

Excavation of Neolithic and Bronze Age settlement features at Lamb's Nursery, Dalkeith, Midlothian

Murray Cook*

with contributions by A Duffy, C Ellis, A MacSween, D Rankin & T Rees

ABSTRACT

Remains of a prehistoric timber roundhouse were identified on a proposed development site in 1992 by Glasgow University Archaeological Research Division (GUARD). In accordance with planning conditions an archaeological excavation by AOC Archaeology was undertaken in 1998, on behalf of Redrow Homes (Scotland) Ltd. Subsequent excavation of a small extension to the main area of investigation was funded by Historic Scotland. The excavation identified the remains of at least two timber roundhouses, one of which was dated to the mid second millennium BC. The site also contained a Neolithic structure and series of pits, some of which contained fragments of Grooved Ware pottery.

INTRODUCTION

An archaeological evaluation was conducted by Glasgow University Archaeological Research Division (GUARD) in advance of a proposed housing development at Lamb's Nursery, Dalkeith, Midlothian, in 1992. The evaluation identified a putative prehistoric timber roundhouse (Smith 1992). In 1998 an archaeological excavation over the area of the putative roundhouse was undertaken by AOC Archaeology. During the course of this work a series of pits containing Neolithic pottery was also identified, along the north-east edge of the excavation trench. Redrow Homes (Scotland) Ltd funded an extension to the excavation — outwith the area covered by the planning consent — and further features were uncovered. Consequently, Historic Scotland funded the excavation of an additional extension to explore the full extent of these features (illus 1).

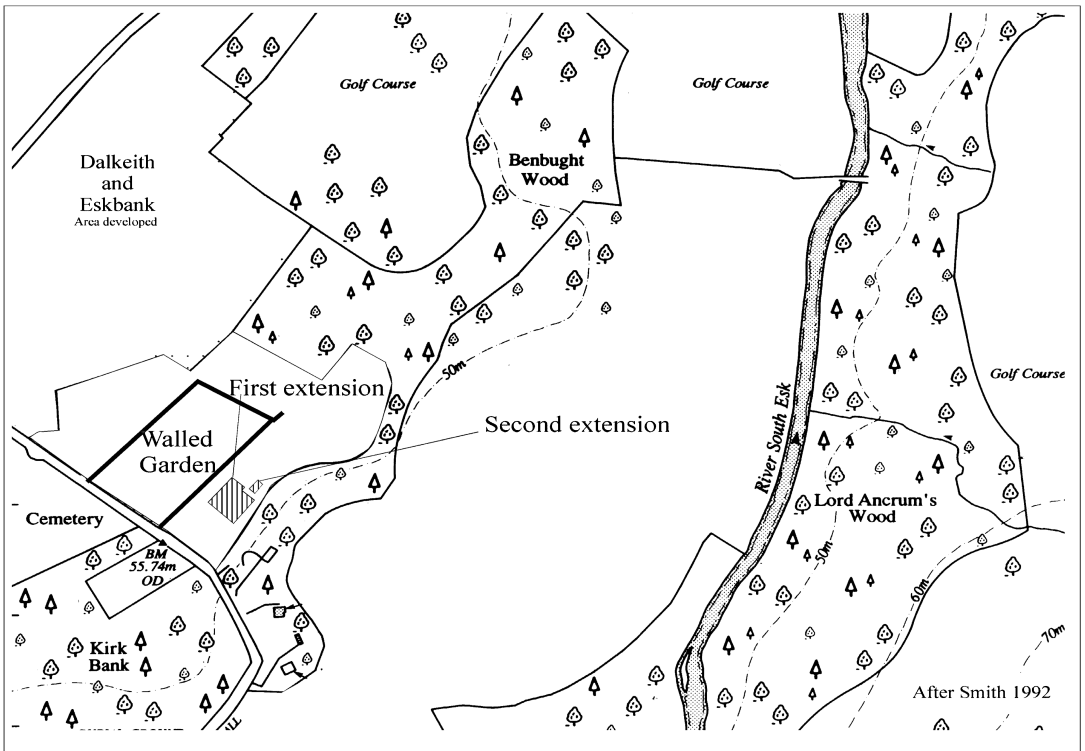
The site is located south of Eskbank and Dalkeith on the Newbattle Road (illus 1), and is situated on the very edge of the South Esk river valley, above its flood-plain on the 55 m OD contour line, and west of Benbught Wood (NGR: NT 331 663). Immediately to the north are the remains of a 19th-century walled garden, in an area previously comprising formal gardens, some 400 m north-west of the site of Newbattle Abbey.

The local soils are of the Rowanhill/Giffnock/Winton Associations, being brown forest soils derived from Carboniferous sandstones, shales, and limestones, with sub-soils comprised of compact gravel deposits (Bown & Shipley 1982, 112–13). The Macaulay Land Use Research

* AOC Archaeology, Edgefield Industrial Estate, Loanhead, Midlothian, EH20 9SY



ILLUS 1 Site location map (Based on the Ordnance Survey map © Crown copyright)



Institute assigns a capability of 3i to the soils around Dalkeith (ibid, 137–8), which indicates that they are capable of producing consistently high yields of a narrow range of crops, principally cereals and grass. The whole area was under cultivation at the time of GUARD’s evaluation in 1992 (Smith 1992, 3).

Prior to the evaluation and excavation described here, the development area contained no known archaeological monuments. The roundhouse itself was not recorded as a cropmark. However, there is extensive evidence in the area around Dalkeith for later prehistoric settlement

remains, eg, the unenclosed roundhouse and palisaded enclosure at Melville Nurseries, Dalkeith (Raisen & Rees 1995), the roundhouse and pit alignment at Thornybank, Dalkeith (Rees 1997) and the pit alignment at Eskbank Nurseries (Barber 1985).

By contrast there is very little evidence of early prehistoric activity in this area, apart from isolated finds. For example, a few scatters of worked flint and chert are known from later sites such as Castlesteads Park, Dalkeith (Rees 1995), or Elginhaugh, Dalkeith (Hanson 1987). There is also a polished flint adze from Inveresk, Musselburgh (NMRS NT 36 NW no 40) and four fragments of late Neolithic pottery were found during the construction of the Woodburn Housing Scheme in Dalkeith (Henshall 1967).

EXCAVATION METHODS

The excavation initially extended over an area measuring approximately 27 m by 27 m, centred on the features identified by GUARD's evaluation. This was cleared of topsoil to a depth of 0.5–0.8 m using a Caterpillar 360 degrees hydraulic excavator with a toothless bucket, under the supervision of an AOC Archaeology field officer. The upper surface of the sub-soil was then cleaned by hand and all archaeological features which could be identified were recorded in plan.

A concentration of archaeological remains continued beyond this area along its north-east edge (illus 2). In order to record the full extent of these features two extensions to the area were cleared using the same methodology. The first measured approximately 15 m long and 7 m wide and the second was 6 m wide and 12 m long.

Given that the proposed development would completely destroy the archaeological remains present all the sub-surface features identified were completely excavated. Soil samples were taken from all features, in order to wet-sieve for ecofacts and artefacts and to determine the soil chemistry of the site. Any remaining soil from features was dry-sieved on site using a 5 mm mesh to retrieve artefacts.

