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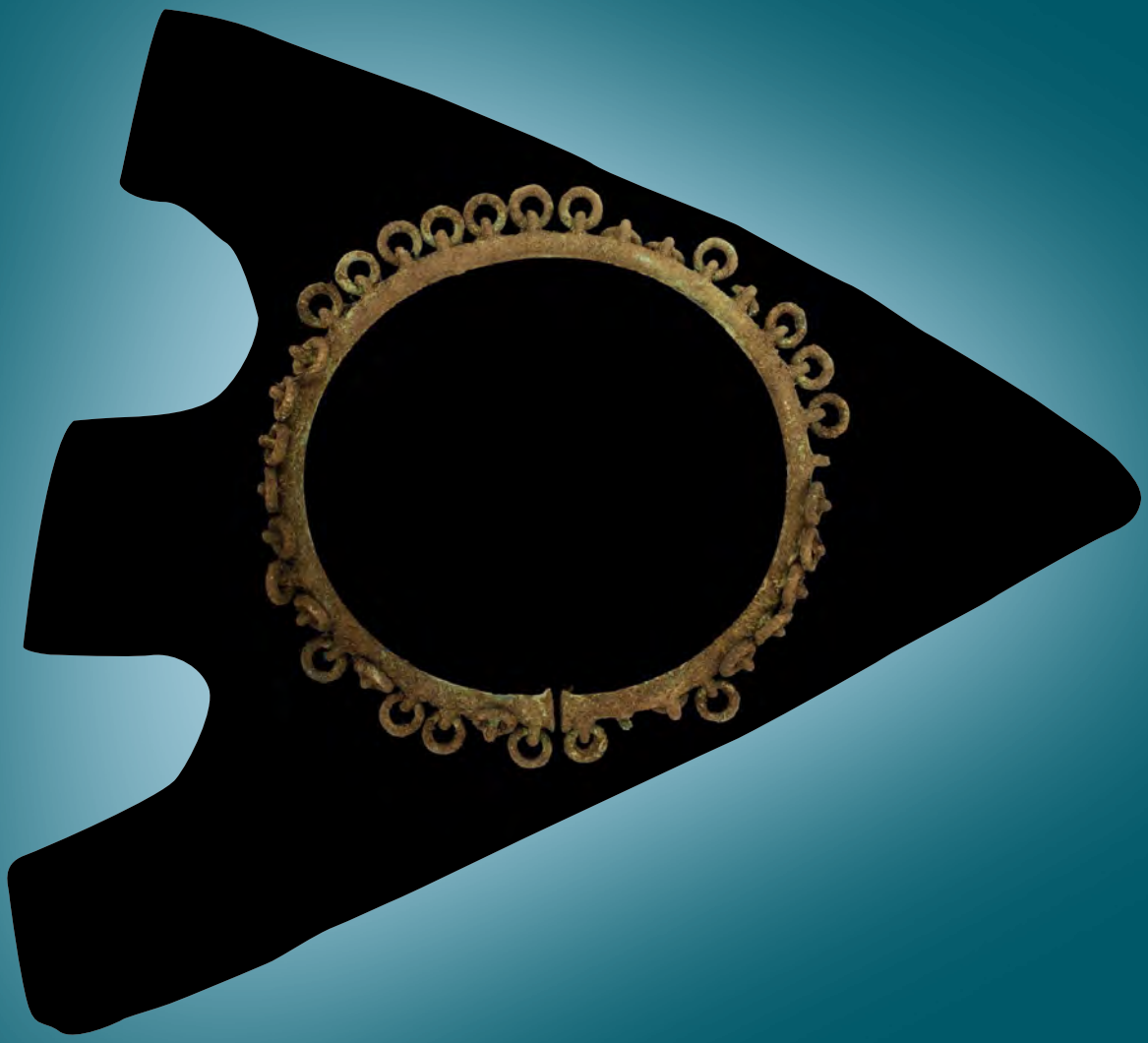

ARO62: 'A Hoard, Spear Moulds and a Bear, Oh my!' a Late Bronze Age Settlement at Greenside farm, Rosemarkie

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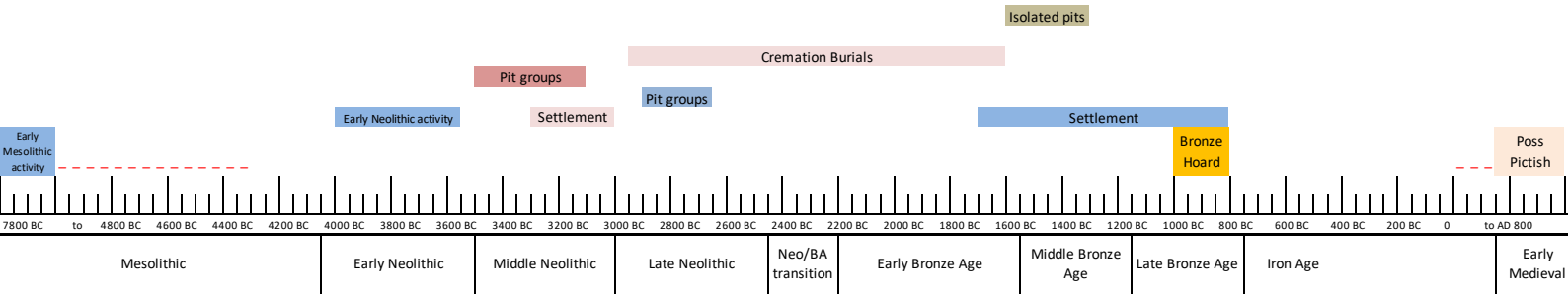

Summary

The excavation and post-excavation analyses of finds recovered from Rosemarkie revealed exceptional archaeology.

While the first evidence of human activity here was traces of Mesolithic and early Neolithic activity, it was only from c. 3300 to 3000 BC that the first demonstrable evidence for permanent inhabitation took place, likely a small farmstead. A hiatus followed, albeit punctuated sometime between 3000 BC and 2000 BC by one of the most interesting cremation burials from the region, containing the phalange bone of a brown bear buried along with a fragment of a polished flint axehead. Unfortunately, this high-status cremation burial was heavily disturbed by later Bronze Age activity. A further cist burial containing the cremated remains of at least one adult individual from the Early Bronze Age was also discovered.

Inhabitation of the site returned from around the beginning of seventeenth century BC until the end of the Bronze Age. It is from the middle Bronze Age, from the mid-fifteenth century BC onwards that particularly clear evidence of occupation was evident. A total of seven roundhouses, three defined by small ditches or enclosures and another with a substantial double-post (fenced) palisade were revealed. This phase of settlement was a long lived one, lasting more than six centuries to the turn of the eighth century BC. But detailed examination of the radiocarbon dates suggests that the different roundhouses were not all occupied at the same time but represent a small community, perhaps a family lineage, building successive roundhouses, occupying different spaces in different periods across the site.

It was towards the tail end of this settlement that a rare and well-preserved late Bronze Age metalwork hoard was buried. Comprising a complete penannular ringed ornament lying on top, a fragment of penannular ringed ornament placed within the complete ornament's circumference, a cup-ended ornament at the very base and six penannular bar bracelets, these were carefully packed, tied together and stacked on top of one another and buried in a pit on the edge of the late Bronze Age settlement.

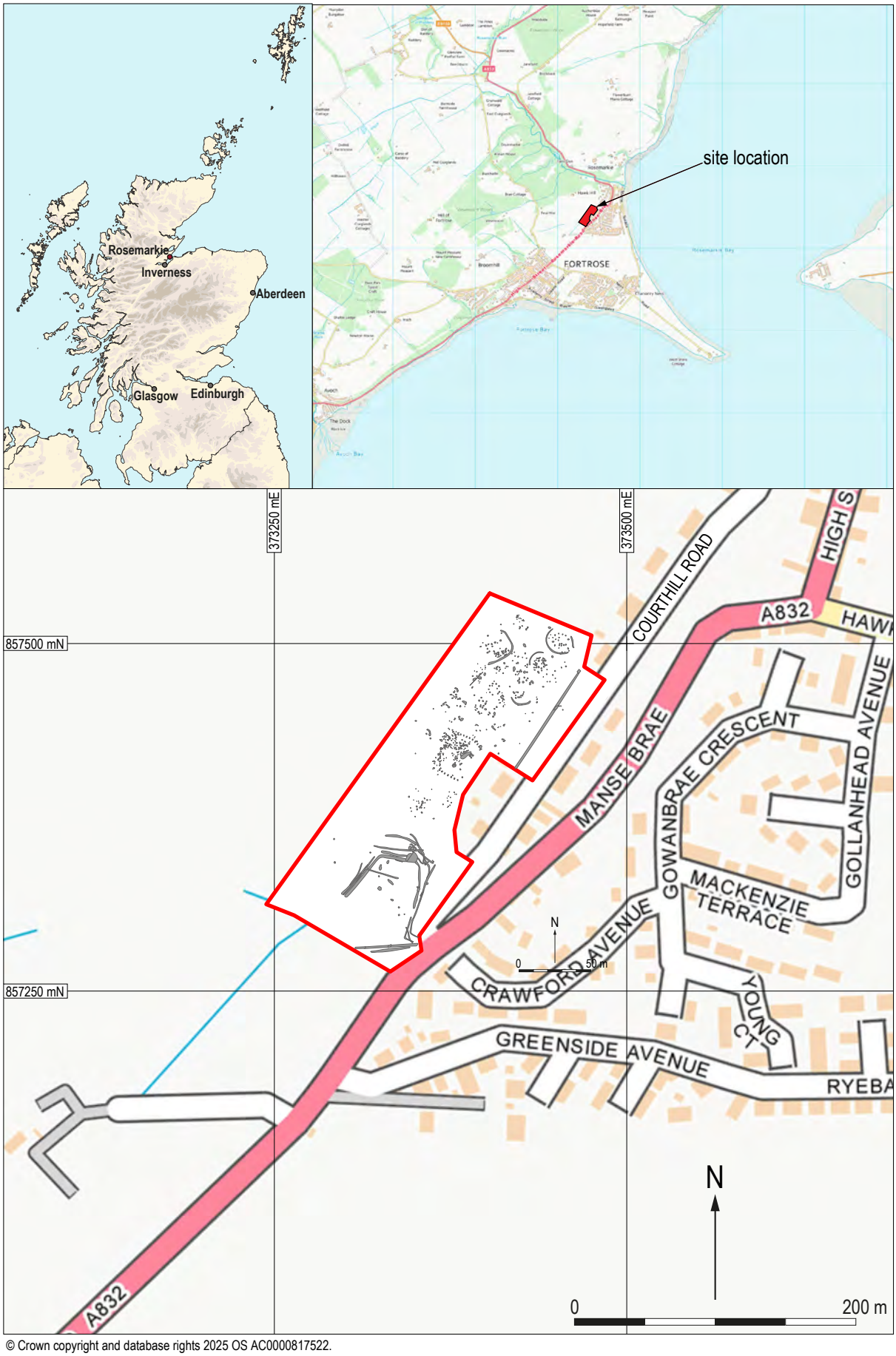

Figure 1.1: Site location plan.

PART 1: Introduction

Introduction

This report details the results of an archaeological excavation carried out on land 90 m north-west of Greenside Farm, Rosemarkie, Highland on behalf of Pat Munro (Alness) Ltd. Rosemarkie lies a quarter of a mile to the north-east of Fortrose on the Black Isle in Ross-shire. Together the two towns were granted the status of a Royal Burgh in 1455 by James II. Fortrose and Rosemarkie are situated either side of the Chanonry Ness promontory, about 12 miles northeast of Inverness. The development site is located within an area of improved pasture land bordered to the south-east by the A832 and Courthill Road, Rosemarkie, at the south-east foot of the Hill of Fortrose (NGR: centred on NH 73369 57406) (Figure 1).

The development area comprised pastureland with the footprint of a previously dismantled agricultural shed along the south-eastern side of the centre (Area 2) of the development site. The local bedrock geology is that of the Rosemarkie Metamorphic Complex mainly psammite overlain by Devensian raised marine deltaic deposits of gravel, sand and silt formed during the Quaternary period (BGS Online Viewer 2025).

