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# A first millennium AD cemetery, rectangular Bronze Age structure and late prehistoric settlement at Thornybank, Midlothian

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ABSTRACT

*Excavation of a cemetery of the first millennium AD revealed the remains of over 100 burials, amongst which were the most southerly examples of square-ditched graves so far excavated in Scotland. The burials were of mixed type and included numerous stone long cists, an unusual four-posted dug grave, two square-ditched graves, one of which may have had a wooden structure around or over it, dug graves with evidence of log coffins and pebble-lined or long-cist infant burials. An extensive suite of radiocarbon dates, the largest from a cemetery of this type, was obtained, the results of which suggested a* floruit *in the middle of the first millennium AD. The cemetery overlay late prehistoric boundary features associated with a ring-groove structure. Adjacent to the cemetery site, an enigmatic rectangular structure was excavated and radiocarbon-dated to the Late Bronze Age.*

In memory of Ken Browell

## INTRODUCTION

The site described here was first discovered in early Victorian times. The *New Statistical Account* of 1845 (vol 1, 277–8) for the parish of Newton in the county of Midlothian recorded that in November 1838 a cemetery of over 50 long cists, containing human bones, with the feet towards the east were discovered when labourers were quarrying sand (NGR NT 3478 6885). It was noted that, 'as the digging was not continued farther, there can be little doubt that many more remain'. In more recent times, further cists have come to light. A report in *Discovery and Excavation in Scotland 1971* records that in October 1970, during disturbance by the insertion of a new gas pipe, two long cists, a small collection of bones and several scattered slabs were found at the same location (NMRS record NT36NW5).

The site is located 125m to the south of Newfarm and 50m to the east of Salters Road (illus 1 & 2) on the summit of a gently undulating terrace which, on the east, slopes down to the Smeaton Burn. The eastern edge of a quarry active in 1838 and visible on the 1854 Ordnance Survey 1st edition 1:10,560 map was revealed at the western edge of the excavations described here. This quarry is still visible today as a large, saucer-shaped hollow, and as a dark mark on aerial photographs. Although within an area dominated by clays, evidenced by the presence of nearby Smeaton brick and tile works (Cressey 1995), the subsoil

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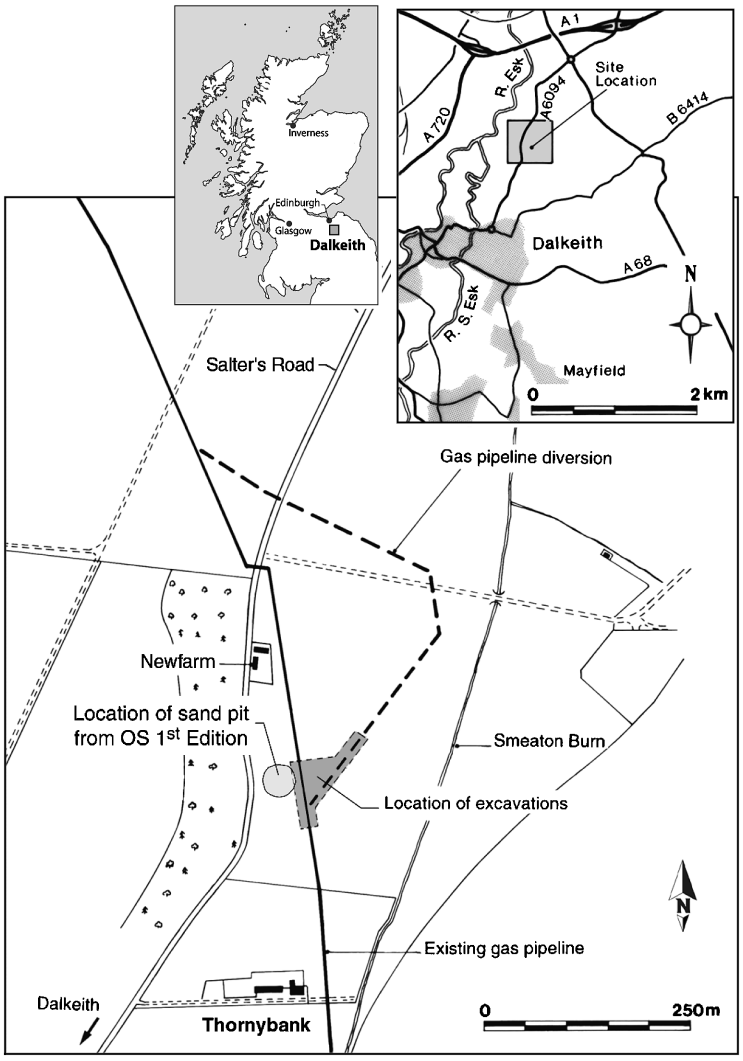
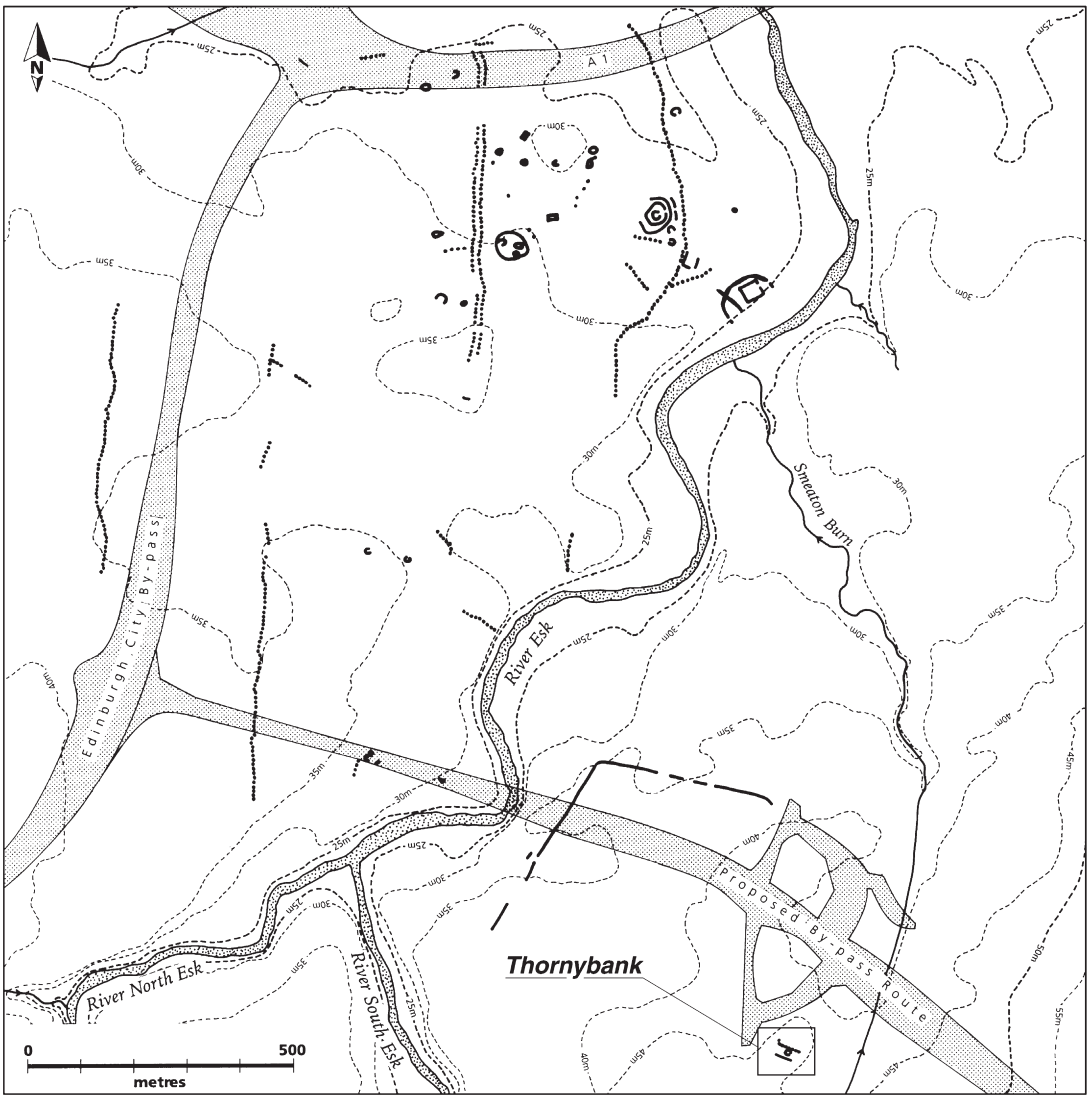



ILLUS 1 Site location map with location of sandpit as depicted on the Ordnance Survey First Edition map

at the site is a fine soft sand with occasional outcrops of dark, almost black, shale.

In October 1996, a watching brief was conducted during topsoiling for the diversion of a main gas pipe, consequent upon the planned construction of the A68 Dalkeith Northern Bypass. During this exercise, several long-cist burials were discovered. As their number increased, it became clear that a large part of the long-cist cemetery first revealed in 1838 had survived. Consequently Historic Scotland recommended that a full-scale excavation of the long-cist cemetery should take place prior to the gas main diversion.

The ensuing excavation showed that the long cists and unlined graves were cut into an extensive spread of earlier prehistoric features. As the excavation progressed, a pit alignment, with associated bank and parallel palisade, a ring-groove structure (illus 3 & 6) and a



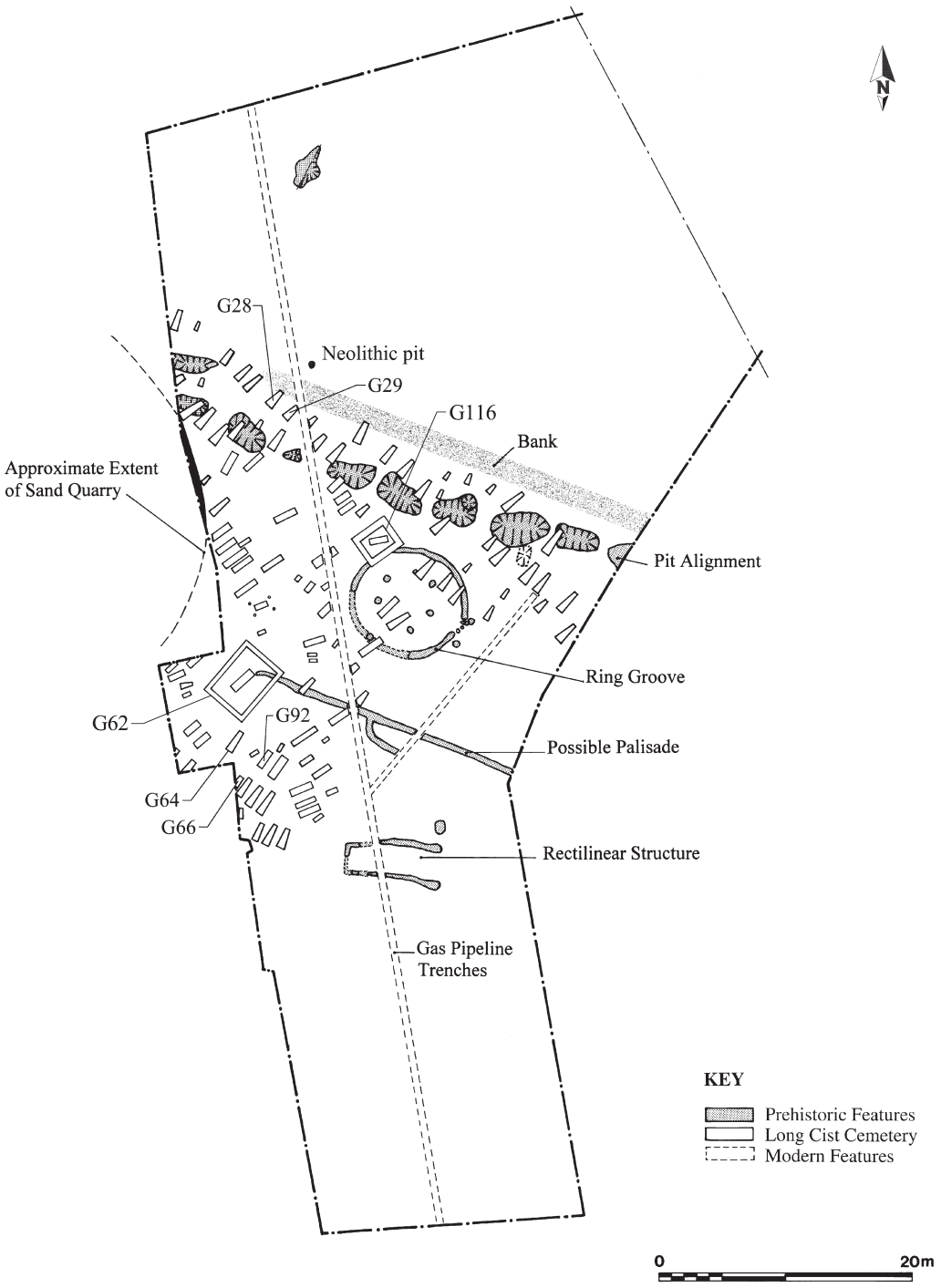

ILLUS 2 Cropmark pit alignment and enclosure complex to the north and west of Thornybank (*Based on the Ordnance Survey map © Crown copyright*)

Bronze Age rectilinear feature (illus 3, 4 & 5) were identified. Below, the prehistoric features are described first, followed by the cemetery. Throughout, the term 'dug grave' is used to describe a grave not lined with stone (a cist). In all cases specialist reports are shortened versions of full reports and catalogues which are lodged with the excavation archive.

## THE EXCAVATION

### BURIED SOIL

At first, excavation during a period of dry weather revealed what appeared to be a clean, natural sand subsoil underlying the modern topsoil. However, once this material was exposed and subsequently weathered, it was recognized that it was in fact a buried, yellowish brown sandy soil through which




ILLUS 3 Location of all features excavated at Thornybank

many of the graves had been cut. This soil horizon lay 0.3m below the upper surface of the far richer, organic, humic modern ploughsoil that had initially been removed from the excavation area; it was 0.2–0.3m thick. When this material was removed by hand, another suite of negative features was recognized, cut into the true natural sand subsoil that lay below.

Prior to the removal of the buried soil, a metal-detector survey was undertaken by Roger McWee in order to identify any iron nails, which might reveal patterns indicative of the former presence of timber structures, such as a chapel. However, the many nails recovered appeared to be randomly distributed. Additionally, coins dating from the 14th to the 19th centuries AD were discovered; identifications by Nick Holmes are listed in the archive.

The origin of the coins and nails is uncertain. If they had been imported with domestic refuse and spread on the fields, then it could be expected that pottery sherds of the same date would be found. However, very little ceramic material of any date was recovered from the buried soil; while surprising, this matches the writer's experience elsewhere within the bounds of Dalkeith Estate.

## PREHISTORIC FEATURES

### NEOLITHIC FEATURE AND STRAY POTTERY FINDS

A pit was discovered 3m to the north of graves 28 & 29, and 1m to the north of the bank associated with the pit alignment (illus 3 & 6). The pit measured 0.50m in diameter and was 0.10m deep. Three pot-sherds identified as unabraded late Neolithic Impressed ware were recovered from the dark brown silty, sandy fill. No contemporary features were located elsewhere on the site, but stray finds of Neolithic pottery were recovered from the subsoil surface in the vicinity of Graves 64, 66 & 92 (illus 3).

#### *Sherds from Neolithic pit*

Catherine McGill

The three sherds (Catalogue numbers 087/1–3: not illustrated) represent a minimum of two vessels and vary in colour from pale orange to red/orange on the exterior, with pale grey cores.

The fabric is robust with c 15% inclusions, of sand with a small amount of angular grit and micaceous stone. None of the sherds represents enough of a single vessel to allow its original dimensions to be calculated. Stab and drag impressions have been applied to the exterior surface of two sherds (087/1–2). No surface treatment other than impressed decoration is apparent. Two of the three sherds are unabraded and have clean, sharp breaks. This indicates that they are likely to have been deposited soon after breakage rather than being incorporated into the fill of the feature at a later date.