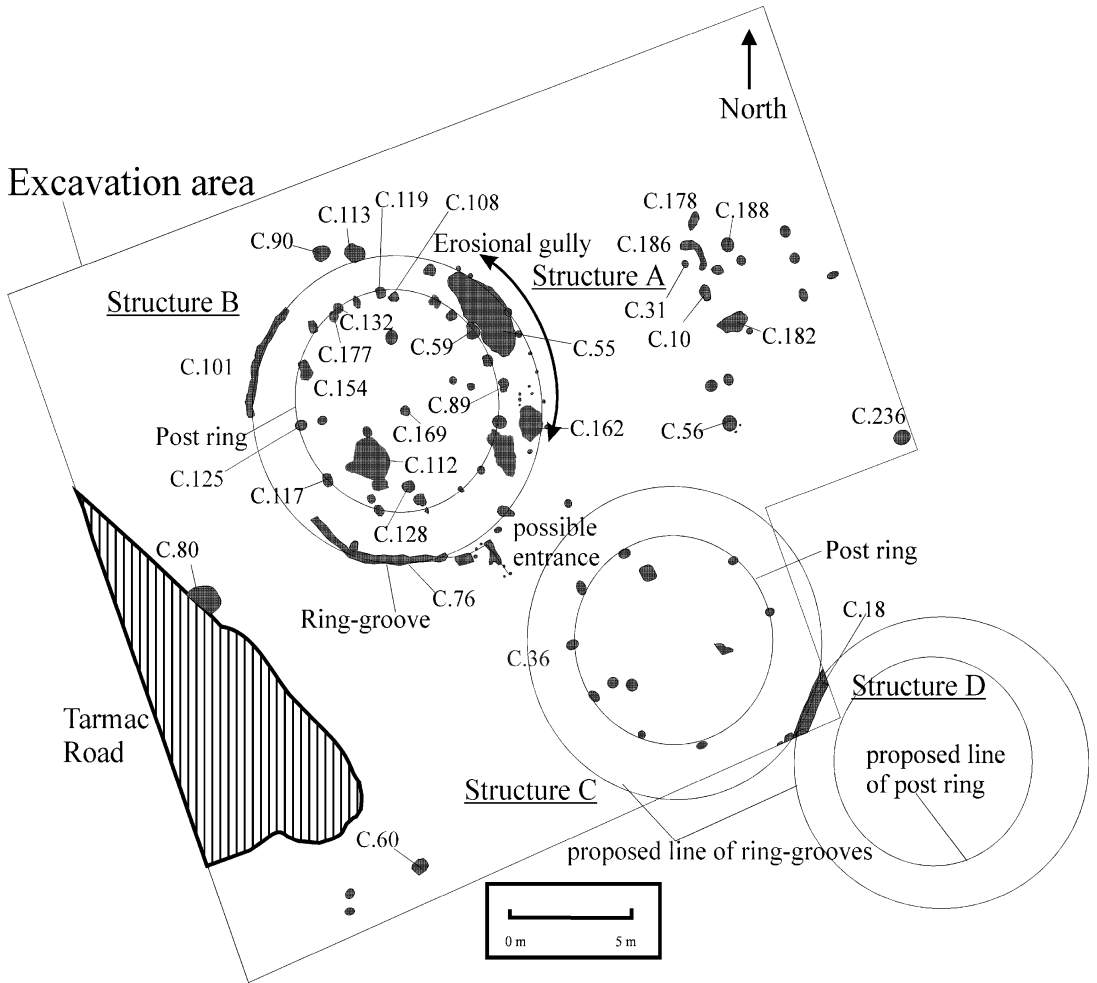
STRATIGRAPHIC SEQUENCE

The excavation and subsequent post-excavation analyses identified three significant phases of activity: Neolithic, Early Bronze Age, and Middle Bronze Age. The features have been broadly grouped into these phases by radiocarbon determinations, artefactual dating or proximity. The majority of these features bore no stratigraphic relation to each other and are simply associated on the basis of proximity and pattern, ie a series of post-holes forming a circle (illus 2).

The prehistoric remains identified on site comprised solely negative features. Clearly, every feature would have been dug from the contemporary land surface but evidence for the original level of that surface has been lost through agricultural activity. Between 0.5 m and 0.8 m of ploughsoil was removed by machine; however, as the site was previously under cultivation, it is possible that the volume of the topsoil was increased by the addition of fertilizers. To estimate the original depth of each feature, figures of 0.3–0.4 m for the depth of the original topsoil have been used. In profile or section drawings (illus 3–6) the estimated depth of each feature is shown as a dotted line.

NEOLITHIC ACTIVITY

Neolithic activity was recorded in three concentrations across the excavated area and comprised five securely dated features and a series of 15 other features in close proximity (illus 2).

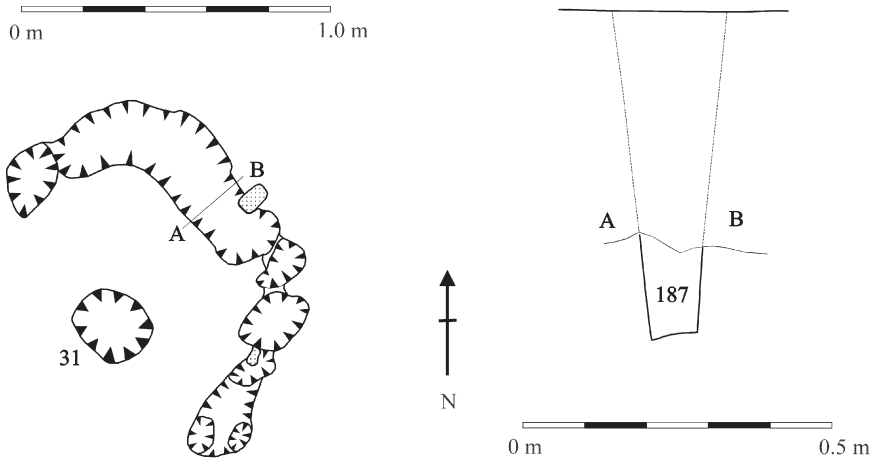


ILLUS 2 Plan of the excavated features with projected outlines of roundhouses (Structures B, C, & D)

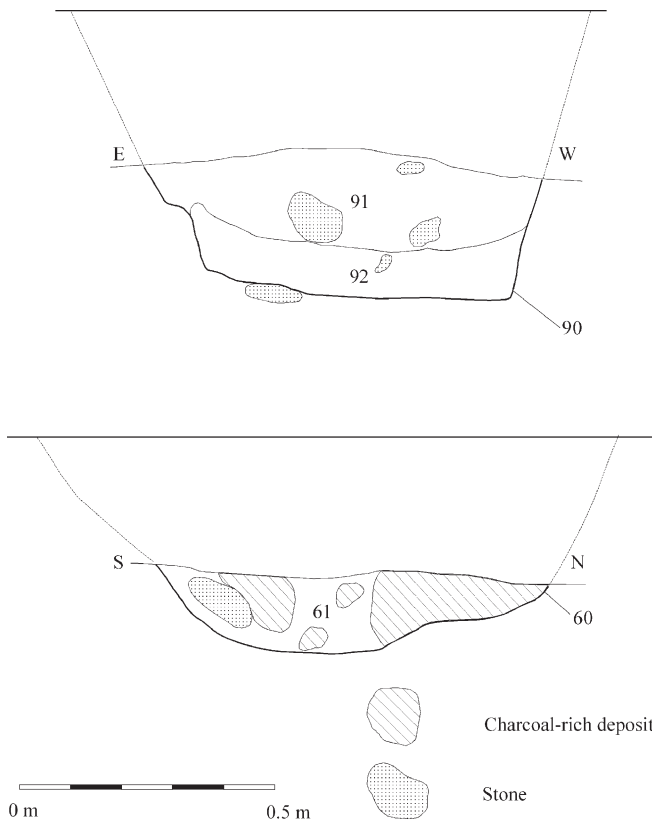
The first concentration clusters around an arcing slot measuring 1.4 m in length, up to 0.19 m wide and 0.1 m deep, and comprising a series of intercutting stake-holes. This remnant was labelled Structure A (illus 3). The cut was filled with a mid brown sandy soil (context 186) and contained three fragments of pottery from different vessels. An AMS date of 4130 ± 50 BP (AA-32604) was recorded for a fragment of oak charcoal from the fill. Immediately south-west of this arc was a single post-hole (context 31).

To the north and south of Structure A were two further Neolithic post-holes. One (context 10) contained the remains of a post-pipe and a single rim sherd of a Grooved Ware vessel. The second (context 188) contained four sherds from different vessels. With the exception of the post-pipe (context 11), which was charcoal-rich, the fills comprised a mid brown sandy soil.

Clustering around these three features were a further 14 pits, post- and stake-holes; all contained uniform mid brown fills with one exception (context 56), which was rich in shattered stones and charcoal.



ILLUS 3 Plan and section of a remnant of Structure A



ILLUS 4 Sectional profiles of Neolithic pits Context 90 (top) and Context 60 (bottom)

The second group of features was located close to the northern edge of the excavation trench and consisted of two charcoal-rich pits (contexts 90 & 113). Both of these contained two distinct fills, an upper loose brown sandy soil with numerous charcoal flakes and a lower stone-rich soil with a greater concentration of charcoal (illus 4). The lower fill of one pit (context 92) contained two pottery fragments from the same vessel, and a small concentration of charred hazelnut shells. A date of 4070 ± 110 BP (GU-8105) was retrieved from a bulk or amalgamated charcoal sample from this context.

The third group of features was located on the south-west fringe of the site and comprised two post-holes with uniform fills (contexts 72 & 74), and a small pit rich in charcoal and blackened stone (context 61; illus 4). A bulk date of 4510 ± 80 BP (GU-8102) was retrieved from charcoal from the fill of the latter.

EARLY BRONZE AGE

The next phase of activity on site is represented by a single pit (context 112) located within the roundhouse identified below as Structure B (illus 2). This feature was an irregular cut or hollow measuring 1.8 m by 1.3 m and up to 0.45 m in depth. It was filled with a light brown sandy loam, containing occasional flecks of charcoal. The feature was originally thought to represent a hearth associated with Structure B. However, the results of thin section analysis (Ellis, below) indicate that it was not a hearth pit and an AMS date of 3845 ± 50 BP (AA-32601), for a fragment of hazel charcoal from the fill, demonstrate that it was not contemporary with Structure B.

