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# The excavation of an early Bronze Age cemetery at Holly Road, Leven, Fife

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## The site (Illus 1 and 2)

The Holly Road cemetery, centred on NGR: NO 3784 0214, was located on the northern extremity of the town of Leven which lies at the W end of Largo Bay on the S coast of Fife, 13km NE of Kirkcaldy and 20km SW of St Andrews. The site was situated at 33m OD, in arable farm land which rises gently from the sea, some 1.5km away. At the time of the excavation, the site was bordered on its S and SW by recently-built private housing while to the N and NW the slope continues upwards across a field to Tullylaw Wood. A short distance E of the site is the Letham Glen through which runs the Scoonie Burn which empties into the sea on the E side of Leven. The steep-sided glen cuts through Carboniferous sandstone which underlies the site and which is mainly dark red in colour although occasional, thin beds of yellow sandstone are visible within it.

The subsoil comprises a complex series of sands, gravels and pebbles which frequently display no sharp distinction between their glacial, fluvio-glacial and post-glacial origins (Forsyth and Chisholm 1977, 235). These materials vary in colour from pale yellow to orange and, in places, are stained black by coal washed in by the sea from the underlying coal measures. Nodules of bituminous cannel coal also occur within the glacial deposits, as do lumps of ochre derived from occasional beds within the Carboniferous levels. Indeed, ochre was mined along the Letham Glen during the 19th century.

Until fairly recently the site and the area around it were ploughed although it had been abandoned as agricultural land a few years previously. Ordnance Survey maps show that during the second half of the 19th century and into the mid-20th century the woods that cover much of the Letham Glen extended in a narrow strip around the N and W sides of the site. Indeed, part of the boundary of this former woodland was identified as an archaeological feature during the excavation (see below).

Cropmarks, classified as unenclosed settlements, occur at Blacketside (NGR: NO 383 028) and Balgrummo (NGR: NO 372 030), 1km NE and 1km NW respectively from the Holly Road cemetery. These sites, situated on slightly higher ground than Holly Road, may be Bronze Age settlements, possibly of broadly contemporary age with the cemetery. A standing stone at Balgrummo (NGR: NO 3754 0297) (RCAHMS 1933, 268) might also have been standing at the time of the cemetery's use.

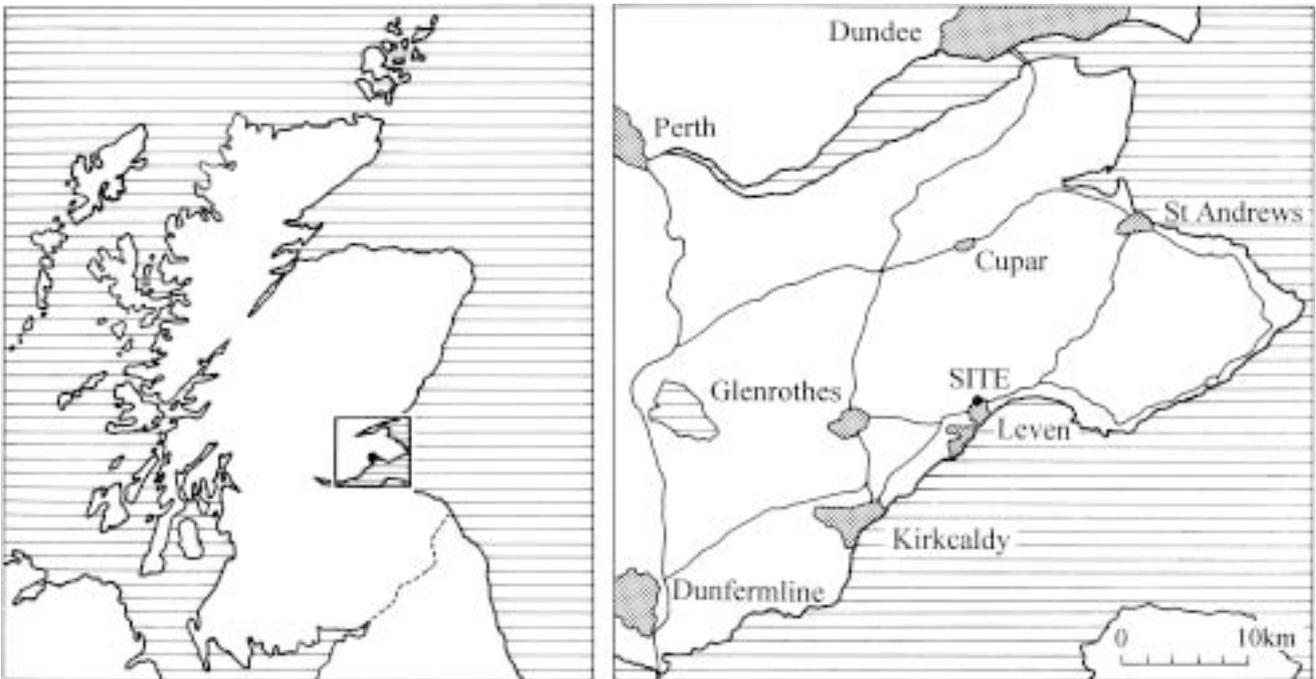
The large ceremonial complex of Balfarg/Balbirnie (Barclay and Russell-White 1993) is only 9km (6 miles) due W of Holly Road, no more than two to three hours walking distance away. This major Neolithic and Bronze Age site would surely have been known to those who laid out the cemetery and those who were to be interred within it.

## The background to the excavation

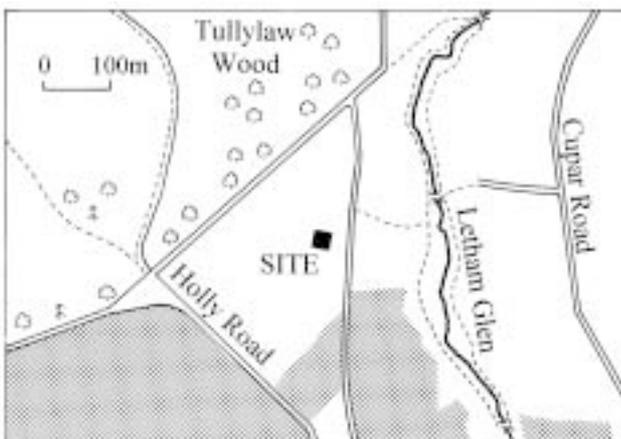
In January 1944, deep ploughing in a field some 700m SE of Durie House disturbed a cist burial which was left open but not investigated archaeologically for five months. It seems likely that the grave was plundered during that time because, when it was finally excavated, only a few fragmentary human bones and one jet bead remained within it (Christie 1949). Thereafter, the cist was backfilled and its precise location lost although Ordnance Survey investigators visiting the site in May 1962 estimated the cist to lie at NGR: NO 3783 0213. In May 2002, AOC Archaeology Group was commissioned by Boyack Homes of Kirkcaldy to undertake an archaeological field evaluation around the presumed area of the cist, prior to a possible application for consent to develop the site (Stentoff 2002).

The principal area of AOC's excavation comprised an irregular trench, measuring approximately 18m square and centred on the estimated location of the cist uncovered in 1944. The tops of eight cists were uncovered, only one of them with its capstone intact. In addition, many fragments of sandstone were found within the topsoil, most of them the probable remains of other capstones. Several sherds of decorated pottery recovered from the topsoil were thought to be fragments of food vessels displaced from the graves. No further excavation was undertaken. The cists were covered with geotextile membrane and the site backfilled on the instructions of Fife Council's Planning Service to allow a decision to be made about its future.

Because no planning application had been submitted for the development of the site at that stage, it was not Boyack Homes' responsibility to fund any further investigations on the site. As a consequence, the resources needed to complete the excavation of the cemetery were sought elsewhere by Fife Council. One of those sources was Videotext Communications Ltd who undertook the next phase of excavation, which was filmed as the core element of a television programme featuring Channel



Illus 1 Site location.



Illus 2 The site and the Letham Glen.

4's 'Time Team'. The backfill was removed from AOC's trench prior to the Time Team's investigation which was directed by Neil Faulkner. The Time Team excavated the eight cists uncovered during AOC's evaluation, as well as another grave which lay beneath a large boulder that protruded above ground level, near the centre of the site, together with a cremation burial and a short stretch of what is interpreted as a post-Improvement ditch. That part of the project was completed within three days at the end of July 2002.

Following the Time Team's departure, the remainder of the trench was fully excavated over a two-week period by a team from Scotia Archaeology, under the writers' direction. During this final stage of the investigation the remains of two more cists, an enclosure ditch of contemporary date and the rest of the post-medieval ditch were uncovered. However, although the whole trench was investigated fully, it is quite possible that the

remains of more cists and perhaps other, related features still await discovery outside its limits.

### The results of the investigations

The area investigated by the Time Team and Scotia Archaeology consisted of a single trench, of similar dimensions to the one opened by AOC but with slightly different boundaries. It measured approximately 21m by 16m and was aligned roughly NW/SE. Prior to AOC's excavation, the site was covered with grass and herbaceous plants growing out of a sandy, humic soil which had been agricultural land earlier in the 20th century but which had not been ploughed for several years.

The principal features uncovered during the main phases of excavation were elements of an Early Bronze Age cemetery and comprised: a total of 11 short-cists containing skeletal remains in varying stages of survival, together with a small number of artefacts; a separate cremation burial; and a ditch surrounding six of the cists. The ditch partially enclosed an area of raised ground measuring approximately 9m in diameter. A sondage, cut across this elevated area, established that it was natural in origin. Along the N and W sides of the trench was another ditch, at first thought to be contemporary with the cemetery although it proved later to be much more recent in date.

Of the 11 cists uncovered during the excavations, six were inside the enclosure and five outside it. There was a marked distinction between the two groups, those within the enclosure having a significantly higher standard of construction than those beyond it. Furthermore, three of the latter group were also in a very bad state of preservation. The letters ascribed to the cists signify the order in which they were exposed during the

three phases of excavation. Those lying within the enclosure were A, B, C, D, J and L; those outside it were E, F, G, H and K. In Cists A, B, D, J and H the remains of their incumbents survived in varying states of preservation while a few fragments of cremated bone were retrieved from the infill of Cist C. No human remains survived in the other graves. What appeared in the early stages of the investigation to be another possible cist (identified as Cist I during the evaluation), proved to be a single, putative grave slab lying vertically, presumably displaced, in the ploughsoil. With the exception of Cist H, all the cists were built of sandstone slabs, presumably quarried from the Letham Glen.

The only graves to retain their capstones were Cists H and J. However, while only a trickle of material had fallen into Cist J, Cist H was full of soil and appears to have been deliberately filled at the time of interment. There was no evidence of luting in any of the surviving cists although evidently the corners of the cist excavated in 1944, believed to be Cist L (see below), had been sealed with clay (Christie 1949, 230). Intriguingly substantial quantities of grey clay were retrieved from the backfill of Cist J's cut but none was found within the cist.

### The enclosure ditch (Illus 3)

The irregular, sub-circular enclosure measured approximately 9.5m N/S by about 7.5m E/W internally and enclosed an area of some 60m<sup>2</sup>. It was identified along an arc of about 270°, its E section having been lost to erosion, probably as a result of ploughing. The entrance into the enclosure was on its NE side where the N terminal was very distinct whereas the S terminal could not be identified with certainty. The ditch was not visible on the W side of the enclosure, suggesting that there might have been a second opening there although the degraded nature of the ditch might simply have been the result of ploughing. Indeed, the course of this feature proved quite difficult to trace at several points.

At the excavated level, the ditch was 0.7–0.9m wide, narrowing to about 0.4m at its base at a depth of 0.25–0.4m. Its width increased to 1.3m at its clearly visible N terminal. Some 2m further S was a shallow scoop (F321), 2.2m long (N/S) by 1.3m wide and 0.3m deep, perhaps the remnant of the S terminal although this could not be confirmed. The materials filling the ditch varied somewhat. In its N arm there appeared to be two separate fills of sand, gravel and small pebbles: a shallow coal-stained basal deposit; and a much deeper one, orange-brown in colour, above. Elsewhere in the ditch, including the putative S terminal F321, boulders up to 0.25m across were intermixed with the sand and gravel. These differences probably signify that the ditch had been filled simply with whatever materials came to hand.

The pit for Cist C clearly cut the fill of the ditch while Cists A, B, D and J lay very close to its edge, indicating that they could not have been emplaced without the sides of the ditch caving in. In turn, this suggests

that most, if not all, of the burials inside the enclosure were inserted after the ditch was backfilled. In addition, a narrow pit containing a cremation deposit had been cut through the centre line of the ditch. Because the cremation was discovered only when the sondage was cut across the site early in the excavation, it was not possible to tell whether it had been inserted before or after the ditch had been backfilled.

### Burials inside the enclosure (Illus 3–9)

#### *Cist A*

Located towards the NW corner of the enclosure, Cist A was built of four red sandstone slabs, typically 50–80mm thick, which had been damaged slightly by ploughing. The cist was aligned N/S and measured 0.78–0.96m long by 0.65m wide and 0.5m deep internally. Its walls were not vertical, its S end-stone having a pronounced outward tilt on its E side, although on the evidence of tight jointing at the top of the grave, this was the result of poor construction rather than disturbance by the plough.

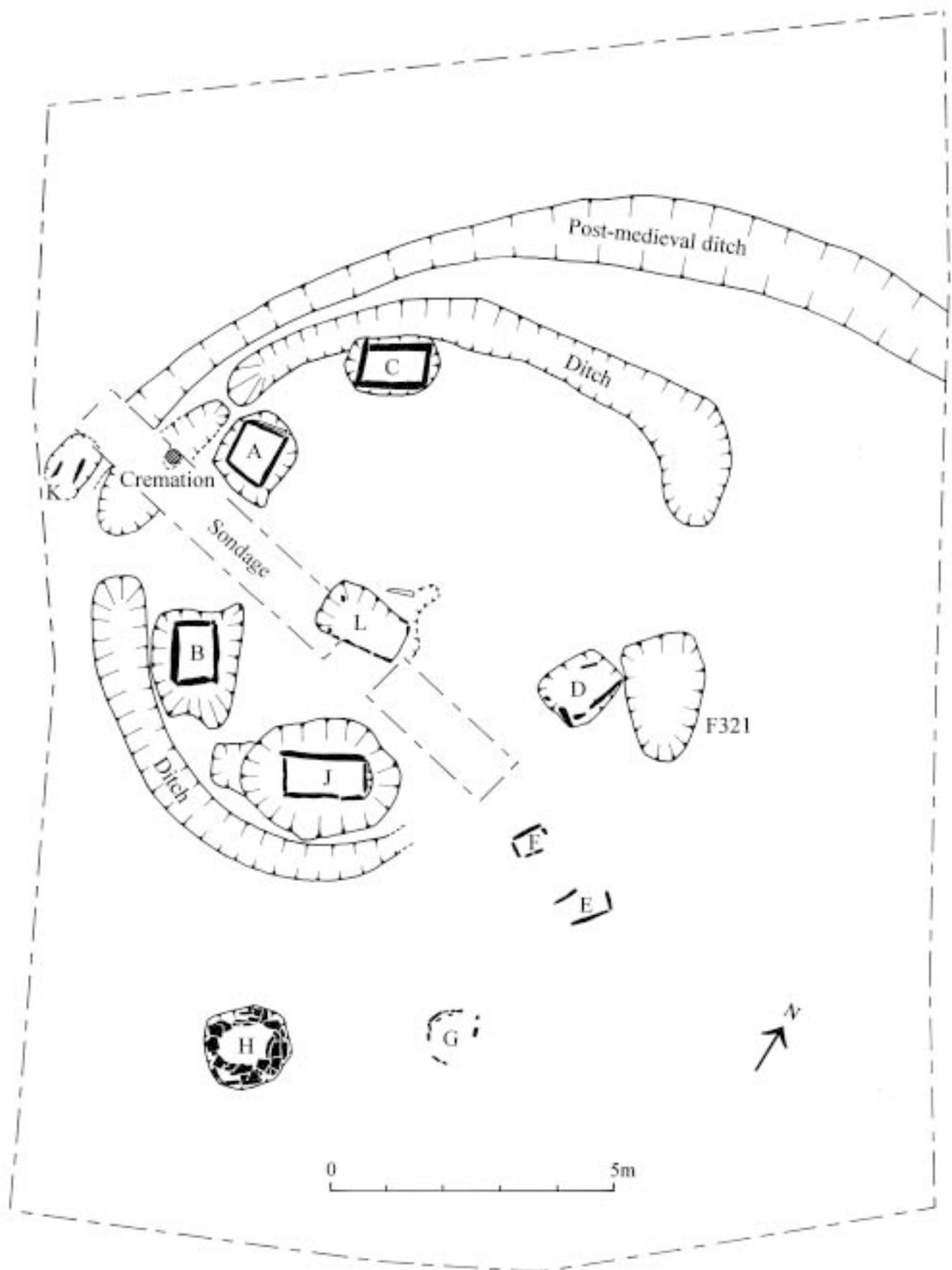
The pit for this grave measured 1.05–1.35m long and 1m wide and had been backfilled with large, rounded boulders, which acted as packing stones, surrounded by redeposited sandy subsoil. Towards the N end of the pit was a sandstone slab, perhaps rejected during the construction of the grave.