The two decorated sherds appear to belong to the group known as Later Neolithic Impressed Ware. No locally found pottery of this period is directly comparable in terms of form or decoration, but sherd 87/1 in particular is reminiscent of examples of the Impressed Ware sub-group known as Meldon Bridge ware. Both 87/1 and 2 are carinated and 87/1 displays the shallow concave neck, open mouth and heavy rim characteristic of this material (Gibson & Woods 1997, 208–9), although no internal rim decoration is apparent. This Borders sub-group is commonly dated to 2700–2100 BC (uncalibrated) (Gibson 1986) although Sheridan (1997, 221) and MacSween (1999, 79) have suggested that the possibility of dates as early as the mid to late fourth millennium BC should be left open.

#### *Subsoil surface pottery finds*

Ann MacSween

The stray find pottery assemblage from Thornybank comprises six sherds of pottery representing five vessels. As the context of the pottery does not indicate the age of the sherds, suggestion of a date is dependent on interpretation of the decoration and morphology of the sherds.

SF48 comprises two body sherds recovered from the subsoil surface with a slipped exterior into which light criss-cross incisions have been made. One sherd has an incomplete perforation on the exterior, the other has an interior 'ledge' beneath which are rows of impressed decoration, probably executed by impressing a small bird bone into the clay.

The fabric, finish and decoration of these sherds are suggestive of the Grooved Ware tradition. Random scoring associated with perforations which

did not extend fully through the vessel wall have been noted in other assemblages including those from Balfarg, Fife (Henshall 1993, 103, illus 31) and Beech Hill House, Perthshire (MacSween 1995, 216–7, illus 13). The impressed decoration on the interior of the Thornybank vessel, while not common in Scottish Grooved Ware assemblages, is not unknown.

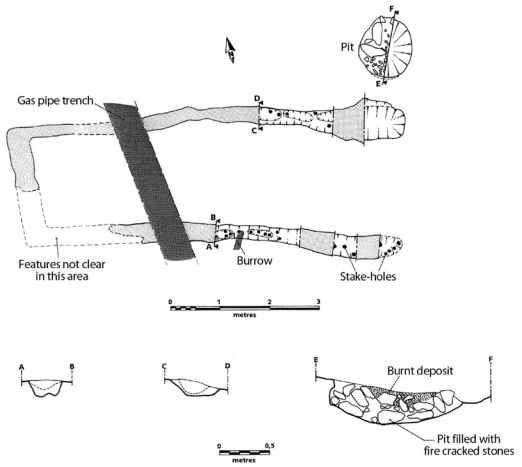
A vessel from Beckton, near Lockerbie, Dumfriesshire, for example, was decorated with a band of incised lines with bird bone impressions extending over much of the vessel exterior (Cormack 1964, illus 3). The placement of such decoration on the vessel interior is, however, an unusual feature.

The dating of Grooved Ware from Scotland has been discussed recently by Ashmore (1998). A date of c 3000 cal BC would be expected for a Grooved Ware assemblage from the south of Scotland.

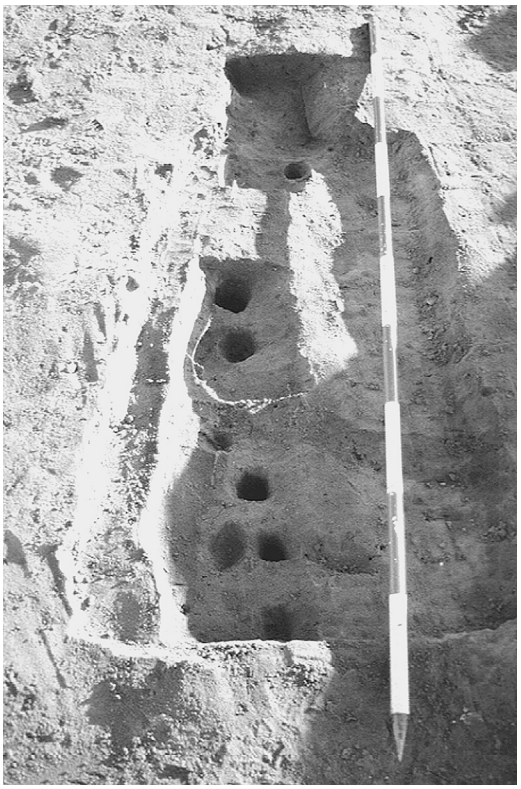
Apart from the Grooved Ware sherds, there is one other decorated sherd in the Thornybank stray find assemblage, SF5, a rim with an incised horizontal line just below the lip on the exterior and obliquely incised lines running down the vessel below that. Incised decoration is difficult to date, being used throughout prehistory. SF5 and the undecorated sherds in the assemblage are of a different fabric from the Grooved Ware and it is possible that they are of a later date: the two rim sherds would not be out of place in a Bronze Age 'flat-rimmed' assemblage (see Halliday 1988 for a discussion of the traits of this type of pottery).

## RECTILINEAR STRUCTURE AND PIT

At the southern end of the cemetery, an open-ended rectilinear structure defined by a shallow slot was discovered which was found to measure 7.6m in length by 3.2m wide at its eastern end and 2.2m at its western end (illus 3, 4 & 5). There appeared to be an entrance at the eastern end. A large pit, measuring 1.2m by 1.1m on plan, immediately to the north of the structure was filled with fire-cracked stones and sooty deposits. When initially cleaned, this pit was connected to the rectilinear feature by a shallow depression filled with a fill similar to that of the main rectilinear feature. However, due to freeze/thaw erosion of the deposit connecting the two features, this link was lost. A small undiagnostic, although probably Bronze Age, pottery sherd was recovered from the fill of the slot which defined the rectilinear structure (MacSween, pers comm).

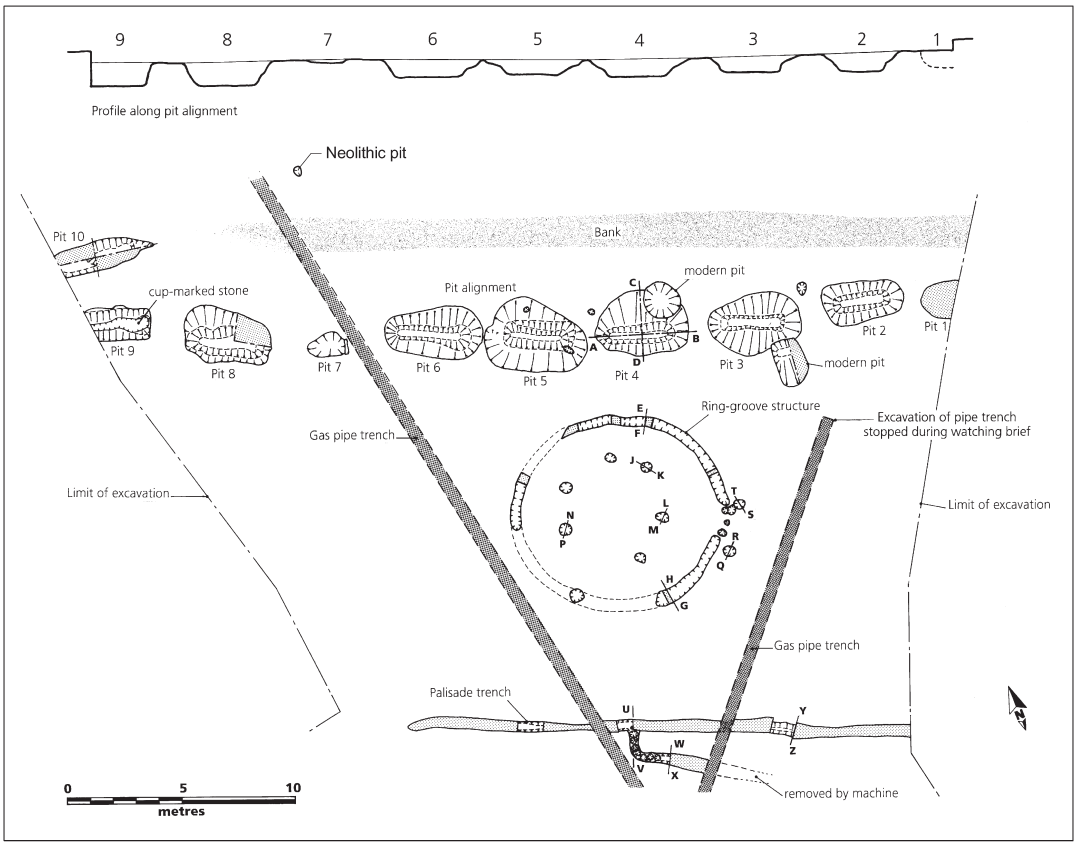



ILLUS 4 Late Bronze Age rectilinear structure



ILLUS 5 Stake-holes within the rectilinear structure

Sections were excavated near the eastern terminals of the structure in order to identify post-holes or other entrance furniture. Upon




ILLUS 6 Neolithic pit, late prehistoric features and section locations

excavation, the slots were found to measure from 0.40m to 1.10m in width with a maximum excavated depth of 0.40m (illus 4 & 5). Extended oval features of roughly equal dimensions (c 0.60m by 0.20m and 0.10–0.15m deep) were cut sporadically into the bottom of the slots. Stake-holes were found both in the bottom of the slots and in these elongated features.

The stake-holes were fairly evenly spaced. Although most were round-ended, some were square-ended, possibly reflecting prepared points. From the surviving holes, the stakes are estimated to have penetrated the underlying layer by 0.05m to 0.15m and to have been 0.04m to 0.08m across.

The pit located to the north of the structure was filled with medium-sized, angular, fire-cracked stones within a black, sooty, sandy fill. It had steep, straight sides and a flat base, and was 0.35m deep. A single piece of birch from within this pit was radiocarbon-dated to 3625 $\pm$ 40 BP (OxA-8201).

As already noted, this pit is believed to have been linked in some way to the open-ended rectilinear structure. Although the relationship cannot be demonstrated, it is tentatively suggested that they are broadly contemporary.

## OTHER FEATURES PREDATING THE CEMETERY

### *The pit alignment*

Ten pits of an alignment were located within the excavated area (illus 3 & 6). Nine were excavated. These features were not revealed until much of the buried soil horizon (described above) had been removed, and after the overlying graves had been completely excavated. The pits are aligned approximately E/W, with one (Pit 10) off-line, to the north of Pit 9 (illus 6 & 7). It is possible that this arrangement indicates the junction of two separate phases of construction.

ILLUS 7 Pit alignment and bank after excavation

With the exception of Pit 7, the pits were similar in form. The dimensions of the pits are summarized in Table 1. From the surface, their sides sloped at about 45° until they met the edges of an axial slot cut into the base of the pit: these slots were much more steep-sided (illus 8). In profile, the basal 'trough' within each pit measured 2.45–2.70m long by 0.20m–0.5m wide. This elongated shape was also characteristic of the pits excavated at Castlesteads (Cameron 1995), Milfield (Miket 1981) and Eskbank (Barber 1985). There were no packing or other stones in the fills of the pits at Thornybank other than a cup-marked stone from Pit 9 (illus 9). Moreover, there was no evidence to indicate that upright timber posts had been set in the pits. Although Pit 7 was substantially smaller and shallower than the others, its position in relation to the other pits indicates that it was probably a component of the alignment.

The fills of most of the pits were characterized by bands of slightly silty sands with unclear horizons, with some small bands of darker silty material along the bases (illus 13). No artefacts other than one fragment of late prehistoric pottery from an upper fill of Pit 4 (a catalogue entry forms part of the site archive) and the cup-marked stone from Pit 9 (see below) were recovered. All the pits demonstrated gradual infilling: there were no signs of deliberate infilling or of slumping from the associated bank (described below).

### *Cup-marked stone*

The cup-marked stone retrieved from Pit 9 was uniformly 170mm thick with two flattish surfaces, both of which displayed pecked cup-marks. The larger surface was roughly sub-circular and measured 400–500mm across. As many as 24 cup-marks were pecked into this surface with all free space used. The cup-marks measured 30–50mm in diameter and varied in depth from slight pecked hollows to 15mm deep cup-marks. On the reverse the surface, measuring 400mm by 360mm, displayed 13 cup-marks 25–70mm in diameter, varying in depth from 25mm at most to shallow areas of pecking. The stone is similar to examples discovered in Angus (Sheriff 1995) where cup-marked stones have been frequently recovered from the stone

TABLE 1
Pit alignment dimensions (all measurements in metres)

| Pit | Length (surface) | Width (surface) | Depth | Separation (pit centre–centre) | Basal 'trough' length | Cut by Grave no | Comments |
|---|---|---|---|---|---|---|---|
| 1 | Unexcavated | | | | | | |
| 2 | 3.60 | 1.90 | 0.80 | 4.84 | 2.28 | | |
| 3 | 4.10 | 2.70 | 0.90 | 3.60 | 2.34 | | |
| 4 | 4.15 | 2.90 | 0.90 | 4.40 | 2.70 | | |
| 5 | 4.20 | 2.20 | 0.80 | 4.60 | 2.24 | 34 | |
| 6 | 4.20 | 2.20 | 0.80 | 5.00 | 2.7 | 111 | |
| 7 | 1.60 | 1.05 | 0.80 | 4.40 | n/a | | May not be part of alignment |
| 8 | 3.80 | 2.20 | 1.10 | 4.80 | 2.40 | 8 | |
| 9 | 2.40 | 1.40 | 0.63 | | 2.35 | 73 & 74 | Cup-marked stone found in this pit |
| 10 | 4.20 | 1.30 | 0.55 | | 2.10 | | Lies north of and parallel to Pit 9 |

ILLUS 8 Pits 1–6 after excavation (viewed from WNW)

lining of souterrains or from adjacent contexts, such as paved areas.

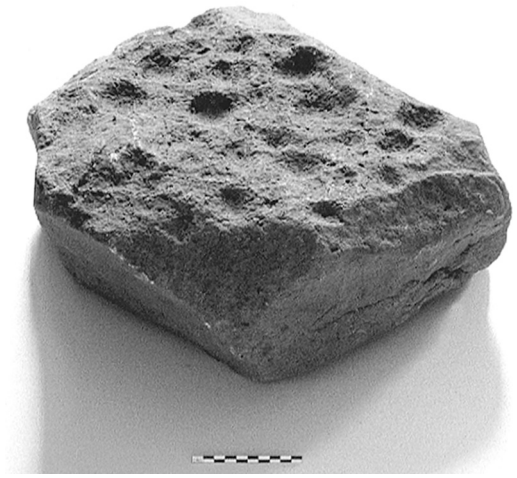
### *Pit alignment bank*

The vestigial traces of a former upcast bank, appearing as a dark stain when suitably weathered and damp, lay 2m to the north of, and parallel to, the pit alignment (illus 6 & 7). The stain was approximately 2m wide, and 0.10m deep, and ran westwards from the eastern edge of the excavations to the point where it faded, 3m short of Pit 10. It seems likely that this terminal marks an original gap, as the nature of the pit alignment changes at this point. A further break may also be visible at the location of the noticeably smaller Pit 7 near the eastern end of the alignment: here the nature and form of the pits themselves changes slightly with, to the west, deeper, steep-sided but narrower pits. Owing to the ephemeral nature of the bank stain, the plan can only indicate its approximate extent. An accurate section was also prepared where the feature was best defined; at this point it measured 2m wide by 0.05m to 0.07m deep.