MIDDLE BRONZE AGE

Timber roundhouse (Structure B)

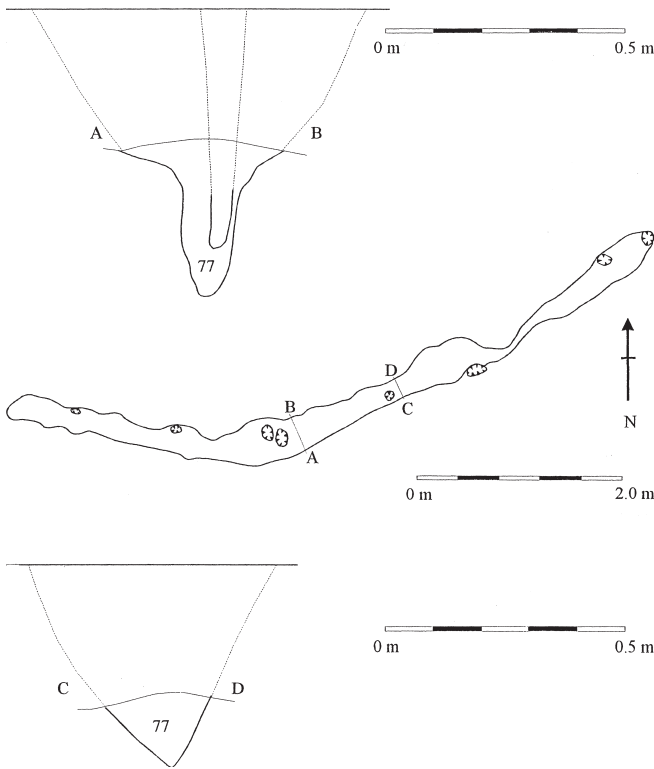
Evidence for this structure comprises four groups of individual elements: a ring-groove approximately 12 m in diameter, a circle of 19 post-holes, an erosional gully and a series of internal features. There was no evidence for any floor deposits within the structure or of any outer palisade.

Ring-groove The outer edge of the house was indicated by a discontinuous series of arcing linear cuts, linear pits and numerous individual and grouped post- and stake-holes (illus 2). No packing stones were present in any of the fills and, in general, these comprised a homogenous mid brown loam. The line of the ring-groove only survived as shallow slots (contexts 76 & 101) on the southern and western edge of the structure; elsewhere the feature was comprised of remains of deeper post- and stake-holes.

The ring-groove was up to 0.45 m wide and up to 0.42 m deep (illus 5). The slot contained the cuts of numerous stake-holes at its base and sides. These features were between 0.01 m and 0.25 m apart. AMS dates were determined on samples from the fills of each of the ring-groove fragments: 3140 ± 50 BP (AA-32600) from hazel charcoal in context 101 and 3150 ± 50 BP (AA-32599) from hazel charcoal in context 76.

The line of the ring-groove was continued east of the slot (context 76) by a cluster of pits and stake-holes. Some of these features lay at right angles to the line of the ring-groove and suggest an entrance to Structure B. The fill and form of these features was identical to those recorded elsewhere in the ring-groove.

The north and eastern edge of the ring-groove comprised a series of pits, stake- and post-holes. A number of these features lay within the cut of the gully feature (context 55). It was not possible to ascertain the relationship between the two sets of features.



ILLUS 5 Plan and section of the ring-groove feature (Context 76) forming part of the outer wall-line of Structure B

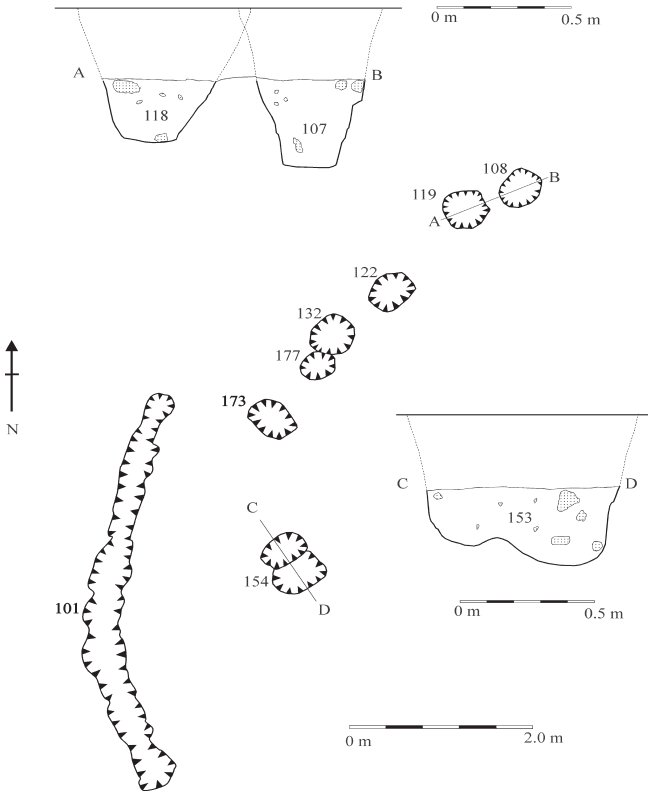
Post-hole circle Inside the ring-groove lay a rough circle of 19 post-holes (illus 2). This post-hole circle and the surrounding ring-groove were not precisely concentric. The distance from the ring-groove to the post-hole circle varied from 2.5 m on the south-east side to 1.5 m on the north-west.

In general, the post-holes were again filled with a homogenous, mid brown, sandy soil and only one of the post-holes had any packing stones. The space between post-holes varied from 0.1 m to 1.8 m (illus 2) and there were more post-holes in the northern arc than in the south.

There is some evidence for replacement of post-holes. One (context 154) appears to have been re-cut, and a conjoined pair (contexts 132 & 177) clearly represent replacement, although it was not possible to tell from the fills which one replaced the other (illus 6). Some of the closely set pairs of post-holes are also likely to represent replacement post-holes (eg contexts 107 & 118).

Fragments of hand-thrown pottery were recovered from the fills of two of the intercutting post-holes (contexts 117 & 132) (in the latter case the pottery was recovered by GUARD during the original evaluation). Two radiocarbon dates were retrieved from the post-holes, an AMS date of 3085 ± 50 BP (AA-32602) from hazel charcoal from context 125 and a date of 3260 ± 90 BP (GU-8104) from a bulk or amalgamated sample of hazel charcoal from context 89.

Gulley feature On the north-east side of the roundhouse, between the ring-groove and the post-hole circle, lay a composite feature, consisting of a shallow gulley lying between two 'pits' (contexts 55 & 162). A fragment of pottery and three pieces of worked flint were recovered from context 55. The feature is irregular in plan and depth and measures up to 8 m long, 1.5 m wide and up to 0.37 m deep. It appears to have subsumed the ring-groove and one of the post-holes (context 59). No relationship could be established between these features. The feature appears to have been the result of erosion rather than a deliberately cut pit. An AMS date of 3145 ± 50 BP (AA-32598) was retrieved from hazel charcoal in context 55.



ILLUS 6 Plan and sections of features in the western sector of Structure B, including post-holes of the main post-ring and a remnant of the ring-groove (Context 101) defining the outer wall-line.

Internal features The interior of the roundhouse contained a series of a miscellany of post-holes, stake-holes and scoops (illus 2). context 128, an internal pit, contained a sherd of hand-thrown pottery. None of these features can be linked directly to Structure A and, as described above, one feature (context 112) can be dated to the Early Bronze Age phase. context 169 appears to represent a central post-hole but the fill (context 168) contained fragments of unidentifiable burnt or possibly cremated bone (K McSweeney, pers comm), as well as three pieces of burnt flint, and this may not have been a structural feature after all.

Post-hole circle (Structure C)

Immediately south-east of Structure B (above), eight post-holes formed a rough circle with a diameter of approximately 7 m. These were generally vertical-sided cuts measuring on average 0.25 m in diameter and up to 0.29 m deep. One of the post-holes (context 36) contained a hand-thrown body sherd. The circle enclosed four irregular scoops, varying from 0.75 m to 0.50 m in diameter and up to 0.1 m deep.

Isolated pits

Two isolated pits were located on the eastern edge of the site. One of these (context 182) contained nine body sherds and two rim sherds from the same vessel and the other (context 236) contained three sherds from different vessels; one of these matched a sherd from a post-pit in Structure C (context 36).

Putative ring-groove (Structure D)

The eastern corner of the excavation trench contained a group of negative features comprising an arcing ditch (illus 2) and a series of adjacent stake-holes. The ditch measured between 0.4 and 0.7 m wide, 2.5 m long and up to 0.35 m deep. The fills of the ditch and stake-holes were again a homogenized mid brown sandy soil.