An archaeological evaluation of the site was carried out in January 2018 and revealed evidence for significant archaeological remains (Kennedy and Peteranna 2018). These remains included pits, some containing prehistoric possible, possible crucible fragments for bronze smithing, and coarse stone tools. The recovery of medieval pottery fragments from a deep soil layer below the upper plough soil suggested that medieval remains could also be present on the site. Other activity was represented by well-preserved linear ditches and the fragmentary remains of a possible stone wall, together with a substantial slab-built culvert, which correlates to a description of works undertaken by a local minister to drain a pond (OSA 1794). The trench evaluation did not include an area along the north-western side of the site, due to the presence of deep plough soil horizons in excess of 1.5 m in this area.

The subsequent watching brief and excavation was carried out between August 2020 and July 2021 and produced extensive prehistoric remains across the north-eastern half of the development area (Williamson 2021). These included six roundhouses, one within a substantial double-post palisade enclosure; 14 prehistoric pit groups including other post-built structures, one of which was surrounded by a likely earthen bank enclosure; three possible grain-drying kilns and a possible pottery-firing pit; the remains of smaller post- or stake-holed structures; numerous other isolated pits, postholes and small linear features; and evidence for prehistoric forest clearance. Possible medieval remains were formed by an extensive network of curvilinear and linear ditches within the south-western half of the site. Post-medieval archaeological remains comprising a stone culvert and associated pits of unknown use were also identified in this area.

A large number of artefacts were recovered from the site and were generally of prehistoric date although some medieval and post-medieval material including ceramics, glass and miscellaneous metal was also recovered. The most substantial part of the assemblage was the prehistoric material, which included coarse stone tools, in particular a large number of saddle querns and quern rubbers, prehistoric pottery and flint artefacts. The most significant find was a Bronze Age hoard, which was lifted in a block of soil and subsequently excavated under laboratory conditions. It was discovered on the western side of the site, preserved below deep soil layers.

During the course of the works it became evident that the site had been affected by a build-up of soil believed to be associated with land-slip events from the Hill of Fortrose to the WNW of the development site. The colluvium from deposits was over 2 m in depth and had preserved archaeological features at different levels.

Archaeological and Historical Background

Directly adjacent to the south-west side of the development area, the location of a retting pond (Highland Historic Environment Record = HHER no. MHG3894) had been recorded on the site on the basis of the OSL 1794). Just beyond this, to the south-west, on the Fortrose and Rosemarkie Waste Water Treatment Works, significant prehistoric remains had been uncovered during upgrade work in 2012. These remains included Neolithic pits, a Bronze Age grain-drying kiln, a Bronze Age cremation cemetery and evidence of medieval activity (Fraser 2014). Recent metal detecting discovered significant artefacts in this field and the surrounding arable fields to the south and south-east (Highland Council Historic Environment Team, pers comm.).

Archaeological excavation ahead of new housing at Ness Gap, around 350 m to the south-east, uncovered prehistoric archaeological features, including two Bronze Age cists, one containing a Food Vessel and a cremation burial containing an urned cremation (HHER nos. EHG3460/3458).

To the east side of the development area, a Bronze Age cist containing an inhumation burial with a Food Vessel was discovered at the Manse in 1904 (HHER no. MHG8852). To the east, a copper Bronze Age flat axe was found by a metal-detectorist in the 1990s (HHER No. MHG16090) and pits were uncovered during a watching brief in nearby Gollanfield Avenue in 2014 (HHER No. EHG4211). To the south-east of the site, a medieval coin hoard containing silver coins were found in a small stone cairn (HHER no. MHG 8570). Rosemarkie is well-known for an early medieval ecclesiastical site represented by a collection of Pictish stones (located in the Groam House Museum, Rosemarkie) found on the site of Rosemarkie Parish Church c. 300 m to the north-east of the development site. The stones were located in an area thought to have previously contained the early twelfth century Cathedral of Ross (later moved to Fortrose), preceded by St Boniface's monastery and St Moluag's early Christian church in the sixth-seventh centuries AD (HHER no. MHG23664).

PART 2: The Archaeological Results

By Sam Williamson

All radiocarbon dates in this publication are quoted at 95.4% probability.

Summary of results

From the watching brief of the topsoil stripping the area was separated into four areas: Areas 1 - 4 (Figure 2.1) described below, with their full details in the site archives.

The archaeological remains (Figures 2.2) comprised predominantly multi-period prehistoric pits and structures defined by postholes, many of which were buried within prehistoric or colluvium layers detected during the evaluation trenching of the site. Within these areas were a number of structural remains, including at least six roundhouses and other structures within the 14 major pit groups (Figures 2.3). Several of the roundhouses were located within small ditch enclosures while one roundhouse was enclosed by a large double-post palisade. Amongst the structural remains, pits represented both domestic and non-domestic activity in the form of hearths or fire-pits, grain-drying kilns, possible metal or smithing pits, and ritual/funerary activity. A dismantled burial cist, potentially a Bronze Age cremation burial was located amongst other features. The most significant find was the Bronze Age hoard, located below deep soil layers at the west side of the site.

Most of the pits contained single fills and some had no clearly discernible function. A range of artefacts were recovered from these features included saddle querns, both intact and broken; quern rubbers; hammerstones; whetstones; burnishing stones and other coarse stone tools. Smaller lithic artefacts of flint and quartz were also recovered, including flint blades and scrapers. A larger number of prehistoric pottery sherds were present, predominantly undecorated but a small number of sherds were decorated (see The Prehistoric Pottery). Two postholes within Roundhouse 6 were notable for an animal bone deposit: one contained an entire cow or deer skull and the other a whale vertebra.

The south-west portion of the site, Area 1, differed from the rest of the site in that the main features consisted of curving and linear ditches and field drains with a small number of pits (Figure 2.4). The remains were interpreted as a possible early medieval or later field system with some prehistoric material recovered from a group of pits.

A number of artefacts were recovered from the topsoil and lower plough soil horizons, including a range of ceramics from the Medieval period to the modern day, clay pipe stems, miscellaneous metal, glass, and displaced saddle quern stone.

Area 1

Area 1 was the southernmost of the four areas. Its topsoil ranged from 0.4 m to 1.5 m in depth, and tended to be deeper alongside the south-east site boundary, and across the north-west area. The natural subsoil was fine yellow and orange sand with occasional small and medium-sized cobbles. There was evidence for what was interpreted as a lower plough soil (039) in this area.

The features identified in Area 1 (Figure 2.4) predominantly comprised a series of linear and curvilinear ditches and field drains, a post-medieval culvert and associated drain, pits, areas of in situ burning and old vegetation.

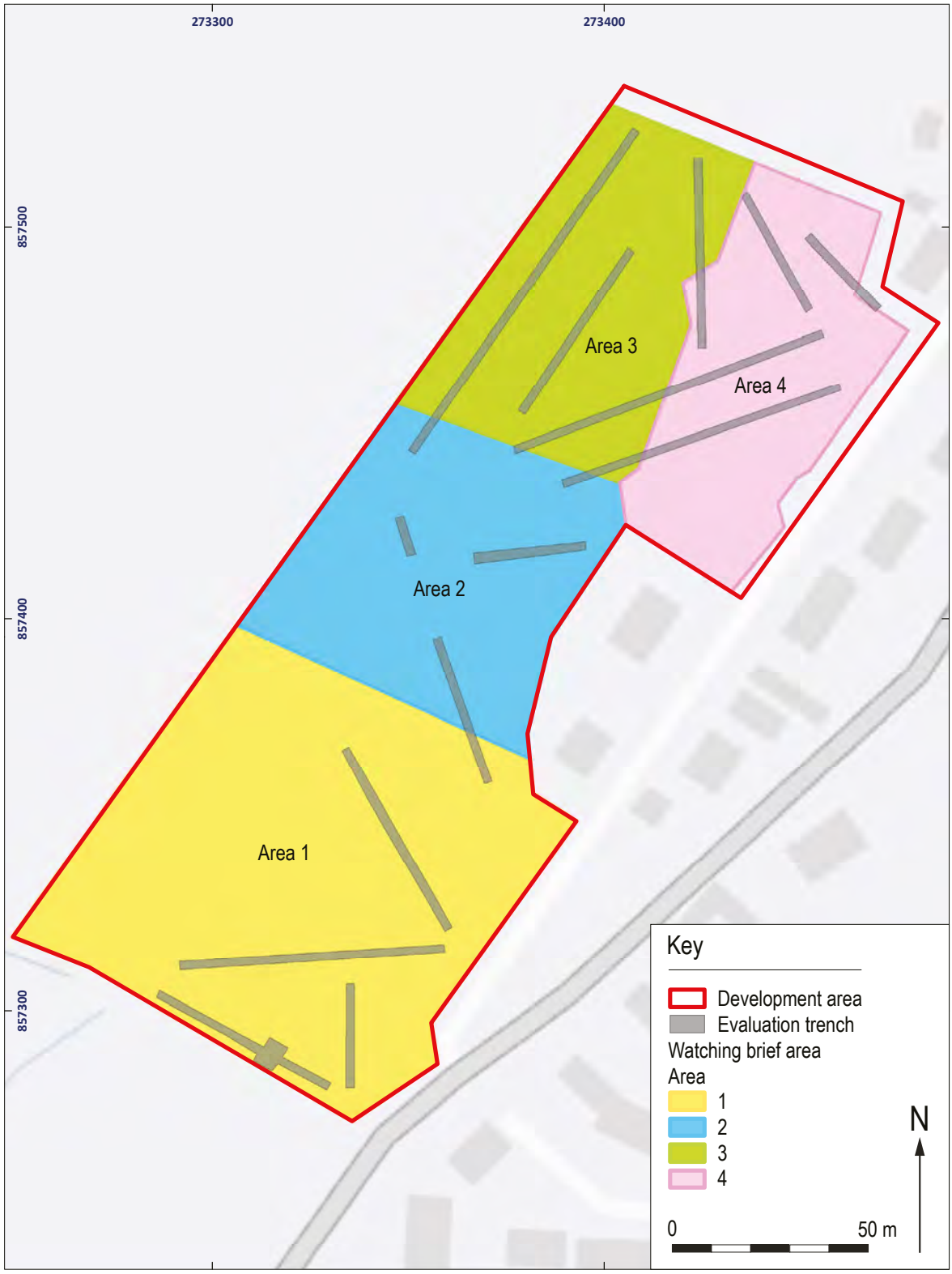

Figure 2.1: Location of watching brief area.