### *Palisade*

A linear slot, within which the post-impressions of a probable palisade survived, was sited 23–24m to the south of and parallel to the pit alignment and its

ILLUS 9 Pit 9 with cup-marked stone in situ



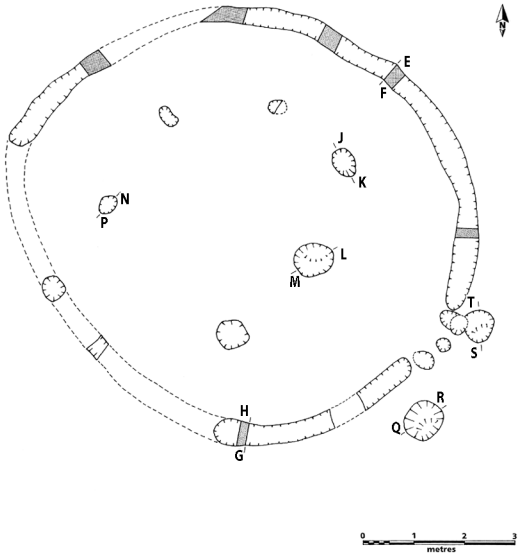
ILLUS 10 Cup-marked stone from Pit 9

associated bank (illus 6, 11 & 13). The slot was 22m long. The western terminal was cut by the square ditch of Grave 62 (illus 3) while the feature continued beyond the eastern edge of the excavations. It was 0.35–0.50m wide and 0.35–0.50m deep and had a rounded base (illus 13). A small section of palisade branches off to the south, 12m from the western terminal (illus 6 & 11). Within the curved section of the palisade, seven narrow, closely-spaced post-pipes were recorded. All were of similar dimensions, from 0.3m to 0.4m in diameter, U-shaped in profile and up to 0.44m deep (illus 13: U–V); their maximum separation was 0.05m. Although no packing stones were retrieved from the fill of the palisade, it is presumed that the close spacing of the posts and tight angle of the curve at this point would have given additional strength and rigidity to any palisade. There were 10 post-pipes in the excavated portion of the slot. Unfortunately, due to over-excavation in the very soft sand by mechanical excavator, the eastern end of this feature was lost.

### *Ring-groove structure*

The vestigial remains of a ring-groove structure were recorded midway between the palisade slot and pit alignment (illus 6, 12 & 13). This structure comprised an intermittent sub-oval slot within

ILLUS 11 Post-pipes within palisade slot

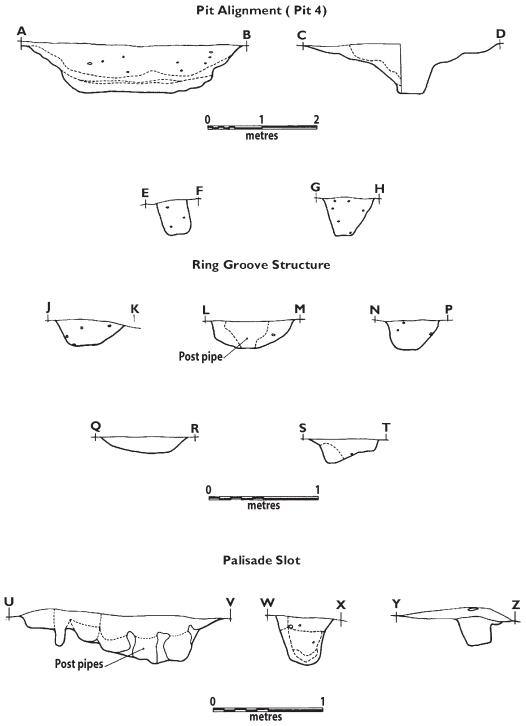



ILLUS 12 Ring-groove plan and section locations

which was a roughly concentric setting of six post-holes, and an entrance arrangement of five posts. Overall the structure measured 9m by 8.8m. Several graves overlay the ring-groove structure (illus 3) but were high enough above the ring-groove in the soil profile for their impact upon its preservation to be minimized. This ring-groove, where best preserved, measured 0.3–0.4m wide and 0.25–0.40m deep with a U-shaped profile (illus 12 & 13).

The fills of the ring-groove, post-holes and entrance features were all broadly similar: a light brown, slightly silty fine sand with little in the way of inclusions. A few sherds of late prehistoric pottery (McGill, below) were recovered from the ring-groove, mainly from its southern arc. The narrow entrance to the ring-groove structure was located on its south-eastern side (illus 14). It comprised an unusual five-post structural arrangement, with small posts perhaps corresponding to a threshold set across the entrance and two larger posts located on either side.

None of the features contained packing stones. The post-holes were roughly similar in size and




ILLUS 13 Pit 4, ring-groove and palisade sections

form with three (illus 13: J–K; L–M; S–T) having a profile possibly created by the erection or removal of timber uprights. The other post-holes had U-shaped profiles.

### *Later prehistoric pottery from the ring-groove*

Catherine McGill

The four body sherds and one rim sherd from the ring-groove represent one or more vessels. The fabric is similar to that of the group of Impressed Ware retrieved from the Neolithic pit to the north of the site (see McGill, above) but with a lower grit content and a paler orange surface colour.

The form suggested by the rim sherd is plain and straight-sided, with a slightly flattened rim. The rim sherd displays a slight irregular lip to the outside. This trait is not necessarily deliberate and not enough of the rim survives to demonstrate whether this feature occurred around the whole vessel. Not enough of the vessel survives to reveal its dimensions, but the curve on the largest sherd suggests that it derives from a vessel with a diameter of more than 250mm on the lower part of its body. No decoration or surface treatment is apparent on any of the sherds.

The vessel(s) appears to have been coil constructed. The outer surface of one sherd displays a black patch, or 'fire cloud', characteristic of open firing (Gibson & Woods 1997, 156). All of the sherds are heavily abraded. This is common in pottery found in domestic contexts, where sherds are often incorporated naturally into the archaeological record after an undetermined period of exposure. These sherds are therefore likely to be residual, and not certainly related to the construction or use of the structure.

The basic straight-sided form suggested by all of the sherds, and the basic flat rim suggest that these sherds belong to the later prehistoric pot form known as 'flat-rimmed ware'. The fragmentary nature of the sherds and the simplicity of the form represented render more precise dating difficult. The rim sherd is reminiscent of Cool's (1982) Broxmouth Type 2 pottery in terms of form and fabric. Cool describes her Type 2 as being a better-made, more straight sided pot than her earlier Type 1, with a wall less than 20mm thick, a sandy feel and a small size of artificially added inclusion. The firing of this type, while open, is controlled, as demonstrated by the 'grey buff' cores and grey to orange exteriors. The approximate currency of this pot type at Broxmouth was from the start of the second century BC to c AD 100. Although the description of the Broxmouth Type 2 pottery closely matches that of the Thornybank material, the geographical and chronological currency of Cool's pottery types has not yet been tested.

## DISCUSSION OF THE PRE-CEMETERY FEATURES

### *Neolithic feature*

Random pits containing unabraded sherds of Neolithic pottery are a very common feature of the archaeological record of eastern Scotland (Barclay 2003) and the pit feature and the pottery recovered from the subsoil surface represent typical manifestations of this trait. That this represents Neolithic activity within this area is indisputable but what the nature of that activity was, is obscure.

*Bronze Age rectilinear feature*

Due to its irregular trapezoidal plan and the very vestigial traces that were left in the sand, this feature has been interpreted as a fairly flimsy, temporary structure. The stake-holes may be the remains of a framework constructed from small diameter stakes, fixed into the soft, sandy subsoil, over which hides or similar material might have been draped. Its close proximity to the large pit choked with fire-cracked stones, allied with the interpretation of the rectilinear feature as a skin-covered structure means that several functions are possible for these juxtaposed features: for example the pit may have been used to heat the stones found within it as potboilers, or the heated stones could have been used to create steam in a sweat-lodge, in the same way as has been suggested for some burnt mounds and their associated structures (Barfield & Hodder 1987; Buckley 1990). Water is available some 50m away and the quantities required for this purpose are not large. Alternatively, although the remains of this feature are apparently slight, further structural elements such as turf and/or wattle walling could originally have been present, and would be unlikely to have survived. Such structural elements could have formed a more substantial building, the purpose of which is unknown.

*Pit alignment, bank, palisade and ring-groove structure*

The pit alignment excavated at Thornybank lies on the periphery of the most extensive system of pit alignments/boundaries so far known in Scotland (illus 2). It provides the first evidence from excavation for the extension of this system across the River Esk. Although few substantial sections of pit alignment have been excavated in northern Britain, nine pits of a similar form were excavated at Castlesteads, 1.5km to the west, in 1995 (Cameron 1995). A section of another pit alignment was also excavated nearby at Eskbank Nurseries (Barber 1985).

Few pit alignments excavated outside Scotland bear much resemblance to the examples at Castlesteads, Eskbank and Thornybank. One exception is the alignment excavated at Milfield Basin in Northumberland (Miket 1981) which were of comparable size, depth and shape. They were also evenly spaced, although Miket estimated that the Milfield pits were separated by 3m centre to centre, in contrast to the Scottish examples: 4.4–5m at Thornybank and 5.2–5.7m at Castlesteads. Unlike the Scottish examples, 90% of the Milfield pits contained artefacts – Late Bronze Age metalwork and numerous sherds of unabraded Grooved Ware pottery.

Both Thornybank and Castlesteads had regular lengths of basal trough: from 2.10m to 2.70m with the majority falling between 2.25m and 2.40m. Miket suggested that the troughs at Milfield held posts set at their terminals. However, the Castlesteads, Thornybank and Eskbank examples did not provide any evidence for this in excavated section or plan. The regular profiles, dimensions and construction style of the pits certainly indicate that substantial organization and supervision would have been required to construct these alignments and Barber (1985) has offered detailed discussion of these aspects.

While the Thornybank alignment reflects many of the attributes of other sites, it has additional features. Pits 8, 9, and 10 may form part of a separate phase of construction; the profile of Pits 8 and 9 is steeper, more regular and deeper than Pits 1 to 7, and they were also narrower than the others. Pit 10, smaller and of different morphology to the other pits, may be the first in a parallel alignment alongside the main alignment and extending out of the excavated area. In addition, Pit 7, which is of a size that brings its purpose as part of the main alignment into doubt, sits at the boundary between two possibly separate constructional phases of the alignment.

It may be that excavation of Pit 7 was begun, but then abandoned when what may be a second alignment was started. Certainly, its

small size would have rendered it difficult to see, even before truncation within a very short space of time. It also appears very likely that the gap disrupted by Pit 7 was originally intended to provide access between the two alignments, and Pit 7 may also reflect closure of the gap.

*Cup-marked stone and territorial arrangements*

Cup-marked stones have previously been interpreted as possible boundary/territorial markers (Bradley 1997). The retrieval of a cup-marked stone from the medial fill of Pit 9 might add weight to the suggestion that this pit is at a particularly significant point in the alignment, for example, at the start of a separate constructional phase. The stone was retrieved from the east end of Pit 9 at the western side of the hypothetical gap between the two phases of alignment.

Bradley suggested that, 'The more complex rock carvings in Britain might have been placed on the outer edges of the landscape because they marked a boundary. If so, then one interpretation is that they were addressed to strangers entering the area from outside' (1997, 152). For the Thornybank example, this is a distinct possibility, as the pit alignment could constitute an important boundary.

The Thornybank stone lends weight to Bradley's (1992) and Hingley's (1992) argument that some of these stones were reused in the Iron Age, because there was an understanding that they had a distinct meaning within the landscape. For example, their incorporation into a souterrain might mark a distinct ownership of a land parcel. Cup-marked stones turn up regularly within souterrains, both in their entrances and in associated paved areas (eg Tealing (Jervise 1873); Ardownie (Rees 2002) & Ardestie (Wainwright 1963)).

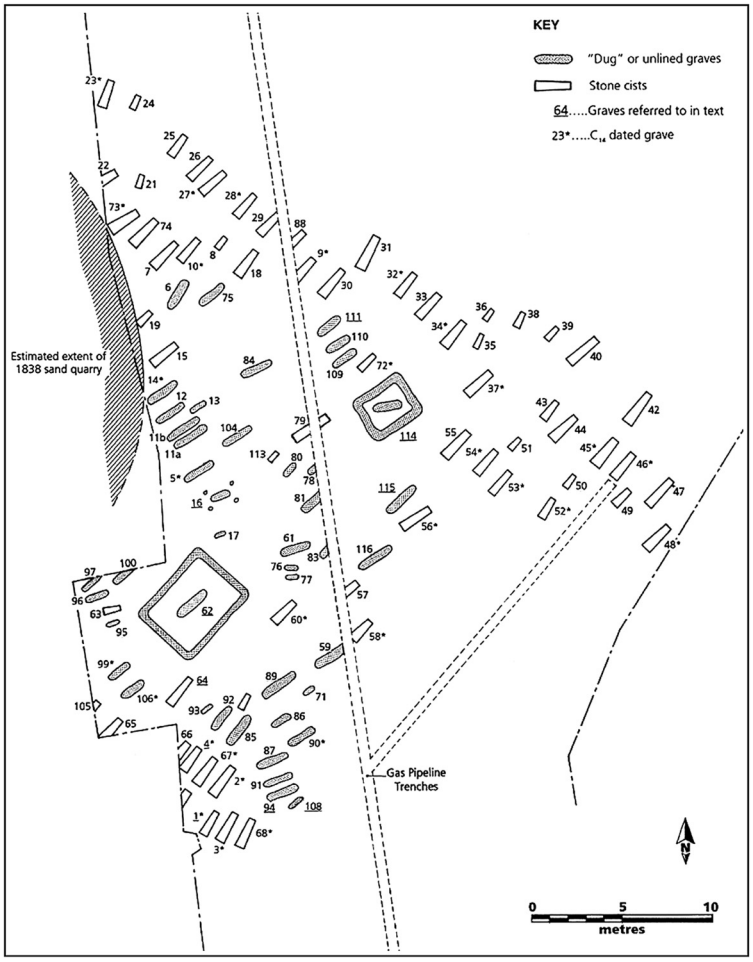
The pit alignment at Thornybank may divide two pieces of land from one another. The presence of the cup-marked stone perhaps reflecting its significance and possible association with land boundaries and ownership. This may manifest itself in the re-use of an artefact of uncertain initial provenance and much earlier date. It is easy to imagine an intensively settled landscape in the Lothian plain during the late first millennium BC which required a well organized, planned, territorial system defined by pit alignments, banks and palisades.

*Ring-groove structure*

The ring-groove-structure between the pit alignment and the palisade should perhaps not immediately be interpreted as a 'house'. Similar structures at Melville Nurseries (Raisen & Rees 1995) provided good evidence for domestic use; but ephemeral structures with limited evidence for substantial weight-bearing posts and domestic occupation, such as were excavated at Thornybank, Wedderburn House (Dunwell 1995), Castlesteads (Rees 1995) and Park Lane, Musselburgh (Neighbour 2002) in each case did not. However, experience on many eastern Scottish sites has shown that deep post-holes and stone packing seem not always to have been considered necessary.

## CONCLUSION

Halliday (1982) and Armit (1997) have suggested that a pit alignment is simply the quarry for a linear earthwork used to separate stock and crop. However, the consistently regular spacing, dimensions, and form, allied to the length of the excavated pit alignments in Lothian, must go some way to discount this theory. A hedge or a wattle fence would be far more efficient at separating stock from crop than an easily eroded and traversed earth bank. In addition, the actual work required to excavate such regularly-spaced and sized pits does appear excessive simply to provide a barrier. Moreover, the actual area taken up by the pits and the associated bank seems wasteful. At Thornybank, the associated bank was placed some 2m from the pits. The upcast from the pits would obviously have to go somewhere,




ILLUS 14 Cemetery plan illustrating grave types and location of radiocarbon-dated graves

however, the bank at Thornybank must have formed an essential component of the land division as a whole. In fact, at Thornybank, the northernmost burials of the cemetery overlie the pits, but carefully respect the vestigial remains of the associated bank; thus, this feature was potentially upstanding as a recognizable boundary well into the first millennium AD. This is especially noticeable in relation to the cemetery, which has otherwise imprecise limits on its excavated eastern and southern sides.

Pit alignments remain an enigmatic monument type within the landscape and it is not yet clear which was the more important focus, the pits, the associated bank or their juxtaposition. What is apparent at Thornybank, however, is that the pit alignment and the palisade which runs parallel to it to the south, appear to enclose a small plot occupied by a ring-groove structure.