UNDATED FEATURE

A pit (context 80) located on the western edge of the site could neither be dated nor demonstrably associated with dated features. The function of the feature is unknown.

SPECIALIST REPORTS

More detailed versions of all of the following specialists' reports have been deposited with the project records at the National Monuments Record of Scotland (RCAHMS).

CHARCOAL

Alan Duffy & Murray Cook

Thirty-two samples of charcoal were identified to genus or species (Table 1). The main aim of this work was to refine the selection of samples for radiocarbon dating. A secondary aim was to try to identify any patterns in the use of wood across the site. Differential use of types of wood within prehistoric roundhouses has been previously observed. For example, at Melville Nurseries, Dalkeith (Raisen & Rees 1995, 42), alder and oak were used for different components of the structure. In the present case, assessment of the charcoal present across the site reveals very little in the way of patterning and in general a wide variety of species seems to have been used throughout the occupation of the site. Charcoals from the various structural components and the gully feature (context 55) of Structure B reveal little variation, and in general the assemblages is dominated by hazel.

RADIOCARBON DATES

Murray Cook

During the excavation it was apparent that some of the post-holes within Structure B had been replaced and that this was clearly a multi-phase structure. Therefore the primary aim of the radiocarbon dating programme was to investigate the date and length of occupation of Structure B. This was to be achieved by comparing the dates from structural elements of Structure B (two from the ring-groove and two from post-holes) with a date from the fill of the gully feature. It was hoped that the first set of dates would relate either to the construction or occupation of Structure B. The latter date was derived from an erosional feature formed within the structure, but which was assumed to have become in-filled after occupation had ceased. Thus any date from this fill should represent a *terminus ante quem* for the occupation or at least the construction of the Structure B.

A secondary aim of the programme was to relate the various isolated features to either Structure A or Structure B. Therefore the 'isolated' pit (context 60) was dated, as was the central pit containing burnt or cremated bone (context 168), in Structure B.

TABLE 1
Wood charcoal identification

Feature	Period	Context	Species	Common name	Fragments
Charcoal pit	Neolithic	60	<i>Quercus</i> sp	oak	10
Charcoal pit	Neolithic	60	<i>Corylus avellana</i>	hazel	2
Charcoal pit	Neolithic	60	<i>Alnus glutinosa</i>	alder	1
Charcoal pit (lower fill)	Neolithic	92	<i>Corylus avellana</i>	hazel	8
Charcoal pit (lower fill)	Neolithic	92	<i>Quercus</i> sp	oak	2
Charcoal pit (lower fill)	Neolithic	92	<i>Alnus glutinosa</i>	alder	2
Charcoal pit (upper fill)	Neolithic	91	<i>Corylus avellana</i>	hazel	12
Charcoal pit (upper fill)	Neolithic	114	<i>Corylus avellana</i>	hazel	5
Charcoal pit (lower fill)	Neolithic	115	<i>Corylus avellana</i>	hazel	3
Charcoal pit (lower fill)	Neolithic	115	<i>Betula</i> sp	birch	2
Charcoal pit (lower fill)	Neolithic	115	<i>Alnus glutinosa</i>	alder	1
Structure A	Neolithic	186	<i>Quercus</i> sp	oak	4
Pit next to Structure A	Neolithic	188	<i>Alnus glutinosa</i>	alder	1
Large pit Structure B	Early Bronze Age	112	<i>Quercus</i> sp	oak	10
Large pit Structure B	Early Bronze Age	112	<i>Corylus avellana</i>	hazel	4
Post-hole in Structure B	Middle Bronze Age	87	<i>Corylus avellana</i>	hazel	5
Post-hole in Structure B	Middle Bronze Age	125	<i>Corylus avellana</i>	hazel	5
Post-hole in Structure B	Middle Bronze Age	125	<i>Alnus glutinosa</i>	alder	2
Post-hole in Structure B	Middle Bronze Age	125	<i>Quercus</i> sp	oak	1
Post-hole in Structure B	Middle Bronze Age	125	<i>Prunus</i> sp	cherry	1
Post-hole in Structure B	Middle Bronze Age	132	<i>Alnus glutinosa</i>	alder	6
Post-hole in Structure B	Middle Bronze Age	132	<i>Corylus avellana</i>	hazel	4
Post-hole in Structure B	Middle Bronze Age	132	<i>Quercus</i> sp	oak	2
Ring-groove of Structure B	Middle Bronze Age	76	<i>Corylus avellana</i>	hazel	9
Ring-groove of Structure B	Middle Bronze Age	76	<i>Quercus</i> sp	oak	2
Ring-groove of Structure B	Middle Bronze Age	101	<i>Corylus avellana</i>	hazel	6
Cremation in Structure B	Middle Bronze Age	168	<i>Alnus glutinosa</i>	alder	5
Cremation in Structure B	Middle Bronze Age	168	<i>Corylus avellana</i>	hazel	5
Gully in Structure B	Middle Bronze Age	55	<i>Corylus avellana</i>	hazel	6
Gully in Structure B	Middle Bronze Age	55	<i>Alnus glutinosa</i>	alder	3
Gully in Structure B	Middle Bronze Age	55	<i>Quercus</i> sp	oak	1
Gully in Structure B	Middle Bronze Age	55	<i>Salix</i> sp	willow	1

The AMS radiocarbon dates were obtained from the University of Arizona via the Scottish Universities Research and Reactor Centre (SURRC). The bulk dates were obtained from SURRC. In general, charcoal from shorter-lived species such as hazel was chosen for the dating program. The dates were calibrated by SURRC using the CALIB program (ie University of Washington Radiocarbon Calibration Program). The results (Table 2) indicate three broad phases of activity on the site: Neolithic, Early Bronze Age and Middle Bronze Age.

Two of the Neolithic dates (AA-32604 and GU-8105) are within 20 years of each other and according to procedures outlined by Long & Rippeteau (1974) are not significantly different from each other with respect to the precision of the analyses. These dates, therefore, could either be contemporary or represent activity within the space of a generation.

The dates from Structure B are also tightly clustered with the exception of GU-8104, and as a whole are also not significantly different. Given the tight clustering of the AMS dates this raises the question of the validity of GU-8104. This date is derived from a bulk sample and could easily have been contaminated with earlier material, possibly from the Neolithic phase. The problems associated with the use of bulk dates — using assorted charcoals of different species from one fill — have recently been discussed by Ashmore (1999).

TABLE 2
Calibrated radiocarbon dates

Sample	Context	Feature	Species (charcoals)	Years BP	$\delta^{13}\text{C}$	Calibrated 1 sigma	Calibrated 2 sigma
GU-8102	60	Possible external hearth	<i>Quercus</i> sp <i>Corylus avellana</i> <i>Alnus glutinosa</i>	4510 ± 80	-25.7‰	3361–3032 BC	3499–2919 BC
GU-8105	90	Possible external hearth	<i>Quercus</i> sp <i>Corylus avellana</i> <i>Alnus glutinosa</i>	4070 ± 110	-25.9‰	2866–2468 BC	2898–2294 BC
AA-32604	186	Structure A	<i>Quercus</i> sp	4130 ± 50	-23.9‰	2866–2582 BC	2881–2499 BC
AA-32601	112	Pit in Structure B	<i>Corylus avellana</i>	3845 ± 50	-26.6‰	2403–2202 BC	2466–2141 BC
GU-8104	87	Post-hole in Structure B	<i>Corylus avellana</i>	3260 ± 90	-26.3‰	1679–1431 BC	1741–1320 BC
AA-32603	168	Cremation? Structure B	<i>Alnus glutinosa</i> Charcoal	3180 ± 50	-27.3‰	1516–1409 BC	1524–1320 BC
AA-32599	76	Ring-groove in Structure B	<i>Corylus avellana</i>	3150 ± 50	-28.7‰	1491–1324 BC	1520–1313 BC
AA-32598	55	Gully in Structure B	<i>Corylus avellana</i>	3145 ± 50	-26.9‰	1489–1323 BC	1519–1306 BC
AA-32600	101	Ring-groove in Structure B	<i>Corylus avellana</i>	3140 ± 50	-28.9‰	1487–1322 BC	1518–1264 BC
AA-32602	125	Post-hole in Structure B	<i>Corylus avellana</i>	3085 ± 50	-27.7‰	1411–1264 BC	1486–1134 BC