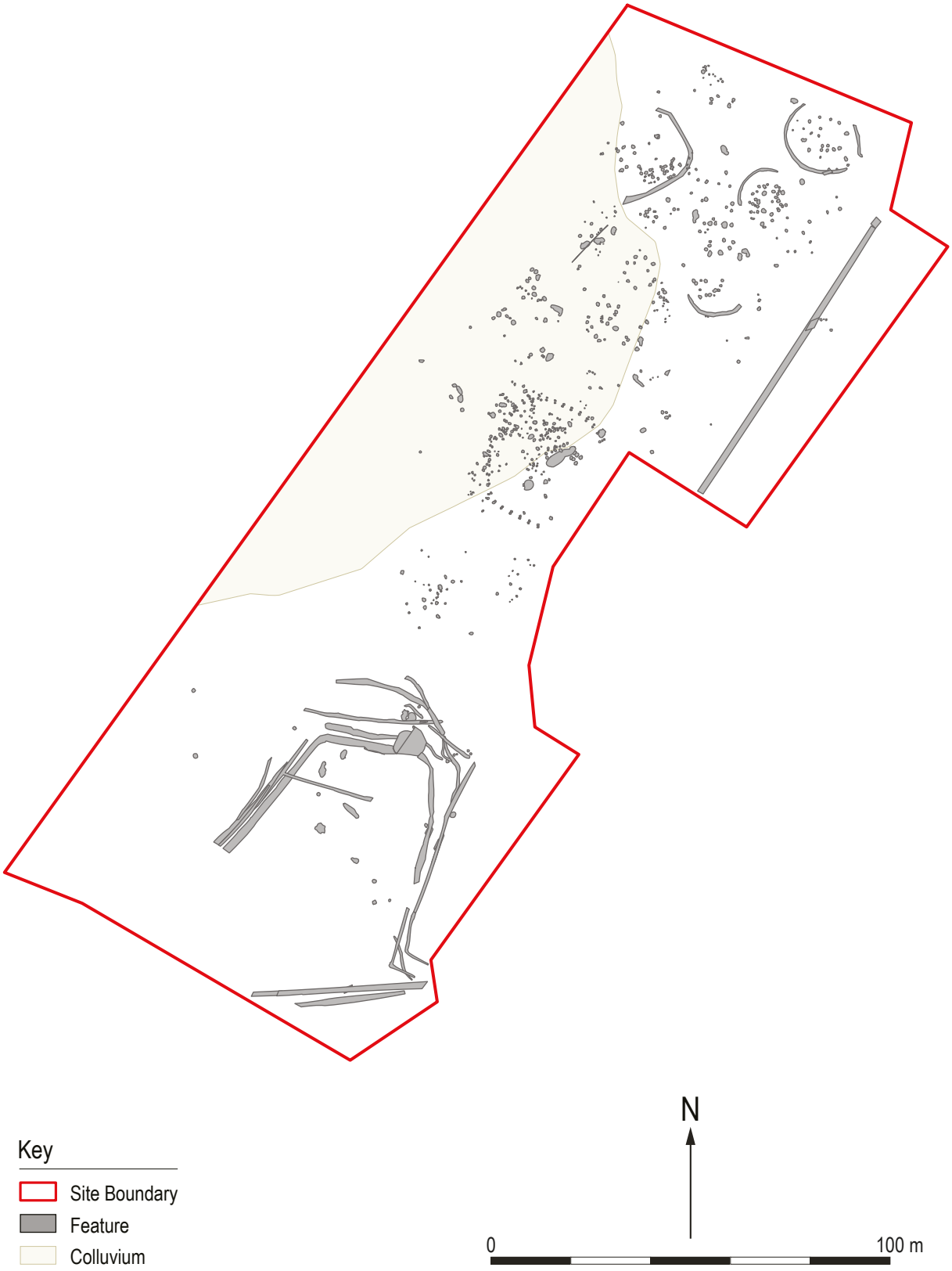

Figure 2.2: Overview of archaeological remains.

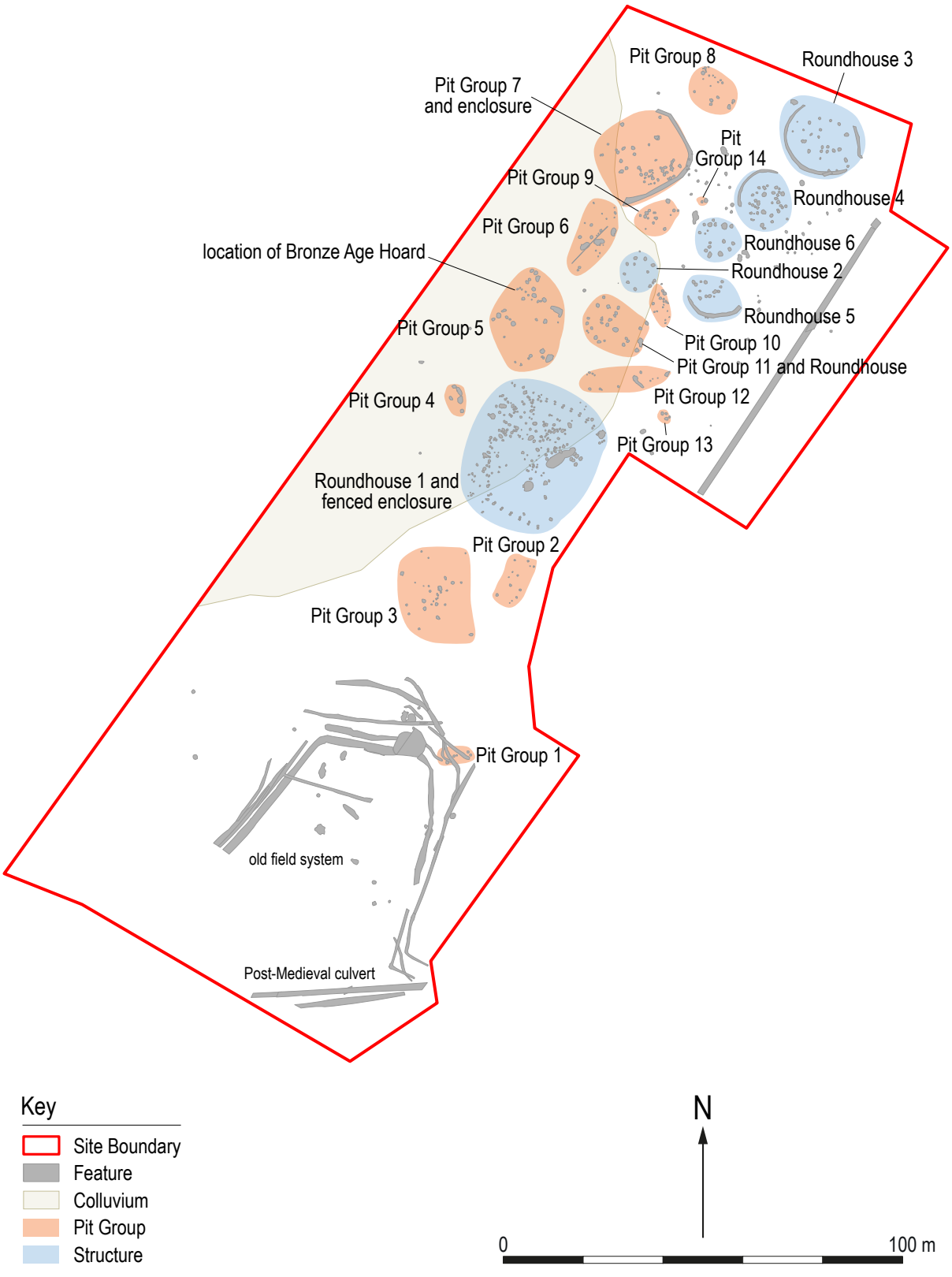

Figure 2.3: Overview of archaeological remains with structures highlighted.

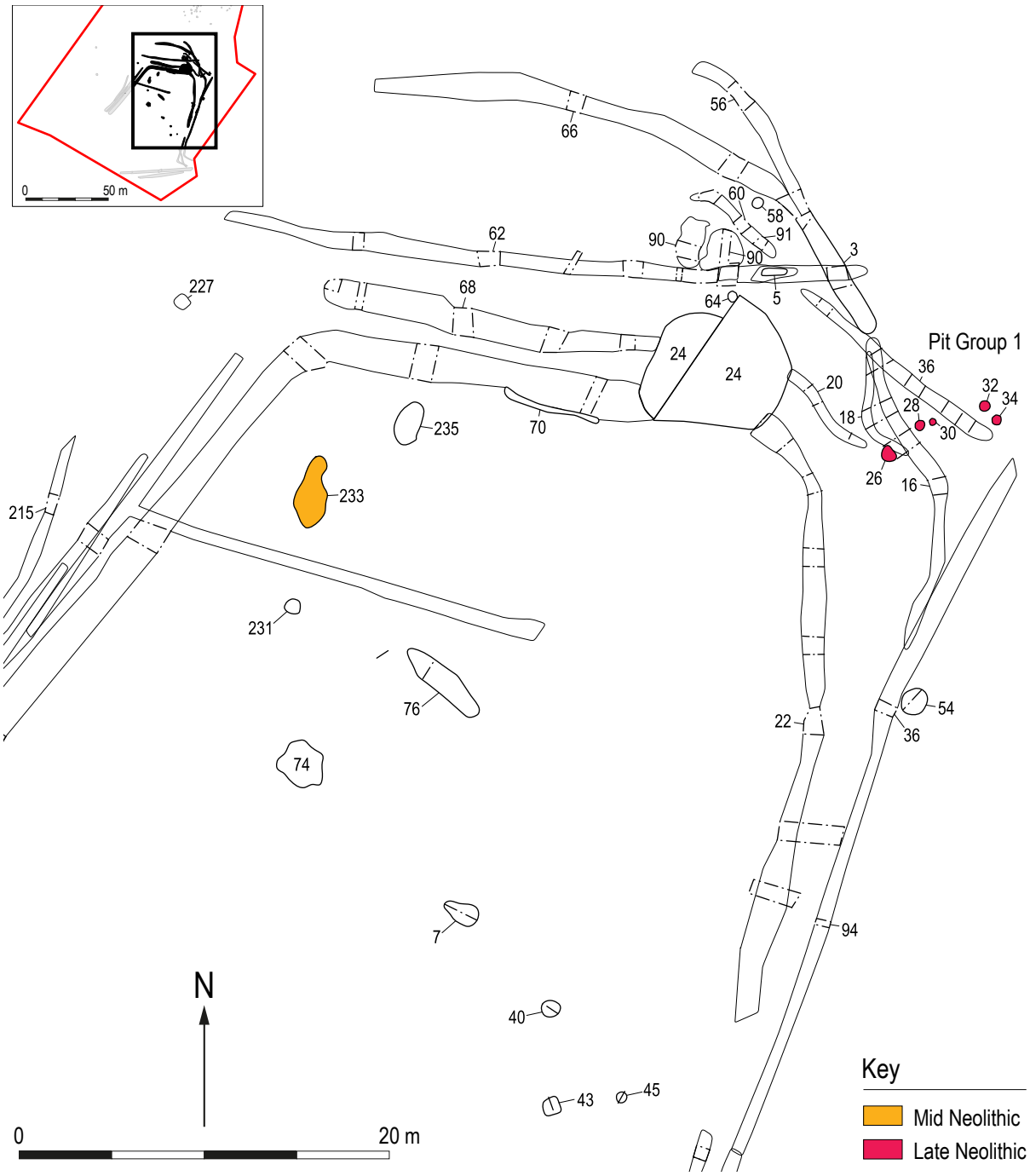

Figure 2.4: SW area of Area 1 with ditches and Pit Group 1.

Ditches and field drains

Sixteen features formed a series of fragmentary ditches, some overlapping and intercutting and others truncated in parts that ran north-east before turning west and then continuing parallel with the first leg to the south-west (Figure 2.5). These were accompanied by rubble-filled field drains (003, 005, 070 and 072) and a ceramic field drain (102). The former cut through the ditches, indicating that they related to a later phase of site activity.

The ditches generally had steep straight-sided or slightly curved sides with flat or slightly rounded bases. They ranged in width from 0.35 m to 2.15 m wide, but on average measured between 0.5 m to 1 m in width and between 0.1 m to 0.3 m in depth. Some of the ditches were affected heavily by plough truncation, particularly to the north-west side of this area. The field drains were more regularly shaped and measured less than 1 m in width and up to 0.3 m in depth.

Artefacts were relatively scarce from these features. Ditch (009), situated to the south-east and comprising a sharp dog-leg bend, produced some fragments of slate (SF 02) and a possible furnace base (SF 03). Ditch (020) produced a piece of carved stone SF 05. Ditch (022) (Figure 2.6), the largest of the ditches, produced a range of post-medieval ceramics, glass fragments and possible slag.

Figure 2.5: Excavation of ditches (009) (front), (010) (middle) and (011) (back). Facing north-east.

Figure 2.6: ENE-facing section of slot 2 through ditch (022/086).