## THE CEMETERY

Although the cemetery consisted in the main of stone-lined long-cist burials, generally attributed to the Early Christian period, other burial types were also discovered, including

ILLUS 15 Cemetery during excavation, viewed from the north-east. (*Crown copyright RCAHMS*)

dug graves, log coffin graves, square-ditch/enclosed graves and a four-posted burial. A large suite of radiocarbon dates was obtained from the cemetery and a notable *floruit* in the sixth century AD was noted. Roughly half of the graves contained skeletal material which was recovered in varying states of decay. A comprehensive skeletal and dental report is included below.

Of 111 burials discovered, 108 were excavated, and these can be separated into three principal distinct types:

stone-lined long cists;
unlined or 'dug' graves, holding log coffins;
square-ditched graves and four-post burials;

A fourth category includes all other variants, such as pebble-lined graves.

Selected graves of each type are described below. In particular the burials from which dates were obtained are considered in detail. All the excavated graves are described within the Appendix.

### STONE-LINED LONG CISTS

Almost all of the stone-lined long cists were constructed in a similar manner and style. They were invariably aligned approximately NE/SW, narrower at the feet than at the head and lined with locally available sandstone. Most of the better-constructed cists were laid out along the northern and southern peripheries of the cemetery in semi-regular rows 1–2m apart. Unfortunately there are no surviving records that describe how the western part of the cemetery was laid out prior to the 19th-century quarrying. Between the two zones of long cists, the central area was dominated by the unlined 'dug' graves.

The construction sequence of a typical cist grave is as follows. Initially, a pit approximately 10% larger than the cist itself was excavated, into which upright side and end slabs were placed and chocked by numerous small rounded pebbles between the cut of the grave and the slab. After the corpse had been interred, lintel-slabs were laid across the tops of the upright-slabs prior to the backfilling of the grave over the capstones. Judging by the position of many of the skulls relative to the body skeletons, it is likely that the burials were placed within shrouds, which covered the head before rigor mortis set in. This resulted in the chin lying tight against the chest.

Locally available yellow and reddish flaky sandstone was the most common constructional material for the cists, which were generally well made. Three of the adults cists (Graves 7, 10 & 64: illus 14) used

ILLUS 16 Graves 7 & 10 with Roman bathhouse arch stones in situ

ILLUS 17 Roman bathhouse arch stone from Grave 7

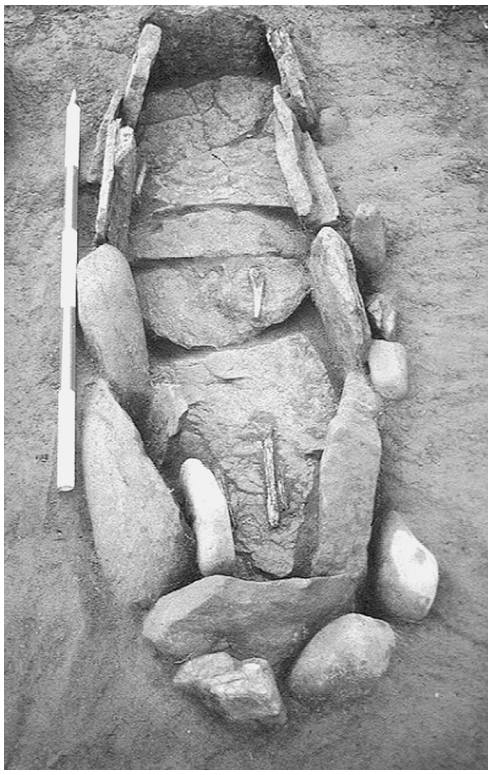
recycled Roman material (slabs from the arch of a Roman bathhouse (Keppie, pers comm)) (illus 16 & 17). Of these, two graves (7 & 10) were located directly alongside each other (illus 16) while grave 64 was on the opposite side of the cemetery. Recycled Roman slabs were also used to line one grave at the long-cist cemetery excavated by Audrey Henshall (1956) at the nearby Parkburn quarry.

The remains of 44 adults, five juveniles and 14 infants/neonates (ages based partly upon skeletal evidence and partly on grave size) with widely varying levels of bone preservation were excavated from stone cists. Occasional burials produced almost complete skeletons while others were very poorly preserved with only major limb bones surviving. The quality of bone preservation appeared to be determined mainly by how well the cists were constructed, and therefore sealed against intrusion by burrowing animals and leaching by percolation of rainwater.

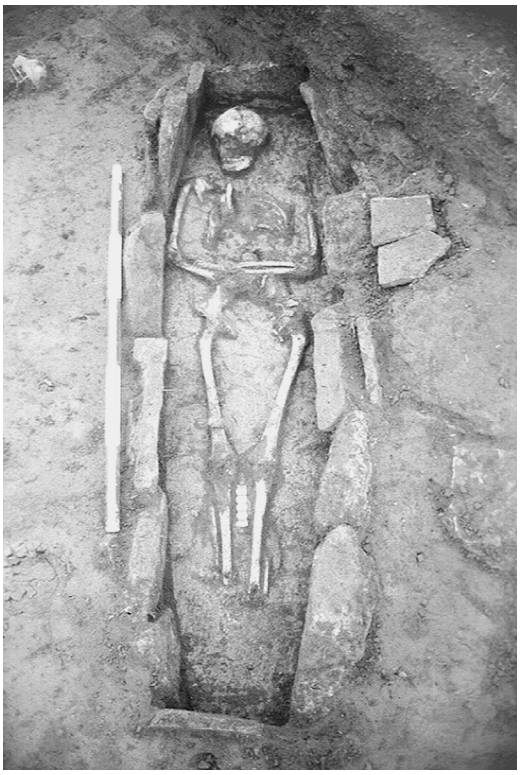
The three stone-lined long cists described below, provide a selection typical of the long cists excavated at the cemetery.

### *Grave 1*

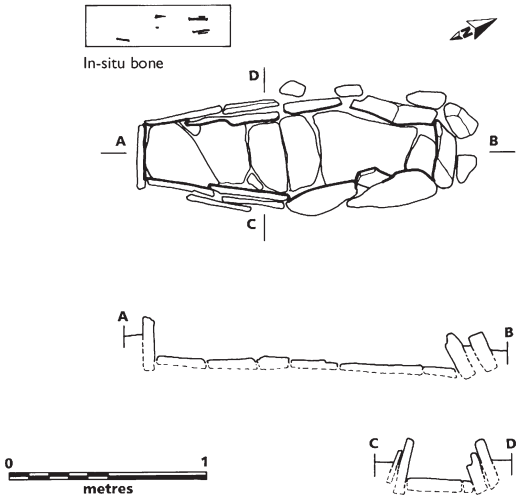
Located at the southern edge of the cemetery (illus 14), Grave 1 was lined with a combination of red and grey sandstone slabs, as well as some large, irregularly-shaped riverborne stones (illus 18 & 19). It measured 1.7m in overall length by 0.7m wide. Internally, the cist measured 1.46m in length by 0.22m wide at the western end and 0.26m at the eastern end. At its widest point, near the shoulders, the cist measured 0.4m internally and it was 0.2m deep. The base of the grave was set with five large slabs which had fractured in situ. The sides were lined with variously-sized, irregular sandstone slabs, water-rolled stones and large, irregularly-shaped stones. At various points, large rounded pebbles had been inserted behind the side slabs to give rigidity to the grave. Grave 1 adjoined Graves 3 and 68 to form an equally-spaced row. The poor quality of the bone preservation within the grave reflects the haphazard construction method, which would not have protected the body from disturbance. The cist was capped by sandstone slabs, some of which had collapsed into the grave while others appeared to have been removed, probably by plough truncation, as the graves in this area were amongst those closest to the present ground surface. Human bone from Grave 1 produced a radiocarbon date of $1705 \pm 45$BP (OxA-8152).



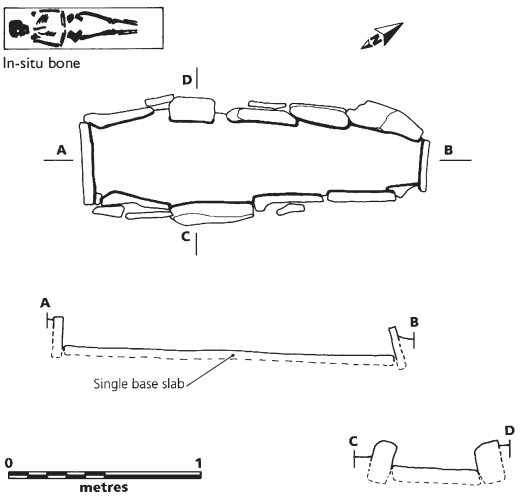
ILLUS 18 Grave 1 after excavation, with skeletal remains in situ



ILLUS 20 Grave 4 after excavation, with skeletal remains in situ




ILLUS 19 Grave 1 plan and profiles




ILLUS 21 Grave 4 plan and profiles

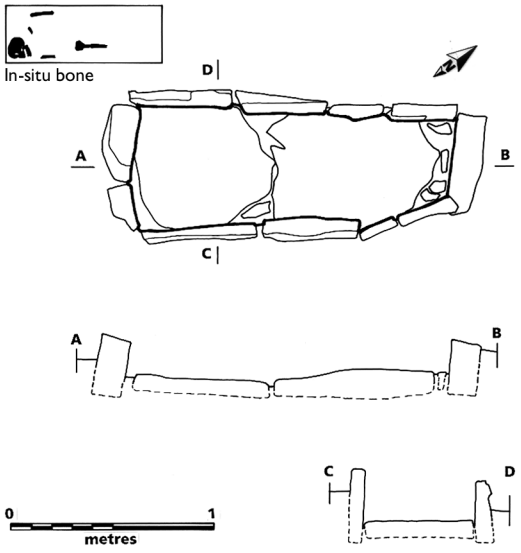
*Grave 4*

Located immediately to the north of the group of Graves 1 and 68, Grave 4 (illus 20 & 21) was part of a similar group, with five burials located alongside each other in a row (one of which remained unexcavated as it lay outwith the area affected by the development). Grave 4 was unusual in that the base of the cist and the lintel slab each comprised single, large, dressed slabs. Overall the grave-pit measured 1.95m in length by 0.74m wide. Internally, the grave measured 1.70m in length by 0.17m wide at the western end and 0.10m at the eastern end and 0.15m deep from the tops of the side slabs. The large lintel slab measured 1.24m in length by 0.58m wide. At the eastern end of the cist two smaller irregularly-shaped slabs were used to cover a small gap left uncovered by the lintel slab. The massive basal slab was recovered undamaged and had been dressed to an approximate coffin shape, which neatly filled the base of the grave. The fact that the grave was well sealed probably contributed to the good preservation of the skeletal remains. Human bone from Grave 4 produced a radiocarbon date of 1490 $\pm$ 40BP (OxA-8665)

*Grave 64*

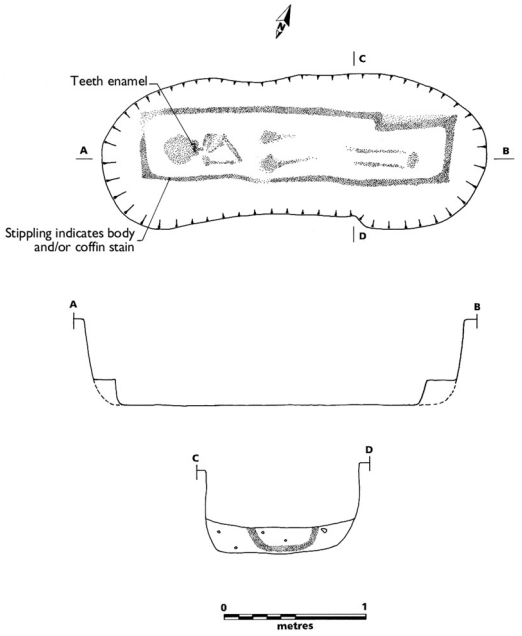
Grave 64 is the nearest grave to square-ditched Grave 62 (below) and lay immediately to the south of it. These two graves, 62 and 64, were surrounded by unlined dug graves. Overall, Grave 64 was 1.94m long, 0.78m wide and 0.56m deep from the tops of the side slabs to the basal slabs. Internally, it measured 1.68m in length and was 0.60m wide at the south-western end decreasing gradually to 0.38m at the north-eastern end. The construction was similar to the majority of the long cists: the larger and better dressed lintel slabs covered the head end, while more fragmentary capstones were laid over the legs and feet. The base of the cist was constructed from two large grey sandstone slabs, which were laid end to end. The side slabs conformed to the edge of the base slabs, which resulted in an irregularly-shaped southern side to the cist. The side slabs were composed of a variety of stone types including grey sandstone slabs. The skeletal remains were very fragmentary and only the skull and lower jaw were recovered in reasonable condition. Only fragments of pelvic bone and lower leg bones were recovered from the rest of the cist. As elsewhere, cists with gaps between the capstones

ILLUS 22 Grave 64 after excavation, with skeletal remains in situ




ILLUS 23 Grave 64 plan and profiles

ILLUS 24 Grave 94 partly excavated, with body stain in situ



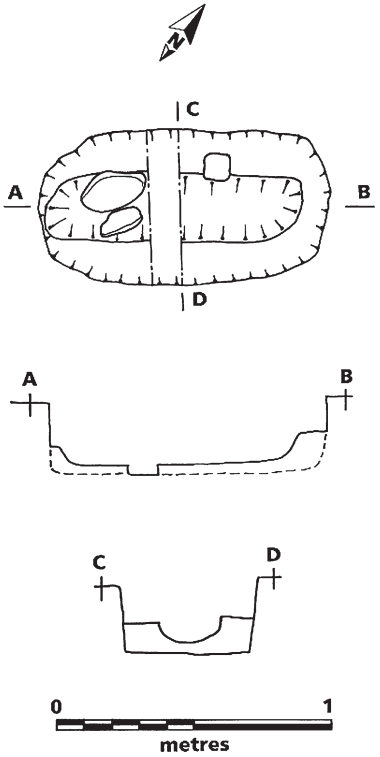

ILLUS 25 Grave 94 plan and profiles showing position of body stain

and the side slabs tended to have very poor skeletal preservation when compared to well-constructed and sealed examples.

### UNLINED OR DUG/LOG COFFIN GRAVES

The construction and style of the unlined graves also appear to conform to a general pattern. Nearly all of the unlined graves produced coffin stains and occasionally body stains which were visible as darker areas of sand, such as in Grave 94 (illus 24 & 25). Although no covers for the coffins were detected (the first components of the grave revealed through excavation were the sides of the coffin in plan) they may originally have been provided. The graves were created as follows. Typically, a large, deep pit, an extended oval on plan, was excavated. Stones were then placed at both ends and sides of the grave prior to the insertion of a hollowed-out log coffin; these stones occurred in all of the dug graves and could clearly be seen in section, and it is probable that they were placed in the grave to provide a secure resting place for the convex profile of the coffin. Two of the shallower unlined graves had small collapsed stone slabs at their western ends, which may have been grave markers; however, it is unclear whether or not they were visible above the ground in antiquity. One notable aspect of the unlined graves in comparison to the stone cists, was the depth to which they were excavated. Whereas the stone cists were generally very close to the surface of the buried soil, the unlined burials were often deeper: the deepest example was 1.3m. This may indicate a concern to protect burials from scavenging animals, against which stone cists would offer better protection.

Forty-five unlined graves were discovered at Thornybank. Based primarily on grave dimensions, 27 were of adult size, seven were juveniles and there were 11 infant/neonate burials. Often the only surface indication of the presence of this type of burial was an elongated oval stain in the sandy subsoil, which could only be seen when the subsoil had been heavily weathered. The 1970 pipe trench had truncated three of these graves, which appear to have gone unrecognized at the time.




ILLUS 26 Grave 108 plan and profiles

ILLUS 27 Grave 108 after excavation

Four examples of unlined graves are described below, selected to provide a cross section of typical adult and infant graves, with good examples of coffin and body stains. Summary descriptions of other unlined graves are given in the Appendix, with fuller descriptions within the project archive.