The human remains within Cist A were reasonably well preserved although friable, fragmentary and comprising only the dentition and portions of the cranial vault which lay towards the N end of the cist. Estimation of age at death suggested a sub-adult of between 6.5 and 12.5 years. Neither sex nor stature could be estimated from the remains. A radiocarbon assay obtained from these remains produced an uncalibrated date of 3520±60 BP (GrA-22160). Three funerary artefacts were also recovered from the floor of the cist: an upright food vessel close to the W orthostat, in front of the chest position of the crouched occupant; a large flint knife blade near the back of the body; and a small bead made from a fossil crinoid about the chin area.

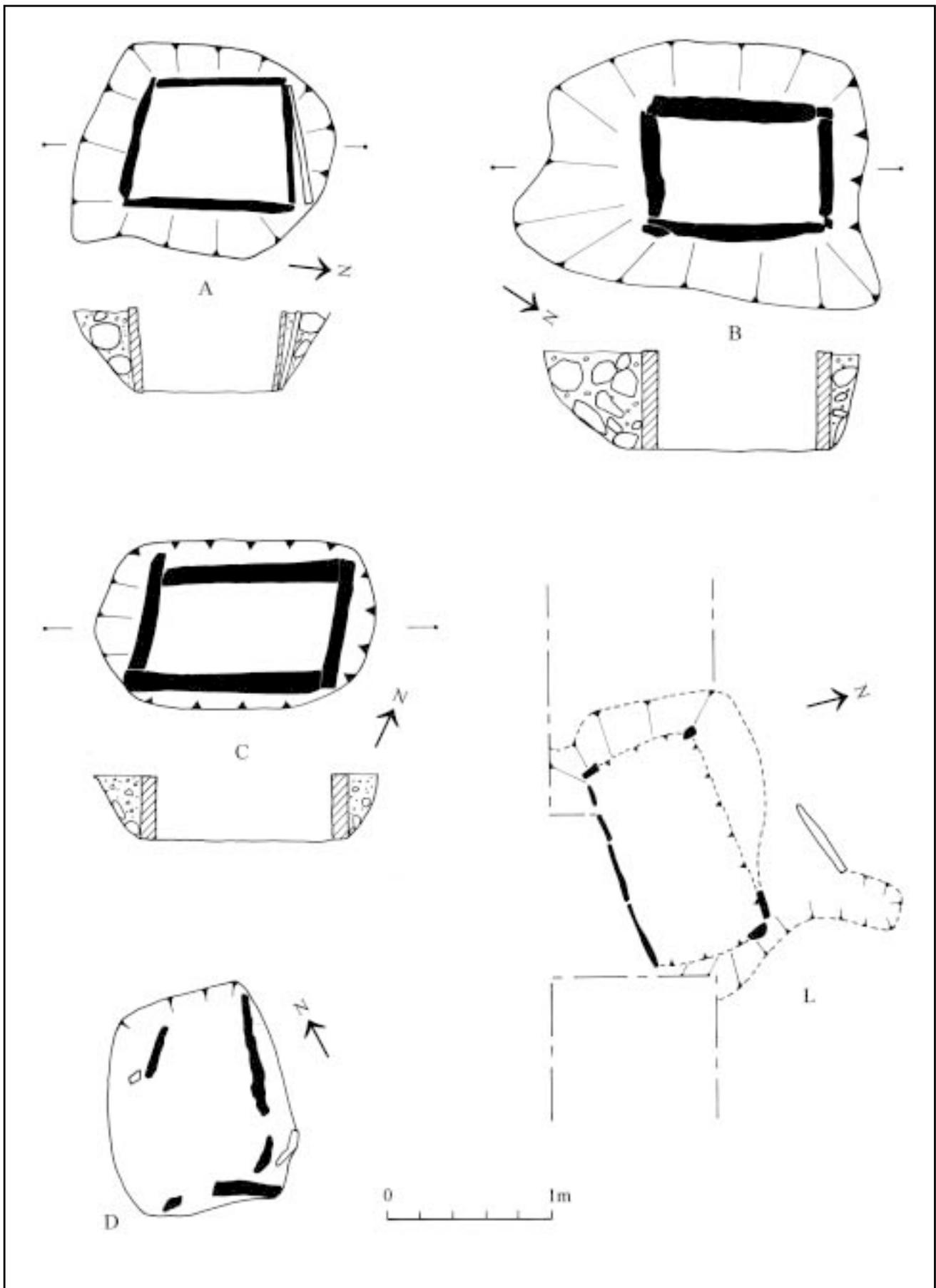
#### *Cist B*

Lying 2.5m S of Cist A, this grave was the most substantial uncovered, with the exception of the massive Cist J. It was built of four substantial sandstone slabs, 80–140mm thick, none of which had been damaged by the plough although its capstone was missing. Both end slabs were of red sandstone whereas the sides were of yellow sandstone, the reverse situation from that in Cist C (see below). This grave was aligned approximately NW/SE and measured internally 0.97m by 0.6m at its base, at a depth of 0.5m.

The grave pit measured 2m by 1.3–1.5m and almost cut the edge of the perimeter ditch. Large rounded boulders had been used as packing stones for the cist and the spaces between the stones filled with dark



**Illus 3** Plan of the excavation area, showing its principal features.



Illus 4 Plans of Cists A, B, C, D and L and profiles of Cists A, B and C.



**Illus 5** *Cist B, showing human remains and Food Vessel, viewed from the north.*

brown humic loam containing smaller stones and gravel.

Although the dentition of the individual in Cist C was well represented, the only skeletal remains were a few post-cranial elements, which were identifiable although fragmentary and very friable. The head appears to have lain at the N end of the cist. The effects of surface erosion and root action had contributed to the damage. Age estimation suggested a sub-adult of 12–15 years at death. Neither sex nor stature could be determined from the surviving remains. Several non-metric traits were observed on the teeth but none on the skeletal elements.

This individual produced a radiocarbon determination of  $3560 \pm 60$  BP (GrA-22107). A food vessel similar to that in Cist A lay on its side on the cist floor, with its base against the W wall.

#### *Cist C*

Cist C lay at the extreme N edge of the enclosure, immediately adjacent to the perimeter ditch and some 2m N of Cist A. It was aligned NE/SW and measured internally 1.1m by 0.67m and 0.4m deep. Its sides were built of red sandstone and its ends yellow sandstone, in contrast to those of Cist B (see above), the slabs being 80–120mm thick. Although its capstone was missing, the sides of the cist had not been disturbed by ploughing

and remained vertical. However, the sandstone had rotted somewhat and was very friable.

The grave pit measured 1.5m by 0.8m, its N edge just cutting the side of the perimeter ditch. There were no large packing stones within the backfill of the pit, only dark brown sandy loam containing a few small stones and gravel.

The only human remains within Cist C were recovered from its fill of ploughsoil and comprised a few cremated bone fragments, mostly from the head and long bones of an individual at least 14 years old. These fragments yielded a radiocarbon date of  $4760 \pm 90$  BP (GrA-21728). A food vessel stood upright against the N orthostat.

#### *Cist D*

Measuring 1.2m by 0.6m and 0.4m deep and aligned N/S, Cist D was located on the E side of the enclosure, 3.3m NNE of Cist J. Although no trace of the perimeter ditch survived in that part of the trench, it seems likely that Cist D would have lain very close to its inner edge. The cist had been damaged both by ploughing and by burrowing animals, the latter having disturbed the ploughsoil that filled the grave. Each of its sides consisted of a single, crudely fashioned sandstone slab, typically 100mm thick, although the E side had been broken (probably by ploughing) at its S end and lay at an angle to the main axis of the grave.

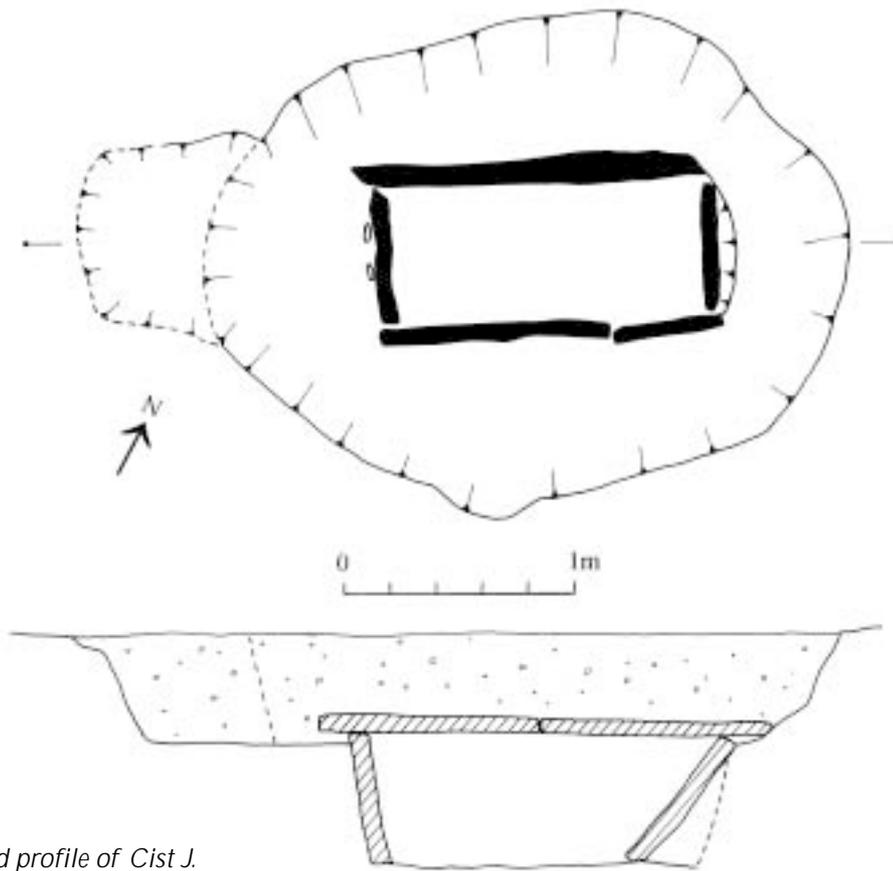
The grave pit was barely larger than the cist itself. Its original fill was difficult to distinguish from the materials deposited during the various disturbances suffered by this feature although it appeared to comprise a mix of sandstone fragments and medium-sized boulders in a matrix of humic topsoil and redeposited sand.

The individual in Cist D was very badly preserved and had been disturbed on at least one occasion; it survived as only two skeletal and two dental elements. Age at death was estimated as over 15–16 years. Neither sex nor stature could be estimated.

#### *Cist J (Illus 6–9)*

Cist J, by far the largest of the cists, was not central to the enclosure, as might have been expected, but was located on its SW side, close to the perimeter ditch. It was aligned NE/SW and measured 1.37m by 0.67m and 0.65m deep. Its sides were built of large slabs of dark red sandstone, 80–100mm thick although the SE side-stone had fractured and the NE end-stone had slipped slightly out of position. The base of the cist was simply natural gravel and sand. A unique feature of this cist was the wave patterns visible on the surface of all its stones. The pattern, which was natural, could have been deliberately sought as decoration for what could have been a particularly important grave (see below).

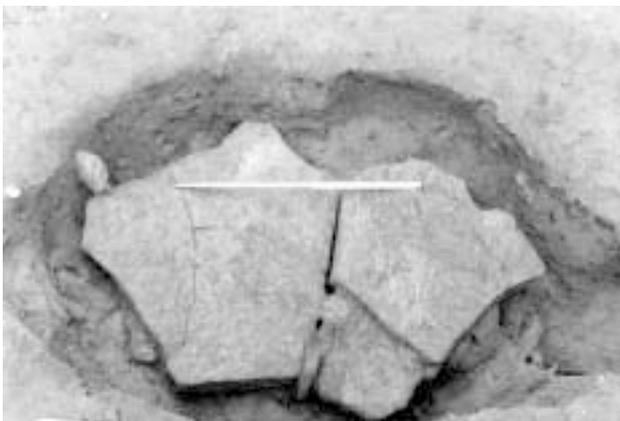
This was one of only two graves (the other was Cist H) to retain its capstone. Cist J was roofed with two capstones of dark red sandstone which were irregular in shape and which overlapped its sides. The capstones



**Illus 6** Plan and profile of Cist J.



**Illus 7** The boulder covering Cist J.



**Illus 8** Cist J after the removal of the boulder, showing its capstones.



**Illus 9** Cist J, showing human remains, viewed from the south-west.

had been covered with a shallow deposit of soil, over which was set a massive hemispherical boulder of volcanic rock (Illus 7). The boulder, which measured 1.3m across its base and 0.45m high, projected well above ground level prior to the excavation and must have been visible for some time.

The cut for Cist J was oval in shape and measured 2.7m by 2m at the top of the subsoil, narrowing to 2.2m by 1.65m at a depth of 0.45m, in line with the top of the cist. Extending 2m beyond the NE side of the pit was a shallow scoop, perhaps cut out to allow easier placement of the cist or the human remains within it. The backfill of the cut comprised silty sand, gravel and a few small pebbles but no large stones. Within the fill of the grave cut were numerous fragments of cannel coal and lumps of (presumably redeposited) grey clay. However, there was no trace of luting between the walls of the cist, as there had been in the grave excavated in 1944 (see below) and no clay was found within its interior.

The inhumation in Cist J was poorly preserved, incomplete, fragmentary and friable with its head at the SW end. There was evidence of root damage of the bones and it appeared that burrowing animals had used the contents of the cist as a nest. Sex assessment and ageing analysis indicated that the individual was probably male and middle-aged or older age at death. Stature could not be estimated. Several non-metric traits were observed although no pathological changes were evident. The radiocarbon date obtained from the skeletal remains was 3610±60 BP (GrA-22150).

#### *Cist L*

Cist L seemed to be the grave discovered in 1944. It lay approximately 2m N of Cist J and survived only as its grave cut together with fragmentary remnants of its sandstone lining within the backfill of earlier investigations. Furthermore, its upper levels had been disturbed by the sondage cut by the Time Team. The base of the grave cut measured 1.35m NE/SW by 0.72m wide, at a depth of 0.5m, although its outline at ground level had been obliterated. It appeared that the cist had been disturbed on more than one occasion: during ploughing in

1944, when it was looted and when it was subjected to more disciplined excavation later that year. Unfortunately, it was very difficult to distinguish the original grave pit from the later excavation cuts.

According to Christie (1949, 230), the cist was 1.22m long, 0.71–0.83m wide and 0.71–0.76m high with a capstone measuring 1.73m by 0.91m. On the evidence of his report, its corners and other gaps had been luted, making Cist L the only one to be so treated. Christie also noted a layer of charcoal at one end of the cist (he does not say which end) although he may well have been describing the fine, water-washed coal that occurred throughout the site.

There were no human remains within Cist L by the time of the 2002 excavation although a few skeletal fragments and one tooth, as well as a single fusiform jet bead, had been retrieved in 1944 (*ibid*, 230).

#### **Burials outside the enclosure** (Illus 3, 10 and 11)

Without exception, these five cists were smaller and substantially poorer in quality of construction than those within the enclosure. Four of them (E, F, G and H) lay beyond the E side of the ditch and one (Cist K) just beyond its W side.

#### *Cist E*

Cist E was located some 2m E of the presumed course of the ditch, which had been truncated at that point. It was aligned NNE/SSW, measured approximately 0.75m by 0.35m and 0.4m deep internally and was built of small, unworked sandstone slabs. The S end stone was missing and its W side appears to have been broken, probably by ploughing which also removed the evidence of a grave cut. The sides of the grave splayed outwards, again the probable result of ploughing.