Post-medieval culvert and associated ditch

A stone-built culvert (051) (Figures 2.7) was identified during the evaluation and was further exposed during the watching brief. It was aligned ENE/WSW and continued beyond the excavation area at both ends, appearing to turn a 90° dog-leg to the south-east at the east side. It was exposed for a distance of 38 m. The ditch measured up to 1.5 m in width and had a steep-sided and flat-based profile up to 0.8 m in depth. The structure of the culvert itself (051) comprised two walls of sub-rounded stones up to four courses high, each sat on a foundation course of slightly larger angular stones which rested on a compact clay floor or lining. Large flat slabs of stone capped the channel and rested on its side walls, which were c. 0.34 m in width. Some of these stones included worked pieces, such as a saddle quern (SF 19A) and a dressed stone (SF 20) (Figure 2.8).

Located south of the culvert (051), a ditch (088) ran almost parallel to it (Figure 2.4). It measured 24 m in length and 0.9 m in width with a near vertical side to the south and a stepped side to the north. It contained a mostly sterile fill except for a possible clay layer in its base, very similar to that found within the culvert. No artefacts were retrieved from the feature.

Figure 2.7: Post-medieval culvert (051). Facing NNW.

Figure 2.8: East end of post-medieval culvert (051) showing change in alignment, facing SW; saddle quern (SF 19A) visible in centre and dressed stone (SF 20) in top left.

Pit Group 1

This consisted of a cluster of five sub-circular pits situated around the north-east end of ditch (036) that formed a broad L-shape (Figure 2.9). Four of the pits (026, 028, 032 and 034) were fairly homogenous and ranged in diameter from 0.44 m to 0.55 m and c. 0.14 m in depth, with fairly similar profiles. Their fills were of similar dark greyish-brown silty sand, with at least one pit (030) possibly containing degraded charcoal. No artefacts were recovered from any of these four pits. The south-westernmost pit (026) was the largest of the five and was more elongated in shape, measuring 0.82 m by 0.67 m. Although slightly shallower than the others at 0.12 m, this pit contained charcoal fragments and prehistoric pottery sherds (SF 10). These features probably represent a group of prehistoric refuse or fire-pits.

Additional pits

Twenty-one additional pits were scattered across Area 1. The majority of them were isolated with no clear relationship to any other. Pit (024) was a large modern feature measuring c. 8 m by 8 m that cut through the lower plough soil (039), truncating ditches (020 and 022) and containing only sterile sandy silt. Pit (054) was situated to the immediate east of ditch (011) and comprised a circular pit 1.3 m in diameter and 0.1 m in depth (Figure 2.10). It contained a charcoal-rich fill with large fragments possibly representing branches or roots, and several stones.

Figure 2.10: West-facing section of pit (054).

Pit (058) was located between ditches (066 and 005) but with no clear relationship with either. It was c. 0.55 m in diameter and shallow. It contained some possible degraded charcoal.

Two pits, (271 and 1569), were particularly isolated features in the north-west of Area 1. Pit (1569) was large over 1 m in diameter by 0.4 m in depth and was filled with medium-sized stones. It was waterlogged, and numerous stones were

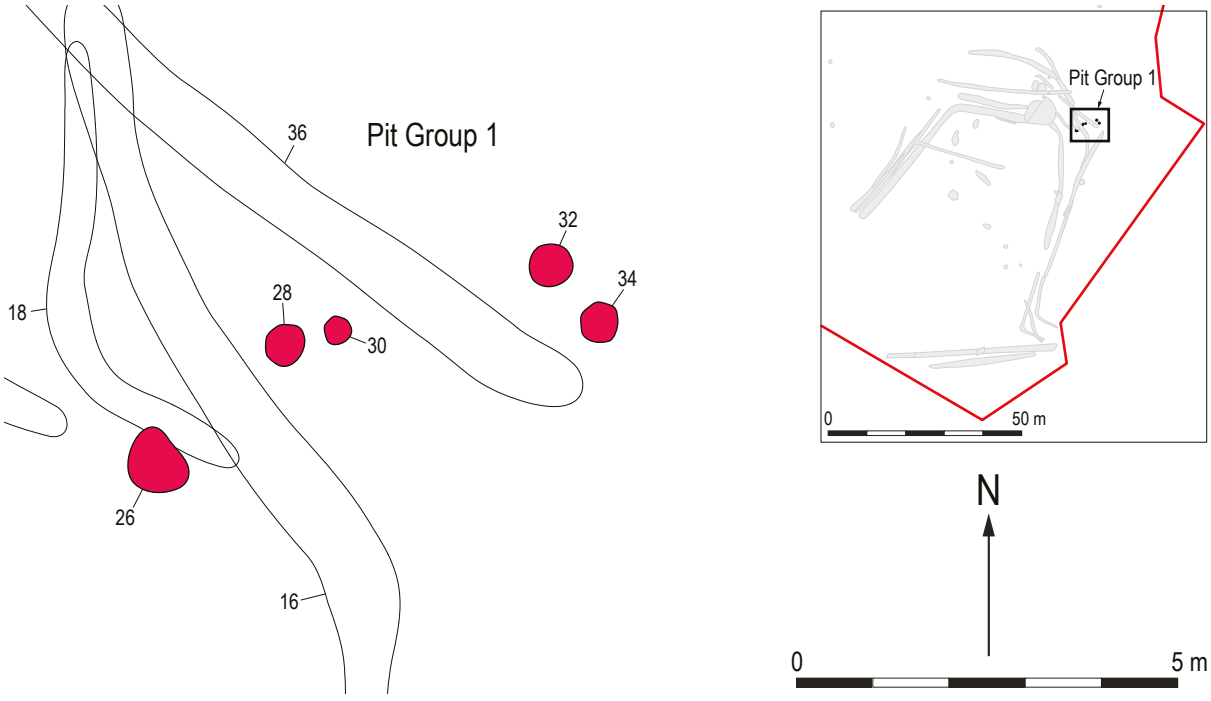

Figure 2.9: Detail of Pit Group 1.

observed in the topsoil overlying the pit, and it was suspected that it was the remnants of a soakaway. Pit (271) was 0.8 m in diameter and contained frequent charcoal fragments and some fire-cracked stones.

Pit (227) was situated at the north-west corner of the ditches and was an isolated square-shaped feature 0.7 m long with straight sides and 0.3 m deep with a flat base. Nine pits were located within the area created by the linear ditches. Pits (007, 040, 043 and 045) were located to the south-east side of the area. Pit (007) was large and oval-shaped measuring 1.8 m by 0.9 m by 0.1 m in depth. It contained a loose concentration of medium sized sub-rounded stones at the centre in a brown silt matrix. Pits (040, 043, and 045) were sub-circular ranging in diameter from 0.65 m to 0.9 m, and in depth from 0.12 m to 0.27 m. Pit (040) was rare as it contained two fills. In general all three pits contained fills with very small amounts of charcoal flecks and no artefacts.

The remaining five pits were located within the north-west corner of the enclosing ditches. Pits (074 and 076) were situated somewhat centrally within the area defined by the ditches. The former was a large sub-oval feature measuring 2.4 m by 1.9 m by 0.3 m in depth with a greyish-black clayey sandy fill and peat-like material towards its base. Pit (076) was a long somewhat rectangular pit measuring 3 m by 1.2 m by 0.6 m in depth, also with a similar fill to (074), with peat-like material present.

Pits (231, 233 and 235) differed from each another. Pit (231) was 0.78 m in diameter and 0.14 m deep (Figure 2.4). It was predominantly filled with stones and contained some charcoal flecks and chunks throughout. Pit (233) was large and sub-oval measuring 4 m by 1.6 m by 0.25 m. It contained some stones, with a notable proportion of quartz pebbles, and distinct charcoal lenses at its base. It also produced a scale-flaked knife (SF 274) in flint (see Lithic Assemblage). Pit (235) was another large sub-oval feature 1.8 m by 1.05 m by 0.3 m. It was filled with rare small stones and charcoal, and with a distinct black silt layer at the base that was thought to be ash. These are considered to represent additional prehistoric pits.

Burning and possible vegetation

Two features showing apparent in situ burning (047 and 048) were located to the south of pits (043 and 045). These deposits were defined only by heat-affected soil and occasional charcoal flecks.

Several areas showed signs of possible vegetation clearance through burning, represented by blackened patches with pale/leeched halos, in various shapes and sizes and ranging from ephemeral to quite pronounced features such as (078 and 090).

Area 2

This formed the central area of the development (Figure 2.1). An area of ground on the east side of Area 2 was stepped in and truncated due to the location of a former agricultural shed. The topsoil in this area was between 0.5 m and 1.2 m deep, and the subsoil (002) was as previously described for Area 1. The lower plough soil (039), also noted in Area 1, was present across the eastern side of the site, while on the west side there were colluvium soil layers that combined with the topsoil were up to 2.6 m deep over the natural subsoil.

These colluvium layers (1556/1571 overlying 1102/1105) were observed to completely cover entire areas of archaeological features, with later activity occurring on top of them (Figure 2.11). Additionally, there appeared to be a deep layer formed by a prehistoric ground surface (401) which covered a large portion of the western side of Areas 2 and 3. In some instances these additional layers complicated feature recognition.

The main features identified within this area comprised three pit groups (Pit Groups 2, 3, 4) and a roundhouse (Roundhouse 1) enclosed within a palisade enclosure, and other activities (Figure 2.12 and 2.13).

Figure 2.11: Sondage through soil layer (401/761) in Area 2 with the height of the colluvial layers and topsoil (001,1556 and 1105) visible to it rear. Facing south-west.

Roundhouse 1 and palisade enclosure

Located at the north-east end of Area 2 was an area with many stake-holes, postholes and a possible ditch demarcating Roundhouse 1, together with a linear arrangement of double postholes - a palisade enclosure (Figure 2.14). Most of these features were dug into the soil layer (681) beneath colluvium (1105). Like elsewhere on the site the similarity of this material to the internal fills of features meant identifying the true extent of a feature was often difficult. This part of the site had also suffered significant modern disturbance.

Roundhouse 1 (Figure 2.15) was situated within the north-east half of the palisade enclosure. This roundhouse comprised 37 postholes. Pit (566) was interpreted as the fragmentary remains of a ring ditch. The remaining features were pits of unknown function. The building was represented by a circle of 10 definite postholes (513, 514, 549, 556, 568, 578, 580, 586, 612 and 618) and two probable postholes (614 and 728). The postholes enclosed an area between 7 m and 8 m in diameter, somewhat smaller than the roundhouses in Area 4 (see below). A further six postholes (620, 715, 718, 720, 722 and 725) formed three pairs that extended south-east from the posthole ring, outlining a porch or entranceway approximately 1 m wide (Figure 2.16). All these postholes were circular to oval-shaped in plan and measured c. 0.21 m to 0.55 m in diameter and between 0.15 m to 0.6 m in depth. They all contained material similar to the surrounding deposit (681), greyish-brown sandy silt with charcoal flecks, and included rounded stones around their edges as packing stones. A number of stone artefacts were recovered from them: (513) contained burnt lithic or shale (SF 86), and a quern rubber fragment (SF 106) reused as packing and (549) contained a whetstone stone (SF 75) reused as a packing stone.