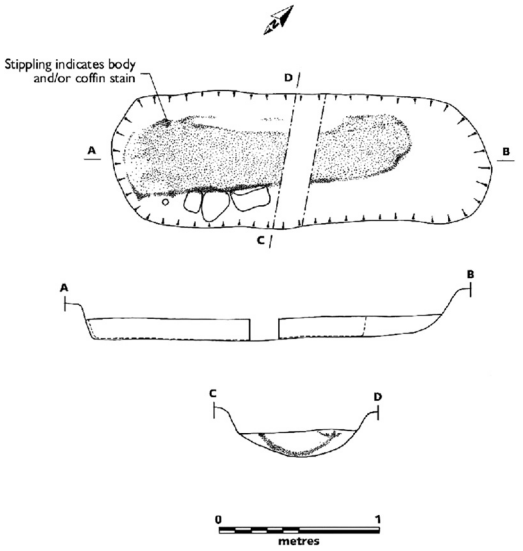
*Grave 94*

Grave 94 (illus 24 & 25) was the largest of a group of four parallel graves (three of adults, 94, 91 & 87; one an infant, slightly to the south, 108, described below) sited at the southern end of the cemetery, 3m east of two groups of long cists. The graves were aligned NE/SW, and were evenly spaced with 0.15m to 0.25m between the graves. Prior to excavation, grave 94 measured 3m in overall length by 1.1m to 1.2m wide. The coffin stain was rectangular on plan, measuring 2.20m in length by 0.52m wide at the head end and 0.46m wide at the other end; in section, it was semi-circular, 0.18m deep with a flattish bottom. The coffin stain itself was 0.10m thick. On plan, within the coffin, a body stain was perceptible, the head and shoulders being particularly clear (illus 25). The body stain was approximately 1.7m in length and was visible as a light brown sand against a background of a dark grey sand fill. Upon excavation, the coffin was found to have squared corners, indicating a dressed wood coffin probably constructed from a hollowed-out tree trunk. Grave 94 was the only unlined grave that produced an almost complete body stain well defined enough to be recorded by drawing and photography.

*Grave 108*

Grave 108 was located 0.6m to the south of Graves 94, 91 and 87 and was an unlined infant grave, sub-oval in plan, which measured 1.06m long by 0.56m wide at the western end, tapering to 0.46m wide at the eastern end (illus 26 & 27). On excavation, a thin coffin stain was revealed which measured 0.80m long by 0.23m wide with straight edges and slightly squared ends. The coffin stain, semi-circular in

ILLUS 28 Grave 111 partly excavated with coffin stain visible




ILLUS 29 Grave 111 plan and profiles showing position of coffin stain

section, was 0.05m thick and 0.09m in overall depth; it was dark brown in colour and became more visible when the material was damp. The coffin was filled by a mid-brown, red, loose silty sand. On the northern side of the coffin, there were two small chocking stones and, on the south-west, one smaller chocking stone was visible.

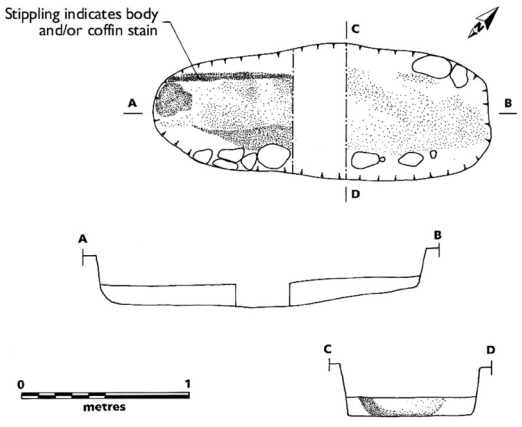
### *Grave 111*

Grave 111 (illus 28 & 29) was the most northerly dug grave excavated at Thornybank and appeared to be part of a small group of three (109, 110 & 111). Two of these graves (110 & 111), were cut into the upper fills of Pit 6 of the pit alignment (see above). Grave 111 was notable for the very distinctive coffin stain and fill excavated within it. The coffin stain was crescentic on plan, of a distinct dark brown colour shading to black, while the fill of the coffin was grey, and stood out clearly in contrast to the light brown sandy fill of the grave. Three adjacent sub-rounded chocking stones, measuring 0.10–0.20m in diameter, were clearly visible in the section abutting the coffin stain on the south-western side. Prior to excavation, the grave was an elongated oval 2.40m long by 0.84m wide. On excavation, the coffin stain measured 1.84m long by 0.40–0.45m in width. Aligned SW/NE, the coffin stain itself was curved in section and measured 0.12m thick. Overall, the coffin stain was 0.36m deep with sloping sides and a flattish base.

### *Grave 115*

Grave 115 (illus 30 & 31) was located 2.75m to the south of the small square-ditched Grave 114 and was aligned NE/SW. Prior to excavation, it measured 2m by 0.80m, with an elongated oval plan. Upon partial excavation, sections of coffin stain were visible as linear marks, 0.10m wide, comprising dark, brown, loose silty sand running parallel with the edges of the grave. The coffin stains were more visible at the western end of the burial and were indistinct at the eastern end of the grave. Overall, the coffin stain, where it could be traced, measured 1.90m in length, 0.45m wide and 0.15m deep. The coffin stain was curved in profile with chocking stones immediately adjacent to its edges. A circular, dark brown greasy mark was visible at the head end

ILLUS 30 Grave 115 post excavation, with head stain in situ




ILLUS 31 Grave 115 plan and profiles showing coffin and head stain

of the coffin; from its position and the presence of tooth enamel it can be assumed that this mark was left by the skull.

## ENCLOSED AND FOUR-POST UNLINED BURIALS

In addition to the series of cists and unlined dug graves, two burials within square-ditched enclosures (Graves 62 & 114) and a single burial within a four-post structure (Grave 16) were excavated.

### *Grave 62 – enclosed burial*

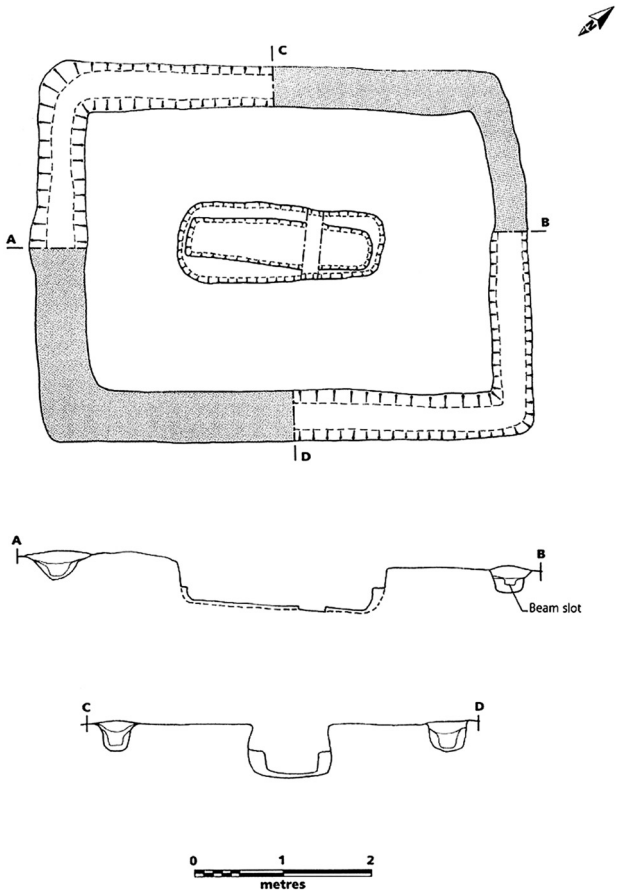
Grave 62 (illus 14; 32–34) was an unlined burial surrounded by a substantial foundation trench defining an area 5.60m in length by 4.40m wide externally. On excavation, this trench was found to be U-shaped in profile and measured from 0.40m wide and 0.35m deep to 0.60m wide and 0.50m deep. Three separate fills were noted in sections excavated across the foundation trench. Each of the four recorded sections produced evidence of a continuous square-section slot (illus 34) which probably held a dressed timber soletree to which a wooden superstructure was attached. No trace of the latter was encountered. No nails were recovered during the excavation but during the metal-detecting exercise, the external square slot of Grave 62 gave off high ferrous readings and this may indicate the presence of decomposed iron nails, thus strengthening the likelihood of the presence of a timber structure. The central grave was unlined and measured 2.50m overall in length by 0.95m wide and 0.45m deep. The coffin stain consisted of a reddish brown sandy deposit and measured 2.20m in length by 0.50m wide by 0.15m deep and was U-shaped in profile with a flattish bottom. Only a small quantity of tooth enamel, unfortunately unsuitable for radiocarbon dating purposes, was recovered.

### *Grave 114 – enclosed burial*

Grave 114 (illus 14, 35 & 36) was a small, unlined grave surrounded by an unbroken square-ditched enclosure, which measured 3.4m in length by 3m wide externally and 2.2m by 1.6m internally. In profile, the ditch varied between 0.40m wide and 0.25m deep to 0.80m wide and 0.40m deep with a distinctly squared profile, but there were no indications that this ditch had ever held a horizontal timber. The unlined grave at the centre measured 1.10m in length by 0.65m wide, while the coffin stain measured only 0.35m in length by 0.25m wide.

ILLUS 32 South-west corner of the cemetery with square enclosure Grave 62 under excavation in the centre of picture

ILLUS 33 Grave 62 partly excavated, viewed from the south-west

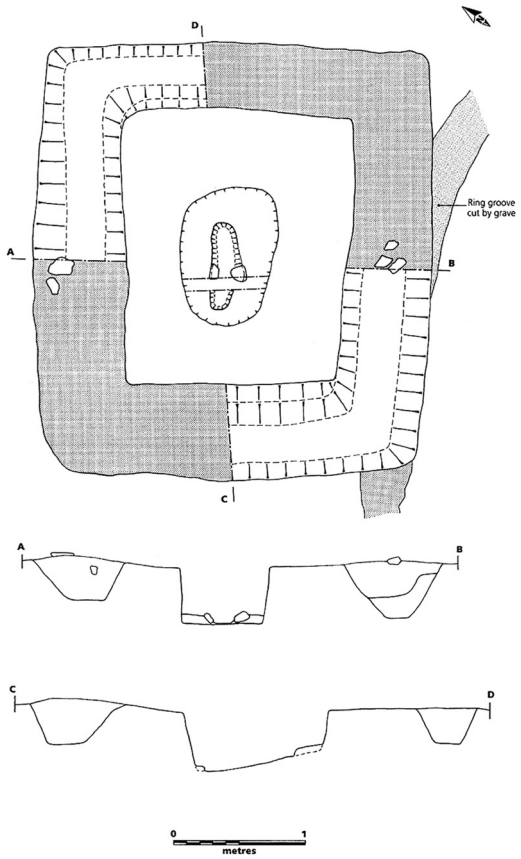



ILLUS 34 Plan, profiles and sections of Grave 62

The small size of the burial probably indicates that Grave 114 held the remains of a young child or infant. It was covered by a spread of small stones, probably the remnants of a small overlying cairn. In addition to this material, several large stones were located within the slot of the square enclosure (illus 36). These were located centrally on each side of the enclosure. These stones may represent the remains of a low revetment wall or kerb, which retained the cairn material.

### *Grave 16 – four-post burial*

Grave 16 (illus 14, 37, 38) was an unlined grave bounded on four corners by large shallow post-holes. The central grave measured 2.2m long by 0.8m wide and 0.4m deep. The coffin stain was roughly rectangular on plan and was similar to other excavated examples in having a curved base. It measured 1.90m in length by 0.50m wide and was 0.17m deep. None of the four post-holes surrounding the grave had packing stones. With the exception of the south-east example, the post-holes were roughly square on plan. The eastern post-hole (L–M) measured 0.50m in diameter and 0.24m deep. The profile of this feature was approximately U-shaped with an uneven base. Five possible stake-holes 0.08m in diameter and 0.10m deep were located in the base of this feature. The post-hole on the northern corner of the grave (G–H) was roughly square on plan and measured 0.30m across by 0.21m deep at the north-eastern side with a ledge 0.09m deep at the south-western corner of the feature. On the western corner of the grave, the post-hole (E–F) measured 0.28m across and 0.19m

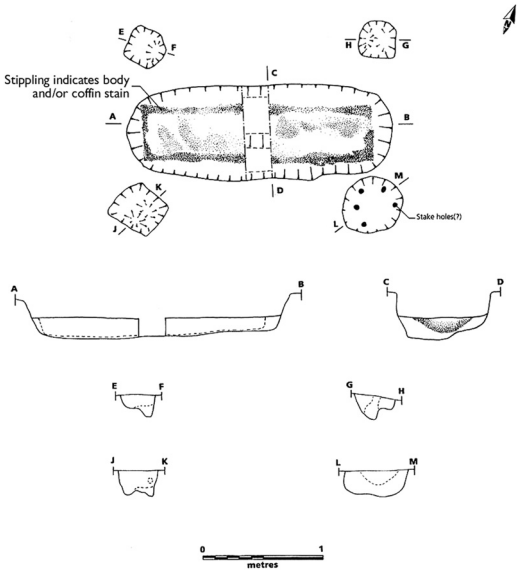



ILLUS 35 Plan, profiles and sections of Grave 114

ILLUS 36 Grave 114, pre-excavation

deep with a similar profile to that on the northern corner with a shallow ledge 0.11m deep on the south-western side of the feature. The remaining post-hole on the southern corner of the grave (J–K) was square on plan and measured 0.33m across and

ILLUS 37 Grave 16 under excavation with the corner posts unexcavated




ILLUS 38 Plan, profiles and section of Grave 16

0.22m deep and was U-shaped in profile with an irregular bottom.

Because no packing stones were recovered from within the post-holes, it is presumed that there may have been a free-standing, wooden superstructure, which could have been constructed off-site, and carried to the grave and inserted into the sand, around the grave. Alternatively, a simple rectangular palisade/fence could have been constructed over and delineating the grave. The posts for this would not require stone packing as timber planking could

be nailed to the corner posts, which would have the effect of bracing the structure.

### MISCELLANEOUS GRAVE TYPES

Other than stone-lined long cists, dug graves and special graves there were several burials that were slightly different from the normal types. Usually, these were infant graves. A typical example is described below.

#### *Grave 71*

This grave measured 0.45m by 0.35m; although there were no human remains the size suggests it was the grave of an infant. It was lined with small rocks and could be termed a 'pebble' grave. Similar graves were excavated at Hallow Hill near St Andrews in Fife (Proudfoot 1996).

## HUMAN BONE AND TEETH

L N Sinfield

### PRESERVATION

Preservation of both skeletal and dental remains was poor, due to taphonomic conditions, which encouraged bone and dental enamel deterioration. The best-preserved remains were from the stone-lined cists, while only tooth enamel survived from the unlined graves. Within the unlined graves, organic material surrounding the body, such as wooden coffins, textiles or leather may have affected the speed of decomposition. It is interesting to note that Graves 81 and 90 are unlined graves in which, nonetheless, the dental remains of young children have survived – this age group has more fragile bones and teeth because they are still forming. Hence, the survival of a neonate skeleton and dentition in Grave 35 is extremely unusual in overall preservation conditions such as those found in the acidic sand of Thornybank.

### AGE AND SEX ESTIMATION

Of the 108 graves excavated, only 25 yielded well-enough preserved human remains for comprehensive study. These were 17 adults and eight juveniles. The age distribution for adults is given in Table 2, and that for juveniles in Table 3. Estimates of age were derived from examination of bones, where possible, and from dental development, eruption and attrition (Hillson 1986; 1996; van Beek 1983; Bass 1987; Buikstra & Ubelaker 1994). Estimates of sex were based on bone morphology in the cranial bones and metrical analysis of the articular surfaces where possible (Bass 1987; Buikstra & Ubelaker 1994). Very few pelvic bones survived in a condition to be of use in either ageing or sexing individuals.