POTTERY

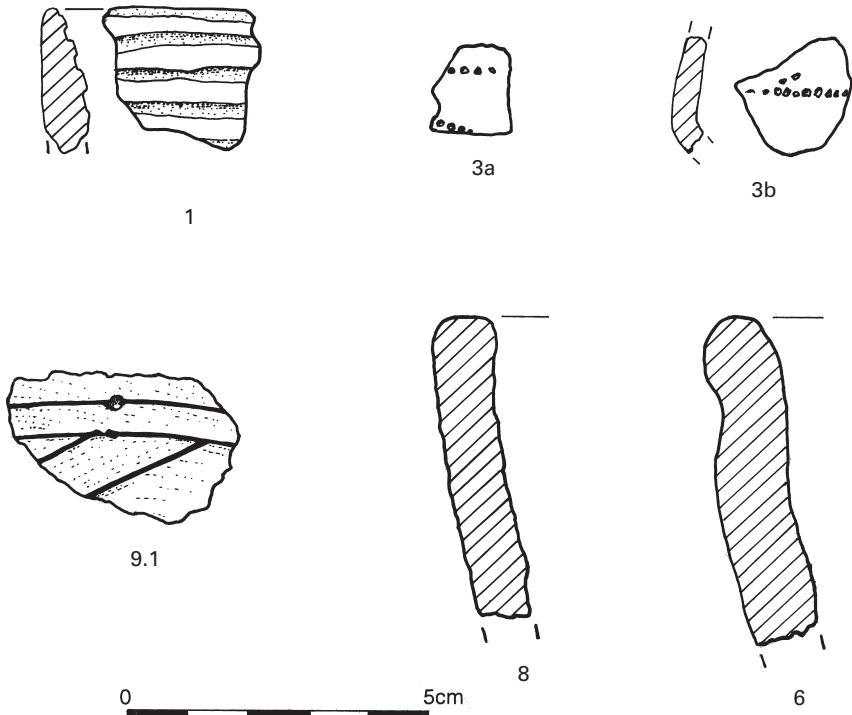
Ann MacSween

A small assemblage of pottery was recovered during the evaluation and excavation, all of it from pits or post-holes. In terms of fabric the pottery can be divided into two groups: a coarse sandy clay with inclusions of crushed white rock, and a finer clay, sometimes mixed with gravel. Pottery of the coarser fabric was recovered from seven contexts and that of the finer fabric from only three.

Pottery made of the finer clay includes no 1 (context 9) which has interior ridging below the rim, no 9 (context 188) which is from a vessel with incised decoration, and no 3 (context 90) which has decoration comprising incised dots (illus 7). Sherds of the coarser fabric were recovered from contexts 36, 55, 128, 132, 182, 186, 222 and 236 and included a rounded rim with a slight carination (no 6 from context 132) and a flat rim (no 8 from context 182) (illus 7).

The decoration on the finer sherds can be paralleled in Grooved Ware assemblages from southern Scotland. Interior ridging similar to that on the sherd from context 9 has been found, for example, on sherds from the midden at Archerfield Estate, East Lothian (Curle 1908, 314, fig 5) and on a number of vessels from Balfarg henge (Henshall & Mercer 1981, fig 44.23). The incised decoration and the impressed dots are less diagnostic but would not be out of place in a Grooved Ware assemblage. Sherds with dotted decoration were included in the Grooved Ware assemblage from Hillend, Clydesdale (Armit *et al* 1994, 120, illus 6.11a–d); the authors noted that the impressions were close-set to resemble comb decoration. Incised decoration is widespread in Grooved Ware assemblages and includes similar combinations of horizontal and oblique lines to that on no 9 from Lamb's Nursery, for example in the Balfarg assemblage (Henshall 1993, 96, illus 27.41). The Grooved Ware of southern Scotland would, on present evidence, be assigned a date of around 3000–2700 cal BC (Cowie & MacSween 1999).

The coarser pottery is less distinctive. While inverted and flat rims are more common in assemblages of the later prehistoric period in south-east Scotland, slightly everted forms such as



ILLUS 7 Selected pottery sherds

that from context 132 at Lamb’s Nursery are occasionally included, eg in the pre-Roman Iron Age phases at Edinburgh Castle (MacSween 1997, illus 111.27) and the lower occupation deposits at Traprain Law (Cruden 1940, fig 7a).

POTTERY CATALOGUE

- 1 Rim sherd from a Grooved Ware vessel. The rim is plain and the interior just below the rim is decorated with at least three parallel grooves 3 mm wide and 3 mm apart. The fabric is sandy clay with c 30% of angular rock fragments up to 7 mm long which has fired hard and is reduced (black). Th 8 mm; Diam (min) 140 mm; Wt 6 g. Context 10. (illus 7)
- 2 Thick body sherd. The exterior surface is smoothed. The fabric is coarse sandy clay with c 40% of angular rock fragments up to 5 mm long which has fired hard and is reduced (black) with an oxidized exterior margin (red). The interior surface is sooted. Th 15 mm; Wt 38 g. Context 36. (not illus)
- 3 Two body sherds, one angled, possibly from a carination. The exterior surface has been smoothed and decorated with lines of dots, made with a pin or comb. The fabric is fine clay which has fired hard and is reduced (grey) with oxidized surfaces (red). Th 5 mm; Wt 3 g. Context 90. (illus 7)
- 4 Small body sherd with an abraded exterior. The fabric is coarse sandy clay with c 30% of angular rock fragments up to 5 mm long which has fired hard and is reduced (grey). The interior has sooting and a residue. Th c 9 mm; Wt 2 g. Context 128. (not illus)
- 5 Body sherd, with most of the exterior surface missing. The fabric is coarse sandy clay with c 60% of angular rock fragments up to 9 mm long which has fired hard and is reduced (grey) with an oxidized exterior margin (buff). The interior surface is sooted. Th 12 mm; Wt 18 g. Context 55. (not illus)

- 6 Rounded rim with a slight carination 24 mm below the lip. The fabric is the same as context 128, Find 4 and could be from the same vessel. Both surfaces are sooted. Th 16 mm; Diam c 180 mm; Wt 65 g. Context 132. (illus 7)
- 7 Basal sherd from the flat part of the base. The fabric is sandy clay with c 20% of angular rock fragments up to 4 mm long which has fired hard and is reduced (grey) with oxidized surfaces (red/brown). Th 8 mm; Wt 3 g. Context 222. (not illus)
- 8 Nine body sherds and two rim sherds from the same vessel. The rim is flat. The exterior surface has been smoothed. The fabric is coarse clay with c 30% of angular rock fragments up to 6 mm long which has fired hard and is reduced (grey/black) with an oxidized exterior margin (red). Both surfaces are sooted. Th 10 mm; Diam 160 mm; Wt 58 g. Context 182. (illus 7)
- 9 Four sherds from different vessels. Context 188. (illus 7)
- (a) Body sherd smoothed on the exterior and decorated with incised lines — parallel horizontal lines and oblique lines below. The decoration has been incised with a sharp point. The fabric is fine clay with c 20% of angular and rounded rock fragments up to 5 mm long which has fired hard and is reduced (grey) with oxidized surfaces (red). Th 7 mm; Wt 9 g.
 - (b) Basal sherd from the flat part of a base. The fabric is fine sandy clay with c 30% of angular rock fragments up to 5 mm long which has fired hard and is reduced (grey) with an oxidized exterior surface. The interior surface is sooted. Th 8 mm; Wt 11 g.
 - (c) Basal sherd. The fabric is fine clay with c 10% of angular rock fragments up to 4 mm long which has fired hard and is reduced (grey) with oxidized surfaces (brown). The exterior surface is sooted. Wt 3 g.
 - (d) Body sherd. The fabric is fine clay with c 10% of angular rock fragments up to 5 mm long which has fired soft and is oxidized (red). Both surfaces are sooted. Th 10 mm; Wt 2 g.
- 10 Three sherds from different vessels. Context 236. (not illus)
- (a) Body sherd from the same vessel as no 2 (context 36). Th 13 mm; Wt 26 g.
 - (b) Sherd from a flat base with angled walls. The fabric is fine clay with c 20% of angular rock fragments up to 6 mm long which has fired hard and is reduced (black) with an oxidized exterior margin (red). The interior surface is sooted and has a residue.
 - (c) Body sherd with the interior surface missing. The fabric is fine clay with c 20% of angular rock fragments up to 5 mm which has fired hard and is oxidized (red). The exterior surface is sooted. Wt 13 g.
- 11 Three sherds from different vessels. Context 186. (not illus)
- (a) Body sherd decorated with oblique, shallow, grooved lines. The exterior surface has been smoothed. The fabric is very fine clay with c 40% of mixed gravel up to 3 mm long which has fired hard and is oxidized (red). Th 8 mm; Wt 6 g.
 - (b) Small sherd with the exterior missing — possibly from a flat rim. The fabric is coarse clay with c 50% of angular rock fragments up to 3 mm long which has fired hard and is oxidized (brown). Wt 3.
 - (c) Small interior flake. The fabric is sandy clay with c 50% of angular rock fragments up to 3 mm long which has fired hard and is reduced (grey) with an oxidized interior surface (red). Wt 1 g.