The remainder of the postholes were located internally and likely represented partitions or other structural features within the roundhouse. These were similarly in shape and size to the posthole ring and porch postholes, and contained similar fills with some artefacts. Posthole (596) contained a prehistoric pottery sherd (SF 95) and a quartz flake (SF 99). A blackened sandy silt

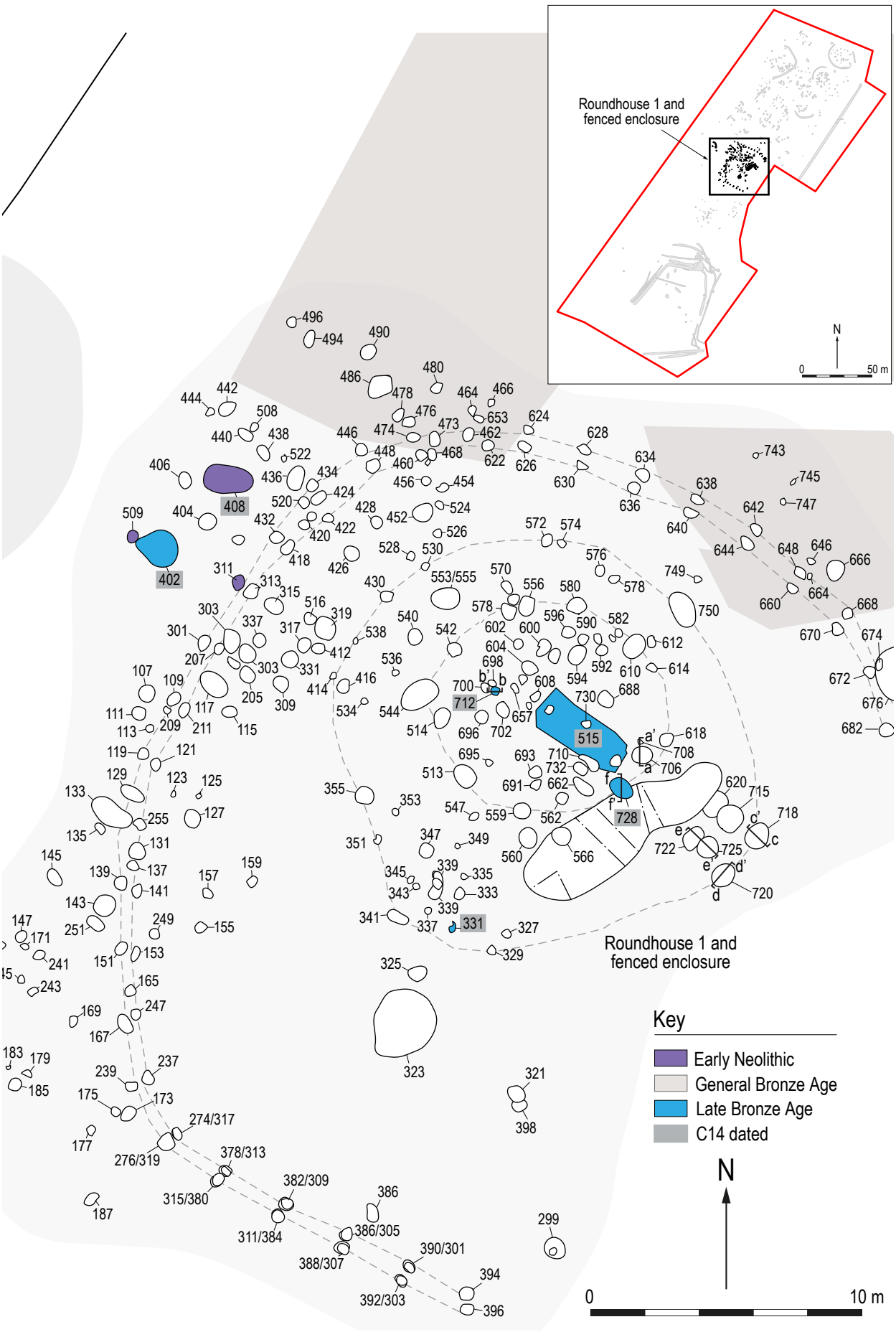

Figure 2.12: Roundhouse 1 and fenced enclosure, with pit 402 outside the palisade to the north-west.

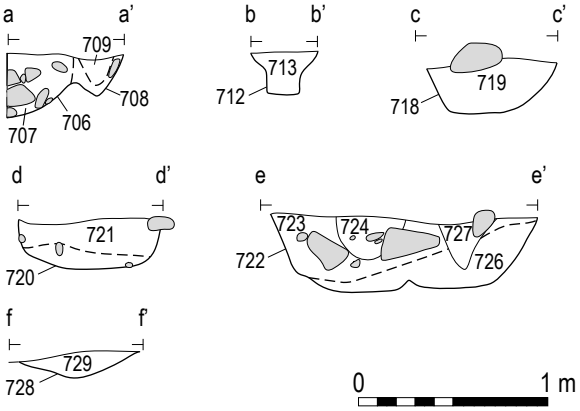

Figure 2.13: Roundhouse 1 selected section drawings through features.

deposit (515), thought to represent a disturbed hearth or fire-pit location, was present within the central area of the roundhouse and contained prehistoric pottery sherds (SF 97) and possible metal-working mould fragments (SF 98). This layer had been cut through by later ard-marks (visible in Figures 2.14 and 2.15) and sampling of the deposit was undertaken in order to check for the presence of metal-working residues. On the basis of the presence of mould fragments, it was proposed that the roundhouse was used as a metal-smithing workshop during part of its lifespan.

Figure 2.14: Aerial view of Roundhouse 1 and northern portion of timber palisade.

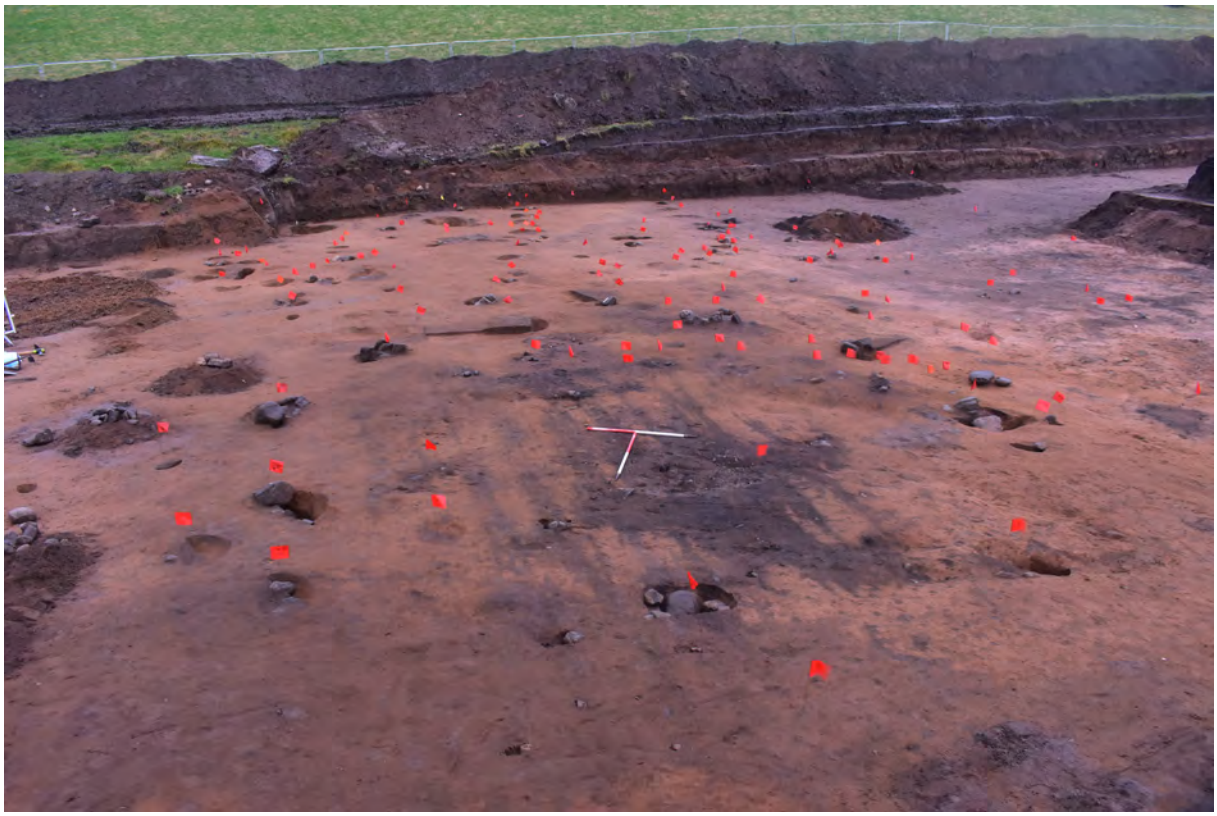

Figure 2.15: Roundhouse 1 with deposit (515) in centre foreground with plough marks. Facing north-west.

Figure 2.16: Roundhouse 1 after excavation with porch at centre front. Facing north-west.

Possible ditch (566) (Figure 2.17) was located on the south-east side of the roundhouse, and measured 6 m in length and was aligned roughly east/west with a slight arc open to the south. Its width varied between 1.75 m and 2.25 m and its profile was gently concave and it attained 0.2 m in depth. Its fill was greyish brown loamy sand with rare charcoal flecks and small rounded stones. It was tentatively interpreted as the partial remains of a ring-ditch.

The sub-oval palisade enclosure (Figure 2.18) comprised pairs of postholes aligned NE/SW and enclosed an area 28 m long by a minimum of 20 m wide. The palisade was only preserved on three sides, the south-east section presumably truncated by later activity on the site. The double postholes forming the main structure of this palisade comprised at least 55 features. Each pair of postholes had been dug less than 0.2 m from each other and each pair was positioned 2.5 m from the next pair, in a coherent system. The postholes were generally circular or oval measuring less than 0.5 m in diameter and between 0.1 m and 0.25 m in depth. Their fills were similar to the surrounding colluvium deposit (681) but comprised charcoal-flecked greyish-brown or black sandy silt, and many had small sub-rounded and sub-angular stones around their edges as packing.

Figure 2.17: South-west-facing section of ring ditch (566).

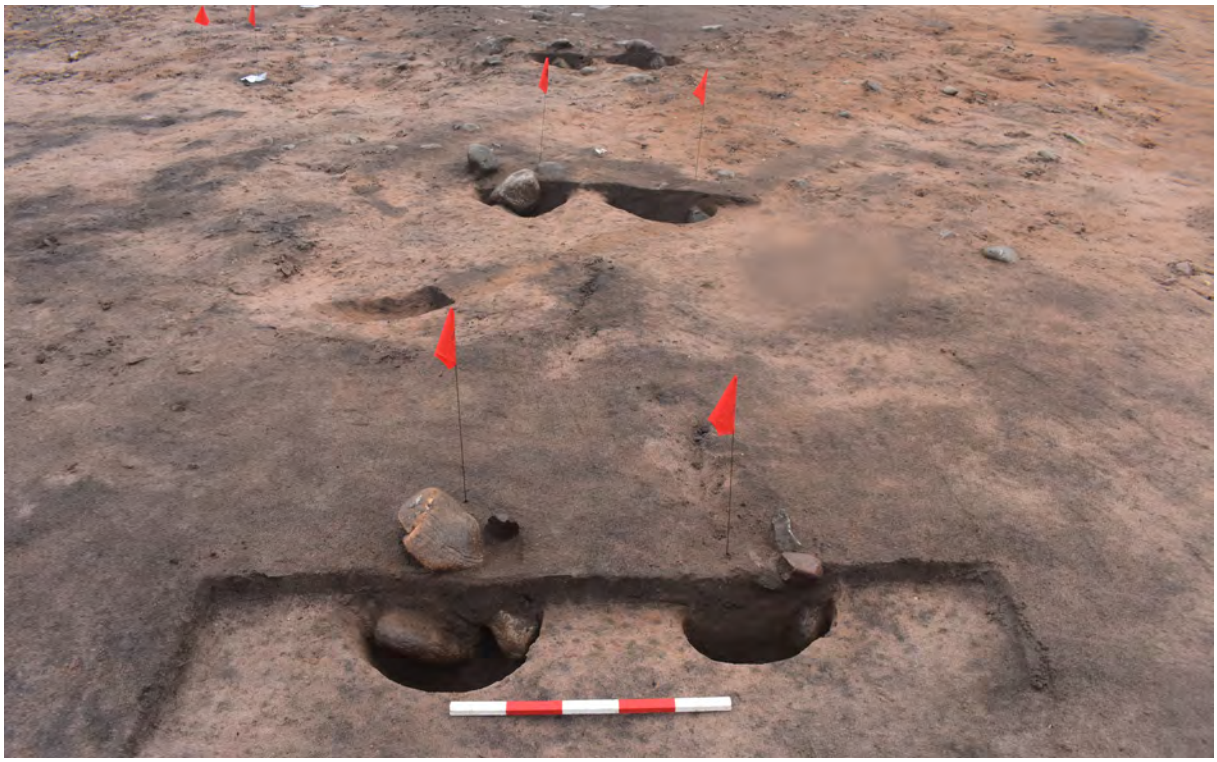

Figure 2.18: Palisade posthole pair (628 and 630) with other paired posts in succession. Facing south-east.