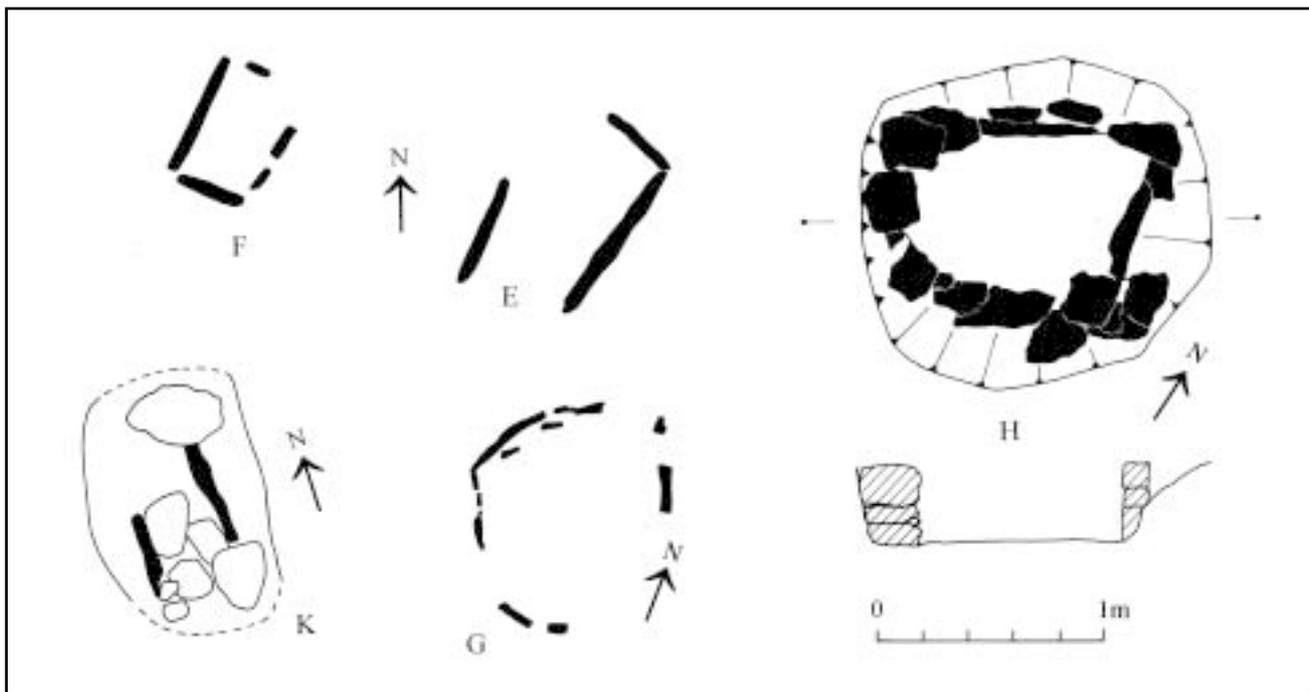
No human remains survived in Cist E.

#### *Cist F*

Lying 1m W of Cist E and parallel to it, Cist F was the smallest grave uncovered at Holly Road. It had been

**Table 1** *Cists and their contents.*

<b>Cist</b>	<b>grave goods</b>	<b>ceramics</b>	<b>human remains</b>	<b>date</b>
A	flint knife, crinoid ?bead	food vessel	fragmentary	3520±60 BP
B		food vessel	fragmentary	3560±60 BP
C		food vessel	residual cremated bone in fill	4760±90 BP
D			fragmentary	
E				
F				
G				
H	?amulet		fragmentary	3680±50 BP
J			fragmentary	3610±60 BP
K		food vessel		
L	jet bead		fragmentary	



Illus 10 Plans of Cists, E, F, G, H and K and profile of Cist H.



Illus 11 Cist H after the removal of its capstones, viewed from the south.

badly damaged by ploughing, its lining being reduced to a few small fragments of sandstone. Cist F measured internally 0.40m by 0.25m and 0.30m deep and was probably a child's grave. No trace of the grave cut remained.

No human remains survived in Cist F.

#### Cist G

Lying 2.5m S of Cist E and 4.4m SE of Cist J, Cist G was unusual in that it was sub-circular, rather than rectangular, in plan. It measured 0.80m across and 0.20m deep and had no discernible alignment. Although it appeared to have been damaged by ploughing, the sides of the cist consisted of small sandstone fragments, rather than larger, more substantial slabs. There was slight evidence of a grave cut only on the N side of the cist.

No human remains survived in Cist G.

#### Cist H

Cist H was located 2.5m SW of Cist G. It was aligned NE/SW and was constructed of several courses of small sandstone slabs, 50–160mm thick, which formed a rather irregular shape. In its NE corner was a large granite boulder. The interior of the cist measured 0.77–0.90m long by 0.5–0.7m wide and 0.35m deep. A single slab of sandstone formed its capstone which, although damaged by ploughing, was still *in situ*. Although its capstone was still in place, the interior of the cist was filled with coal-stained, silty soil containing a few rounded stones and it was obvious that the grave had been deliberately backfilled at the time of interment.

The walls of the cist lay directly against the sides of its pit which had been cut into the rather pebbly subsoil of this part of the site, thus obviating the need for packing stones around the perimeter of the grave.

The remains of one individual, comprising fragmentary, friable and poorly preserved cranial bones survived in Cist H. The individual was probably male and aged over 21 years at death and possibly of advancing age. Stature could not be assessed. One primary non-metric trait was noted and some dental pathology was observed. A radiocarbon determination for these remains produced a date of  $3680 \pm 50$  BP (GrA-22812). A stone amulet was recovered from the cist fill.

#### Cist K

Lying very close to the W edge of the trench, Cist K was identified during the excavation of the post-Im-provement boundary ditch which, together with burrowing animals, had disturbed it (see below). No trace of a grave cut was visible.

Cist K was aligned N/S and measured approximately 0.70m by 0.35m. Its only surviving elements were its sides of unworked sandstone, which had been disturbed by any number of agents. The stony backfill of the post-medieval ditch lay within the cist, some of that material lying immediately against a small food vessel (see below). Neither the base of the cist nor its grave cut could be identified because of the numerous disturbances suffered by it.

No human remains were found within the limits of Cist K or near to it.

#### *The cremation burial*

The cremated remains of two individuals were found during these investigations. One was within Cist C (see above) and the other at the W end of the trench. The latter was discovered during the excavation of the long, E/W sondage, which cut through this feature, leaving only the bottom 0.14m of it intact. The pit for the cremation comprised a steep-sided, sub-circular cut, measuring roughly 0.45m across, within which was a very compact collection of calcined bones, almost cemented at its base.

These remains produced a radiocarbon date of  $4480 \pm 60$  BP (GrA-21729).

#### **The post-medieval ditch** (Illus 3 and 12)

In the NW side of the trench, just outside the cemetery enclosure, was another shallow ditch, at first thought to be of Bronze Age date but later interpreted as a post-Improvement feature. This ditch varied in width from 0.5m to 1.2m and had a maximum depth of 0.4m along gently sloping sides. It was filled with silty sand and gravel which included significant amounts of rounded field boulders, some of which lay amongst the remnants of Cist K (see above). A fragment of iron was retrieved from the upper level of its fill, indicating that the ditch was probably not a Bronze Age feature although it is possible that this object had been deposited during ploughing in relatively recent times.

What is beyond dispute, however, is that Ordnance Survey maps show the line described by this ditch as a boundary from at least the mid-19th century until recent times. It is not clear from any of those maps precisely what form that boundary took: fence, wall or ditch; it is simply shown as the edge of a wooded area. However, it is reasonable to interpret that boundary as either a narrow ditch which had been backfilled at some stage or, perhaps more likely, a drystone wall which was grubbed out, leaving a furrow into which discarded stones and soil were tipped.

#### **The artefacts**

In addition to the fusiform bead from the 1944 investigations, the cemetery produced nine items that had been made or used in prehistory. In Cist A were a flint



**Illus 12** View, from the east, along the post-Improvement ditch.

knife, a fossil crinoid (identified by Dr Lyall Anderson) that had been used as a bead, and a Vase Food Vessel; in Cists B, C and K, one Vase Food Vessel each (with parts of two others being found in disturbed positions); and in Cist H, an unusually-shaped pebble that had probably been used as an amulet. Post-excavation work included the re-examination of the 1944 find to check its material.

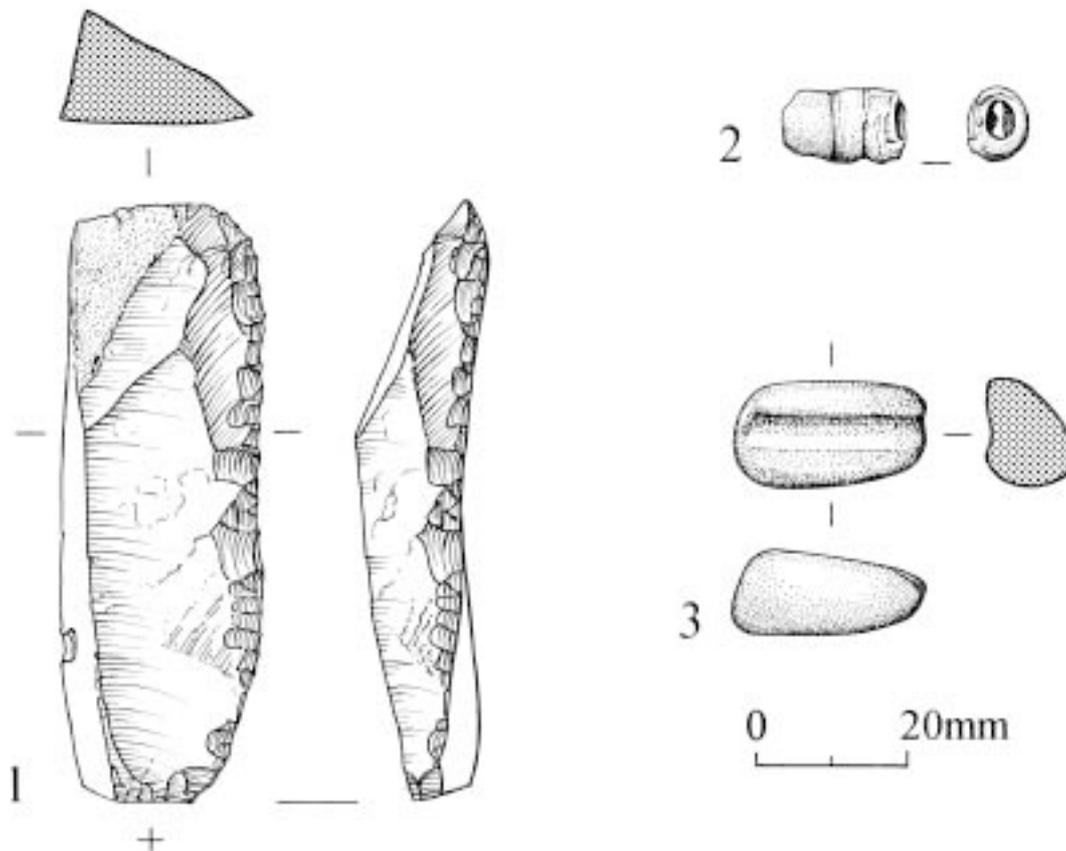
#### **Lithics** (Illus 13)

##### *Flint knife from Cist A* (Illus 13, 1)

Alan Saville

A large, robust flint blade was found, ventral (flat) side uppermost, behind where the back of the corpse would have been. The surviving skeletal remains (see below for details) produced a date of 1980–1680 cal BC (GrA-22106). The blade is 81mm long, 28mm wide, has a maximum thickness of 14mm and weighs 31g. It has a large, plain striking platform, 7mm deep and 14mm wide, above a pronounced bulb of percussion and has almost certainly been produced by hard-hammer striking technique. The cross-section of the blade is essentially triangular, with a single dorsal ridge, and is much steeper on the left side of the ridge than the right.

A small area of brown ( $\approx$ Munsell 7.5YR5/4) cortex remains at the distal end, while the rest of the surface is



**Illus 13** *Lithics: 1, flint knife blade; 2, bead from Cist A; 3, pebble from Cist H.*

predominantly an undiscoloured, very dark grey coloured flint ( $\approx$ Munsell 2.5YR3/0). The flint has some inclusions of lighter colour but is of high quality and either the artefact or the raw material has undoubtedly been imported into Fife from an external source, probably in England.

Shallow, invasive scalar retouch down the sharp, right-side edge, giving it a slightly sub-denticulate outline, defines this artefact as a single-edge knife. The tool has not been cleaned in case use-wear analysis is to be undertaken, but even so, under the microscope, there are obvious signs of abrasion on the retouched edge consistent with use. The opposite edge, naturally blunted, also has some rounding of the edge and minor 'squilling' removals, suggesting that this too has seen some use. This, therefore, is not an absolutely pristine grave-good but an implement which has had some previous, albeit minor, use prior to deposition.

The classic flint artefact associated with Food Vessels is the plano-convex knife (Pierpoint 1980), but it is equally clear that a variety of less extensively retouched knife forms are also frequently associated (Simpson 1968). In this respect the date and association of this knife in the Leven cist are unremarkable. The knife itself is not an especially refined example when compared, for example, with the exceptional Neolithic plano-convex knife from Dalladies, Kincardineshire (Piggott 1972, fig.13:1), but it does have the potentially

significant characteristic of size. As the discussion of the flints from Lunanhead, Angus, indicated (Wickham-Jones and Mackenzie 1996), flint artefacts as large as the Leven blade are, on the whole, rather unusual in prehistoric eastern Scotland. This factor alone may have given the large blade from Leven sufficient prestige value as a grave-good. However, the fact that it appears to have been used rather than deposited in a pristine state also suggests that this was an item of personal gear buried with the deceased, rather than a posthumous funerary gift.

#### *Bead from Cist A* Alison Sheridan

A small, naturally hollow fragment of stone was found in the chin area of the body in Cist A. It is a flattish, corrugated cylinder, 16mm long and 8.5–9.6mm across, with a narrow, irregularly-shaped hole. It is dark brown in colour with a rust-coloured area in the interior. Although the stone is likely to have been used as a bead, no trace of any thread was found. This item has been identified as a fragment of a fossil crinoid—a sea creature, whose fossilised remains occur in the Leven area. It does not appear to have been modified for use.

The selection and use of this natural geological freak as a bead may indicate that it was ascribed amuletic powers: its unusual shape might have been regarded as

a link with the Otherworld, the world of the ancestors and gods, (see also below, Cist H). The use of fossil crinoids and other fossils is well attested from other Early Bronze Age funerary contexts elsewhere in Britain (eg Seamer Moor, Yorkshire: Smith 1994, 153, NYM 173), particularly in the composite necklaces of southern England, most of which have accompanied cremated remains (eg Aldbourn Barrow IV: Kinnes and Longworth 1985, no 280). Here, the crinoids' superficial similarity to segmented faience beads might have been a factor in their use, and the presence of other rare or special materials such as amber or jet in these necklaces encourages the view that all of these materials were ascribed amuletic powers (Sheridan and Shortland 2003). Whether or not the user of the Leven bead was aware of segmented faience beads and the crinoid's resemblance to them—unlikely but, from the radiocarbon date, theoretically not impossible (ibid)—in any case its special nature is likely to have been of significance.

*Pebble, probably an amulet, from Cist H*  
Alison Sheridan

Like the crinoid in Cist A, this item, retrieved from the lower fill of Cist H, appears to have been a natural geological freak, collected because of its unusual shape. It has rounded, water-worn edges and a marked natural groove running along one surface, making the pebble reminiscent of a cowrie shell. It is 26.2mm long, 15.5mm wide and 12mm thick and is of a hard, probably igneous stone (Dr Suzanne Miller pers comm.). The only evidence of possible human modification is the high sheen on the pebble, which could have resulted from its being carried in a pouch or similar container, or from being rubbed. There is also what appears to be a coating of blackish-brown material over much of its surface. Compositional analysis of this material by Laurianne Robinet (NMS Conservation and Analytical Research Department), using x-ray fluorescence spectrometry (XRF), has revealed that the material is iron-rich and is probably ochre. Given the abundance of ochre along the nearby Letham Glen and in the local glacial deposits, it is unclear whether the pebble had been coated naturally or deliberately. Nevertheless, its selection would have been deliberate.