LITHICS

Thomas Rees

Thirty pieces of worked flint were recovered from 16 contexts across the site. There were no cores or retouched pieces present. The material represents waste from the primary stage of the reduction method. It is likely to relate to the Neolithic and Early Bronze Age phases of occupation though the majority of pieces were recovered from Middle Bronze Age features where they had evidently been redeposited. In contrast, the five pieces recovered from the central feature within Structure B may have been deliberately deposited. This was a pit containing unidentifiable burnt or

cremated bone as well as lithics. At least three of the five pieces were products of a deliberate reduction method and all of them were unburnt. This implies that the lithics were not present within the fire or pyre on which the bones were burnt but rather were added later.

PLANT REMAINS

Dorothy Rankin

Forty-one samples were processed using a system of flotation and wet-sieving, adapted from the Siraf system (Williams 1973). The flot was collected in mesh sizes 0.3 mm and 1 mm and the retent was wet-sieved through a 1 mm mesh. The nomenclature for wild species follows that of the *Flora Europaea* (Tutin *et al* 1964–80).

Results

Thirty-five samples produced carbonized or charred remains, including cereals and non-cereals. All 41 samples contained uncharred plant material, including seeds, fruits, stems and roots of non-cereal species. These uncharred remains are probably modern contaminants incorporated in the samples by bioturbation (eg worm action or root penetration).

Given the mobility of the uncharred plant remains it seems probable that some of the carbonized plant remains may also represent modern activity. Indeed the generally degraded condition of many of the caryopses and seeds indicates that they were subjected to abrasive actions before, during, or after their deposition and they are probably not *in situ* deposits. The site was previously part of a walled garden and nursery and therefore it is likely that crops were grown and that refuse was burnt on the site. Any such material could easily have become incorporated into the fills of the excavated features through the same mechanisms of bioturbation as the uncharred material.

Both cultivated and wild species are represented in the macroplant assemblage. The cultivated/cereal element consisted only of the grains with none of the more diagnostic chaff fragments being recovered from any samples. Preservation of the charred remains was generally very poor resulting in the use of rather broad taxonomic groups in identification and it has not been possible to highlight any context-related variation in the composition of the plant remains. They contribute little, therefore, to an understanding of function of individual features.

All the excavated features contained the same broad range of species, principally barley (*Hordeum vulgare* indet) and wheat (*Triticum aestivo-compactum* Schiem and *Triticum cf dicoccum*), but oat (*Avena* sp) was also present in Structures B and C. Hazelnut shells were also found across the site, including a concentration from the Neolithic pits (Contexts 90 & 113). Finally there was a wide range of segetal weed seeds, probably collected along with any harvested crops.

Discussion

Barley, perhaps of a hexaploid six-row variety, was the dominant crop from the assemblage as a whole. These have been tentatively identified as hulled barley which is represented elsewhere in the Scottish Neolithic, for example at Balbridie in Aberdeenshire (Fairweather & Ralston 1993) and Boghead Mound, Moray (MacLean & Rowley-Conwy 1984). Wheat has also been a cultivated crop since the Neolithic. Oats are often associated with the Iron Age (Boyd 1988, 104)

though oats considered to be of the cultivated variety have been recovered at the excavations at Upper Suisgill in Sutherland, a Late Bronze Age/Iron Age site (van der Veen 1985).

The caryopses recovered from the site may represent the remains, or weed element, of a crop. The lack of any plant debris associated with the processing of newly harvested cereals — such as rachis fragments and chaff — suggest that the crops had already been cleaned prior to their deposition, or may indicate a bias in preservational processes (Boardman & Jones 1990). With respect to the former hypothesis, clean grain could have become charred piecemeal through processes such as preparing food.

Finally, the abundant nutshells of hazel attest once again to its exploitation as a more or less constant food resource in Scottish prehistory.

SOILS

Clare Ellis

Soil chemistry

Soil chemistry analyses were conducted on fills of various features to assess whether they represent anthropically altered material, such as hearth fill, or had been affected by such material. No clear pattern emerged, but the results can be summarized as follows. None of the contexts was calcareous. The levels of easily available phosphate were predominantly high, although nine of the samples exhibited medium levels. The pH values were all acid. The loss-on-ignition values were generally low, ranging between 6.92% to 1.44%.

Soil micromorphology

The field interpretation of the large pit within Structure B (Context 112) was that it may have been a hearth connected with the structure. To test this observation, a single sample was taken from the fill of this pit — via kubienna tin — for micromorphological thin section analysis. It is apparent from the micromorphological analysis that Context 112 is not the remnants of a hearth base, as the lower portion of the sediment was largely unaffected by burning. Some possible ash remnant clasts and rare charcoal were present but these components were probably incorporated by bioturbation and suggest burning of materials such as grasses and wood immediately above the feature, or in its immediate vicinity, at a later date.

In summary, the function of the pit remains unknown. Clearly it was not a hearth. In any case, radiocarbon determination (above) has subsequently demonstrated that it was significantly earlier than Structure B and therefore could not be associated it.

DISCUSSION

The site is situated on the upper edge of the South Esk valley, a location which places any settlement safely above the floodplain, yet within easy access of it. Thus the site lies between two different environmental zones, the river valley and higher surrounding plains, both of which would have different exploitable resources. This location would have been highly favoured by early settlers in all periods, hence the palimpsest of activity recorded on the site.

NEOLITHIC TO EARLY BRONZE AGE

The Neolithic activity at the site comprises a limited spread of pits, post- and stake-holes and charcoal-rich features, from which a small pottery and macroplant assemblage was retrieved. At least two of these features contained charred nutshells of hazel. The on-site activity represents a palimpsest of features potentially covering a broad time span between 4510 ± 80 BP (GU-8102) and 3845 ± 50 BP (AA-32601), although equally this could represent the minimum range.

The most coherent element of this activity is Structure A with an associated radiocarbon date of 4130 ± 50 BP (AA-32604). It seems likely that Structure A is a remnant of a circular structure. Roughly circular, stake-built structures have been excavated at Beckton Farm, near Lockerbie, Dumfriesshire (Pollard 1997), and Chapelfield, at Cowie, Stirlingshire (Atkinson 1995). An alternative explanation is that the feature is complete and represents remains of a curvilinear screen or windbreak, or possibly (if Context 31 contained a central post) a semi-conical shaped structure. A similar, though earlier, Mesolithic structure was excavated at Fife Ness, Fife (Wickham-Jones & Dalland 1998).

There was no evidence within Structure A of a hearth. It is possible that it contained a hearth for which the evidence has since been destroyed; alternatively, as such a small structure would have been prone to combustion, the safest place for a hearth may have been out of doors, perhaps protected from the wind within the shelter of a pit. At Beckton Farm the majority of hearths were located in pits outwith structures (Pollard 1997, 83).

Four charcoal-rich pits were associated with this phase; two contained charred material other than charcoal. The function of the charcoal-rich pits is unclear. They may represent hearths or hearth dumps, but this seems unlikely and the features probably served another non-domestic purpose. The estimated original depth of the pits militates against their interpretation as hearths (see, for example, *illus 4*). Furthermore, it seems implausible that pits would have been dug simply for dumped hearth debris since such material could have been more efficiently used as fertilizer on arable fields. The macroplant record provides no further clues as to the function of the pits.

Remains of nine different vessels were recovered from fills associated with Structure A or adjacent pits. While it may be possible for fragments of a single vessel to become incorporated into the fills of features accidentally, the presence of multiple fragments must represent deliberate deposition. The structured deposition of Neolithic pottery within pits has been examined on previous occasions (Barclay & Russell-White 1993, 199–8; Rideout 1997, 56–7). While this activity may involve more complex patterns of deposition than at Lamb's Nursery — as at Cowie Road, Bannockburn (Rideout 1997, 34–8), for example — the features described here were heavily truncated and may be vestiges of a more complex scene of events than can now be described. Barclay & Russell-White (1993, 167) described such deposits as representing 'minor ritual activity', perhaps associated with day to day domestic duties rather than purely ritual acts. It is perhaps in the light of such 'minor ritual activity' that the four charcoal-rich pits should be seen. Such pits and structured deposits have been encountered at other Neolithic settlement sites, including Beckton Farm, Dumfriesshire (Pollard 1997), and Chapelfield, Cowie, Stirlingshire (Atkinson 1995). It may also be the case that where such pits exist in isolation — as at Hillend, Clydesdale (Armit *et al* 1994) — ploughing has long since destroyed any indication of settlement.