TABLE 2
Age distribution for adults

| Age group | Male | Female | Total |
|---|---|---|---|
| Young Adult (18–25 years) | 1 | 4 | 5 |
| Middle Adult (25–40 years) | 4 | 5 | 9 |
| Older Adult (40+ years) | 1 | 2 | 3 |
| TOTAL | 6 | 11 | 17 |

TABLE 3
Age distribution for juveniles

| Age group | No of individuals | Grave no |
|---|---|---|
| Foetal/ Neonate | 1 | 35 |
| Infant (6m–5 years) | None | None |
| Juvenile (5–13 years) | 5 | 49, 72, 58, 68, 81(i) |
| Sub-adult (13–18 years) | 1 | 90 |

Age distribution schemes are those used by Mackinley (1995, 221) which are preferred, as it is felt they more accurately reflect the physical stages of ageing (ie reaching physical maturity, reaching peak reproduction age and passing peak fertility), rather than the cultural stages of ageing which may well have been different in the past. It can be seen that there is a fairly even mix of male and female in the Older and Middle Adult categories, but that more females than males are present in the Younger Adult category. Three individuals lived long into Older Adulthood, and one individual (Grave 55) may have been over 60 years old when he died.

### CAUSE OF DEATH

Where there are more deaths of younger females than males, it is tempting to relate the higher number of deaths to childbirth, but in this case, where we have so few individuals from such a potentially long time-span, this is not a sustainable explanation.

The only individual in which childbirth can be postulated as related to cause of death is Grave 45, a Middle Adult aged between 30 and 34 years old

TABLE 4
Estimates of stature

| Grave No | Height estimate | Bones used | Sex | Age |
|---|---|---|---|---|
| 04 | 159cm/5′2″ | R femur | Female | Younger Adult |
| 46 | 155–158cm/ 5′1–2″ | All 4 limbs | Female | Younger Adult |
| 45 | 165cm/ 5′5″ | R femur | Female | Middle Adult |
| 44 | 174cm/ 5′8″ | L ulna | Male | Middle Adult |
| 34 | 158cm/ 5′2¼″ | R femur | Female | Older Adult |
| | 166cm/ 5′5¾″ | R radius | | |
| 60 | 152cm/ 4′11″ | R radius | Female | Older Adult |
| | 161cm/ 5′3″ | R humerus | | |
| | 175cm/ 5′8″ | R femur | | |
| 55 | 176cm/ 5′9″ | R femur | Male | Older Adult |

who had bony changes sometimes linked to childbirth. The only other individual to whom can be assigned a possible cause of death is Grave 55, an Older Adult male, whose dental problems were so bad that the resultant infection may have been the cause of his death.

## STATURE

Estimates of stature were calculated using the charts in Bass (1987) and are shown below in Table 4. Many individuals had no intact long bones for use in height estimation, and two (Graves 34 & 60) had differing height estimates, according to which long bones were used.

## PATHOLOGY

There appeared to be a good overall level of health amongst the population interred within Thornybank cemetery. The individuals suffered few illnesses affecting the skeleton; as bone takes a few days to react to any condition affecting the soft tissue, any disease of only a day or two's duration would not leave any traces in the bone.

In addition, the poor preservation of most of the remains means many conditions may not be seen, this applies especially to degenerative joint disease (such as the various arthritis conditions) hereafter known as DJD, as the evidence for this is seen in the articular surfaces of bones; many of the Thornybank skeletons have no articular surfaces present at all. Those that did, however, exhibited no traces of DJD.

Traumatic injury was limited to three individuals – an adult male (Grave 44) with a broken tibia which had healed successfully several years before his death – there appears to be no shortening of that part of his bone, and relatively good apposition of the fragments suggests possible use of a splint during healing. Another individual (Grave 5), about whom no other information could be gained, had had no lasting problem with his broken finger, which had healed successfully before death with no inflammation. Grave 9, a Young Adult female, had a healed non-union stress fracture of her fifth lumbar vertebra – in other words, a spinal bone in her lower back had been subject to a lot of repeated physical trauma.

One interesting anomaly was noted – not the result of direct trauma but of repeated minor trauma. Grave 46 (Young Adult female) exhibited an abnormal wear pattern on her lower right central incisor. Scanning Electron Microscopy (by kind assistance of John Craven, Geology Department, Edinburgh University) showed that this had been caused by repeated gripping of some soft material between the front teeth. This effect has been linked to flax-processing, pulling the fibres through the mouth to wet them before spinning; however, in this case, the position of the marks is wrong for this process, and examination showed that the material had definitely been gripped rather than pulled. It is therefore suggested that she had been involved in plaiting or some similar textile processing in which the material is held static in the mouth.

Malformation was not common. The only sign of skeletal malformation was Grave 72, a juvenile aged 6–8 years, in whom two cervical vertebrae, C6 and C7, were fused together. This would probably not have been a problem during life, and the individual may have been totally unaware of it. Graves 45 and 60 both exhibited a type of new bone growth on the inner aspect of the frontal bone of the cranium, known as *hyperostosis frontalis interna*. In the case of Grave 60, an Older Adult of over 50 years of age, this may be related to the

hormonal changes in bones involved in the menopause; however in the case of Grave 45, a Middle Adult of only 30–34 years of age, this cause is unlikely, as such an age would represent a very early onset by today's standards, although it may have occurred earlier in the past. The new bone growth visible on the skeleton from Grave 45 may be the result of a related condition known as 'the pregnancy osteophyte' indicating that she might have recently given birth or still have been pregnant at the time of death. No foetal bones or teeth were retrieved from her grave.

Five individuals had disturbances to the formation of their teeth – in other words, at certain ages in childhood (indicated by the position on the tooth of the defect and the tooth involved), the individual was systemically ill to an extent where the body stopped all inessential processes in order to address the systemic disturbance. When tooth enamel formation is re-started, the interruption shows as a line or as pits in the enamel. Known causes can be linked to weaning (vomiting or diarrhoea over several days or weeks) or illnesses such as chickenpox, measles, malnutrition or soft-tissue infections (FDI, 1992). The individuals are listed below, and include two individuals not included elsewhere in this study since there is no other information ascertainable about them:

Grave 30 (age and sex unknown) one incident in the first six months of life, possibly as early as the ninth foetal month;

Grave 37 (Middle Adult, female) at least three separate incidents – first at or around birth, second between birth and six months and third between nine and 12 months of age;

Grave 47 (Middle Adult, female) one incident at 4–5 years of age;

Grave 58 (juvenile, 7–9 years of age) one incident at 3–4 years of age;

Grave 67 (age or sex unknown) one incident at 4–5 years of age.

One individual showed new bone formation in the maxillary sinuses above the upper teeth – Grave 54 (Middle Adult, male). This is often interpreted as a sign of sinusitis, which could be from pollen reactions, or from living in a smoky environment (Roberts & Manchester 1995).

## NON-METRIC TRAITS

These are skeletal anomalies, which are thought to be inherited, and may therefore indicate familial relationships. Amongst the 25 individuals studied, three adults and one juvenile exhibited extra small bones along the suture lines between bones at the back of the cranium, known as Inca bones or Wormian bones. Further DNA study may indicate whether these four individuals are indeed related.

The juvenile is Grave 68 (8–10 years of age) and the adults are Grave 46 (Young Adult, female), Grave 43 (Middle Adult, female) and Grave 55 (Older Adult, male).

Non-metric traits can, however, turn up as an isolated anomaly – or as a mere genetic 'hiccup' in development or in growth timing. Grave 49 (juvenile, 4–6 years of age) has an open metopic suture in the forehead, which one would normally expect to be on the way to closing by this age. Since there are 18 of the 20 deciduous teeth present and 22 of the possible 28 permanent teeth (for this age, including partially developed unerupted teeth), but none of the permanent 5s, or second premolars, are present, it is possible that these teeth are congenitally absent. Second premolars are the most common tooth to be affected in this way, other than the wisdom teeth.

## THE DENTITIONS

Methods used for assessment of age by dental means included development, eruption, occlusion and attrition. In general, the individuals have good dental health with, in particular, a low rate of caries. Some individuals had a perfect set of all 32 adult teeth in good condition, but of course many individuals, whose remains survived in a more fragmented form, had only loose teeth for examination, and it is not possible in these instances to tell how many teeth were present at the time of death.

### *Caries*

No carious lesions were found in any of the eight juvenile individuals. Of the adults, three of the six males and one of the 11 females exhibited carious lesions. These are shown in Table 5. Males have an overall total percentage of carious teeth from total teeth present of 2.21 per cent, as compared to females of 2.73 per cent. The percentage for all adults, both male and female, is 2.6 per cent. No carious lesions were found in the Young Adults, and it must be remembered that this is a very small sample number. In particular Grave 43 (Middle Adult, female) has seven carious lesions and is the only female with caries.

TABLE 5
Carious lesions

| Age Category | Grave Number | No of carious teeth | No of teeth present |
|---|---|---|---|
| Adult Males | | | |
| Young Adult | 88 | None | 12 |
| Middle Adult | 29 | None | 20 |
| | 44 | 1 | 30 |
| | 53 | 1 | 17 |
| | 54 | None | 30 |
| Older Adult | 55 | 1 | 27 |
| Adult Females | | | |
| Young Adult | Grave 04 | None | 24 |
| | Grave 09 | None | 32 |
| | Grave 46 | None | 31 |
| | Grave 47 | None | 33 * |
| Middle Adult | Grave 10 | None | 4 |
| | Grave 18 | None | 19 |
| | Grave 37 | None | 27 |
| | Grave 43 | 7 | 24 |
| | Grave 45 | None | 31 |
| Older Adult | Grave 34 | None | 16 |
| | Grave 60 | None | 15 |

* Grave 47 has a retained deciduous canine 33, and therefore has more than the usual number of teeth.

### *Periodontal disease*

This is notoriously hard to identify in dry bone, and especially in fragmented archaeological dry bone. It is easy to diagnose a post mortem breaking of the alveolar bone as recession of the bone in life. In addition, recession of the alveolar bone may not always be due to periodontal disease. Therefore, apparent recession of the alveolar bone was not the only criterion – porosity of the alveolar bone and socket and 'shelving' or remodelling of the alveolar bone at its margin were also sought. Several individuals were unsuitable for examination due to their lack of alveolar bone, or in some cases, due to their lack of any jaw bone at all. Of the three males suitable for examination, two had signs of periodontal disease; of the 10 females suitable, four showed signs of it. It would seem that there was a high rate of periodontal disease in this community – or at least a high incidence of inflammation and disruption of the bone surrounding teeth. This, taken in conjunction with the low caries rate, suggests a low standard of oral hygiene (producing the periodontal disease) but combined with a diet low in sugars of all types (producing the low caries rate).

### *Abscesses*

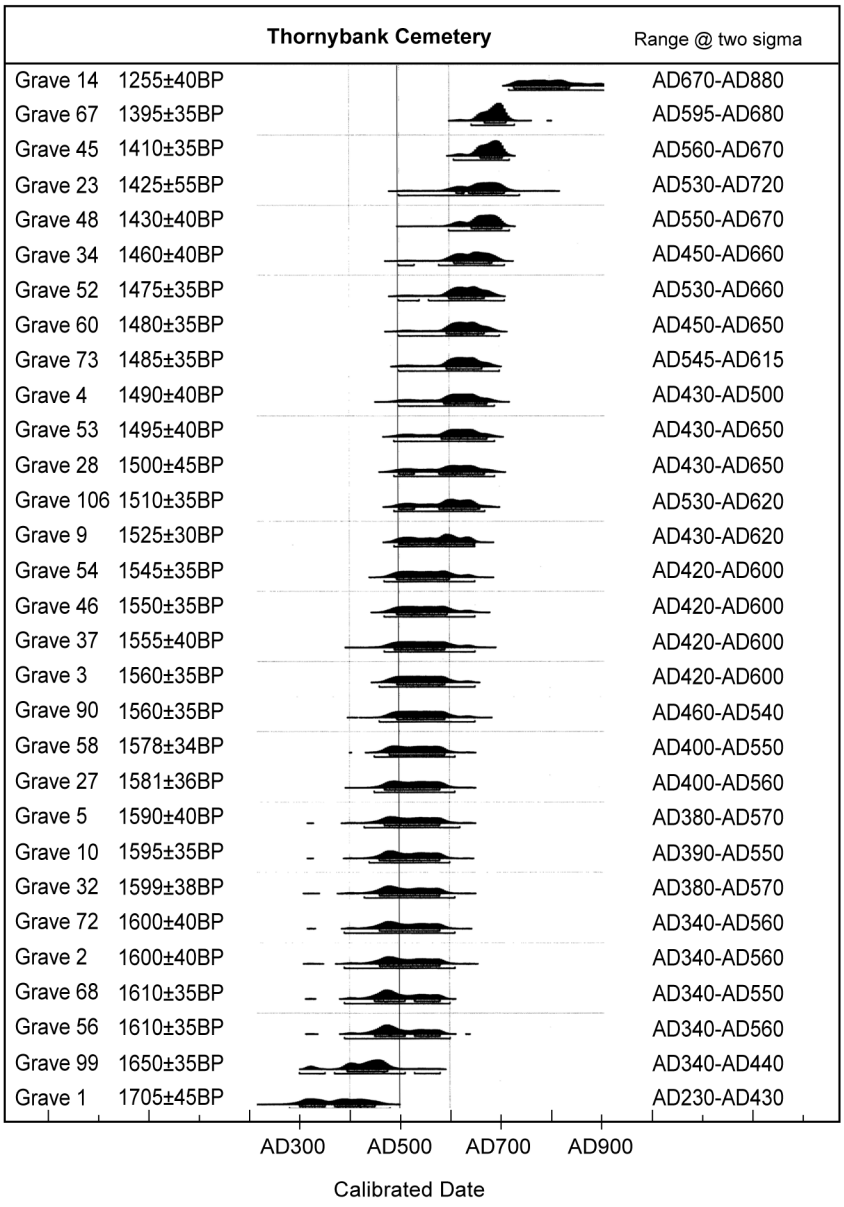
Of those suitable for examination, three of four males and four of nine females showed signs of dental abscesses – an overall percentage of 54 per cent of individuals. This also correlates with the suggestions of poor oral hygiene above.

### CONCLUSION

The individuals studied were a small proportion of the burials at Thornybank, and cannot be considered a truly representative sample. However, analysis of these 17 adults and eight juveniles does indicate that there was good general health amongst these 25 individuals at least – those few with bad dental health were probably individually predisposed to dental problems, rather than exposed to environmental or dietary factors. The fractured tibia of Grave 44 had healed strongly and fully, leaving him with no lasting problem. The age range of these 25 individuals does not reflect that of the society as a whole, due to the small sample size. However, the fact that three individuals reached Older Adult status does indicate that longer lives could be enjoyed by at least some of the population.

## RADIOCARBON DATING

An extensive programme of radiocarbon dating was undertaken at Thornybank cemetery. Thirty-two samples of human bone were submitted for analysis (Table 6; illus 39). Reliable dates were




ILLUS 39 Radiocarbon dates from Thornybank

obtained from 30 graves spread across the cemetery. Very few large suites of dates for a cemetery of this period have been previously obtained and the dating programme for Thornybank is the most extensive yet undertaken on a cemetery of this type in Scotland. It is also only recently that excavated individual cists or small groups of cists have begun to be routinely dated, thus providing a fuller record of dates of long cists from this period. The only comparable site that has been as extensively dated is Hallow Hill in St Andrews (Proudfoot 1996) which produced two dates from the sixth century AD, 14 in the seventh, two in the eight and one in the ninth. The Catstane in Midlothian (Cowie 1978) had five graves dated, the youngest and oldest of which are included below (Table 7).