Within the north-west and west side of the enclosure, numerous features interpreted mostly as postholes were thought to represent re-dug postholes and remnants of subsidiary internal and external structural settings.

To the immediate south-west of the roundhouse was a cluster of 19 features, 13 of which were interpreted as postholes (325, 327, 329, 333, 335, 339, 341, 343, 345, 349, 351, 353 and 547), which appeared to form a rough figure-of-eight shape (Figure 2.12). They were between 0.2 m and 0.3 m in diameter and between 0.1 m and 0.38 m in depth. Some contained packing stones, and some produced artefacts: (325) contained a lithic (SF 66); and (333) contained a possible stone polisher (SF 64). Also present in feature (321) was burnt material and fragments of a possible metal-working mould (SF 62). A further four pits (247, 331, 337 and 398) were identified as pits of unknown function that may represent degraded postholes or refuse pits. Pit (398) contained a quartz blade (SF 65). These features provided further evidence for high status metal-smithing in Area 2, and the postholes likely represent structures.

A large pit (323/355) (Figure 2.19) to the south side of this group, was interpreted as a possible grain-drying kiln. It was sub-circular measuring 2.23 m NE/SW by 1.95 m and was 0.50 m deep. It had been truncated on the north-west arc by a pit for a modern concrete foundation associated with the agricultural shed. To the south-west, pit (355) was originally only 0.6 m wide and 0.5 m deep suggesting there were two phases of use of the same feature, with (323) representing the re-cut. The feature contained grey silty sandy with lenses of blackened material, including charcoal, mostly visible on the edges with a more homogenous central fill. This overlay grey-black silt with small charcoal fragments that had formed in a circular pit in the base of the pit where a compact group of large sub-rounded stones may have formed the destroyed remains of a setting such as a fire-pit.

To the immediate north-west of the roundhouse and confined by the palisade enclosure, were twenty-three further features predominantly recorded as postholes (Figure 2.20). These ranged from oval to circular in plan and from 0.22 m to 0.66 m in diameter with depths ranging from 0.14 m to 0.3 m. Most contained dark brownish-grey sandy silt with charcoal flecks and many had packing stones. Some contained artefacts: (309) contained two plain pottery sherds (SF 59) and (412) contained two small sherds of pottery (SF 90) and a quartz flake (SF 82). These postholes may have formed another structure(s) but may also indicate partitions to the inside of the palisade, or ancillary enclosures abutting it as observed on the external sides of the enclosure. The remainder of the features within this grouping comprised pits of unknown function.

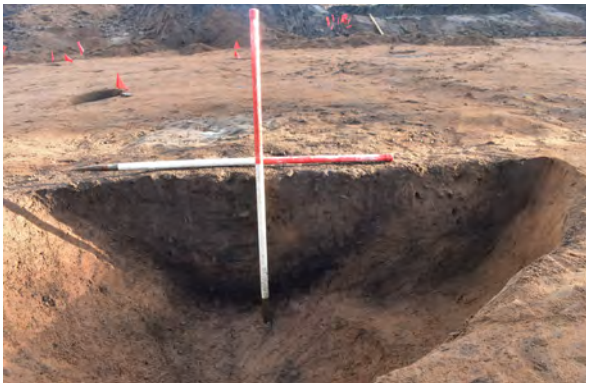

Figure 2.19: South-facing section through pit (323) (left) of a possible kiln with pit (355) (right). Facing north.

Situated around the north-west external side of the palisade were 16 features (Figures 2.21 and 2.22). These features were initially described as being sealed below the colluvium layer (401) where it was at its deepest. Features (406, 408, 438, 440, 442, 444, 490, 494 and 496) were interpreted as postholes and were generally circular or oval and between 0.35 m and 0.67 m in diameter, while (408) was a posthole dug within a larger pit 2.18 m in length. These features were between 0.15 m and 0.47 m deep. Their fills consisted of greyish-brown sandy silt with charcoal flecks and with sub-rounded stones positioned as packing stones on their edges. Three contained artefacts: posthole (406) contained a plain sherd (SF 92); posthole (408) contained middle Neolithic pottery Vessel 30; and posthole (496) contained Vessel 31. The additional features were interpreted as probable hearth/fire-pits or refuse pits. Pit (404) contained pottery sherds (SF 93,) and pit (436) contained a quartz piece (SF 89) and plain pottery sherds (SF 88). The postholes appeared to represent a small sub-rectangular structure aligned NE/SW and defined an area approximately 5 m in width. It could have abutted or underlain the palisade enclosure.

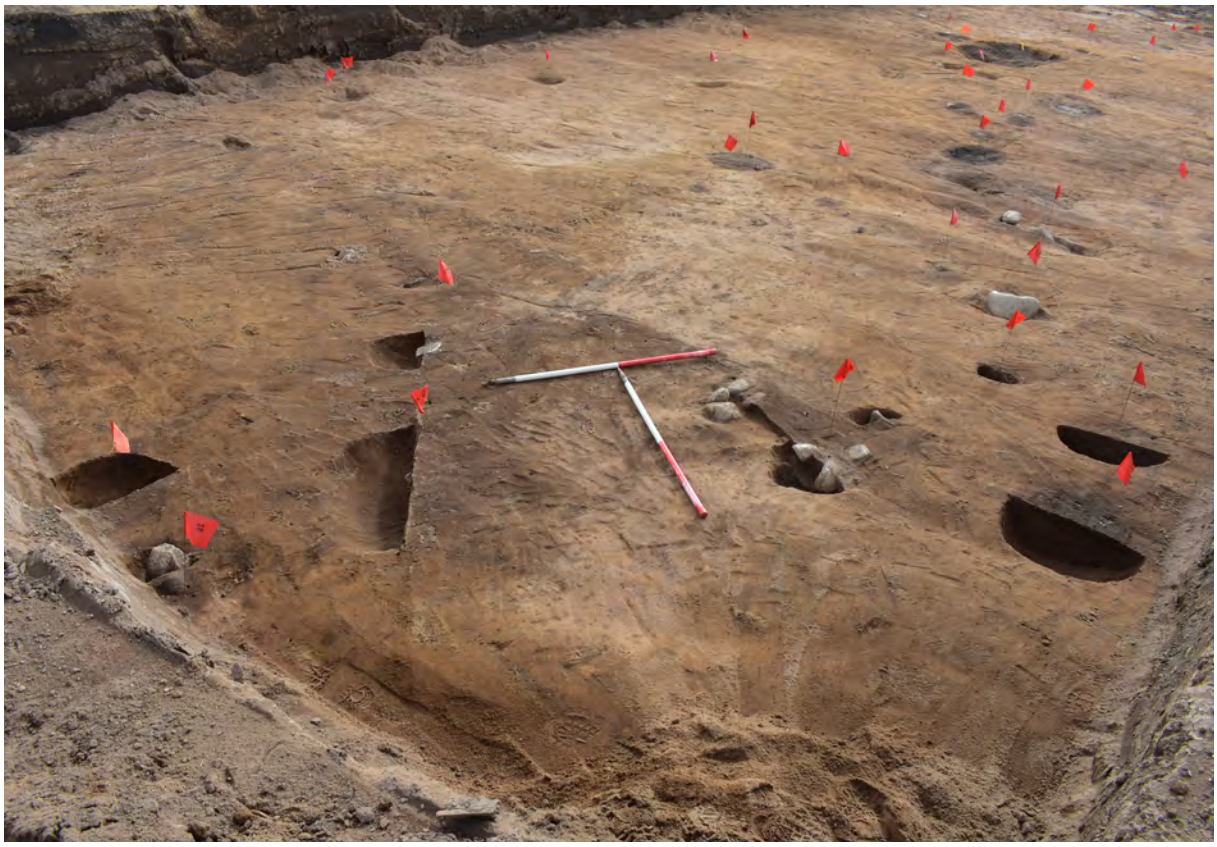

Figure 2.20: Overview of features north-west of Roundhouse 1, including pits (107-207). Facing SSE.

Figure 2.21: Overview of features on north-west side of the palisade. Posthole (496) is the bottom right feature. Facing south.

Another grouping of 20 small irregularly positioned features straddled the palisade on its south-west side (Figure 2.23). All but three (127, 155 and 157) were interpreted as postholes, similarly proportioned to those situated on the north-west side of the palisade, but with no artefacts present. There was not a coherent pattern to these features to indicate they formed a single structure.

Figure 2.22: Excavated features on north-west side of the palisade, posthole (496) is at the bottom left. Facing south-east.

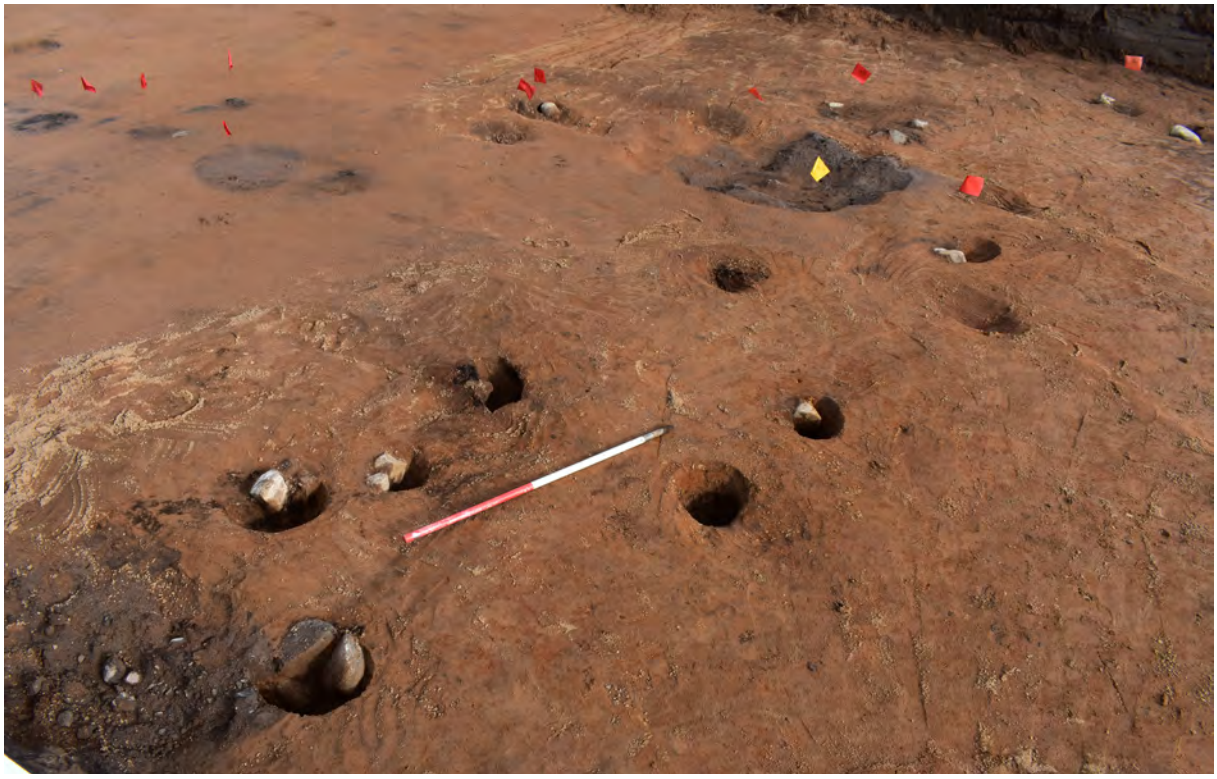

Figure 2.23: Overview of features to the south-west of the timber palisade, including features (149, 147, 171, 241, 245 and 243) from left to right. Facing ENE.