As with cowrie shells, the pebble's shape is suggestive of female genitals, and it may well be that this was a factor in its selection and use. If its patina (and possible coating of ochre) indicates repeated, ritualized use, then it is likely that this pebble had served as an amulet, possibly with fertility connotations. Its association with an individual who may have been a relatively old man may be significant, although it would be stretching the evidence to suggest any shamanic associations. As is clear from the crinoid in Cist A, the use of amulets does not appear to be restricted to one particular age group or gender.

Relatively little attention has been paid to the use of amulets in Bronze Age Scotland, and examples from

Scottish Early Bronze Age inhumation burials are fairly scarce (although further examples might have been found but not recognized as such in the past). Loose pebbles of possible amuletic significance—as opposed to pebbles used as cist paving, some of which might equally have been ascribed similar powers—have been found in several cists (eg at Ellon, Aberdeenshire, associated with a beaker: Shepherd 1986, 29). Pebbles or fragments of quartz, a stone possibly associated with moon-related rituals, have been found in cists in various parts of Scotland, such as at Tavelty Farm, Kintore, Aberdeenshire where they were associated with a beaker (ibid) and at The Cuninghar, Tillicoultry, Clackmannanshire, associated with a Vase Food Vessel (Robertson et al 1895; see Mitchell 1884 for further examples and discussion). A topaz crystal is known from another beaker-associated cist at Newhills, Aberdeenshire (Shepherd 1986, 30); and the presence of lumps of ochre has been noted in several cists in the Kilmartin area of Argyll and elsewhere (Craw 1929, 160, 162).

*Fusiform bead from the 1944 investigations*  
(not illustrated)  
Alison Sheridan

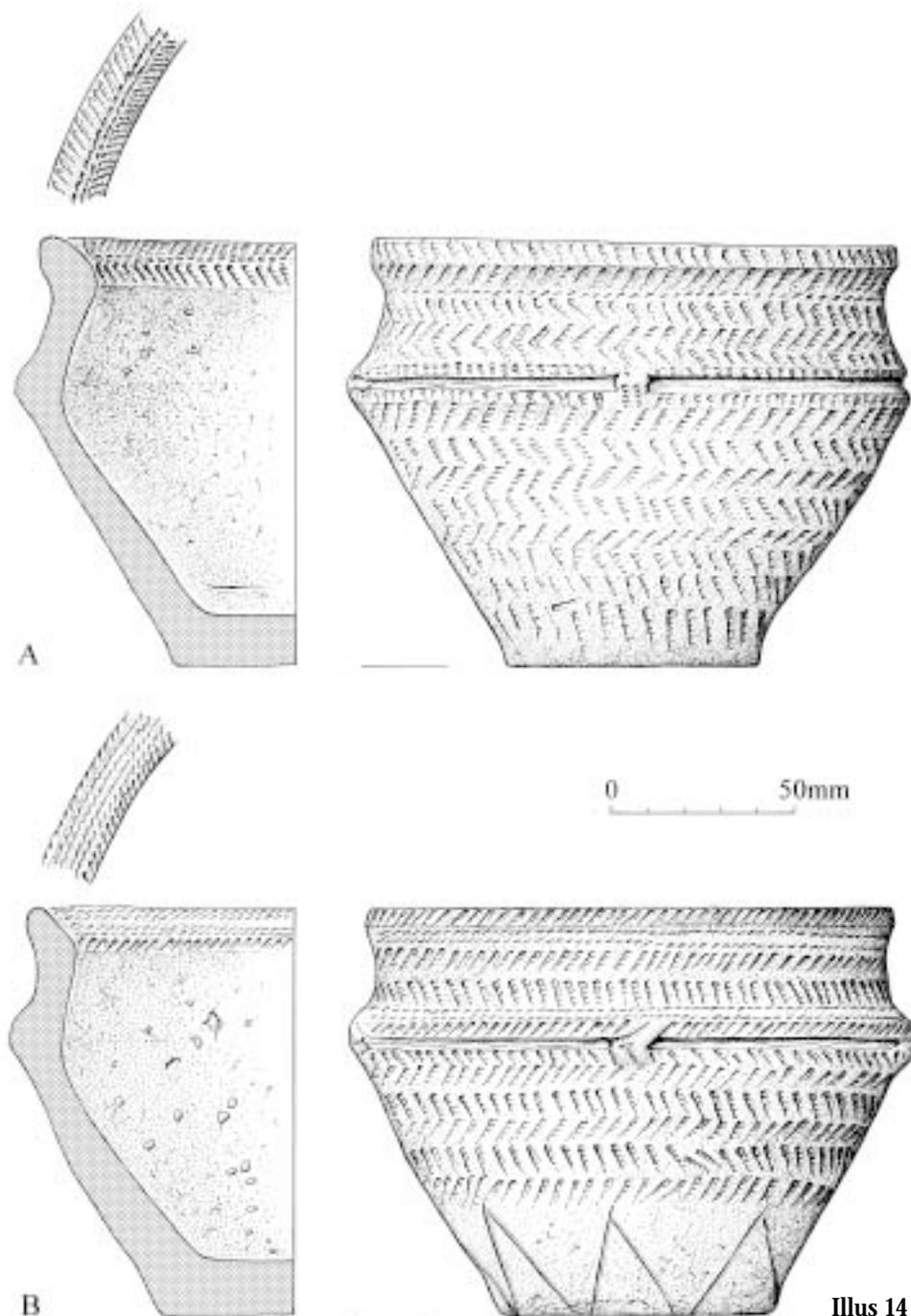
This bead, which was already in fragments when it joined the National collections in the 1940s or '50s (Registration no NMS X.EQ 603), is 13mm long and of a slender fusiform shape. It is black, polished to a medium sheen, and has broken with the conchoidal fracture pattern that is characteristic of jet. To verify its material, the bead was compositionally analysed by Dr Kathy Eremin (NMS C and AR Department), using XRF. The results indicate a composition closely comparable with that of Whitby jet and suggest that the bead (or rather the necklace of which the bead had been a component) had originally been imported from Yorkshire (see Sheridan and Davis 2002 for other examples of Whitby jet objects found in Scotland).

**The pottery** (Illus 14–18)  
Alison Sheridan

Two fragmentary and four complete Vase Food Vessels were found. The former (SF1 and SF2) were retrieved during AOC's investigation; the latter, during the main programme of excavation. Each will be described individually, then all discussed together.

*SF 1*

This comprises twelve sherds, now conjoined, forming over a third of a bipartite Vase Food Vessel with a stop-ridge groove on its shoulder. These were found at the top of the subsoil, a short distance SSW of Cist A, although they cannot have been associated with it. The remainder of the vessel was not found subsequently and the location of the cist in which it had been buried is not known. The fracture surfaces are all fresh, probably



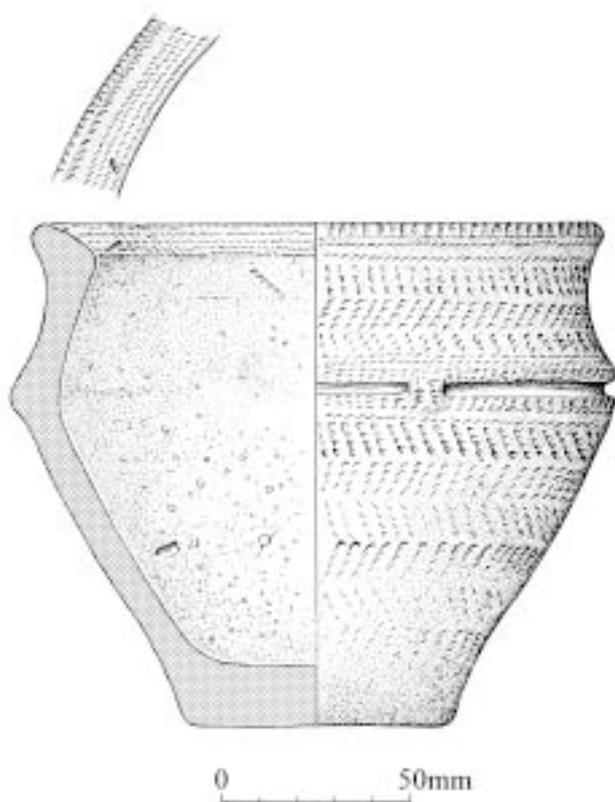
**Illus 14** Food Vessels from Cists A and B.

as a result of the machine-stripping of the area during its evaluation in May 2002 (Stentoff 2002).

The pot is 140mm high, with a shoulder at roughly two-thirds of its height. The estimated rim diameter is 150mm and the base diameter 70mm; the wall thickness is 7–9.6mm, increasing to 16mm at the base. The rim is everted and has a broad internal bevel and narrow external bevel; the neck is upright and gently concave. The stop-ridge is narrow (approximately 4mm wide) and sharply defined, having been made by gouging out a line of clay with a blunt-ended organic tool such as a twig or withy; the tool has left striations in the groove. The stop-ridge is interrupted by one extant strap-lug; there would originally have been four. The

lug is narrow and unperforated (and thus non-functional in terms of suspending the pot) and had been made by leaving clay on the shoulder at this point, rather than gouging it away. Below the stop-ridge, the belly narrows evenly towards the base, changing direction almost imperceptibly just above the wall-base junction to form a pedestal; the base is flat inside and outside.

The whole of the exterior surface (except the stop-ridge groove and the area just above the base) and the internal rim bevel are decorated with impressions made using fairly fine cord, between 1.5 and 2.5mm wide. These become increasingly shallow from the stop-ridge to the bottom of the wall. Short, vertical



**Illus 15** Food Vessel SF1.

whipped cord 'maggots' (made by tightly twisting the cord or wrapping it around a flexible core) occur on the external rim bevel, the edges of the stop-ridge and the extant strap lug. Plain lines of twisted cord impressions occur as five concentric lines on the internal rim bevel; as two horizontal lines at the top of the neck, and two at its bottom; and as two horizontal lines at the top of the belly. Elsewhere, the decoration consists of a herringbone design of twisted cord, fading out at around 10–15mm above the base of the pot.

The exterior and interior surfaces are a light reddish-brown and the core is blackish; this indicates rapid firing. A small grey-brown patch (more of a stain than an encrustation) on the interior at stop-ridge level could conceivably represent the final traces of the pot's evaporated former contents. The exterior surface has been carefully smoothed to conceal the crushed stone temper, and both exterior and interior surfaces may well have been coated in a self-slip (a slurry made from the clay used to form the pot) prior to decoration. The slip has cracked, leaving a network of hairline cracks over the surfaces. The fabric is hard and the deliberately-added temper comprises angular fragments of a speckled, black and white crystalline rock up to 4 x 3.5mm in size, at a density of about 10%. There are two unintentional impressions on the interior surface, possibly of a material such as straw; they do not seem to be cereal impressions.

## SF 2

This comprises 23 sherds (of which five are now conjoined) of a ridged, bipartite Vase Food Vessel. Although only about a quarter of the pot is present, its overall shape and decoration can be reconstructed. The sherds were found just outside the badly-damaged Cist L, believed to be the cist unearthed in 1944, and might have come from it. The fracture surfaces are slightly abraded.

The pot's estimated height is approximately 163mm, its estimated rim diameter around 200mm, its base diameter 80mm and its wall thickness 8.7–14.5mm, increasing to 27.8mm at the base. The rim is squared off and very slightly inverted; the neck is vertical and corrugated by means of four ribs (one formed by the outer edge of the rim, one on the neck-belly junction and two in between). The shape of the belly is the same as in SF1; the base is flat outside and slightly domed inside.

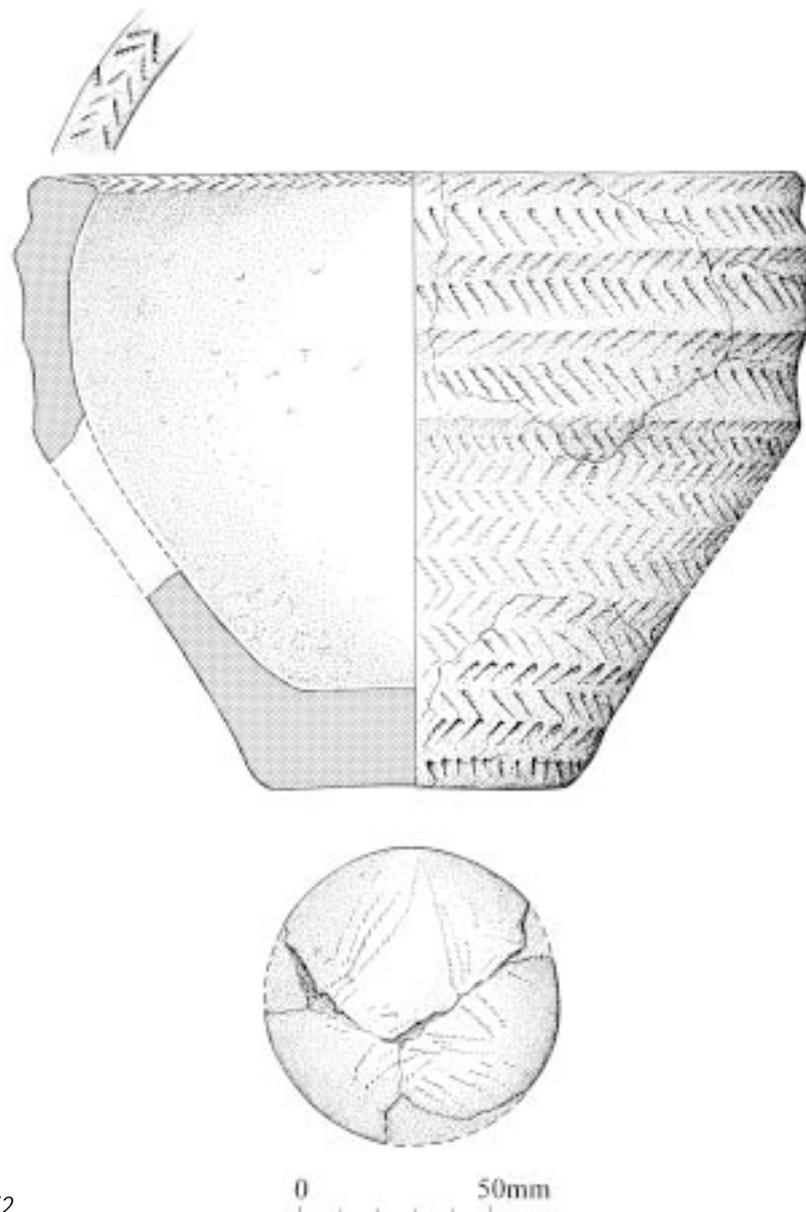
The whole of the outer surface, including the top of the rim and the base, is decorated with impressions of fine, fairly tightly-twisted cord. These range in width from 1 to 2.5mm and in depth from very shallow at the base to up to around 0.75mm on the body. They are arranged in a herringbone pattern on the top of the rim and down the body. The base has a loose, star-shaped design featuring at least five nested lines.

The exterior and interior surfaces are pale to medium brown in colour and the core blackish-brown. Surface preparation had been the same as for SF1 although here fewer stone grits are visible and the slip is not cracked as extensively. These inclusions appear to be angular fragments of a dark grey stone up to 8 x 5mm in size. Their colour makes them hard to distinguish from the dark core fabric and makes estimation of their abundance difficult although it could be around 7–10%. Although the fabric is fairly hard, it is also rather friable and breaks with a hackly fracture.

## Cist A

Intact bipartite Vase Food Vessel with a stop-ridge groove, markedly similar to, but slightly smaller than SF1. It was found upright on the floor of the cist, beside the W wall, in front of where the deceased's chest would have been. There is minor, ancient damage to the rim and neck at one point and to the wall just above the base at another. There is also more recent, minor surface spalling from the interior.

The pot is 115mm high with a shoulder at roughly two-thirds of its height. The rim and base diameters are 142 and 66mm respectively. Wall thickness is about 10mm, increasing to 14mm at the base. The rim is everted and has an angled internal bevel and a narrow external bevel; the neck is straight and vertical, kinking in below the rim and out towards the stop-ridge. The latter, 3.5mm wide, is sharply defined by gouging (as with SF1) and has four small unperforated strap-lugs. The belly shape echoes that of SF1 but with a more



**Illus 16** *Food Vessel SF2.*

clearly-defined pedestal; the base is flat inside and outside.