The radiocarbon dates indicate that at least some of the activity on the site is not contemporary and may cover as broad a time-span as 4510 ± 80 BP (GU-8102) to 3845 ± 50 BP (AA-32601). Aside from coincidental reuse of the site, there are two possible explanations for the ranges of dates. The first possibility is that the site was continuously occupied throughout the

period but that most of the associated remains have since been destroyed or are located outwith the excavation area. Alternatively, the site could have been occupied intermittently over the span indicated by the dates. The latter explanation appears more likely and, indeed, it has been suggested that permanent sedentary settlements did not appear in Scotland until the Bronze Age (Armit & Finlayson 1992). The evidence from Beckton Farm, Dumfriesshire (Pollard 1997), also suggests intermittent occupation.

MIDDLE BRONZE AGE

The activity in this phase comprises a roundhouse with a ring-groove element (Structure B), a second roundhouse with post-hole circle (Structure C), a putative third roundhouse comprising a ring-groove (Structure D), and a pair of external pits containing pottery. There were no indications of any enclosure surrounding these features. The pottery is generally undiagnostic but fits well with a later prehistoric context. Structure B has been radiocarbon dated via several dated samples to the mid second millennium BC.

Structure B

Structure B can be defined as double-ring roundhouse (after Reid 1989). Known contemporary structures of this sort generally tend to be situated in upland locations, as, for example, Green Knowe, Peeblesshire (Jobey 1980) or Lintshie Gutter, Lanarkshire (Terry 1995). Similar structures are known from plough truncated lowland sites, but these are not contemporary, and are generally ascribed to the first millennium BC (Raisen & Rees 1995, 42). At least one contemporary lowland example does exist, however, at Myrehead, Stirlingshire (Barclay 1983). That only two sites with such structures have been found in lowland locations is surprising and suggests either that these areas were less densely settled in this period than later periods, or that traces of such occupation have been largely eradicated in the lowlands by ongoing tillage.

The post-hole circle would have held the main structural elements of the house, and their location corresponds well with that of a hypothetical ring-beam (following the model described by Reynolds 1982). The evidence from the outer wall suggests that some of it would have comprised a line of closely packed stakes within a ring-groove, forming a continuous outer wall face. However, where the ring-groove was absent the line comprised more widely spaced features, perhaps representing a wicker framework. The evidence is inconclusive. The use of stakes within the ring-groove is paralleled at other contemporary structures, such as House 2 on Platform 2, at Green Knowe, Peeblesshire (Jobey 1980, 78). The south-east sector of the ring-groove contained a further group of stake-holes at right-angles to the line of the main circuit. It has been suggested above that this group of features represents the entrance. House 3 on Platform 2 at Green Knowe also featured a similar element at its entrance (Jobey 1980, fig 3).

The post-hole circle was positioned off-centre within the ring-groove, with a larger gap between these two elements in the southern portion of the structure, to either side of the proposed entrance. Reid (1989, 4) has suggested that social factors as well as engineering principles affected the positioning of the roof posts within a large roundhouse, and especially the relative size of the central floor space to the annular area outwith the post-ring. Various uses have been proposed for this outer annular space. At House 3, Lairg, Sutherland, where there was little or no erosion of the floor surface in this marginal area of the house — in contrast to the central floor space — it was thought to have been protected by a continuous wicker pallet or mat (O'Sullivan 1998, 104–5). At Platform 5, Lintshie Gutter, Lanarkshire (Terry 1995, 382–4), the outer annular

space contained an oven. In a number of so called ‘ring-ditch houses’ the annular space is divided from the central floor area by a continuous gully or series of pits, often lined with rubble or stones — as at Dryburn Bridge, East Lothian (Triscott 1982), or Douglasmuir, Angus (Kendrick 1995) — although unlined examples also exist, as at Culhawk, Angus (Rees 1998). It is unclear whether this gullied or ditched area is a deliberate design feature (following Kendrick 1995, 61) or an erosional by-product of the patterns of use of the floor area (following O’Sullivan 1998; Raisen & Rees 1995, 39–40). In the present case the gully around the margins of Structure B appears to have been an erosional feature. It also appears to represent differential use of the outer floor area, with erosion hollows appearing only in the north-east sector (illus 2). The site is highly truncated, however, and these features may once have been continuous, although not as deep, around the whole structure.

There is clear evidence from Structure B for the replacement of some of the posts within the post-circle, but it is not known how often the posts needed to be replaced or at what point the structure could no longer be repaired. At Butser Experimental Farm the internal posts of a reconstructed timber roundhouse demonstrated significant decay after 14 years (Harding *et al* 1993, 110). This evidence is also supported where dendrochronological evidence is available. At Buiston Crannog, Ayrshire, one of two excavated roundhouses had a lifespan of only five years while the other had lasted 17 years (Crone 2000, 64–6).

A pit lying roughly in the centre of Structure B contained unidentifiable burnt bone fragments. The incidence of unburnt, worked flints within the same pit suggest that the bone formed part of a ritual deposit rather than merely food debris. The ritual deposition of human or animal remains within probable domestic structures is rare, although examples are known from some excavated wheelhouses. Around a hundred animals (including cremated remains) were placed in pits in the floor of a wheelhouse at Sollas, North Uist (Finlay 1991). Ritual deposits of human bone have also been recovered from Hornish Point, South Uist (Barber *et al* 1989) and Cnip, Lewis (Armit 1996, 156). These deposits appear to relate both to the foundation of the structure and to its subsequent use.

With one exception (GU-8104) the dates from Structure B are tightly clustered and statistically are not significantly different to one another. There are three possible explanations for this:

- 1 The bulk date (GU-8104) relates to an early phase of activity in the structure and the cluster of later dates represents the final phase of activity, including post replacements. This would mean that the site was occupied for a very long period of time.
- 2 The bulk date (GU-8104) represents contamination from earlier Neolithic charcoal. The tight cluster of dates represents activity associated with the structure, which was only in use for a limited period of time, perhaps a generation or two.
- 3 The bulk date (GU-8104) represents contamination from earlier Neolithic charcoal. The tight cluster of dates represents a single event within the structure (possibly its destruction) and because the wood was used to build the structure the date relates to its construction, specifically.

Given the presence of uncharred plant remains in every context sieved and the known mobility of charcoal through archaeological deposits (Carter 1993), none of the options is clearly more probable than the other. However, as described above, evidence from Butser experimental farm and Buiston Crannog suggests that internal posts would have to be replaced at regular intervals. The southern portion of the post-hole circle reveals no indications of any post replacements,

unless precisely the same post-holes were used, which seems unlikely. It is also unlikely that internal timbers would have survived for longer than 50 years without being replaced. Together, these factors suggest that the structure itself would not have survived for longer than 50 years, which corresponds with the second interpretation of the radiocarbon dates, above.

Structures C and D

Structure C was represented by a ring of eight post-holes enclosing four internal pits. The post-hole circle was approximately the same size as that in Structure B and it may have been surrounded by a similar ring-groove, no longer extant when the site was excavated. The erosion and consequent disappearance of outer wall trenches has been noted on a number of roundhouse sites (Barclay 1983; Gibson & Tavener 1989; Barclay 1993; Russell-White 1995; see Guilbert 1981 for a general discussion). There is no evidence that any of the posts in Structure C were replaced, perhaps indicating that it was not in use for as long as Structure B.

Structure D was represented by remains of a shallow slot which may have been the remnant of another ring-groove. An alternative possibility is that Structure D, rather than being a further structure, may in fact have been the only surviving element of a ring-groove around Structure C. It is located approximately the same distance from the recognizable elements of Structure C as the span between the ring-groove and post-ring in Structure B (illus 2). Given the limited excavation area, these possibilities were not explored fully.

Relationship between Structures B, C and D

The extant remains of Structures B, C, and D do not overlap, but if Structure C had been surrounded by a ring-groove of approximately the size of that in Structure B, then Structure C would overlie Structure D and block the entrance to Structure B. It seems unlikely, therefore, that all three structures were contemporary and the evidence is more likely to represent successive buildings. It is impossible, however, to determine the building sequence.

ACKNOWLEDGEMENTS

The excavation and post-excavation analyses were funded by Redrow Homes (Scotland) Ltd with funding from an extension to the main area of excavation by Historic Scotland. I would like to thank all the excavators — Alan Duffy, Lindsay Dunbar, Margaret Engl, John Gooder and Chris Reid — as well as all the staff at AOC Archaeology for their help and encouragement.

REFERENCES

- Armit, I 1996 *The Archaeology of Skye and the Western Isles*. Edinburgh.
- Armit, I, Cowie, T & Ralston, I 1994 'Excavation of pits containing Grooved Ware at Hillend, Clydesdale District, Strathclyde Region', *Proc Soc Antiq Scot*, 124 (1994), 113–27.
- Armit, I & Finlayson, B 1992 'Hunter-gatherers transformed: the transition to agriculture in northern and western Europe', *Antiquity*, 66 (1992), 664–76.
- Ashmore, P 1999 'Radiocarbon dating: avoiding errors by avoiding mixed samples', *Antiquity*, 73 (1999), 124–30.
- Atkinson, J 1995 *Excavations at Chapelfield, Cowie*. Unpublished report. Glasgow University Archaeological Research Division (GUARD 153.2). Glasgow.
- Barber, J 1985 'The pit alignment at Eskbank Nurseries', *Proc Prehist Soc*, 51 (1985), 149–66.