Pit (402), initially considered a kiln (Figures 2.12 and 2.24), was located 5 m north-west of the palisade and was keyhole-shaped in plan. It measured 1.5 m by 1.45 m. Its profile was steep-sided and rounded at the base, undulating somewhat into a smaller bowl to the WSW and was 0.39 m deep at deepest point. Its upper fill was mottled brown sandy silt that had a burnt flint flake (SF 71), possibly representing residual material. This overlay an intense thin black lens (511), which was situated over a basal fill (512) of brown sandy silt containing some sub-rounded stones 0.3 m long positioned in a rough line. This feature was originally interpreted as a possible grain drying kiln, the thin black lens representing perhaps the burned kiln rack and the stones within the basal fill potentially part of the kiln architecture to support a rack. A posthole was located on its west side. Due to the evidence of finds and cremated bone in this feature it has been reinterpreted and is discussed in detail in (Part 6: Discussion - Neolithic)

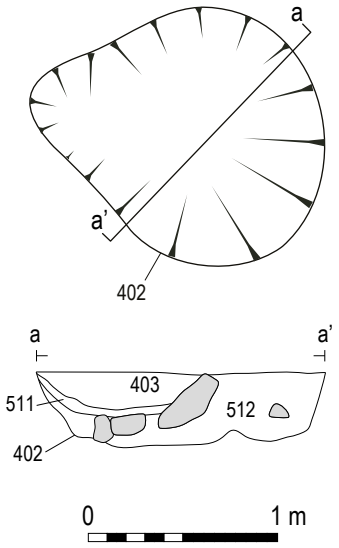

Figure 2.24: Plan of Pit (402) with section drawing.

Pit (676) (Figure 2.25), was cut by the palisade posthole (674) on the east side of the enclosure. The pit was sub-circular in shape and measured 1.55 m by 1.45 m with a depth of 0.37 m. This is also interpreted as a possible grain drying kiln, with similarities to (402). It had a dense burnt layer (738) overlying a basal deposit of grit and stones (739) which may have formed the kiln support or lining.

Figure 2.25: Possible grain-drying kiln (676) Facing west.

Pit Group 2

A small grouping of 13 circular pits was located on the south-east side of Area 2 that formed a rough figure-of-eight measuring c. 12 m in length by 5 m in width, in a broad NE/SW alignment (Figures 2.26, 2.27 and 2.28). Pit (273) was the largest and south-westernmost of the features, measuring 0.6 m in diameter with a flat base at 0.3 m depth (Figure 2.29). Its fill comprised predominantly sub-angular and sub-rounded stones and charcoal within greyish-brown silt, indicative that the feature may have been a fire-pit. Pit (281) was located towards the centre of the group and measured 0.4 m in diameter, by 0.08 m in depth. It contained brown loamy sand with a few stones at the top of the fill.

The remainder of the features generally measured between 0.2 m and 0.3 m in diameter and typically between 0.12 m and 0.25 m in depth. They were interpreted as small postholes or stake-holes, many with packing stones evident. There were no small finds associated with any of these features.

Pit Group 3

Pit Group 3 comprised 25 pits, probable postholes, stake-holes, a fire-pit, a possible sunken floor or activity area and a prehistoric soil layer (257) in the south-west corner of Area 2, extending over an area of approximately 25 m2 with the majority of features clustered towards the centre of the deposit (Figures 2.26 and 2.27).

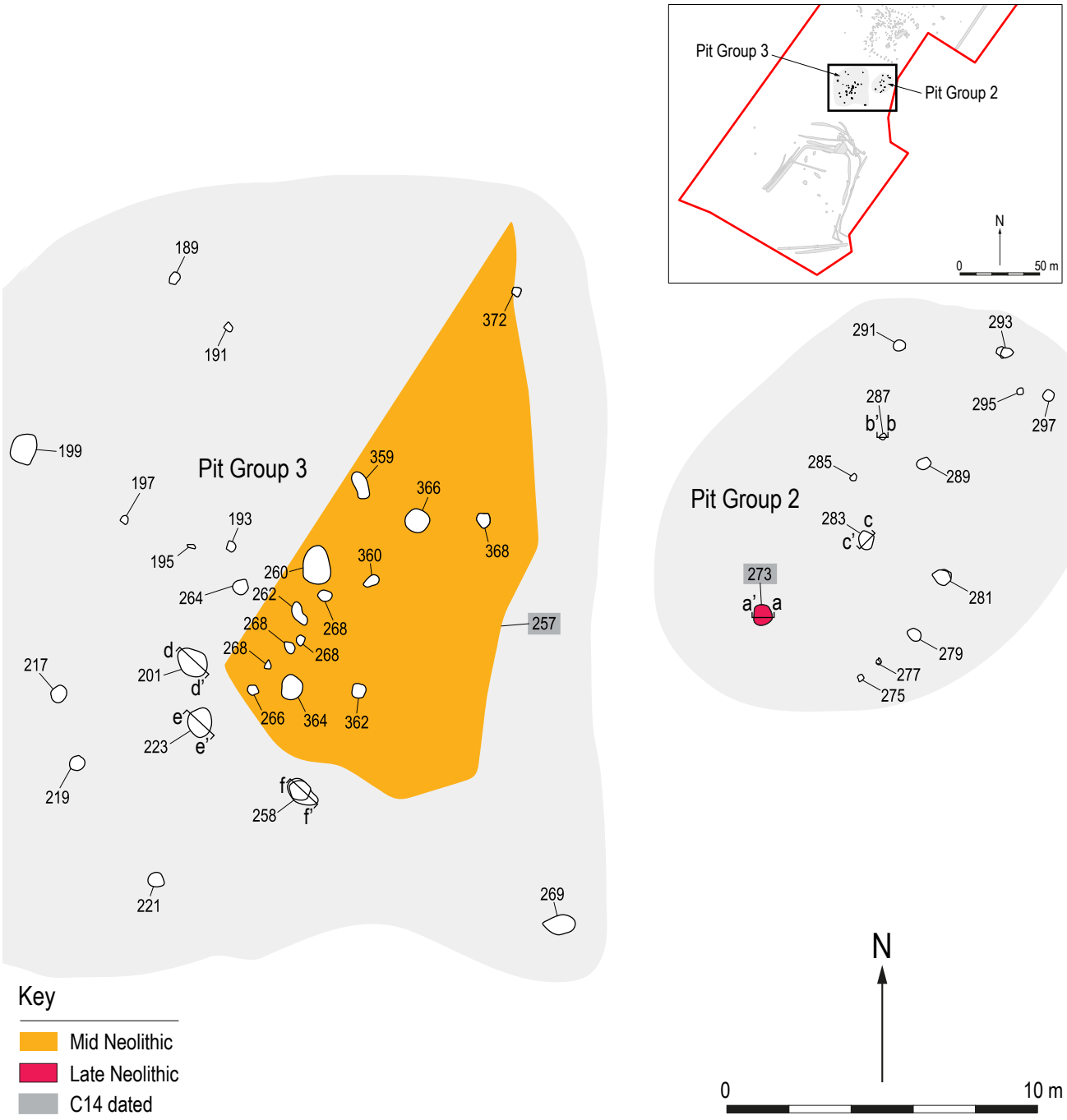

Figure 2.26: Pit Group 2 and Pit Group 3 with dated features highlighted

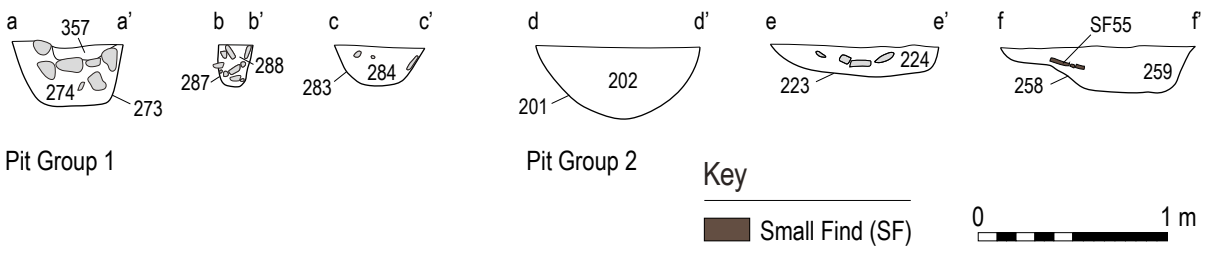

Figure 2.27: Section drawings of Pit Group 2 and Pit Group 3.

Figure 2.28: Overview of pits (273-289) of Pit Group 2. Facing south.

Figure 2.29: North-facing section of pit (273).

Across this area, which had been truncated on its west side during machine excavation, a deposit of dark grey silty sand (257) was preserved over the subsoil in a slightly lower-lying area of the site. At the centre of the deposit was a more compact and partially vitrified sub-oval patch that measured 5 m by 3.4 m and was up to 0.15 m thick at its south end (Figure 2.30). The deposit was initially interpreted as a possible sunken floor surface for a small structure, which may have burnt down. A concentration of prehistoric pottery sherds, many burnt from Vessels 5 and 6 (see Prehistoric pottery), were uncovered from this deposit, along with quartz flake (SF 56) and a flint blade (SF 51), concentrated generally towards the centre of the area. A group of degraded small stake-holes or postholes (359, 360, 362, 364 and 368) were located below (257), and indicated earlier activities.

The pits forming the pit group were generally circular or sub-circular in plan and ranged between 0.22 m and 0.85 m in diameter, with the larger elongated features extending up to 1.35 m in length. The vast majority of features were between 0.1 m to 0.25 m in depth. Most of the features were concentrated in a somewhat curving cluster c. 15 m in length, which was open to the south-east. Pit (269) may not have been associated with the group, situated somewhat in isolation to the south-east. The contents of these pits were fairly homogenous and consisted of greyish-brown silty sand, with occasional charcoal fragments present. Pits (201, 217, 219, 221, 223 and 258) located to the south-west also contained charcoal, some burnt bone and fire-cracked stones, as well as flints flakes (SF 27) in pit (201), and (SF 28) in pit (217), and fragments of an in situ Vessel 7 in pit (258) (Figure 2.31).

Figure 2.30: Deposit (257) during excavation showing in situ pottery sherds (SF 54). Facing north-east.

Figure 2.31: Excavation of pit (258) with in situ pottery sherds (SF 55).

Pit Group 4

This pit group was situated to the north-west of Roundhouse 1 and comprised five pits and several plough or ard marks (1508).

Pits (1498-1504) formed a somewhat linear NW/SE alignment extending for 7 m. These pits were somewhat larger than most on the site, were oval or sub-oval in plan and measured between 1.2 m to 2.5 m in length and 0.7 m to 1.3 m in width. Pits (1498, 1500 and 1504) were c. 0.27 m deep while pit (1502) was only 0.12 m in depth. Their contents were similar, comprising greyish-brown sandy silt with occasional charcoal flecks. Pit (1498) also contained a small number of sub-rounded stones in its base and a large unworked boulder (SF 266). Smaller pit (1506) was located to the south-west and measured 0.9 m by 0.65 m by 0.09 m. This feature contained fine orangey-red silt with a possible sheep bone. The surrounding subsoil was clearly heat affected, and the feature had been truncated by a series of plough or ard marks.

The six ard/plough marks were aligned NW/SE and were tightly clustered, ranging in length from 2.2 m to 3.7 m, the slightly differing alignments of each suggesting a single bladed plough was used (Figure 2.32).

Vegetation remnants and isolated pit

Situated to the south-west of Roundhouse 1, and beneath colluvium layer (1105) was an area with amorphous patches of black-brownish-grey organic-like silt with leeched white sandy halos surrounding them, and charcoal flecks. The underlying subsoil was pale white-yellow sand. These dark areas were difficult to identify with many smaller areas degrading rapidly when

Figure 2.32: Excavated pit (1506) of PG4 with plough-marks (1508). Facing WSW.