The whole of the exterior (except the stop-ridge groove) and the internal rim bevel are decorated with twisted cord impressions. As with SF1, these have been neatly applied in an overall herringbone pattern. The cord has been twisted slightly more tightly than in SF1 although the material used for the cord seems to be very similar: individual fine strands can be seen in the impressions and the overall width of the impressions is no greater than 2.5mm. The upper and lower margins of the stop-ridge have a line of short, vertical impressions of tightly-twisted cord and the internal rim bevel has a herringbone design interrupted by two concentric plain lines of twisted cord.

The exterior is light to medium brown in colour while the interior is pale grey at the base and grey-brown elsewhere. The core colour, visible where the in-

terior surface has spalled off, is a medium grey. The surfaces has been carefully smoothed and coated with a thick slip prior to decoration. This surface treatment has obscured almost all of the stone inclusions. There are no indications of any former contents. Accidental impressions of organic material are visible in at least three places: a straw impression on the lower exterior surface; a probable grass impression near the base of the interior; and what may be a seed-head (not cereal) impression on the base.

#### *Cist B*

Intact bipartite Vase Food Vessel with a stop-ridge groove, again markedly similar to SF1, and to the Cist A pot with which it is almost identical in size. However, in this case the herringbone decoration does not extend all the way to the bottom of the wall, the lowest quarter

of the pot having a crudely-scratched, vertical chevron design. The pot lay on its side on the floor of the cist with its base against the W wall, and its mouth towards the head and chest area of the body, a similar position to that of the upright pot in Cist A. It is unclear whether it had originally been deposited upright. There is very minor ancient chipping on the rim and edge of the base; cracks appeared as the pot slowly dried out but were arrested during post-excavation consolidation.

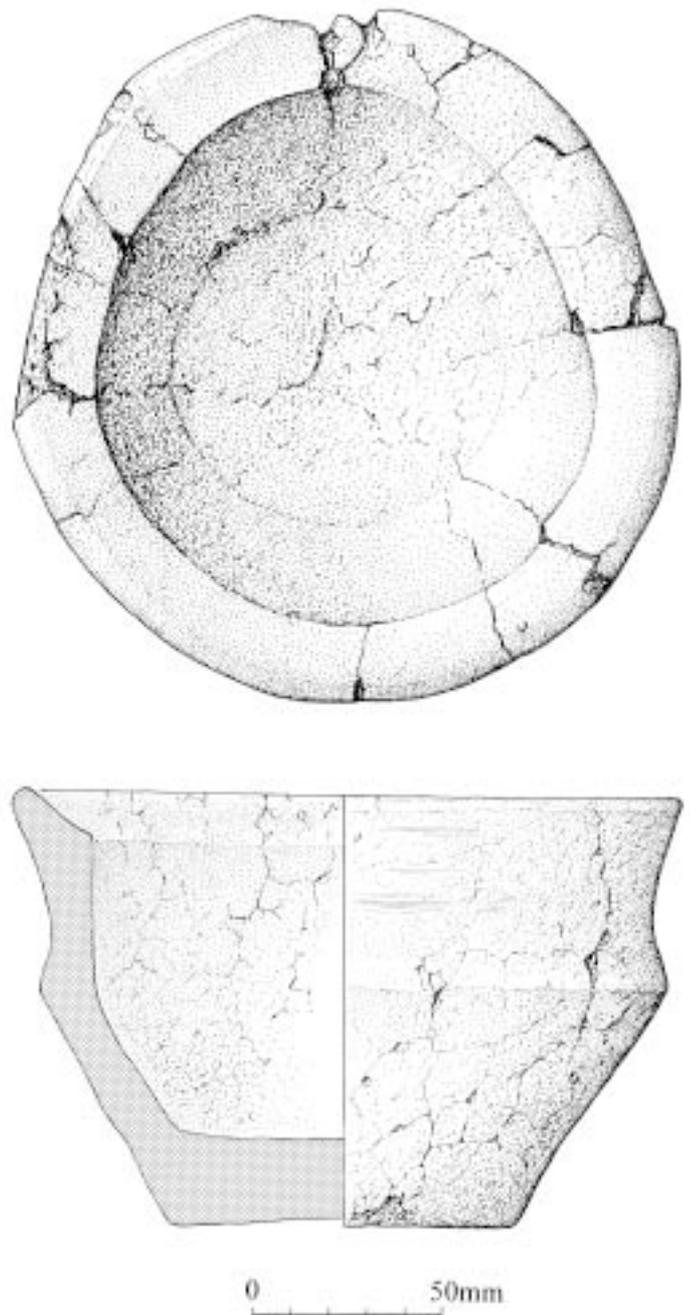
The pot is 113mm high, with a shoulder at roughly two-thirds of its height. The rim diameter varies from 138 to 143mm and the base diameter is 70mm. Wall thickness is around 9mm, increasing to a maximum of 18mm at the base. The everted rim has a narrow external bevel and a broad internal bevel. The neck is upright and slightly concave; the stop-ridge is virtually identical to and made in the same way as those of SF1 and the Cist A pot; and there are four unperforated strap lugs. The belly is the same shape as in SF1 while the base is flat on the exterior and very slightly domed on the interior.

Three-quarters of the exterior (except the stop-ridge), and the internal rim bevel, are decorated with impressions of twisted cord. The chevron design towards the base of the vessel is mostly shallow and was made with a narrow, organic tool leaving incisions about 1mm wide. The twisted cord impressions resemble those on the other similar pots in terms of the fineness of the cord, visibility of individual threads and overall width. The herringbone design, made using tightly-twisted cord, occurs on the neck and upper belly; the upper and lower edges of the stop-ridge also have short, opposing diagonal impressions forming the same design. Plain lines of more loosely-twisted cord impressions occur on the neck, where two pairs form a border for the herringbone. There are also four concentric lines on the internal bevel and, below these, a fringe of short, diagonal lines of tightly-twisted cord. Similar lines are present on the external bevel and on the lugs.

The exterior is a variegated light to medium brown colour and the interior a light grey-brown to medium brown. In the tiny areas where the core is visible, it appears to be dark grey. The surfaces has been carefully smoothed and slipped prior to decoration although some stone inclusions are clearly visible on the interior surface, and a few also on the exterior. These are almost all of a blackish-brown, hard stone up to 5 x 6.5mm in size; the density is 5–7%. Their angularity indicates that the stone had been deliberately crushed and added as temper. There are no traces of the pot's former contents. There are a couple of accidental impressions of organic material including straw, but no cereal impressions.

#### *Cist C*

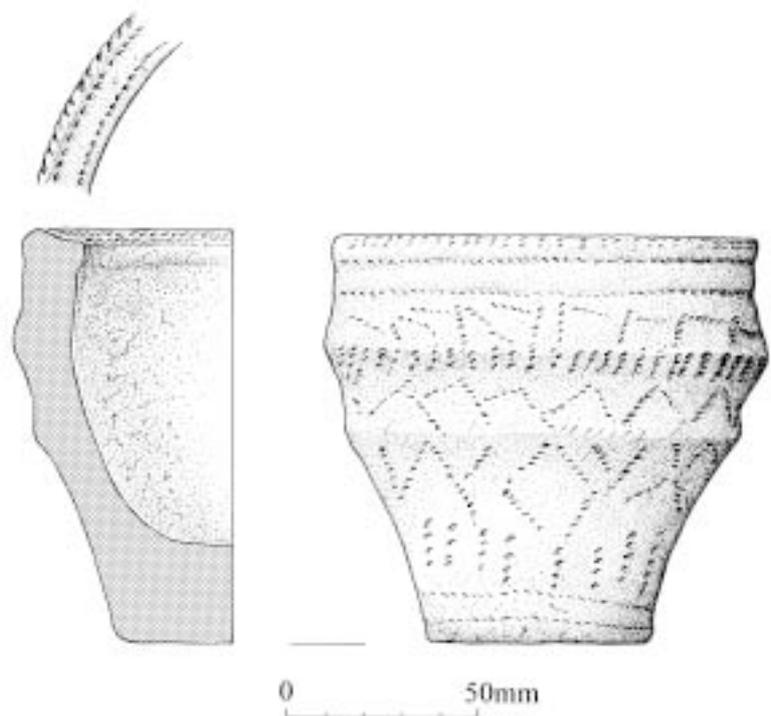
An intact, undecorated bipartite Vase Food Vessel, considerably coarser in appearance than SF1 and the pots from Cists A and B, was retrieved from Cist C. It was found upright against the N wall of the cist, towards its



**Illus 17** *Food Vessel from Cist C.*

E end. The pot is of slightly friable fabric and there was damage to its rim and base-wall junction, some spalling of the interior surface and considerable cracking on the surface and through the wall. The cracking was again arrested, thanks to speedy conservation.

The pot is approximately 110mm high with a shoulder just over half way up. It appears markedly oval in shape when viewed from above and slightly lopsided when viewed from the side. The rim diameter varies from 174 to 184mm, the base diameter is 92mm and the wall thickness is about 12mm, increasing to 20mm at the base. The rim has a concave internal bevel. The slightly splaying neck is concave, the shoulder fairly sharp and the belly is of variable shape, forming a pedestal over part of the circumference and elsewhere



**Illus 18** Food Vessel from Cist K.

narrowing evenly to the base. The base is concave on the exterior and flat on the interior.

The exterior is a mottled red-brown, light brown and dark brown colour while the core is blackish-grey and the interior a variable light to dark grey-brown. The surfaces had been smoothed and slipped and there seems to have been some post-slipping smoothing on the outside of the neck, to judge from faint, horizontal striations. This surface treatment had obscured the stone temper although a few large fragments of angular, crushed stone are visible in fracture surfaces, the largest being 11.5mm across. More than one kind of stone is present. There is no indication of the pot's former contents, if any had existed.

#### *Cist K*

Intact, small, slender tripartite Vase Food Vessel. This was found upright immediately outside the badly-damaged Cist K, protected by stones from the backfill of the post-medieval ditch. Its position suggests that it might have been discovered and repositioned by the diggers of that ditch. There is minor, ancient surface abrasion at the rim and the base-wall junction area, and some minor cracking.

The pot is 108mm high, with rim and base diameters of 107–112mm and 59mm respectively. The upper shoulder is at roughly two-thirds of the pot's height while the lower shoulder is mid-way down the body. Wall thickness is approximately 10mm, increasing to 26mm at the base. In profile, the pot is slightly asymmetrical: the base does not lie centrally below the rim, giving the pot a lopsided appearance. The rim is very slightly everted, with a shallow dished internal bevel. The neck is straight and slightly inverted, kinking out

at the rim and the upper shoulder; between the latter and the lower shoulder the body is concave. On one side of the pot the belly narrows evenly towards the base while, on the other, it is concave; both sides narrow to a low pedestal. The base is flat internally and externally.

The rim bevel and the entire exterior surface are decorated with fairly shallow and broad cord impressions (up to 3.5mm wide), with the cord twisted to differing degrees of tightness. Individual threads can be seen in some of the impressions. The design is looser and less neatly applied than on the trio of pots SF1, 'Cist A' and 'Cist B'. The rim bevel has two concentric lines of tightly-whipped cord impressions, with short vertical stretches on the outer edge of the rim. Similar, more widely-spaced, vertical lines adorn the upper shoulder, while the lower shoulder has a short stretch of vertical thumbnail impressions. The neck has four horizontal lines of which the lower two are discontinuous, not always horizontal, and interrupted by irregularly-spaced vertical lines. The area between the two shoulders has a running vertical chevron design which breaks down into a jumble of lines over part of the pot's circumference. Below the lower shoulder is an equally untidy running chevron or criss-cross design. Further down the belly there is a row of short diagonal stretches of impressions, and just above the base there are two horizontal lines.

The exterior is pinkish-buff in colour and the interior is similar but slightly greyish; the core is not clearly visible but appears to be darker. The surfaces had been smoothed and slipped prior to decoration; stone inclusions are visible on the inner surface. These are angular fragments of a speckled, crystalline black and white stone, comparable with those seen in SF1; the largest

are around 4 x 3.5mm in size and the density around 5–7%. There are no traces of any former contents.

### Discussion

What is immediately striking about this assemblage of Vase Food Vessels is the close similarity between SF1 and the vessels from Cists A and B, a trio of vessels so similar to each other that they could arguably have been made by the same potter. The quality of their manufacture is noticeably higher than that of the other three pots, as regards the regularity and fineness of decoration (notwithstanding the incised decoration on the pot from Cist B), regularity of shape and, to a certain extent, wall thickness.

The trio of pots are classic examples of a widespread variant of Vase Food Vessels, characterised by a bipartite shape (or tripartite, if the stop-ridge is broad), one or more stop-ridges with lugs, and a herringbone design. Although part of a class of Vases labelled by some as 'Yorkshire Vases' (eg Kitson Clark 1937; Simpson 1968; ApSimon 1969), there is no unequivocal proof that they originated in Yorkshire. Examples are known from central and northern England, Scotland and Ireland (for a distribution map encompassing this type in Ireland, see Sheridan 1993, fig 21; and for a discussion of terminology see "Rīord-in and Waddell 1993, 1–4, 27–31). Examples from Scotland include Kingsbarns Law, Crail, Fife (Anon 1875, 243–5), Glenhead, near Doune, Perth and Kinross (Anderson 1883, fig 10) and Newton, Cambuslang, South Lanarkshire (Simpson 1965, no 47).

The dates associated with the pots from Cists A and B (GrA-22106–7, 3520±60 BP and 3560±60 BP respectively) are sufficiently close to allow the possibility that the vessels had been contemporary; the 1s calibrated values lie between c1950 and c1750 BC. These dates compare with those of c 2200–1700 BC for the overall currency of the Vase tradition in Ireland (Brindley pers comm.). As others have previously remarked (eg Manby 1986; 1994), there are very few reliable dates for Food Vessels in Britain as a whole (see Sheridan 1997, 39–41 for a review of Scottish dates). According to Needham (1996, 130), the earliest examples may date to the 21st or 22nd century BC although most date to after 2000 BC, as is the case in Yorkshire (Manby 1994, 37); few are likely to date to after 1700 BC. The Leven dates, therefore, fall well within the main period of Food Vessel use.

The strong possibility that these three pots had been made by the same potter is not the only such example where the products of an individual Food Vessel manufacturer have been identified. With some, as at Leven, the pots have been found in close proximity: this was also the case at Bewcastle, Northumberland, where a 'pair' of fine Vase Food Vessels was found in a cist (Hodgson 1940). In a barrow at Newbarn, Isle of Wight, another 'pair' of Bowl Food Vessels each had a thumb impression on its base, probably left as a kind of

maker's mark (Tomalin 1979). In some cases, however, the apparently related pots have been found at some distance from each other. In Scotland, Trevor Cowie has pointed out the remarkably close similarity between Vase Food Vessels from North Mains, Perth and Kinross and Cowdenhill, West Lothian, sites which are separated by some 36km (Cowie 1983, 254–6, fig 29). In England, Simpson (1976, 234) has argued that vases from Tallington, near Stamford, Lincolnshire and Garrowby Wold C97, Humberside, over 150km apart, are so similar that they could have been the work of the same potter. A vessel from Wetwang Slack site 4, Humberside could also belong to this particular 'set' (Manby 1986). Other possible examples of pairs or sets of Food Vessels have been discussed by Sheridan (1993, 50–65 for Irish examples) and Pierpoint (1980 for northern English examples).

If the three pots from Leven had indeed been made by the same potter, perhaps roughly at the same time, this suggests that the occupants of the cists might have died within a short time of each other. Notwithstanding the inevitable broadness of radiocarbon dating, the evidence from the bones does not contradict such a view. The nature of the decoration on the pot from Cist B, where the herringbone design had been finished off with a crude incised chevron design, might indicate that this pot was finished in some haste. Whether this was done to allow three simultaneous funerals, we can only speculate.

As for the other three Food Vessels from Leven, relatively little can be said, particularly given the absence of dates for these pots and the aforementioned general paucity of dates for Food Vessels in Scotland. Undecorated Food Vessels are rare, but examples include bipartite vases from Doonfoot, South Ayrshire and Palmerston, Maxwelltown, Dumfries and Galloway (Simpson 1965, nos 10 and 18). The herringbone-decorated, ridged bipartite Vase SF2 has a number of comparanda of varying degrees of closeness in Scotland and elsewhere, such as Westhaugh of Tulliemet (Sheridan 1997, Illus 11) and Kirkburn, Dumfries and Galloway (Simpson 1965, no 20). And examples of Food Vessels with imprecisely-executed cord impressions, comparable with the little pot from Cist K, are not hard to find (eg Ninewells, Angus (Jervise 1866, 216)).