- Barber, J, Halstead P, James H, & Lee, F 1989 'An unusual Iron Age burial at Hornish Point, South Uist', *Antiquity*, 63 (1989), 773–8.
- Barclay, G J 1983 'The excavation of a settlement of the Later Bronze Age and Iron Age at Myrehead, Falkirk District', *Glasgow Archaeol J*, 10 (1985), 41–71.
- Barclay, G J 1993 'The excavation of pit circles at Romancamp Gate, Fochabers, Moray, 1990', *Proc Soc Antiq Scot*, 123 (1993), 255–68.
- Barclay, G J & Russell-White, C J (eds) 1993 'Excavations in the ceremonial complex of the fourth to second millennium BC at Balfarg/Balbirnie, Glenrothes, Fife', *Proc Soc Ant Scot*, 123 (1993), 43–210.
- Boardman, S & Jones, G 1990 'Experiments on the effects of charring on cereal plant components', *J Archaeol Sci*, 17 (1990), 1–11.
- Bown, C J & Shipley, B M 1982 *Soil Survey of Scotland: South-East Scotland*. Macaulay Institute for Soil Research. Aberdeen.
- Boyd, W 1988 'Cereals in Scottish Antiquity', *Circaea*, 5 (2), 101–10.
- Carter, S 1993 'Tulloch Wood, Forres, Moray: the survey and dating of a fragment of prehistoric landscape', *Proc Soc Antiq Scot*, 123 (1993), 215–34.
- Cowie, T & MacSween, A 1999 'Grooved Ware from Scotland: a review', in Cleal, R & MacSween, A (eds), *Grooved Ware in Britain and Ireland*, 48–56. Oxford.
- Crone, A 2000 *The History of a Scottish Lowland Crannog: excavations at Buiston, Ayrshire, 1989–90*. Edinburgh (= Scott Trust Archaeol Res Monogr Ser, 4).
- Cruden, S 1940 'The ramparts of Traprain Law: excavations in 1939', *Proc Soc Antiq Scot*, 74 (1939–40), 48–59.
- Curle, A O 1908 'Notice of the examination of prehistoric kitchen middens on the Archerfield Estate, near Gullane, Haddingtonshire, in November 1907', *Proc Soc Antiq Scot*, 42 (1907–8), 312–15.
- Fairweather, A D & Ralston, I B M 1993 'The Neolithic timber hall at Balbridie, Grampian Region, Scotland', *Antiquity*, 67 (1993), 313–23.
- Finlay, J 1991 'Ritual pit deposits of Period B1', in Campbell, E, 'Excavations of a wheelhouse and other Iron age structures at Sollas, North Uist by R J C Atkinson in 1957', *Proc Soc Antiq Scot*, 121 (1991), 141–6.
- Gibson, A & Tavener, N 1989 'Excavations at Dundee High Technology Park, Tayside', *Proc Soc Antiq Scot*, 119 (1989), 83–90.
- Guilbert, G 1981 'Double-ring roundhouses, probable and possible, in prehistoric Britain', *Proc Prehist Soc*, 47 (1981), 299–317.
- Hanson, W S 1987 'Elginhaugh', *Current Archaeol*, 9 (1987), 272.
- Harding, D W, Blake, I M & Reynolds, P J 1993 *An Iron Age Settlement in Dorset. Excavation and reconstruction*. Edinburgh (= Univ Edinburgh Dept Archaeol Monogr Ser, 1).
- Henshall, A S 1967 'Neolithic sherds from Dalkeith', *Proc Soc Antiq Scot*, 98 (1964–6), 312.
- Henshall, A S 1993 'The Grooved Ware', in Barclay & Russell-White (eds), 94–108.
- Henshall, A S & Mercer, R 1981 'Report on the pottery from Balfarg', in Mercer, 163–71.
- Hill, P H 1982 'Settlement and chronology', in Harding (ed), 4–43.
- Jobey, G 1980 'Green Knowe unenclosed platform settlement and Harehope cairn, Peeblesshire' *Proc Soc Antiq Scot*, 110 (1978–80), 72–113.
- Kendrick, J 1995 'Excavation of a Neolithic enclosure and an Iron Age settlement at Douglasmuir, Angus', *Proc Soc Antiq Scot*, 125 (1995), 26–97.
- Long, A & Rippeteau, B 1974 'Testing contemporaneity and averaging radiocarbon dates', *American Antiquity*, 39(2) (1974), 205–15.
- MacLean, A C & Rowley-Conwy 1984 'Appendix 4: the carbonised material from Boghead, Fochabers', in Burl, H A W, 'Report on the excavation of a Neolithic Mound at Boghead, Speymouth Forest, Fochabers, Moray, 1972 and 1974', *Proc Soc Antiq Scot*, 114 (1984), 35–73.
- MacSween, A 1997 'Coarse Pottery', in Driscoll, S T & Yeoman, P A, *Excavations within Edinburgh Castle in 1988–91*, 117–21. Edinburgh (= Soc Antiq Scot Monogr 12).

- Mercer, R 1981 'The excavation of a late Neolithic henge-type enclosure at Balfarg, Markinch, Fife', *Proc Soc Antiq Scot*, 111 (1981), 63–171.
- O'Sullivan, J 1998 'The architecture of prehistoric settlement at Lairg', in McCullagh, R P J & Tipping, R (eds) *The Lairg Project 1988–1996: the evolution of an archaeological landscape in northern Scotland*, 102–12. Edinburgh.
- Pollard, T 1997 'Excavation of a Neolithic settlement and ritual complex at Beckton Farm, Lockerbie, Dumfries & Galloway', *Proc Soc Antiq Scot*, 127 (1997), 69–122.
- Raisen, P & Rees, T 1995 'Excavation of three cropmark sites at Melville Nurseries, Dalkeith', *Glasgow Archaeol J*, 19 (1994–5), 31–50.
- Rees, A 1995 'Castle Steads, near Dalkeith', *Discovery Excav Scot* 1995, 56.
- Rees, A 1997 'Thornbank, near Dalkeith', *Discovery Excav Scot* 1997, 53–4.
- Rees, T 1998 'Excavation of Culhawk Hill ring-ditch house, Kirriemuir, Angus', *Tayside Fife Archaeol J*, 4 (1989), 106–28.
- Reid, M L 1989 'A room with a view: an examination of roundhouses, with particular reference to northern Britain', *Oxford J Archaeol*, 8(1) (March 1989), 1–39.
- Reynolds, P J 1982 'Aspects of later prehistoric timber construction in south-east Scotland', in Harding (ed), 44–56.
- Rideout, J (ed) 1996 'Excavation of a promontory fort and a palisaded homestead at Lower Greenyards, Bannockburn, Stirling, 1982–5', *Proc Soc Antiq Scot*, 126 (1996), 199–270.
- Rideout, J 1997 'Excavation of Neolithic enclosures at Cowie Road, Bannockburn, Stirling, 1984–5', *Proc Soc Antiq Scot*, 127 (1997), 29–68.
- Russell-White, C 1995 'The excavation of a Neolithic and Iron Age settlement at Wardend of Durris, Aberdeenshire', *Proc Soc Antiq Scot*, 125 (1995), 9–28.
- Smith, H 1992 *Lamb's Nursery*. Unpublished report. Glasgow Univ Archaeol Res Div (GUARD, 62). Glasgow.
- Terry, J 1995 'Excavation at Lintshie Gutter unenclosed platform settlement, Crawford, Lanarkshire, 1991', *Proc Soc Antiq Scot*, 125 (1995), 369–428.
- Triscott, J 1982 'Excavations at Dryburn Bridge, East Lothian', in Harding (ed), 117–24.
- Tutin, T G, Heywood, V H, Burges, N A, Moore, D M, Valentine, D H, Walters, S M & Webb, D A (eds) 1964–80 *Flora Europaea*, 5 vols. Cambridge.
- Veen, M van der 1985 'Carbonised plant remains', in Barclay, G J, 'Excavations at Upper Suisgill, Sutherland', *Proc Soc Antiq Scot*, 115 (1985), 188–91.
- Wickham-Jones, C R & Dalland, M 1998 'A small Mesolithic site at Craighead Golf Course, Fife Ness, Fife', *Tayside Fife Archaeol J*, 4 (1998), 1–19.
- Williams, D 1973 'Flotation at Siraf', *Antiquity*, 47(1973), 19.

This paper is published with the aid of a contribution from Redrow Homes (Scotland) Ltd