TABLE 6
Radiocarbon dates from Thornybank

| Lab No | Grave No | Uncalibrated determination (BP) | Calibrated range (1sigma) all AD | (2 sigma) all AD | $\delta^{13}C$ (per mil) |
|---|---|---|---|---|---|
| OxA-8152 | 1 | 1705 ± 45 | 320–400 | 230–430 | −20.5 |
| OxA-8153 | 2 | 1600 ± 40 | 410–530 | 340–560 | −20.5 |
| OxA-8664 | 3 | 1560 ± 35 | 430–540 | 420–600 | −20.1 |
| OxA-8665 | 4 | 1490 ± 40 | 535–620 | 430–650 | −20.4 |
| OxA-8154 | 5 | 1590 ± 40 | 420–530 | 380–570 | −20.6 |
| OxA-8653 | 9 | 1525 ± 30 | 460–490 | 430–620 | −20.1 |
| OxA-8186 | 10 | 1595 ± 35 | 410–530 | 390–550 | −20.0 |
| OxA-8155 | 14 | 1255 ± 40 | 680–790 | 670–880 | −20.2 |
| OxA-8723 | 23 | 1425 ± 55 | 595–665 | 530–720 | −20.1 |
| OxA-10160 | 27 | 1581 ± 36 | 420– 530 | 400–560 | −20.3 |
| OxA-8724 | 28 | 1500 ± 45 | 530–640 | 430–650 | −20.4 |
| OxA-8188 | 34 | 1460 ± 40 | 560–635 | 450–660 | −20.5 |
| OxA-8787 | 37 | 1555 ± 40 | 430–550 | 420–600 | −20.4 |
| OxA-8187 | 45 | 1410 ± 35 | 613–656 | 560–670 | −20.7 |
| OxA-8654 | 46 | 1550 ± 35 | 430–550 | 420–600 | −19.9 |
| OxA-8189 | 48 | 1430 ± 40 | 595–655 | 550–670 | −20.6 |
| OxA-8666 | 52 | 1475 ± 35 | 560–640 | 530–660 | −20.1 |
| OxA-8667 | 53 | 1495 ± 40 | 535–620 | 430–650 | −20.1 |
| OxA-8788 | 54 | 1545 ± 35 | 430–560 | 420–600 | −20.5 |
| OxA-8789 | 56 | 1610 ± 40 | 480–540 | 340–560 | −20.3 |
| OxA-10161 | 58 | 1578 ± 34 | 420–530 | 400–550 | −20.4 |
| OxA-8190 | 60 | 1480 ± 35 | 450–650 | 545–620 | −20.6 |
| OxA-8191 | 67 | 1395 ± 35 | 595–680 | 621–663 | −20.7 |
| OxA-8192 | 68 | 1610 ± 35 | 340–550 | 480–530 | −20.4 |
| OxA-8193 | 72 | 1600 ± 40 | 340–560 | 410–530 | −20.7 |
| OxA-8194 | 73 | 1485 ± 35 | 450–650 | 545–615 | −20.7 |
| OxA-8655 | 90 | 1560 ± 30 | 420–600 | 460–540 | −20.4 |
| OxA-8668 | 99 | 1650 ± 40 | 320–540 | 340–440 | −20.4 |
| OxA-8690 | 106 | 1510 ± 35 | 430–640 | 530–620 | −20.6 |
| OxA-8935 | 32 | 1599 ± 38 | 380–570 | 480–540 | −20.6 |

## CEMETERY DISCUSSION

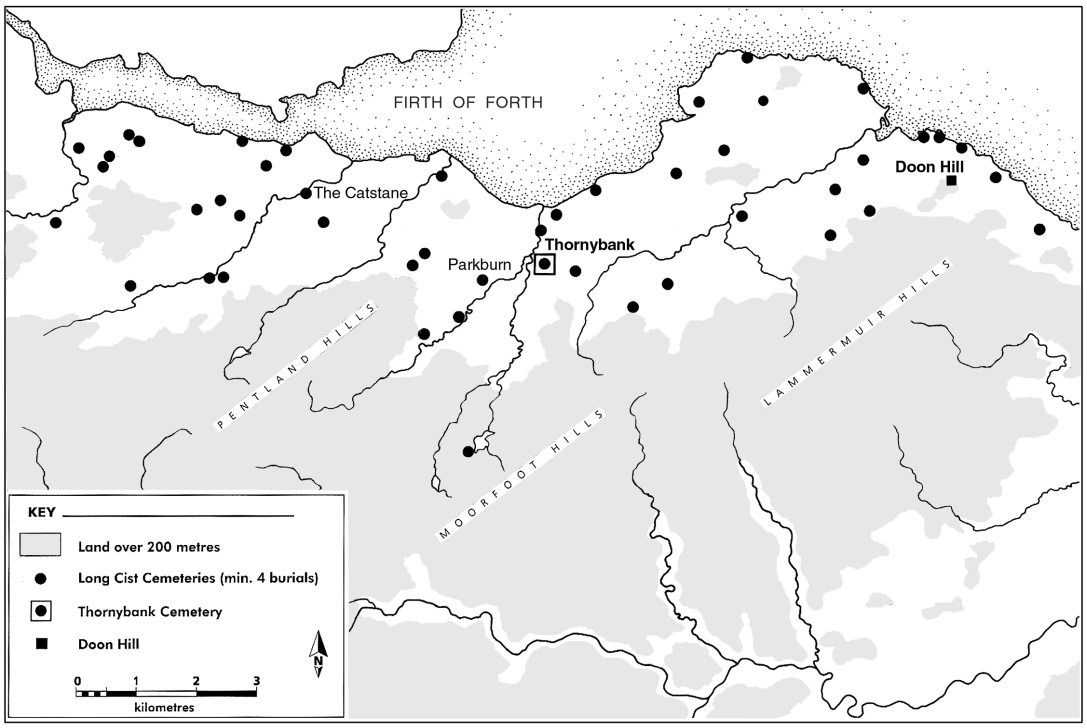
Since records began to be compiled in the 18th century, long-cist cemeteries, isolated single cists and groups of long cists have been frequently revealed by intensive farming, industrial activity and sand and gravel quarrying. Long-grave cemeteries, normally identified as being Early Christian in south-east Scotland, are usually located on low mounds or raised open areas with a sand or light gravel subsoil. These cemeteries often contain up to 200 inhumations in the form of extended burials within stone-lined long cists and, occasionally, unlined 'dug' graves. The burials themselves are usually placed with the head to the west. A lack of grave goods reflects Christian tradition. Thornybank cemetery is located centrally amidst the densest concentration of long-cist cemetery sites in Scotland (illus 40). Three sites within this area, The Catstane, Parkburn, and Thornybank, all containing numerous burials, have now been excavated using modern methods.

In 1956 Audrey Henshall listed all the then-known, long-cist cemeteries in Scotland. She used six burials as a minimum number for sites to qualify for inclusion as a cemetery. In the updated list of cemeteries for the Lothians presented here, a minimum of four burials is used as an indication of a cemetery: only two sites are included which have fewer than six burials. More cemeteries and groups of burials have come to light since the 1950s, and 48 long-cist cemetery sites in the Lothians are now listed in the National Monuments Record of Scotland. In arriving at this total, any sites that

TABLE 7

Dates from other long cist cemeteries, dug and square ditched graves

| Site | Lab No | Context | Uncalibrated determination (BP) | Calibrated range at 2 sigma (all AD) | Material |
|---|---|---|---|---|---|
| Plas Gogerddan, Wales. Square ditched burial (Murphy 1992) | CAR-1045 | 231 | 1580 ± 60 | 265–640 | Fibrous wood material from coffin stain. |
| Tandderwen, Wales. Square ditched burial (Brassil 1991) | CAR-984 | Grave | 1440 ± 60 | 433–680 | Fibrous wood material from coffin stain. |
| Long cists from Avonmill Rd Linlithgow, W Lothian (Dalland 1993) | GU-3098 | Cist 1 | 1560 ± 50 | 400–615 | Human Bone |
| | GU-3099 | Cist 2 | 1600 ± 50 | 345–600 | Human Bone |
| Galson long cist cemetery, Lewis (Neighbour et al forthcoming; Ponting & Bruce 1989) | GU-7401 | Gals 96 | 1850 ± 50 | 60–316 | Human Bone |
| | GU-7400 | Gals 93 | 1770 ± 60 | 110–410 | Human Bone |
| | GU-2115 | Gals 89/2 | 1710 ± 70 | 130–530 | Human Bone |
| Hallow Hill, St Andrews, Fife (Proudfoot 1998). (Earliest and latest burials) | GU-1868 | 107B | 1490 ± 50 | 430–660 | Human Bone |
| | GU-1853 | 48/1 | 1175 ± 50 | 693–980 | Human Bone |
| The Catstane, Midlothian (Cowie 1978) | GU-1156 | F7 | 1585 ± 60 | 390–585 | Human Bone |
| | GU-1158 | F12 | 1550 ± 70 | 415–590 | Human Bone |
| Lundin Links, Fife (Greig et al 2000) | Ox-A8895 | Cist G | 1560 ± 40 | 440–600 | Right Femur |
| | Ox-A8896 | Cist A | 1455 ± 35 | 565–660 | Left Femur |
| | Ox-A8897 | Cist J | 1550 ± 35 | 445–600 | Right Femur |
| | Ox-A8904 | Cist P | 1610 ± 40 | 340–560 | Left Femur |
| | Ox-A8898 | Cist H | 1600 ± 30 | 400–540 | Left Femur |
| Boysack Mills, Angus (Murray & Ralston1997) | GU-1301 | Square Enclosure | 930 ± 105 | 900–1285 | Mixed brushwood |
| | GU-1514 | Square Enclosure | 720 ± 90 | 107–1420 | Mixed brushwood |




ILLUS 40 Long cist cemeteries south of the Forth Estuary

lack proper records or secure archaeological evidence have been excluded. If such sites, often only mentioned in Statistical Accounts and other parish records were to be included, the total number would be much higher.

Further cemeteries of this series have been recognized on, and are known solely from, aerial photographs, for example, that at Sprouston in Roxburghshire (Smith 1992). New examples continue to come to light, sometimes on projects focused on remains of different periods. During February 2001, for example, part of an extensive cemetery with over 35 long cists and several dug graves was discovered near Fenton Tower in East Lothian; this site may prove to contain as many as 200 or 300 graves. Evaluation trenches were excavated to assess the extent of the cemetery and both long-cist burials and occasional dug graves were uncovered (Suddaby 2001).

North of the Forth, in Fife, there are more than 25 known long-cist cemeteries, notable amongst these being the cemetery at Hallow Hill, St Andrews (Proudfoot 1996) where 125 burials were excavated, producing radiocarbon dates distributed throughout the first millennium AD, with a notable *floruit* in the seventh century AD. The cemetery site at Lundin Links in Fife has produced graves of a similar type to those from Thornybank, with broadly contemporaneous dates; excavations during 1965 and 1966 also revealed a number of square and round cairns and long cists (Greig et al 2001). The Thornybank cemetery shares traits that have been seen at other nearby cemeteries such as the re-use of dressed Roman bath-house arch slabs (illus 16–17) as cist slabs, mirroring those recovered from a similar context at nearby Parkburn (Henshall 1956). For Thornybank, either the nearby site of Elginhaugh with its associated bath-house (Frere 1985) or the settlement at Inveresk (Bishop 2002) may have been source of the voussoirs re-used as grave slabs. While

radiocarbon dates for particular graves can allow us to establish approximate dates for individual deaths, the religious beliefs of the person interred can only ever be hypothesized from an examination of the burial rite. The practice of extended inhumation in long cists or unlined dug graves, aligned approximately east/west and lacking grave goods, is fairly widespread throughout Britain and Ireland by the fourth and early fifth centuries AD (Thomas 1971). In Scotland too, burial in long cists is a fairly widespread rite, and, while the densest concentration is in the south-east of the country, notable examples are recorded from several other areas. Whithorn (Hill 1997) in the south-west, Galson (Neighbour et al 2000) on the Isle of Lewis, and Ackergill in Caithness (Edwards 1927), for example, are amongst the more geographically far-flung and earliest dated long-cist sites in Scotland. At Whithorn, some of the earliest graves have been dated to the sixth century AD. Amongst these were examples containing split log coffins, set in dug graves similar to those excavated at Thornybank; at Whithorn, these graves were interpreted as of high status by the excavator (Hill 1997). Circular ditched graves excavated at Newton on Islay contained unlined dug graves with body stains within them (McCullagh 1989). Five dug graves, apparently of a similar type, were encountered at Inveresk (Gallagher & Clarke 1993) but were only seen in section. The second-century AD Roman pottery recovered during this small-scale excavation may either be residual, or, indicate a particularly early adoption of the inhumation rite, which did not reach Roman Britain until the late second century. The occupants may have belonged either to the fort garrison of Inveresk or the civilian population of the *vicus* (Thomas 1988).

The concentration of large long-cist cemeteries – the first substantial cemeteries containing over 30 individual graves of any period in the Scottish archaeological record – in the Lothian plain possibly indicates three things: a large settled population during the mid-first millennium; the rapid adoption of an largely egalitarian burial rite among a settled organized population; and the widespread adoption of Christianity. A combination of all three factors was probably at work, in conjunction with the large-scale settlement of the Lothians by Angles from the seventh century AD onwards, which may have given further impetus to the tradition. Archaeological evidence for the Anglian advance has been found on sites such as Doon Hill (illus 40) (Hope-Taylor 1980), south of Dunbar, where a timber hall similar to those at Yeavering was discovered overlying an earlier timber hall and located close to a later prehistoric defended settlement; possible dug graves were revealed on aerial photographs outside the palisade surrounding the building (Perry 2001).

### SQUARE BARROWS/SPECIAL GRAVES

Another notable aspect of the Thornybank cemetery is the presence of the special graves, the two square enclosure burials (Grave 62 & 114), the four-posted burial (Grave 16) and the dug graves which surround them. Graves with a similar square or slightly rectilinear enclosure (square barrows) were, before the Thornybank excavation, practically unknown in Scotland south of the Forth. Numerous cropmark examples are however, known from aerial photography from Inverness-shire to Fife with a possible example noted from aerial photographs in Dumfries & Galloway (Cowley 1996), suggesting that the distribution may yet prove to be wider. The densest concentration of square barrow cropmarks as presently known occurs in Angus and two sites with square-ditched burials have been excavated in the Lunan valley, at Boysack Mills (Murray & Ralston 1997) and Redcastle (Alexander & Rees 1997; Alexander 1999). A further possible square-ditched grave was excavated in 1994 near Longforgan to the west of Dundee (Neighbour 1994); however, no human remains were recovered from this damaged example. Although very similar in plan

to those at Thornybank, some of the characteristics of the excavated Angus graves were slightly different; notable was the existence of causeways at the corners of the graves at Redcastle, while the barrows excavated at Boysack Mills were delimited by irregular shallow ditches containing no post-holes and no timber slots.

The main square barrow at Redcastle (Alexander 1999) produced two calibrated radiocarbon ranges, both for square barrow (SB)1 (AD 430–570 (OxA-8140) & AD 430–600 (OxA-8141)) which overlap with over half the date ranges from Thornybank. Further graves enclosed within truncated square and round barrows were excavated at Redcastle, as were unenclosed long-cist graves. Dating evidence pointed towards the unenclosed graves at Redcastle being slightly later than the main, female grave within the largest square barrow (SB1). This tends to confirm the widely held belief that the square-ditched burials sited on the east coast of Scotland (and particularly Angus) fall within a distinct geographical area and chronological period, shared with the Pictish sculpted stones.

Burials of a type similar to Grave 114 at Thornybank have also been excavated at Ackergill near Caithness and Sandwick on Unst in Shetland (Bigelow 1984) and have been referred to as 'platform cairns'. This term was originally coined by Hogg (1977) and was applied to burials from Wales (Close-Brooks 1984).

Some of the closest structural parallels for the Thornybank special graves and the Pictish square barrows of eastern Scotland have been excavated in Wales, while Grave 16 has a close possible parallel in Germany. Three sites in Wales in particular produced graves very similar in type and form to the Thornybank square-ditched Graves 62 and 114.

A possible parallel for Grave 16 was excavated in Germany in the large Early Christian Reihengräberfeld (cemetery with graves set in rows) at München-Aubing on the outskirts of Munich (Dannheimer 1967). A dug grave with no grave goods excavated at this site had four corner posts, which the excavator had proposed could be reconstructed as a small wooden mortuary structure known as a *'Totenmemoria'*. Graves with post settings overlying them appear in continental second-Iron-Age graves in mainland Europe. These post settings have been explained either as supports for small structures or as simple settings for individual posts, which may have served as grave markers (Waldhauser 1987). However, four-post settings such as the one surrounding Grave 16 are extremely rare. No other examples of this grave type have been excavated or are known in the British Isles, and they remain relatively rare in Europe. However, close parallels do exist in Scotland, such as the graves with four boulder settings excavated at Garbeg, Drumnadrochit (Wedderburn & Grime 1984).

