manufactured for immediate deposition in burials rather than for domestic use (Finlayson 1997, 311), as they usually show no or little use-wear. As argued above, foliate knives are associated with Collared Urns, and at Grandtully in Perthshire a foliate knife was retrieved from a cremation cemetery along with Collared Urns and barbed-and-tanged arrowheads of the Kilmarnock type.

It is not clear whether the stone bead from Pit 024 was burnt or not. It is likely to have been a personal ornament, worn by the individual buried in this pit.

There were six burnt bone/antler ornaments from just three burial contexts. Two of these were in the same cremation pit, 004. A burnt bone pin was associated with an adult cremation, while a nine-year-old child in a re-cut of the same pit was accompanied by a bone toggle/pendant or short pin. Another burnt pin was found inside Urn 013 with an older adult. The presence of pins could suggest a simple shroud being used to clothe the deceased as they were put on the pyre. Bone pins of this form are only broadly datable but they are generally, but not exclusively, found in association with Collared Urns. At Skilmafilly, however, Urn 013 has been identified as a Cordoned Urn, containing as it does a burnt bone pin fragment.

An un-urned pit burial (012) of a ten-year-old child was accompanied by four burnt antler objects, two of which have been identified as toggles. This is an unusual find, and may indicate that a more elaborate garment with multiple fastenings was worn by the deceased. Ornamental objects made from antler are rare in Scottish burial contexts and no further antler toggles are known.

None of the bone or antler artefacts were complete. They were all burnt, suggesting that they went through the pyre and only partially survived the process. The lack of similar finds from the other cremations could mean that only some of the deceased were wrapped in garments which required a fastening device. It could also mean, however, that other objects did not survive the pyre, or even that they were not collected during the gathering of material from the pyre, either because they were not seen or because it was not considered important to collect them. We know that not all of the cremations were extensive enough to represent a whole body and so this selective collection policy may have extended to pyre goods too.

The cremations in Pit 004 are also unique in that they contained two Golden Eagle talons, specifically associated with the child. Furthermore, four burnt flints were found too, meaning this burial of a young person had the widest variety and largest quantity of objects associated with it, as well as being one of the few multiple cremations.

It is tempting to interpret this group as being people of some considerable importance, perhaps even a family group: parents and child. Perhaps the nature of their deaths contributed to their special treatment, especially if the child, being interred in the re-cut, died shortly after its parents, perhaps as a result of some accident or illness which befell them all. Another possibility is that the group were of a leading family, perhaps one of them even being the chieftain.

The presence of other grave or pyre goods may be indicated by stains on some of the bones. Staining of the bone with a green/blue discolouration was noted in contexts 003 and 040. This type of staining may be related to contact with copper alloy (McKinley 1994b, 133).

The range of goods present, and the presence of both pyre and grave-goods, indicates that a degree of choice existed as to how burial goods were treated and deposited.

7.5 Marking the grave

The presence of grave markers of some form is perhaps likely given that in the 41 pits there is little evidence for re-cutting or disturbance. There must have been some way of locating the pits in order to avoid disturbing them, as they are tightly clustered: it is highly unlikely that they were all dug at the same time. A small pit or stake hole (008) is interpreted as a possible grave marker: this may have served to ensure that the pit could be found later, possibly for a secondary cremation, or may have helped to mark the location of the cemetery. A possible wooden grave marker was also recorded at the site of Kirkton, Fife in a grave located beside cremation pits (MacGregor 1998). Alternatively, there may have been small mounds or stones set on the ground surface overlying the pits which have since been ploughed away.

7.6 Dating

It is generally accepted that Collared Urns were made earlier than Cordoned Urns. The former type is envisaged to appear around 2000 BC, while the latter appears *c* 2050–1700 BC (Sheridan 2003, 203). Needham's synthesis of the dating evidence for the British Bronze Age (Needham 1996) presented a general scheme, in which he suggested that the period 2050–1700 BC saw a major change in funerary rites, with the introduction of urned cremations. Collared Urns of Burgess' (1986) Early and Middle type appear at this time, and Cordoned Urns are described as running 'broadly parallel'

(Needham 1996, 131), beginning a little before 1900 BC. Both types continued in use until about 1500 BC. The picture in Scotland is little different. Prior to the dating programme of the Skilmafilly cremation cemetery, there were only a limited number of dates associated with Collared Urns and Cordoned Urns in Scotland, obtained principally through the NMS *Dating Cremated Bones Project* (Sheridan 2003); this project took the total to 13 dates for Collared Urns and 13 dates for Cordoned Urns. For Scottish Collared Urns, the known dates were in the range 2130–1510 BC (Sheridan 2003, 206), while for Scottish Cordoned Urns the range was 1940–1410 BC (ibid, 207).

Fifty-seven radiocarbon assays were obtained for Skilmafilly, which clustered between 2040 BC and 1500 BC, making Skilmafilly the most comprehensively dated Bronze Age cremation cemetery in the UK. Eighteen of these dates relate directly to the urned cremations. Therefore, this new set of dates contributes significantly to the available dataset and builds on the dates obtained by the NMS *Dating Cremated Bones Project*.

However, there is no apparent difference in date between the two types of urns here, so Skilmafilly does not contribute to a refinement of the dating schemes of these two vessel types. The two Cordoned Urns, 013 and 030, date to 1690–1500 BC (GrA-26523) and 1920–1690 BC (GrA-26528) respectively, while the Collared Urns have a range of 1970–1530 BC (excluding date Poz-7706), and indeed, as noted above, it is not always possible categorically to state to which of these two types each urn belongs.