## The human remains

### Inhumations

Tom McCulloch and Hannah Koon

Five of the cists (A, B, D, H and J) contained human remains. The results of the analysis of these remains were considered under the following headings: inventory and preservation; assessment of sex; estimation of age at death; estimation of stature; non-metric traits; and pathology.

### *Inventory and assessment of preservation*

Both visual and scored inventories were taken. The visual inventory provides information about the anatomical location of those elements and fragments present while the scored inventory gives an indication of the degree of completion of each element. The standard scoring system developed by Buikstra and Ubelaker (1994) was adopted throughout. The assessment of preservation determined the degree of completeness, fragmentation, friability and specific forms of damage noted on the skeletal remains.

### *Assessment of sex*

While some ambiguity and overlap do exist, sexing adults on the basis of dimorphic traits is considered straightforward and reliable (Mays and Cox 2000, 125). However, certain areas are considered better indicators than others, leading to a ranked order of diagnostic value. The most diagnostic anatomical regions are those related to sexual function, the pelvic bones yielding the most accurate sex determination (Phenice 1969; Lovell 1989; Mays and Cox 2000, 118; White and Folkens 2000, 363). The skull, including the mandible, is the next most reliable indicator of sex and, although several post-cranial elements can be used for sex determination, they are considered less reliable (Bass 1987, 81–2; Mays and Cox 2000, 118).

Sex determination in sub-adults is much more problematic. Adult sex dimorphism is caused by the action of hormones on body tissue, low hormone production in pre-pubescent males resulting in almost imperceptible differences in the skeletal morphology of sub-adults.

### *Estimation of stature*

Estimate of stature is usually based on the measurement of long bones although the accuracy of this technique has been questioned and such determinations should, at best, be viewed as approximate.

### *Estimation of age at death*

Estimation of age at death is usually based on degree of ossification, eruption and maturation patterns, together with age-related changes and deterioration of specific diagnostic areas. It is easier to date sub-adults because of their immature dentition and rapid and progressive processes of growth and development, certain stages being known to occur at specific ages (Buikstra and Ubelaker 1994; Whittaker 2000, 83–6). Teeth are extremely good indicators, the sequence of dental formation and eruption covering most of the sub-adult range (Scheuer and Black 2000, 12; Ubelaker 1984, 46–7; Whittaker 2000). Less successful, although still useful, tools for ageing sub-adults include skeletal ossification and maturation patterns.

Age determination of adults can be very problematic. Once skeletal maturity has been reached, age can only be ascertained from the examination of patterns of degeneration and deterioration. These processes can vary considerably and are not necessarily related only to chronological age but also to environment, lifestyle and genetic background (Cox 2000, 64; White and Folkens 2000, 340).

Only macroscopic methods of age determination were employed on the individuals examined. These methods included: the observation of the final stages of skeletal maturation and dental development (Krogman and Iscan 1986, 50–185; Ubelaker 1984, 53–67; Cox 2000, 65–6); the observation of the pubic symphysis surface (Brooks and Suchey 1990); the auricular surface of the ilium (Lovejoy et al 1985); the degree of cranial suture closure (Meindl and Lovejoy 1985); and the extent of the dental attrition (Lovejoy 1985). Because of the ambiguities and problems of interpretation inherent in all the above techniques, a conservative approach has been adopted here for ageing adults. The adult age bands, described by Buikstra and Ubelaker (1994) and listed below, have been used here.

<i>young adult</i>	20–34 years
<i>middle adult</i>	35–49 years
<i>older adult</i>	50+

### *Non-metric traits*

Non-metric traits are minor variations in the morphology of an individual, of which a large number exist in all types of tissue. Osteologists once used these traits as indicators of direct relationships between individuals and populations although such conclusions have now been largely discredited. However, such traits are still considered to have value in demonstrating affinities within large sample populations.

### *Pathology*

The detection of pathological conditions in skeletal and osseous material is an extremely important area of osteological analysis. However, many pathological conditions affect only soft tissues and evidence of disease and trauma in skeletal material is almost entirely limited to lesions which relate to long-term, chronic conditions (Roberts and Manchester 1995, 9). With the exception of traumatic fractures, acute conditions do not affect bones or teeth for sufficient time to elicit a response (Larsen 1997, 64). Furthermore, bone is limited in its reaction to harmful agents, either by depositing or removing bone.

Nevertheless, there are numerous conditions that can be identified by palaeopathology, including congenital defects, neoplasms, trauma, infectious diseases, joint diseases, metabolic and endocrine disorders and dental disorders. (Ortner and Putschar 1981; Roberts and Manchester 1995; Aufderheide and Rodriguez-Martin

1998). It should be noted that evidence of pathological alteration does not necessarily indicate an unhealthy individual but perhaps one whose system adapted to and survived the effects of trauma (Wood et al 1992, 353).

Pathological examination undertaken for this study followed standard protocols (Buikstra and Ubelaker 1994).

#### *Cist A*

The skeletal remains within Cist A consist only of a few cranial vault fragments, almost all from the right side of the skull of what appears to be a sub-adult. Although reasonably well preserved, the fragments are quite friable. The right temporal is almost complete, missing only the most inferior tip of the mastoid process and the zygomatic arch. The right parietal is also well represented although it lacks the most superior third of the squama. With the exception of the most medial portion of the sphenoid body, the right side of the sphenoid is almost intact. The right side of the occipital lacks only part of the basilar region and a portion of the superior occipital squama although a small piece of the superior apex of the squama does survive, originating from lambda. Of the frontal, only a small fragment from the central squamous region and the right orbital plate remain. In addition, several unidentified cranial fragments are also present.

Despite the absence of the mandible and viscerocranium, an almost complete set of dentition, comprising both permanent and deciduous teeth, is remarkably well preserved. The permanent maxillary and mandibular left and right 1st molars and central and lateral incisors have erupted and, with the exception of the left and right mandibular 3rd molars, the rest of the permanent dentition remains within the alveolar crypt. Eight deciduous teeth are also present: the mandibular left and right 2nd molars, the maxillary left and right 1st and 2nd molars and canines.

Despite the size of the cranial vault fragments, this individual appears to have been a sub-adult, which is supported by its dental development. The deciduous maxillary and mandibular left and right 2nd molars, deciduous maxillary left and right 1st molars and deciduous maxillary left and right canines are all present. However, the permanent maxillary and mandibular 1st molars and central and lateral incisors have erupted. The remainder of the permanent dentition was found elsewhere in the cist, with the exception of the mandibular left and right 3rd molars which were not apparent. This phase of development suggests an age of 9 years  $\pm$  24 months. Unfortunately, the deciduous mandibular left and right canines, which are not usually lost until 10 years  $\pm$  30 months (Ubelaker 1984, 47), were absent and could not be used as age indicators. On the available evidence, this individual is presumed to have been a sub-adult, aged between 6.5 and 12.5 years at death.

Neither sex nor stature of this individual could be determined because of its immature status and the lack

of complete post-cranial elements, respectively.

Because of the minimal survival of this individual, only one primary non-metric trait was observed on skeletal material, the foramina ovale was incompletely formed on the right side of the sphenoid. Two dental non-metric traits were observed: the mandibular permanent 1st and 2nd left and right molars exhibited a Y5 crown fissure pattern whereas the maxillary 1st and 2nd left and right molars bore a 4 crown fissure pattern.

No skeletal or dental pathological changes were seen on this individual.

#### *Cist B*

Although the skeletal remains of this individual are incomplete, fragmentary and very friable, preservation is reasonable and some quite large fragments persist. The cranium and mandible are both absent and the post-cranial skeleton is only partially represented. The diaphysis of the left humerus is present and the right scapula is represented by the coracoid process and a fragment of the lateral part of the scapular spine. The 1st to 4th lumbar vertebrae are intact and the right halves of the 1st and 2nd sacral vertebrae are also present; otherwise, the only vertebral elements to survive are an unidentified body fragment and parts of three neural arches.

Most of the right ilium remains, missing only the superio-lateral border whereas the left ilium is represented only by two small fragments. Of the right ischium, only the region bearing the ischial tuberosity and the ischial third of the acetabulum survive; the left ischium is represented only by the ischial tuberosity. The proximal metaphysis and proximal half of the diaphysis are present for both the left and right femora and the right femoral head epiphysis is also noted. The diaphyses of both the left and right tibiae are present.

There are several unidentified pieces, including eight unisided and unsequenced rib fragments, two unisided metaphyseal tibial fragments, some post-cranial fragments and other small flecks of human bone.

While the skeletal remains are few, the dentition is strongly represented and well preserved. An almost entire set of permanent dentition survives, only the mandibular left and right lateral incisors and the maxillary right 2nd molar being absent. Interestingly, the maxillary left and right lateral incisors appear to be intermediate between incisors and canines.

There are several indicators of age at death. The degree of dental attrition, based on the presence of a well preserved dental arcade, suggests an age at death of 12–18 years. On the evidence of the size of the surviving post-cranial fragments and the stage of dental development, this individual was a sub-adult. The permanent left and right maxillary and mandibular incisors, canines, premolars and 1st molars have all erupted. Furthermore, the left and right maxillary and mandibular 2nd molars erupted shortly before death but are not in full occlusion and also lack their root apices. This phase of development suggest an age of 12  $\pm$  3 years. However, on the evidence that the mandibular and maxillary left

and right molars were just beginning to erupt, the individual was  $15 \pm 3$  years at death.

The triradiate suture of the right acetabulum has begun to fuse, between the ischium and ilium, which occurs between 11 and 17 years. However, neither the iliac crest, the femoral head, the greater trochanter, nor the lesser trochanter show any sign of fusion, processes which usually occur within the age ranges, 12–17, 12–19, 14–18 and 14–20, respectively. Furthermore, the proximal epiphyses of the tibiae, which are still separate, normally fuse at 13–19 years, indicating that this individual was below that range. The overall impression is that this individual was towards the lower end of these various age ranges, probably 12–15 years.

The immature status of this individual does not allow this individual to be sexed, while the complete lack of complete post-cranial elements makes it impossible to estimate its stature.

Unfortunately, the absence of the cranium, cervical vertebrae and the distal humeri do not allow for an assessment of non-metric traits on skeletal elements. However, several non-metric dental traits have been observed. Both the left and right maxillary 1st molars bear a carabellis cusp, a supernumerary cusp located on the lingual surface of the mesiolingual cusp (Buikstra and Ubelaker 1994). The crown fissure patterns can also be seen. The left and right mandibular 1st molars both bear a +5 pattern whereas the left and right mandibular 2nd molars demonstrate a Y5 morphology. The maxillary left and right 1st and 2nd molars bear a 4 crown fissure patterning.

No skeletal or dental pathological alterations were noted in this individual.

#### *Cist D*

This individual is extremely badly represented and only two skeletal and two dental elements survive. The only reasonably well preserved element is the left 3rd metacarpal which is missing its distal epiphysis. An unsided and unsequenced intermediate phalange is also present although it is poorly preserved and friable. The only remnants of teeth to survive are the crowns of the permanent maxillary left 3rd premolar and the permanent right canine, which again are not well preserved and some enamel has been lost from both.

Estimation of age at death is extremely difficult because of the paucity of remains and only a very limited judgement can be made. However, the proximal epiphysis of the left 3rd metacarpal has fused to the metaphysis, suggesting that the individual was over 15–16 years at death.

Neither sex nor stature can be estimated from the surviving remains and no non-metric traits or pathological alterations are evident on them.

#### *Cist H*

The remains of this individual are very fragmentary, very friable and poorly preserved throughout. Only a

few dense cranial fragments survive. However, the squamous region of the occipital is near complete and a tiny fragment of the right parietal is also present, still fused at the lamboid suture to the occipital at a point near lambda. The right temporal is represented by the mastoid process, the external auditory meatus, the petrous pyramid and the tympanic plate. The most medial tip of the petrous pyramid of the left temporal is also present, as are several unidentified cranial fragments. One tooth, a well preserved, permanent right mandibular 3rd molar, also survives.

The paucity of skeletal remains has restricted the potential for estimating the age at death. However, on the evidence of the mandibular right 3rd molar having erupted, this individual was over 21 years at death. Furthermore, this tooth displays a high degree of dental attrition, suggesting that its owner was of advanced age.

Although skeletal remains were few, the left mastoid process, nuchal crest and suprametateal crest all approach typically male morphology, suggesting that the individual was male. However, the lack of post-cranial elements does not allow for an estimation of stature. Only one primary non-metric trait was noted, the right mastoid foramen, which carries a strand of the occipital artery, is located outside the occipito-mastoid suture.

No skeletal pathology is evident although the permanent mandibular 3rd molar bears a smooth-edged perforation through the distal root, the probable result of a root abscess. There is a similar defect on the much-worn occlusal surface of the tooth, placed over the mesial root, probably a small caries which may have affected the neighbouring abscess.

#### *Cist J*

The inhumation from Cist J is poorly preserved and bore evidence of considerable root damage, the skeletal remains being incomplete, fragmentary and very friable. However, much of the upper cranial vault survives and comprises the frontal, parietals, superior squamous portion of the occipital, the greater wings of the sphenoid and the squamous portion of the left temporal. In addition, the petrous pyramid of the right temporal is present, as is the right nasal, the superior tip of the left zygomatic, a small piece of alveolar bone from the left side of the mandible, fragments of the ethmoid and an unsided fragment of maxillary alveolar process bone. There are also a few loose roots and fragmented crowns although none can be identified or assigned to specific teeth.

Several post-cranial elements remain, including a right trapezium, the right side of the neural arch of the 12th thoracic vertebra, the right ala of the 1st sacral vertebra and five unsided and unsequenced rib fragments. The right femur is represented only by the medial side of the diaphysis whereas the left femur is more complete and comprises the diaphysis, most of the distal metaphysis and the lateral condyle. Diaphyseal portions of both tibiae are also present, as is the

incomplete left patella. A portion of the acromion process also survives, as does an unisided pubis fragment.

In addition, there is a quantity of unidentified skeletal fragments of varying sizes, which totalled 76.6g in weight.

Estimation of age at death is limited by the lack of key diagnostic features. Indeed, only the degree of cranial suture closure can be properly assessed, using the technique developed by Meindl and Lovejoy (1985). Post-mortem breakage means that the lateral-anterior sites are obscured although the vault sites are present and give a result of phase S4, which correlates to an age at death of 32–62 years. A high degree of wear on the few loose roots and fragmentary crowns of the teeth also suggest an individual of advancing age although a high degree of dental attrition could be the result of diet as much as of age.

The lack of pelvic elements means that sex assessment is based on examination of the skull. Of the six morphological traits present, the suborbital ridges, glabella profile, orbital shape and temporal ridges are all stereotypically male in form. Of the remaining two traits, the zygomatic bone is thought to be probably male in morphology whereas the degree of frontal and parietal bossing is considered probably female in form. The overall impression is that this individual was male. It is not possible to estimate stature because of the lack of complete post-cranial elements.

Despite the absence of many key regions, several primary non-metric traits are evident. These include bilateral supraorbital notches, which are small arches present within the supraorbital margins of the frontal bone and would have carried the supraorbital vessels and nerves. On the frontal is a partial metopic suture, part of the sutura interfrontalis which is usually lost by the age of eight (Buikstra and Ubelaker 1994). Another specific feature is an inca bone, which is an area of the superior occipital squama separated from the remainder of the squamous portion by a suture because of the failed fusion of the primary ossification centres in this region. Also present are bilateral parietal foramen, perforations located adjacent to the sagittal suture at obelion.

There are no dental non-metric traits.

No skeletal or dental pathological alterations are visible.

#### *Cist L*

No human remains were found in Cist L in 2002 although the account of the original excavation of the grave (Christie 1949) refers to the retrieval of a few fragmentary skeletal and dental elements in 1944. They comprised: the lower end of an adult right tibia with a well-marked squatting facet on its anterior margin; the base of the metatarsal of the second left toe; fragments of a calcaneum; and one deciduous lower right second molar.

The tooth appears to have been just erupting, indicating that the individual was probably a sub-adult,

perhaps about 12 years at death. No attempt was made to sex the individual or estimate its stature.