Three Welsh sites furnish good parallels for square-ditched graves 114 and 62: Plas Gogerddan; Tandderwen; and Llandegai. At Plas Gogerddan in Dyfed (Murphy 1992) a special grave (no 373) produced evidence for a timber slot within its square enclosure. It also had an entrance on the eastern side flanked by two post-holes surrounding an east/west-aligned dug grave. Just inside the threshold marked by the two posts was a small stone-lined pit, which had evidence of timber staining within its fill. This staining was interpreted as evidence for the former presence of a wooden box. Two other dug graves were excavated nearby which provided evidence for a rectangular slot surrounding the graves, with one such structure (375) producing a pit similar in size and position to the grave found within structure 373. At that site, dug graves were also sited around these special graves in rows aligned north/south: a radiocarbon date of $1580 \pm 60$ BP (CAR-1045) was obtained from the fibrous coffin stain of unenclosed dug grave 229.

At Tandderwen (Brassil et al 1991), a Bronze Age round barrow had been modified with an enclosing square ditch dug around it

while immediately to the north were nine graves, each enclosed by a further square ditch. Amongst these were scattered up to 25 dug graves with coffin stains, one of which provided a calibrated range of AD 433–680 (CAR-984, 1440 ± 60 BP). This admixture of square barrows and less structurally elaborate graves matches the Thornybank evidence.

The similarities between, for example, Tandderwen, Grave 62 at Thornybank, and SB1 at Redcastle (Alexander & Rees 1997) for example are striking, especially when the sections across the graves and surrounding ditches are compared.

At Llandegai in Gwynedd (Houlder 1968) a cemetery of up to 60 dug graves was laid out in a very similar manner to those encountered at Thornybank. The excavator, however, interpreted a square-ditched feature here not as a grave but as a timber chapel. If Grave 62 had been the only square-ditched grave excavated at Thornybank then it too might have been proposed as a possible early timber chapel fortuitously incorporating a single grave. At Llandegai, the square-ditched feature lay at the edge of the trench and there may well have been other examples beyond the excavated area.

With several Welsh parallels for the graves at Thornybank it is interesting to note that when Inveresk and its dependent lands (ie Inveresk *naoir*, Inveresk *minor*, Smeaton (Thornybank), Carberry, Wymet, and Cousland) were given to the Abbey of Dunfermline by Malcolm III in 1129 it was as six settlements or *vills*. This would seem to imply that Malcolm III gave the Abbey at Dunfermline territory organized using a land unit of a type similar to those known in early medieval Wales (Aliaga-Kelly 1986). Although this donation occurred much later than the period at which the cemetery was in use, it is important to note, nonetheless, as it demonstrates a further shared trait between Wales and the Lothian area in the first millennium AD.

A less tentative and more easily identifiable link is the one between the Pictish graves of the east coast such as those excavated at Redcastle (Alexander & Rees 1997) and the square-ditched graves from Thornybank. Thornybank is the first identifiable site south of the Forth demonstrating a further link between what are considered to be essentially Pictish grave styles and the large cemeteries containing graves of Parkburn type that are usually, and perhaps unsatisfactorily, termed Early Christian.

## CONCLUSION

The cemetery at Thornybank has benefited greatly from an extensive suite of radiocarbon dates, which has allowed a large series of graves of this type to be placed properly within a first millennium AD framework. Nothing suggests the cemetery began much earlier; nor is there any indication from this site that the cemetery continued in use into the medieval period. Notable aspects of the cemetery include the two square-ditched graves, a four-poster grave and the appearance of unlined, log coffin graves; traits all previously rare, and some potentially of high status.

Analysis of the skeletal material has revealed a population that was predominantly healthy (insofar as can be told from skeletal material), with few or no signs of heavy physical work or strain during their lives. Radiocarbon dating of these skeletal remains has produced a concentration of calibrated radiocarbon ranges within the mid-first millennium AD. The unusual concentration of dates around AD 450–550 allows the writer to infer either that there was a peak in population and consequent cemetery use around this time, or, that there was a noticeable increase in the death rate due to epidemic disease around the fifth and sixth centuries AD (Keys 2000). Either explanation is possible. A further, hypothesis is that another cemetery elsewhere became the main focus for burial.

It is worth emphasizing here that the cemetery at Thornybank and the other large excavated long-cist cemeteries at Parkburn

and the Catstane represent the earliest large cemeteries, containing 50 or more burials, of any date yet known in Southern Scotland. We therefore see in the post-Roman period, the first large, superficially egalitarian cemeteries in Scotland. In contrast to earlier periods, during which the display of items indicative of ascribed or achieved status seems to have been important (at the moment of burial at least), and where the form of the barrow or other grave furniture may also have been important, this change seems significant.

The suite of dates from Thornybank confirms the generally accepted view that long-cist cemeteries were principally used during the fourth to eighth centuries AD. Radiocarbon dating has demonstrated that the cemetery at Thornybank was in use for a fairly restricted period of time, with a notable peak in the middle of the first millennium. It is noteworthy that there are no intercutting graves at Thornybank and, in conjunction with relative intensity of use we must consider the use of grave markers and/or a degree of 'custodial care' of the cemetery in order to prevent intercutting.

Perhaps the most important outcome of the excavations at Thornybank has been the widening of the known distribution of square-ditched burials within Scotland. The presence of the square-ditched grave implies a wider adoption of the square-ditched burial tradition than has been previously considered tenable from the field evidence. We may in fact have to alter our rather simplistic geographical, secular and possibly religious divisions, marked by changes in funerary rites between Later Iron Age/Pictish groups and 'Early Christians', as being indicative of distinctly separate north and south populations. Rather, there appears to be far more closely comparable continuity of tradition and development of burial style on both sides of the Forth estuary.

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## APPENDIX: Graves register

In the absence of skeletal remains, the approximate age group has been estimated depending on the grave dimensions. Radiocarbon dates, for skeletal material, are cited uncalibrated at a single standard deviation.

| Grave No | C14 Date (BP) | Burial type SC Stone Cist U Unlined S Special I Infant | Gender/Age/Height Estimate (by grave dimension) S = Skeletal material present | Dimensions (Length, Width, Depth) |
|---|---|---|---|---|
| 1 | 1705 ± 45 | SC | (S) Young adult/undetermined sex | See text for detailed description |
| 2 | 1600 ± 40 | SC | (S) Adult/undetermined sex. 1.65m to 1.68m in height. | 2.10m/0.61m/0.29m |
| 3 | 1560 ± 35 | SC | Adult | 1.86m/0.62m/0.29m |
| 4 | 1490 ± 40 | SC | (S) Young Adult Female 1.58m in height | See text for detailed description |

| Grave No | C14 Date (BP) | Burial type SC Stone Cist U Unlined S Special I Infant | Gender/Age/Height Estimate (by grave dimension) S = Skeletal material present | Dimensions (Length, Width, Depth) |
|---|---|---|---|---|
| 5 | 1590 ± 40 | U | Adult | 2.34m/0.62m/0.10m |
| 6 | | U | Adult | 2.32m/0.80m/0.20m |
| 7 | | SC | Adult | 2.0m/0.50m/0.60m |
| 8 | | I | Infant | 0.80m/0.30– 0.40m/0.15m |
| 9 | 1525 ± 30 | SC | (S) Young adult Female | 1.80m/0.50–0.60m/0.40m |
| 10 | 1595 ± 35 | SC | (S) Possible Adult Female | 1.90m/0.65m/0.25m |
| 11/A & 11/B | | SC | Two Adults | 2.60m/1.60m/0.40m |
| 12 | | SC | Adult | 2.20m/0.78m/0.45m |
| 13 | | U | Adult | 1.70m/0.60m/0.20m |
| 14 | 1255 ± 40 | U | Adult | 1.95m/0.76m/0.20m |
| 15 | | SC | Adult | 1.56m/0.60m /0.10m |
| 16 | | 'Special' four posted grave | Adult | See text for detailed description. |
| 17 | | I | Infant | 0.82m/0.30m/0.07m |
| 18 | | SC | Young Adult Female | 1.70m/0.50–0.58m/0.20m |
| 19 | | SC | Infant | 0.90m/0.56m/0.10–0.15m |
| 21 | | SC | Infant | 0.66m/0.30–0.40m/0.18m |
| 22 | | SC | Adult | Unexcavated grave sited underneath the baulk |
| 23 | 1425 ± 55 | SC | Adult | 1.85m/0.75m/0.45m |
| 24 | | SC | Infant | 0.75m/0.34m/0.18m |
| 25 | | SC | Adult | 1.87m/0.55m/0.25m |
| 26 | | SC | Adult | 1.65m/0.60m/0.35m |
| 27 | 1581 ± 36 | SC | Adult | 1.95m/0.63m/0.35m |
| 28 | 1500 ± 45 | SC | (S) Young adult Male | 1.95m/0.70m/0.35m |
| 29 | | SC | (S) Middle adult Male | 0.85m/0.60m/0.28m |
| 30 | | SC | (S) Young adult | 1.80m/0.60m/0.35m |
| 31 | | SC | (S) Young Adult | 2.10m/0.70m/0.40m |
| 32 | 1599 ± 38 | SC | (S) Young Adult | 1.75m/0.55m/0.40m |
| 33 | | SC | (S) Young Adult Female | 1.80m/0.55m/0.34m |
| 34 | 1460 ± 40 | SC | (S) Adult Female | 1.90m/0.60m/0.25m |
| 35 | | I | (S) Infant | 0.85m/0.38m/0.18m |
| 36 | | SC | (S) Juvenile | 1.58m/0.52m/0.36m |
| 37 | 1555 ± 40 | SC | (S) Adult Female | 1.78m/0.62m/0.28m |
| 38 | | I | (S) Infant | 0.83m/0.53m/0.23m |
| 39 | | I | Infant | 0.82m/0.42m/0.18m |
| 40 | | SC | Adult | 1.97m/0.62m/0.26m |
| 42 | | SC | Adult | 2.15m/0.70m/0.50m |
| 43 | | SC | (S) Adult Female | 2.10m/0.85m/0.35m |
| 44 | | SC | (S) Adult Male | 2.05m/0.80m/0.35m |
| 45 | 1410 ± 35 | SC | (S) Adult Female | 1.90m/0.70m/0.38m |
| 46 | 1550 ± 35 | SC | Young Adult Female | 1.80m/0.60m/0.34m |
| 47 | | SC | Young Adult Female | 1.91m/0.61m/0.29m |
| 48 | 1430 ± 40 | SC | Adult | 1.92m/0.58m/0.30m |
| 49 | | SC | (S) Young Juvenile | 1.30m/0.49m/0.40m |
| 50 | | I | Infant | 0.90m/0.45m/0.27m |
| 51 | | SC | Infant | 0.85m/0.40m/0.24m |
| 52 | 1475 ± 35 | SC | Adult | 1.60m/0.43m/0.18m |
| 53 | 1495 ± 40 | SC | (S) Middle Adult | 1.68m/0.65m/0.38m |
| 54 | 1545 ± 35 | SC | (S) Young Adult Male | 1.80m /0.60m /0.30m |
| 55 | | SC | (S) Adult Male | 2.05m/0.58m/0.40m |
| 56 | 1610 ± 40 | SC | (S) Adult | 1.90m/0.65m/0.32m |
| 57 | | I | Infant | 0.70m/0.40m/0.32m |
| 58 | 1578 ± 34 | SC | (S) Juvenile aged between 7 & 9 years old | 1.40m/0.48m/0.18m |
| 59 | | U | (S) Adult | 2.0m/0.65m/0.16m |

| Grave No | C14 Date (BP) | Burial type SC Stone Cist U Unlined S Special I Infant | Gender/Age/Height Estimate (by grave dimension) S = Skeletal material present | Dimensions (Length, Width, Depth) |
|---|---|---|---|---|
| 60 | 1480 ± 35 | SC | (S) Adult Female | 1.65m/0.43m/0.45m |
| 61 | | U | Adult | 2.05m/0.60m/0.50m |
| 62 | | S | Adult | See text for detailed description |
| 63 | | I | Infant | 0.79m/0.45m/0.20m |
| 64 | | SC | (S) Adult | See text for detailed description |
| 65 | | SC | This grave was unexcavated as it was emerging from the section | Unexcavated |
| 66 | | SC | This Adult grave was unexcavated as it was emerging from the section | Unexcavated |
| 67 | 1395 ± 35 | SC | (S) Young adult | 2.10m/0.85m/0.25m |
| 68 | 1610 ± 35 | SC | (S) Juvenile | 1.75m/0.45m/0.23m |
| 69 | | I | Infant | 0.75m/0.40m/0.20m |
| 70 | | I | Infant | 0.90m/0.39m/0.08m |
| 71 | | I | Infant or Neonate | See text for detailed description |
| 72 | 1600 ± 40 | SC | (S) Juvenile aged between 6 and 8 years old | 1.50m/0.50m/0.24m |
| 73 | 1485 ± 35 | SC | (S) Adult | 1.78m/0.60m/0.20m |
| 74 | | U | Adult | 1.90m/0.60m/0.15m |
| 75 | | U | Adult | 1.86m/0.79m/0.16–0.24m deep |
| 76 | | U, I | Infant | 1.84m/0.78m/0.26m |
| 77 | | U, I | Infant | 1.39m/0.52m/0.14m |
| 78 | | U | Juvenile | 1.18m/0.40m/0.12m |
| 79 | | SC | Adult | 1.93m/0.62m/0.31m |
| 80 | | I | Infant | 1.06m/0.38m/0.18m |
| 81 | | U | (S) Dental fragments indicate a juvenile of around 10 to 12 years and a mature adult | 1.05m/0.85m/0.64m |
| 83 | | U, I | Infant | 0.70m/0.54m/0.12m |
| 84 | | U | Adult | 2.52m/0.92m/0.52m |
| 85 | | U | Adult | 2.10m/0.92m/0.22m. |
| 86 | | U | Juvenile | 1.10m/0.45m/0.13m |
| 87 | | U | Adult | 2.20m/0.85m/0.95m |
| 88 | | SC | A young adult male | 1.42m/0.70m/0.22m |
| 89 | | U | Juvenile | 1.74m/0.34m/0.15m |
| 90 | 1560 ± 30 | U | (S) Aged between 12 and 16 years old | 2.40m/0.70m/0.27m |
| 91 | | U | Juvenile | 1.31m/0.71m/0.24m |
| 92 | | U | Adult | 1.92m/0.70m/0.26m |
| 93 | | I | Infant | 0.78m/0.55m/0.09m |
| 94 | | U | Adult | See text for detailed description |
| 95 | | U | Juvenile | 1.70m/0.69m/0.38m |
| 96 | | U | Adult | 1.80m/0.68m/0.32m |
| 97 | | U | Juvenile | 1.15m/0.38m/0.10m |
| 99 | 1650 ± 40 | U | Adult | 2.0m/0.65m/0.48m |
| 100 | | U | This grave appeared to consist of two infants laid end to end within the same burial | 1.20m/0.55m/0.10m |
| 104 | | U | Adult | 1.05m/0.80m/0.15m |
| 105 | | SC | Adult grave | Only a small part of this grave was emerging from the section |
| 106 | 1510 ± 35 | U | (S) Adult | 2.12m/0.82m/0.18m |
| 108 | | U, I | Infant | See text for detailed description |
| 109 | | U | Adult | 2.15m/0.75m/0.25m |
| 110 | | U | Adult | 2.35m/0.85m/0.32m |
| 111 | | U | Adult | See text for detailed description |
| 113 | | SC, I | Infant | 0.72m/0.50m/0.25m |
| 114 | | U, S | Infant | See text for detailed description |
| 115 | | U | Adult | See text for detailed description |
| 116 | | U | Adult | 2.05m/0.75m/0.34m |

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