7.7 *Skilmafilly in context*

The burial practices of the first half of the second millennium BC are characterised by cremation burials but within this broad category there are a wide variety of funerary monuments and ritual practices, such as cairns, cists, flat cemeteries, enclosed and unenclosed cemeteries of various sizes, urned and un-urned cremation burial, and isolated discoveries. These cemeteries can include a mixture of Collared and Cordoned Urns, occasional upright vessels, a mixture of ages and sexes, a mixture of urned and un-urned cremations within the same cemetery, and a variety of grave goods. It is apparent that grave goods are unequally distributed amongst the cremation burials, with many cremations being unaccompanied while others have a few items such as pins, toggles and flints, while yet others have more lavish goods (for example the fine faience beads at Findhorn; Shepherd & Shepherd 2001). A small proportion are also accompanied by animal remains, whose presence is not always easily explained away as the result of ritual feasting as the animal or animal part is not one normally recognised as being eaten.

The unenclosed flat cremation cemetery at Skilmafilly is one of a number known across central, southern and eastern Scotland in the Early Bronze Age, although few have been recently excavated. Many are older excavations or antiquarian finds, where findspots are uncertain, little analysis has been undertaken on the bones or finds, and the thoroughness of recovery can be called into question (eg Eastern Culbeuchly, near Banff; Wallace & Walker 1961). However, all of these sites provide important comparisons with Skilmafilly and indicate that Skilmafilly sits within a broad tradition of cremation rite at this period.

Unenclosed cemeteries at Brackmont Mill, Fife (Mears 1937; Spence 1949; Longworth et al 1967) and Grandtully in Perthshire (Simpson & Coles 1990), produced both Collared and Cordoned Urn burials alongside un-urned cremations. At Brackmont Mill, brief mention is made of an occipital bone of a pig which may have been associated with one of the urns (Mears 1937, 262), giving us another example of animal remains being associated with cremations, and other grave goods identified were a pin and a small accessory vessel (Mears 1937). Grandtully is of interest for containing only children and young adults. One of the burials, of three children in a Collared Urn, contained a bone point and a leaf-shaped flint point. This is a similar context to the foliate knife at Skilmafilly, but with children instead of an old man.

An unenclosed cremation cluster of just five burials was excavated beside an enclosed cemetery at Silvercrest (Suddaby forthcoming). The unenclosed cremations appear to be contemporary with those in the enclosed cemetery, indicating that the two forms are not mutually exclusive. The cemetery includes Collared and Cordoned Urns, one of which was upright, and, where identified to age and gender, the cremation cluster contained adults. Of interest is an upright Cordoned Urn which contained an adult along with nine complete and unfinished arrowheads.

Enclosed cemeteries have been more commonly excavated, including Loanhead of Daviot (Kilbride-Jones 1936), Ratho, Midlothian (Smith 1995), Sketewan, Perth & Kinross (Mercer & Midgley 1997), and Seafield, Inverness (Cressey & Sheridan 2003). Similar variety can be seen in these, as in the unenclosed cemeteries.

There is no readily apparent reason from the excavated material why some people were buried in pots and some were not, why some pots were occasionally upright, and why some people were accompanied by grave goods; there is also no obvious distinction or identifiable and repeatable pattern present between young and old or male and female burials. The range of sexes and ages and the overall number of burials suggest the cemetery was in use for perhaps several generations by a small community, whose home base location is unknown, and there was no apparent exclusivity in who could be buried there. The excavated evidence does indicate, however, that Early Bronze Age cremations were a complex

mixture of funerary rites which hint at a complex social structure or set of beliefs, taboos and societal norms, the unpicking of which is beyond the scope of this paper.

7.8 The Mesolithic pit

An earlier feature was found on the site, a large, deep pit of apparently late Mesolithic date, with charcoal dates calibrated to 4510–3970 BC. No artefacts were recovered from this pit, other than a Collared Urn smashed on its surface, so its function is difficult to determine. A similar large, deep pit with multiple fills, some containing charcoal, was excavated at Spurryhillock, Stonehaven, Aberdeenshire (Alexander 1997) and radiocarbon dates from its base calibrate to 4910–4360 BC (Beta-73552–3). This pit lay within a small group of isolated pits and its function was unclear but it also lacked artefacts apart from a single flint blade, and contained oak charcoal.

The majority of the known Mesolithic activity in Scotland consists of lithic scatters and very little structural evidence has thus far been excavated (see for example Suddaby 2007). There is perhaps a poorly understood tradition of late Mesolithic activity in the north-east of Scotland which includes the digging of pits, of which Pit 036 at Skilmafilly is one and Spurryhillock another.

7.9 Conclusion

The Early Bronze Age cremation cemetery at Skilmafilly is currently the most comprehensively dated cremation cemetery in Britain, and has been found to date to the period 2040–1500 BC. Twenty-nine cremation pits were found, ten of which contained cremation urns. An eleventh urn was found smashed and spread across the site surface. Two of these urns are Cordoned Urns, and nine are Collared. A single urn was found upright while the remainder were found inverted in pits. A range of artefacts was found associated with the cremations, including a flint foliate knife, antler toggles and bone pins and two Golden Eagle talons. The cremation rituals and characteristics of the population buried have been discussed, and analysis has shown that the indi-

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