#### *Conclusion*

The human remains recovered from the cists at Holly Road were fragmentary, incomplete, typically friable and generally poorly preserved. This situation severely curtailed the potential for further osteological analysis. Assessment of sex was possible only for the inhumations in Cists H and J; even in those cases, determination was largely tentative.

Estimation of age at death was slightly more successful. Firmed determinations were gained for the sub-adults in Cists A and B; on the evidence of the osteological analysis on the human remains retrieved in 1944, Cist L also contained a sub-adult. Large potential age-ranges were observed in the remaining burials.

Stature could not be estimated for any of the individuals because of the complete absence of intact long-bones. Examination of non-metric traits was somewhat more successful, skeletal traits being observed for the individuals in Cists A, J and H and dental traits being noted in those from Cists A and B. Only one pathological lesion was observed, in the dentition of the individual from Cist H. However, it is not possible to state that this was the only lesion present *in vivo* because post-mortem breakage and loss may have masked other pathological alterations.

#### **Cremated bone**

Kath McSweeney

Two cremation burials were found, one within Cist C, the other within a discrete pit cut into the enclosure ditch. The general methods used for ageing and sexing the bones are those outlined in Bass (1987, 13–21), Breathnach (1958, 3–7), Brothwell (1981) and White and Folkens (2000, 337–69). The identification and assessment of age of the dental remains is based on van Beek (1983).

#### *Uncisted cremation*

This assemblage was retrieved from a pit which had been cut through the W side of the enclosure ditch (see above). The bones have been subjected to a marked degree of cracking, twisting and lateral splintering. In addition, many cranial fragments have cracked and warped causing the inner and outer tables to separate. Ubelaker (1984, 35) suggests that lateral splintering and warping can indicate that the body was burnt soon after death while Mays (1998, 207) states that fragmentation and distortion are the probable result of rapid water loss during cremation. The bones are mostly light yellow-grey in colour, indicating that a temperature consistently over 645° was reached during the process (ibid, 217).

A total of 705g of bone was extracted. Only 49% of the bone could be identified to specific or even general

anatomical areas. The condition of the remains is not good with few large fragments surviving. There are a few fragments about 40–60mm long, mostly from the tibia and femur, although most are considerably smaller. Modern cremations tend to produce much larger fragments (McKinley 1993, 284), as have many prehistoric excavation sites, suggesting either that disintegration was more significant than usual at Holly Road or that the bones had been deliberately crushed.

A few complete bones are present, all of them hand and foot phalanxes; some adjoining pieces have also been noted. The bones display considerable splintering, distortion and splitting because of burning. There is no evidence for more than one individual: no duplication of bones and no differences in robustness, colour or size. There are two pairs of matching bones, the right and left parts of the mandible and the right and left petrous parts of the temporal. Bones from most skeletal areas have been recognized although nothing survives from the spine and only one fragment from the pelvis, elements containing soft cancellous material which tend to disintegrate at high temperatures.

Epiphyseal fusion on a terminal phalanx of the hand indicates that the age at death was at least 15 years. Complete closure of the apices of the roots of some teeth point to an age in excess of 13 years. Several fragments of cranium have surviving sutural edges, the sutures being still open, suggesting that the individual was at most in early adulthood (Buikstra and Ubelaker 1994, 32).

Neither sexually diagnostic features nor pathological lesions have been noted.

#### Cist C

The cremated bone from Cist C, residual material within the grave's infill of ploughsoil, comprises only

26g of identifiable bone and 12g of unidentified fragments, all of which are small and in poor condition. Of the 24 identifiable fragments, most are parts of the shafts of six long bones, the remainder being mostly from the head region. The remains were scattered throughout the fill of the cist and may have been incorporated accidentally. As in the other cremation, the bones display a fairly uniform yellow-grey coloration, suggesting cremation temperatures of over 645°.

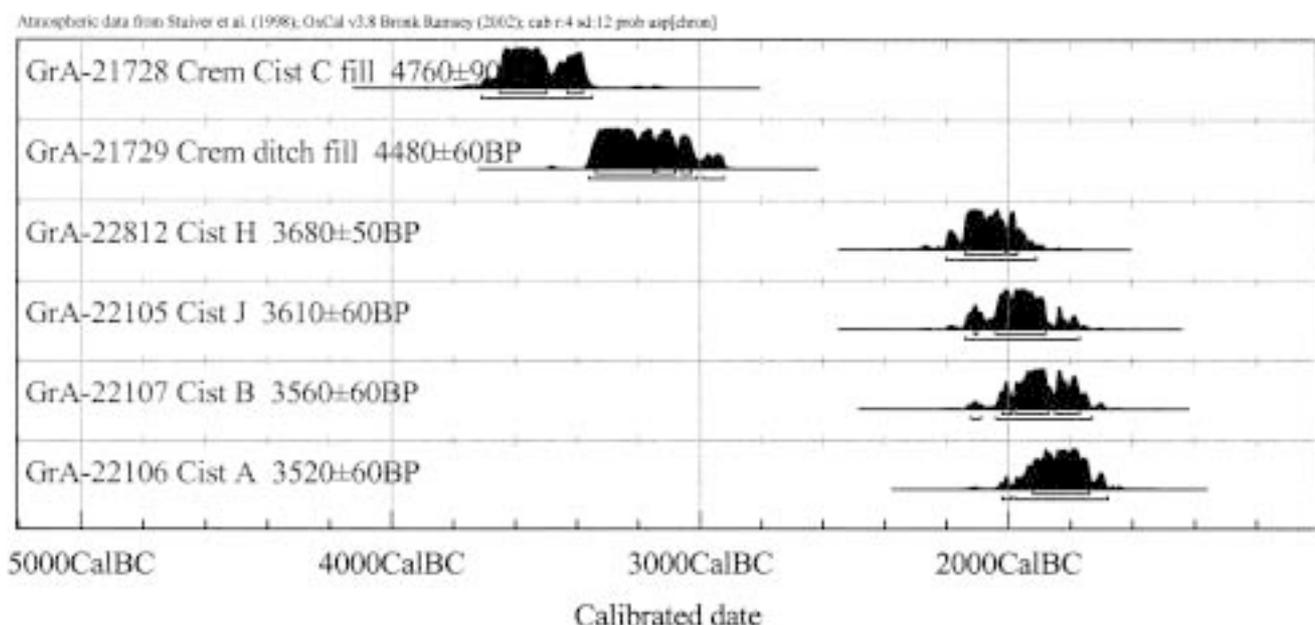
There is nothing to suggest more than one individual who, on the evidence of the fusion of a head of a radius, was at least 14 years and probably more at death. There are no indications of sex and no evidence of disease.

#### Radiocarbon dates (Illus 19)

Jan Lanting

Seven samples were submitted for AMS radiocarbon dating at the University of Groningen: one from each of the two deposits of cremated bone; one sample of unburnt bone from each of the cists A, B, H and J; and one sample of tooth enamel from Cist B, to test for comparability with the bone sample from the same body. The sample from Cist H was dated twice, as the first result proved to be anomalous (GrA-22108, 4490±60 BP).

The unburnt bone samples received the standard Longin pre-treatment in which the bone mineral is dissolved in hydrochloric acid and subsequently the crude bone collagen is converted into soluble gelatin, leaving insoluble contaminant behind. Collagen yields were satisfactory in each case (at 7.2%, 8.3%, 2.9% and 8.9% for the samples from Cists A, B, H and J respectively). For details of the method used for dating the cremated bone, see Lanting et al 2001.



Illus 19 Radiocarbon determinations.

**Table 2** Radiocarbon dates.

lab code	sample material	years BP <sup>15</sup> N(0)	<sup>13</sup> C(0) 1σ	calibrated dates 2σ
GrA-21729	cremated bone from ditch	4480±60	n/a	3340–3150(49.1%)
				3140–3080(13.5%)
				3060–3030(5.6%)
GrA-21728	cremated bone Cist C fill	4760±90	n/a	3650–3500(52.4%)
				3430–3380(15.8%)
GrA-22106	unburnt bone Cist A	3520±60	-21.46 10.15	1920–1740(68.2%)
				1980–1680(93.0%)
GrA-22107	unburnt bone Cist B	3560±60	-20.92 10.52	2020–1990(3.5%)
				2120–2090(1.5%)
				1980–1870(43.8%) 2040–1730(93.9%) 1850–1770(20.9%)
GrA-21688	tooth enamel Cist B	3320±50	n/a	1680–1670(5.3%)
				1740–1490(95.4%)
				1660–1650(3.4%) 1640–1520(59.6%)
GrA-22812	unburnt bone Cist H	3680±50	-21.79 11.44	2140–2010(59.3%)
				2200–1910(95.4%) 2000–1970(8.9%)
GrA-22105	unburnt bone Cist J	3610±60	-20.85	2110–2100(2.3%)
				2140–1770(95.4%)

The results, listed in Table 2 and shown graphically in Illus 19, were calibrated using OxCal v.3.8 (Bronk Ramsey 2002), using atmospheric data from Stuiver et al 1998. The result for the tooth enamel from Cist B indicates a significantly younger individual than that suggested by the collagen in the bone from the same body and confirms suspicions (shared with colleagues in other radiocarbon dating laboratories) that tooth enamel is not always a reliable dating material (dentine, however, is less likely to be prone to collagen loss.) The result GrA-21688 is therefore excluded from consideration. There are no grounds for doubting the reliability of any of the other dates listed in Table 2.

The values for <sup>13</sup>C and <sup>15</sup>N suggest that the diets of the deceased individuals consisted largely of terrestrial C-3 plants and of meat from herbivores living on C-3 plants.

## Geophysical survey

John Gater

Three areas of the site were chosen for geophysical survey to coincide with the Time Team's presence at Leven. A magnetic susceptibility survey was undertaken in Area A, the excavation trench which measured 20m by 16m, while gradiometer surveys were carried out in two other areas, B and C. Area B was located to the S of the trench and measured 20m square; Area C lay to the E of the trench and measured 64–8m N/S by 60m wide.

### Area A

The magnetic susceptibility survey was carried out using a Bartington field coil and a sample interval of 0.5m. Three main groups of readings were discerned from the

resulting data, ranging from a low of 150 to a high of 2,499 SI units. The very high readings are attributed to the igneous geology of some of the stones present on the site. Relatively high readings adjacent to some of the cists could be the result of burning associated with burial rituals although there was no visible evidence of burning in those areas.

### Area B

The results from Area B were almost impossible to interpret because of a magnetic disturbance, probably caused by modern debris within the topsoil, which covered much of the area. An anomaly towards the N of this area might also have been of recent origin.

### Area C

Large parts of Area C were dominated by magnetic disturbance, again almost certainly the result of recently deposited debris. In addition, a strong ferrous response on the W side of the area was probably caused by the fence which formed its boundary.

A large number of pit-type anomalies and trends were identified in Area C, at least some of which may be of archaeological origin although it was not possible to investigate these potential features in more detail and such interpretation remains speculative.

## General discussion

### Radiocarbon dates

There are a number of irregular peaks within the probability distributions for the radiocarbon calibrations.

However, the uncalibrated dates for the inhumations in Cists A, B, J and H lie within a range of 160 years at the 1 sigma level of confidence (68% probability). When converted into calendar years they all fall within a range spanning the early part of the second millennium BC. The earliest date was obtained from Cist H, which was outside the enclosure, although at the 2 sigma level of confidence (95% probability) this small variation is probably of little consequence. However, the much earlier dates obtained from the two cremation deposits are clearly significant. At a 2 sigma level of confidence they appear to be at least 1,000 years earlier than the inhumations, suggesting a Neolithic presence on the site (see below).

### Interpretation and burial rites

The remnants of the sub-circular enclosure ditch appear to define the principal and special area of burial, albeit with smaller cists of an inferior quality of construction present outside the enclosure. Complete excavation of the surviving remnants of the ditch demonstrated that it had probably been excavated in segments which were then joined. This was particularly evident adjacent to Cist A, where the ditch narrowed and the depth decreased markedly, suggesting a junction between two lengths of ditch. What resembled an entrance causeway at the W side of the enclosure appeared simply to be the result of truncation of the ditch at one of these joining points. This segmentation method of construction was evident in the ditch surrounding a cemetery at Balneaves, Angus (Russell-White et al 1992, 289–90) and also appears to have been the case at an enclosed cemetery at Kinneil Mill near Linlithgow, West Lothian (Marriot 1968, 88).

The entrance, on the E side of the enclosure at Holly Road was defined on its N side by a flaring out of the ditch terminal, with a marked inward curve (Illus 3) whereas its S side was simply defined by a pit. Both terminals appear to have been created by the excavation of shallow pits to which the ditch was attached although the line of the ditch immediately beyond the southern terminal had been truncated by ploughing. Barclay (1983, 181), quoting Startin (pers comm), suggests that the segmentation method of digging a ditch and the excavation of entrance pits can be viewed as two different construction techniques for building and laying out an enclosure plan. This may be reflected in the organization of labour for the building of the monument, where some enclosures are constructed by separate squads excavating the conjoining segments and at other sites a single squad has been used to dig the entrance pits and the rest of the ditch. However, at Holly Road both methods appear to have been used on a single monument, whereby the position of the entrance has been marked by pits and then joined by separate squads digging the surrounding ditch. A conclusion that could be drawn from these methods of construction is that the position and orientation of the entrance was important to the cemetery

builders, perhaps in terms of ceremonial access to the enclosure and the route of a processional way.

From the evidence of its fill, it appears that the enclosure ditch did not remain open long enough to accumulate a basal fill of silt. From this, the enclosure ditch may be seen as a means of demarcating a precise area of burial on the slightly raised ground, its construction perhaps forming part of a consecration ritual (see below). However, the deliberate infilling of the ditch was clearly not the final burial rite because Cist C cut the inner edge of the filled ditch. Indeed, due to the friable nature of the sandy subsoil and the close proximity of Cists A, B, C, D and J to its edge, it is inconceivable that any of these graves was inserted when the ditch was open.

These perimeter graves were fairly evenly spaced, some 3–4m between their centres and with their axes adjacent to and parallel with the somewhat irregular ditch. Clearly the line of the ditch was visible or marked in some way during their construction, which also suggests that very little time elapsed between the excavation of the enclosure and burial within these cists. This situation, combined with the lack of a primary silt or weathering horizon at the base of the ditch, implies that the enclosure had no other function than its single period of use as a burial site.

It is surely significant that all but one (Cist L) of the enclosed graves were positioned around the edge of the ditch, perhaps to leave a central area for ceremonial activity. In fact, a case can be made that, had another cist been placed close to the N entrance terminal, a complete ring of evenly spaced graves would have been set around the inner perimeter of the enclosure. Was this the intention of the cemetery builders? It may be tempting to speculate that the enclosed part of the cemetery was a family graveyard or an exclusive area for important burials, perhaps awaiting a final interment, close to the entrance.

All the graves within the enclosure comprised well-constructed cists, each built of four sandstone slabs set in pits and, where human remains survived (in Cists A, B, D, J and L), containing a single inhumation. Cist L was the only grave not positioned on the edge of the ditch, being just off-centre in the S part of the enclosure. It was the only cist to have clay luting and, given its position near the centre of the enclosure, it may represent a primary burial. However, because the ditch was filled in almost immediately after it was dug and the ring of graves respected its position with no intercutting of burials, an argument can be made for a primary, short-lived use of the enclosure, with Cist L perhaps being the final interment.

Given their regular spacing and adherence to the irregular shape of the enclosure, the perimeter burials could even have been interred in a single ceremony (see below). It is also worth noting that Cist J, which formed part of the perimeter ring group, is the largest grave with a natural sand and gravel floor and natural patterning on the orthostats. Its position was also marked with a large boulder on top. Could this have

been the first burial of a higher status individual or a senior member of the family or group? Remnants of the corpse in Cist J suggest a male aged 32–62, which would not preclude this interpretation. Petersen (1972, 39) has suggested that some groups of graves with multiple interments, which are eventually covered by a barrow, represent family vaults. It is possible that the evidence from Holly Road takes this idea a little further and, in this case, we might suggest that the enclosure contained members of a family who died in a common calamity and were buried as a single group. There is certainly a good argument to be made for the contemporaneous construction of the perimeter ring of graves, partly supported by the pottery evidence and to some extent the radiocarbon dating (see below). None of the graves exhibited evidence of being opened at a later date for the insertion of additional burials. Therefore, it could be concluded that, once all the burials within the enclosure were in place, the enclosure was effectively sealed off from later interments and probably acted merely as the focus for further funerary activity.

Nonetheless, it is important to realise that the construction of the enclosed part of the cemetery was a time-consuming process and corpses would have had to be stored elsewhere while work proceeded. Another possibility, which belongs to the realms of speculation rather than interpretation, is that the enclosed monument was constructed to await the death of its future occupants. Estimates of time and manpower for the building of cists have been gained from experimental archaeology (MacAdam and Watkins 1974; Watkins 1982, 114–8), where a team of eight people took two to three days to construct a grave, including transporting the stone. However, such estimates should be viewed with some caution, the proximity of materials and dexterity and fitness of the builders playing a crucial part in the timing. Certainly, if the enclosed part of the cemetery was of short-lived use and constructed as a single event, then a large pool of labour would be required from the wider community. It should also be borne in mind that bodies would begin decomposing within three days.

As well as the inhumation remains recovered from five of the enclosed cists, funerary artefacts were retrieved from Cists A, B, C and L. Complete food vessels were present in Cists A, B and C, with the distinct possibility that pots from Cists A and B could be the work of the same potter. In addition, the vessel from Cist B had a crude, incised finish to the fine herringbone design towards its base, suggesting that the potter was in a hurry to finish the decorative work. This might imply urgency in preparing the burials as a contemporary group. The other lithic artefacts are unremarkable as Early Bronze Age finds in a funerary context although the flint knife from Cist A and the fusiform jet bead from Cist L (which presumably formed part of a larger ornament) can be classified as exotic artefacts.

When compared at the 2 sigma level of confidence, the radiocarbon dates from the human remains in Cists A, B and J do not conflict with the view that these three

graves could have been contemporary. If a date range can be concluded from this evidence, then it is the large Cist J that was the earliest interment (by no more than a couple of generations) and the dates from Cists A and B are so close as to be considered contemporary. However, such comparison of similar radiocarbon dates is stretching the credibility of the error factor to its extreme limits.

Nevertheless, given the evidence from the pottery and radiocarbon dating, there seems a strong possibility that Cists A and B were contemporary. A link can also be made between Cists B and C (located either side of cist A). Cist B was constructed of red sandstone slabs at its ends and yellow sandstone slabs on its sides whereas the sequence of coloration was reversed for Cist C. These arrangements are too similar to be accidental and show a deliberate selection and arrangement of the stones in the two cists, strongly supporting the notion that their occupants were interred at the same time. When taken as a whole, the pottery, radiocarbon dates and structural evidence for the enclosed ring of graves is very conclusive. It strongly supports the notion that these graves were probably inserted in close succession, if not contemporaneously, following the construction and infilling of the enclosure ditch.

The single cremation deposit in the enclosure ditch is a curiosity although evidence for others was sought and checked by systematically removing spits of subsoil from the interior of the enclosure. It remains an isolated find with no stratigraphic relationship with any of the cemetery features, its presence being revealed only during the excavation of a sondage which destroyed any relationships with adjacent deposits. All that can be said is that the cremation pit was deeper than the ditch and, on the evidence of the pit's location in the centre of the ditch, the latter would have been visible at that time. The radiocarbon assay places the death of this individual firmly in the Neolithic period, 1,000 years or more before the inhumation burials. This is intriguing and offers a number of interpretations for the history of the site. The idea that the cremation is a primary Neolithic feature seems doubtful. That would imply that this single burial was marked and its precise location recorded and preserved for at least 1,000 years, until the Bronze Age cemetery builders could identify its exact position and place the ditch exactly over it. A rather more convincing interpretation is offered here, whereby the cremation was removed from elsewhere, perhaps from a well established Neolithic cemetery, and brought to the site and then inserted in the ditch as some kind of consecration ritual and link with the past, thus embellishing the Holly Road cemetery. This interpretation may account for the fine crushed and incomplete nature of the bones as a result of transportation and re-burial or, of course, other mortuary practices at the time of death. However, either interpretation shows a clear link with much earlier burial rites. At an open cemetery at West Water Reservoir near West Linton, Scottish Borders a pit containing fragments from three Beaker vessels was interpreted as a primary feature,

perhaps containing pottery brought from an earlier funerary site and re-interred at the cist site as a foundation deposit (Hunter 2000, 169). Beaker sherds and early Neolithic pottery associated with a radiocarbon date of 3361–3098 cal BC (GU-3216) at 1 sigma confidence, were also retrieved from pits beneath a Bronze Age funerary cairn at Stoneyburn Farm by Crawford in South Lanarkshire (Banks 1995, 294).

A further variation to the above explanation is that the general area had been the site of Neolithic burials, one of which was disturbed, possibly by the creation of the cemetery, and inserted into the ditch. The intrusive fragments of cremated bone found in the fill of Cist C, which yielded a radiocarbon date of 3650–3380 cal BC may attest to further Neolithic burials in the area although no other such burials were found within the area of excavation.

The cists outside the enclosure (E, F, G, H and K) were all smaller than those inside it and their construction was of inferior quality. In fact, Cist G might better be described as a circular setting of orthostats and Cists F and K categorised as box-cists. Similar sized box-cists were found only 8km NNW of Holly Road at Pitlessie (Gordon 1927), where they contained cremation deposits, and at the Early Bronze Age cemetery of Kirkton of Cults (MacGregor 1998). A very neat box-cist built of four slabs and containing a cremation deposit was also excavated at the Barns Farm cemetery near Dalgety, Fife (Watkins 1982). It has been suggested that these small stone boxes served as temporary storage for cremations until the appropriate time for burial (MacGregor 1998, 78). However, at Holly Road, Cist K contained a food vessel, albeit in a disturbed position, and thus appears to have been a final resting place for its incumbent.

Stone settings have been recorded around cinerary urns and food vessels from such sites as Seamill, Ayrshire (Callender 1927, 249), Lyne, Peeblesshire (Stevenson 1949) and closer to Holly Road at Aberdour Road, Dunfermline, Fife (Close-Brooks et al 1974). It is possible that Cist G was designed for this form of burial rite although no remains of any kind were recovered from this disturbed feature.

Cist E was very poorly preserved and had suffered considerable plough damage and, like Cist F, contained no burial remains or artefacts. Cist H, however, was better preserved and even had its capstone *in situ*. It contained skeletal remains of an adult male, which yielded a radiocarbon date of 2141–1970 cal BC. This was the only grave known to have been filled at the time of interment and a stone amulet was recovered from its fill. The radiocarbon date is the earliest from the inhumations and may indicate that the area was receiving burials prior to the construction of the enclosed part of the cemetery. The archaeological record suggests that filled cists were most commonly associated with cremation burials and multiple interments, seemingly as a final act of closing a grave (see Hunter 2000, 170–1). However, at Holly Road the undisturbed Cist H contained remains of a single inhumation and may

merely demonstrate that a slightly different form of mortuary rite was sometimes practiced. Whether there was a distinct reason why this cist was filled at the time of burial, that is, a specific form of mortality or something about the life of this individual, remains purely speculative.

None of the graves outside the enclosure made use of stone slabs as large as those within it and the manpower needed for their construction would have been small. In fact, each cist could have been the work of a single person, in very marked contrast to the number of people required to transport the orthostats from the Letham Glen and construct the graves in the enclosed part of the cemetery.

The fragments of food vessels retrieved from the ploughsoil during AOC's investigation might have derived from plundering of some of the cists. Indeed, sherds of one of the vessels (SF2) were gathered from the vicinity of Cist L, believed to be the grave discovered in 1944.

Some environmental analysis of soil samples was undertaken during the Time Team's excavation. However, no significant environmental data was recovered. Soil profiles for pollen data were taken from the cist fills although tests suggested that no ancient pollen had survived and further analysis was deemed inappropriate in the circumstances.

### The site in its wider context

There are numerous examples of burial sites positioned on raised ground from throughout prehistory and later periods. The Holly Road cemetery was one of these, being placed on a slightly raised knoll in an otherwise gentle sloping terrain. Excavation demonstrated that the knoll was entirely natural in origin and appeared not to have been accentuated by the cemetery builders. If there had once been a covering mound over any part of the cemetery, no evidence survived into the 21st century. On this evidence, the Holly Road site can be classified as an enclosed Bronze Age cemetery with no covering mound or cairn. Had the enclosure ditch been completely, rather than partially, eroded away, the site might have been interpreted as an open or flat cemetery. Indeed, the surrounding ditch only came to light after meticulous cleaning of the ground surface after the Time Team had left the site.

There has been some discussion of this kind of potential confusion in the classification of Bronze Age cemeteries (see Stevenson 1992) and the results from Holly Road serve to reinforce the case for careful, large-scale excavation around funerary remains to verify the existence or otherwise of some form of enclosure and/or mound. At present, the enclosed form of Bronze Age burial ground seems to be the smallest group when compared with flat cemeteries and those covered by a cairn or earth mound.

Within our present knowledge of Bronze Age culture there appears to be no evidence to support the notion that burial sites were deliberately hidden away in the

landscape. Indeed, quite the contrary appears to be the norm, with not only hill top locations being commonly exploited but also any slight prominent area within the general landscape, as with the Holly Road site. Furthermore, the position of this burial ground appears to have been marked by the large projecting boulder which sat over the capstone of Cist J. Other cists may have been similarly defined: although none remained *in situ*, several similar, but slightly smaller, hemispherical boulders lay to the immediate E of the enclosure where they had probably been deposited during ploughing. If this is the case, then the cemetery builders were deliberately selecting gravestones of durable volcanic rock. The size and weight of these stones might have been intended to seal off the graves from later funerary insertions or disturbance, the one over Cist J requiring a machine to lift it. The discovery of Bronze Age grave markers is becoming increasingly common with recent excavators looking specifically for evidence of them. This has yielded positive results at such open cemetery sites as West Water Reservoir, Scottish Borders (Hunter 2000), Kirkton of Cults, Fife (MacGregor 1998) and the enclosed cremation cemetery of Balneaves, Angus (Russell-White et al 1992).

In addition to the marking of individual graves, the position of the Holly Road site appears to have been preserved in the local landscape, although not necessarily visible as a cemetery, prior to the discovery of Cist L in 1944. Old maps show the area of the site cordoned-off by fence lines and the post-medieval ditch exposed at the N end of the trench respects the northern circumference of the enclosure.

From the state of preservation of most of the cists, the majority had been disturbed at some time. Only Cists H and J retained their capstones and all but Cist H, which was filled with soil at the time of interment, had been contaminated by invasive ploughsoil. Cists C, E, F, G and K contained no trace of human remains (other than residual fragments of calcined bone in Cist C) and, because of the local soil conditions, scant evidence survived in the other graves. For this reason, analytical studies of sex, age, physique and pathological traits for the occupants of the cemetery as a whole have little meaning. However, within the enclosure both Cists A and B contained the remains of young persons and the large Cist J, a senior male. Whether these individuals belonged to a family group and the question of timing of their death has been discussed above. All that needs reiterating here is the overwhelming evidence for the short-lived nature of the enclosure, certainly in respect of the inner ring of graves. How long the site in its entirety remained a place of burial is unclear because five of the graves remain undated while others may lie beyond the area of excavation.

The only direct parallel for the Holly Road site as an enclosed cist cemetery is the partially excavated Bronze Age cemetery at Loanleven, Perthshire (Lowe 1992). This site, which sat on a gravel terrace 5km NW of Perth, comprised the S half of an enclosure measuring approximately 20m in diameter, the remainder of it

having been destroyed by quarrying. Nonetheless, its excavation revealed four cists containing single burials, two with inhumation remains and two with cremation deposits, all inside a circular ditch. However, unlike the Holly Road cemetery, the ditch appeared to have remained open long enough to accumulate a primary fill of washed-in sand. A second fill of silty clay had been deliberately placed over it. The four cists appear to have been positioned randomly about an area close to the perimeter of the ditch. One of the cists cut the edge of the second fill of the enclosure ditch, in a manner similar to that of Cist C at Holly Road.

A comparison of radiocarbon dates at Loanleven suggested that one of the cists probably predated the deliberate filling of its ditch. The four radiocarbon dates from the Holly Road cists place this site firmly in the Early Bronze Age, probably within the first two centuries of the second millennium BC which is broadly contemporary with the Loanleven cemetery. Cist burials lying within a short distance of Holly Road and which have been radiocarbon-dated to the Early Bronze Age include Balfarg Riding School, Markinch (Barclay and Russell-White 1993) and Aberdour Road, Dunfermline (Close-Brooks et al 1974). More distant open cemetery sites include Gairneybank, Perth and Kinross (Cowie and Ritchie 1991) and Almondbank, Perth and Kinross (Stewart and Barclay 1997).

Other enclosed Bronze Age cemeteries are known throughout Lowland Scotland and further afield. However, at the time of writing, no excavated examples, with the exception of Loanleven, appear to feature cist graves as the predominate form of burial. Furthermore, no parallel for the somewhat irregularly-shaped plan of the Holly Road enclosure is known to the authors. All of the excavated enclosed cemeteries feature near-circular ditches or stone surrounds. The builders of the Holly Road cemetery appear to have been more concerned with defining the area of raised ground rather than laying out a neat, circular plan. However, the penannular shape of the enclosure can be compared with such sites as Balneaves (Russell-White et al 1992), Lesmurdie Road, Elgin, Moray (Suddaby 2002, 83) and the partly excavated enclosure around the beaker burial at Newmill, Perth and Kinross (Watkins and Shepherd 1980) although, again, these cemeteries feature non-cist forms of burial. In conclusion, the Holly Road site appears to represent yet another variation on the already complex pattern of Bronze Age cemeteries where almost exclusively cist interments were contained within an irregular, short-lived enclosure defined by a penannular ditch with further burials outwith its limits.

Further archaeological work within the area bordering this excavation site is possible in the near future, as the recent housing development expands. Such work may well increase our knowledge of this Bronze Age cemetery and perhaps of a settlement associated with it.

## Acknowledgements

The evaluation undertaken by AOC was funded by Boyack Homes and instigated by its commercial director, Lance Saunders. The main project was initiated by Fife Council who funded the main excavation and the entire post-excavation process.

The Time Team working on the site comprised: Neil Faulkener (excavation director), Stewart Ainsworth, Margaret Cox, Henry Chapman, Catherine Edwards, Kerry Ely, Phil Harding, Jim Mower, Francis Pryor, Alice Roberts, Clair Stephens, Davis Thorpe, David Whittaker and Emma Woods. The geophysical survey was undertaken by John Gater of GSB Propection. On-site environmental analyses were undertaken by Richard Tipping and Althea Davies. The television crew was led by Tim Taylor (series editor), Mel Morpeth (director) and Tony Robinson (presenter). Scotia Archaeology's excavation team comprised the authors, John Bendiks and Tom MacFadyen. Post-excavation analyses were undertaken by John Gater (geophysics); Tom McCulloch and Hannah Koon (inhumations); Kath McSweeney (cremated bone); Alan Saville (flint knife blade); and Alison Sheridan (other lithics and pottery). The artefacts were drawn by Marion O'Neil and the line drawings by Angie Townshead.

Alison Sheridan would like to thank Lyall Anderson for identifying the crinoid fossil, Laurianne Robert for XRF work on the fusiform jet bead and the ochre coating on the amulet and BelÈn Cobo del Arco for conservation work on the Food Vessels.

We would like to thank Peter Christie of Durie for his encouragement and for supplying information about his grandfather's discovery of the cist uncovered in 1944. Our gratitude is also extended to Rod McCullagh for reading a draft of this report and offering many useful suggestions and to Douglas Speirs, archaeological officer at Fife Council, for his support during both the excavation and post-excavation work. Finally we would like to extend our warm thanks to the people of Leven who showed great interest in the excavations and who treated the site with the greatest possible respect.

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### Abstract

Excavations were undertaken in advance of the development of an area to the N of Leven where a cist burial was discovered in 1944. The recent investigations revealed an enclosed cist cemetery, radiocarbon-dated to the first two centuries of the second millennium BC. The cemetery appears to have had a short period of use when it received inhumation burials inside the ditched enclosure. A number of cists of poorer construction were uncovered outside the enclosure and a Neolithic cremation deposit was retrieved from within the ditch.

### Keywords

cemetery  
cists  
cremation  
ditch  
Early Bronze Age  
enclosure  
Leven  
Neolithic  
Vase Food Vessels

*This paper is published with the aid of a grant from Fife Council.*