Figure 2.33: Deep colluvial layers (1571-1102) with (401-761) uppermost on south-west side of Area 3 near Pit Group 5. Facing north-west.

exposed. The three largest and most distinctive were recorded as a sample (1493, 1494 and 1497). The former indicated a starburst-like plan measuring 1.6 m in length that may indicate the root system of a tree or animal burrowing. Another, (1494), contained large fragments of charcoal considered to be burnt roots.

To the north of these deposits was a single isolated pit (1495), 0.6 m in diameter and 0.15 m in depth that was dug through (1105). The pit contained dark brown sandy silt with charcoal fragments and some fire-cracked stone but he surrounding subsoil was not heat affected.

Area 3

This area was defined as the north-west section of the site, where deep colluvium soil layers, (1556/1571) overlay (1102/1105), and extended across the western boundary of site at the base of the hill. The deepest of these attained a depth of 2.8 m and was present towards the south-west corner of the area (Figure 2.33). As the site levelled out to east, the colluvium deposits were defined as an early, possibly Medieval plough soil (039). The topsoil ranged between 0.4 m and 0.8 m in depth. The natural subsoil was pale to dark orange-brown sand to the south-west, and dark orange-brown sandy gravel to the north-east.

The main archaeological areas (Figure 2.3) included: eight pit groups, Pit Groups 5 to 12. Pit Group 7 was enclosed by a possible earth/turf enclosure, and Pit Group 5 contained a buried Bronze Age hoard and Pit Group 11 had a Bronze Age cist. Roundhouse 2 was situated in the centre of the area.

Roundhouse 2

Roundhouse 2 (Figures 2.34 and 2.35) comprised thirteen postholes, which were predominantly circular in plan, ranging in diameter from 0.35 m to 0.82 m with depths of 0.17 m to 0.4 m. All but two (1080 and 1082) contained packing stones (Figure 2.36). These features were all covered by colluvium deposit (1102) post-dating the structure.

The structure was clearly defined by a ring of ten posts, with posthole (1080) located externally 1 m to the north, and postholes (1088 and 1092) situated internally on the north-west and eastern arcs respectively. These three features were somewhat smaller than the others. The ring of internal postholes was 7 m in diameter and located 1.5 m from each another except in the south-eastern arc, where three postholes (939, 941 and 100) marked the entrance but with a 3 m gap at either side from the next posts in the ring.

Several packing stones were re-used stone tools and included a stone anvil (SF 190) in posthole (1082), and saddle quern (SF 189) in posthole (1094). Prehistoric pottery sherds (Vessels 37 and 38) were also recovered from the fill of postholes (941 and 1090) respectively.

The somewhat isolated feature (1151) situated 2 m to the south-west of Roundhouse 2 was a stake-hole 0.1 m in diameter and 0.18 m in depth.

Pit Group 5

Pit Group 5 comprised thirty-five features (Figures 2.37 and 2.38) situated along the western periphery of Area 2. All but one of these features (1105) was dug through layers of colluvium and due to the similarity in composition of the colluvium and the feature fillings were difficult to distinguish. Within this pit group there was a dense area to the north-west comprising 18 features, with the remaining 19 features located more sporadically to the south-west and south-east.

The seventeen features in the north-west (Figure 2.39) ranged in plan from oval to circular and were both small and large. The small features (1534, 1536, 1538, 1540, 1542, 1544 and 1557) measured between 0.2 m and 0.35 m in diameter. Their contents, excluding (1534), tended to be dark brown sandy silt with charcoal flecks and almost indistinguishable from the surrounding colluvium (1105) the features were dug into.

Pit (1534) was primarily identified through the presence of small stone settings interpreted as small stake-holes sealed by colluvium (1571). A Bronze Age hoard (see Part 5: Metalwork Hoard) was found within the circular pit (1534) that measured 0.28 m in diameter (Figure 2.40). It comprised bronze objects (SF 271) and was lifted as a block to be excavated under laboratory conditions. Its initial analysis indicated that it was enclosed within the remnants of a woven basket or bag.

The larger features in this group tended to show more variation in form and were often dug through both colluvium layers (1105 and 1556), with the deepest encountering the subsoil (002). Pits (1524, 1526, 1528, 1530, 1532 and 1550) ranged in diameter from 0.7 m to 1.3 m (Figure 2.41). Their fills were varicoloured but often contained charcoal flecks and sub-rounded stones indicating them as stone-packed postholes, stretching across a 7 m area in a somewhat irregular arc open to the north-east. Two of the postholes contained artefact material: (1526) contained a burnt flint flake (SF 268) and (1530) contained plain prehistoric pottery sherds (SF 269).

Pits (1522, 1546 and 1554) ranged between 0.6 m to 1.3 m in diameter and their fills were notable for a lack of stone. They were interpreted as pits of unknown function but it is possible they may have been remnants of removed posts/postholes. Pit (1552) was a shallow oval-shaped pit measuring 0.9 m by 0.7 m by 0.16 m. It contained mottled orangey-brown sandy silt with fire-cracked stones, charcoal flecks with underlying heat-affected natural, indicating this was a small fire-pit.

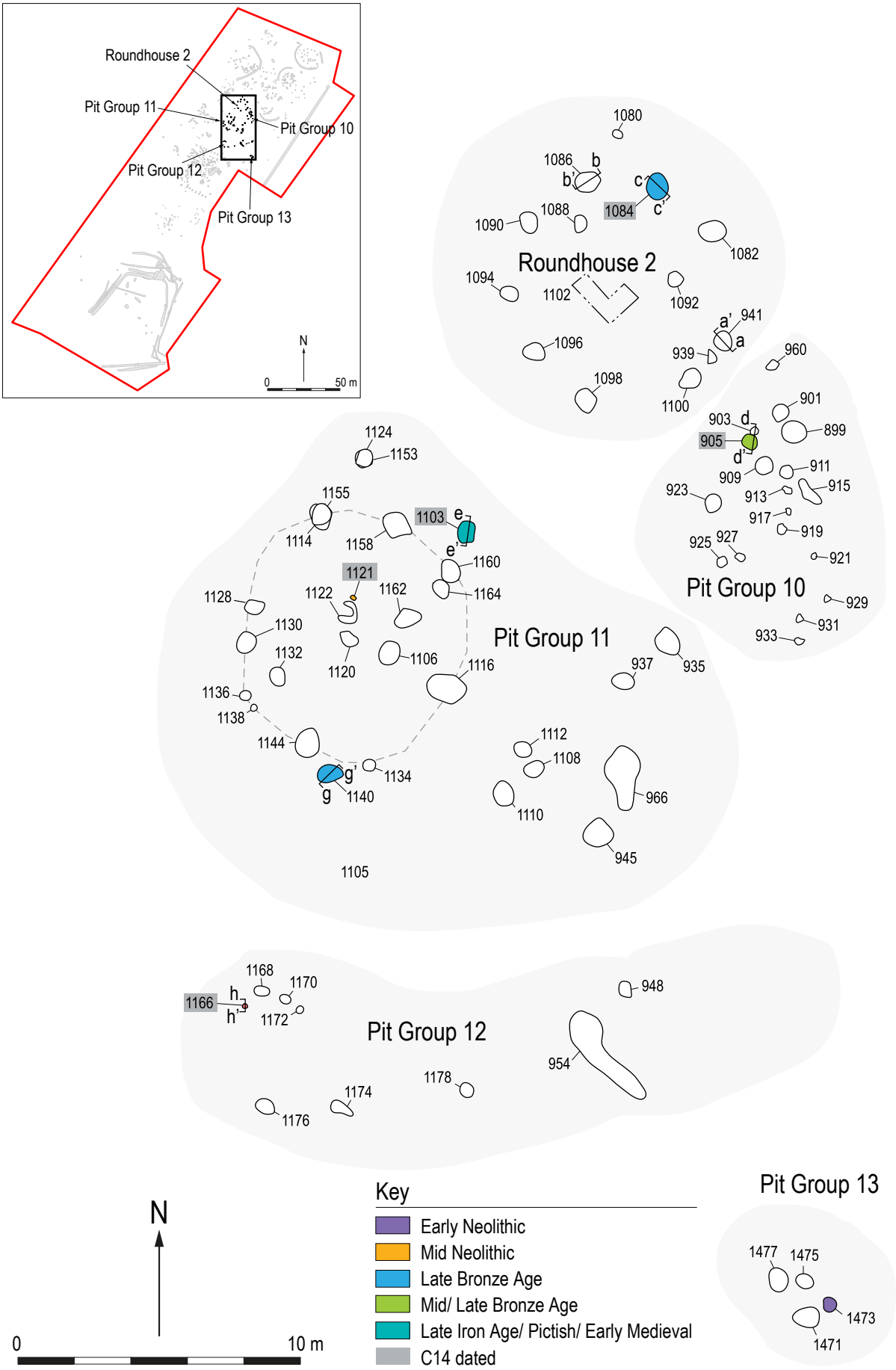

Figure 2.34: Roundhouse 2 with Pit Groups 10, 11(roundhouse), 12 and 13.

The additional sixteen pits of Pit Group 5 were distributed more sporadically to the east and south and comprised fairly isolated post- and stake-holes with pits. Pit (1512) was filled with cobbles (Figure 2.42). Posthole (500) contained a large number of unworked stones used as packing stones but also raw clay (SF 108).

Three pits (1516, 1518 and 1565) were located to the south-west of the overall group. These ranged in size from 0.38 m to 1.2 m in length. Their fragments of charcoal and occasional sub-rounded stones and were interpreted as refuse pits for hearth/cooking waste. Pits (1516 and 1518) appeared to be dug into colluvium (1105), however, pit (1565) appeared to have been sealed by colluvium (1556). This pit also contained prehistoric pottery sherds (SF 276).

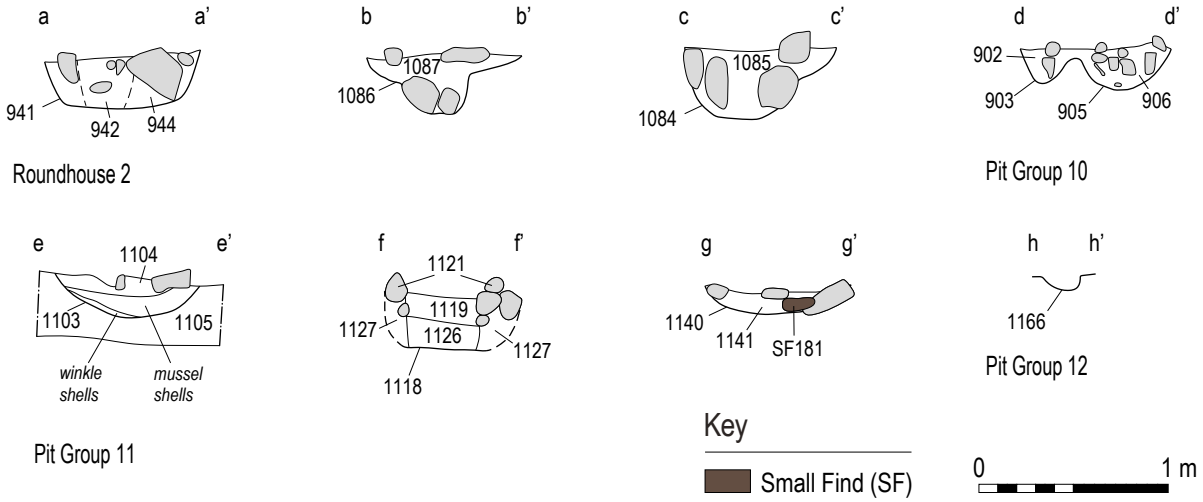

Figure 2.35: Roundhouse 2 with Pit Groups 10, 11, 12 and 13 selected section drawings.

Figure 2.36: Excavation of Roundhouse 2. Facing ESE.

Pit Group 6

Pit Group 6 comprised a group of 23 pits and a linear feature situated to the north-west of Roundhouse 2 (Figures 2.37 and 2.38). These features formed a cluster distributed across an area of 18 m by 7 m broadly aligned NE/SW and many appeared to underlie colluvium (1105). The similarity between (1105) and the fills of the features made the identification of the features themselves difficult (Figure 2.43).

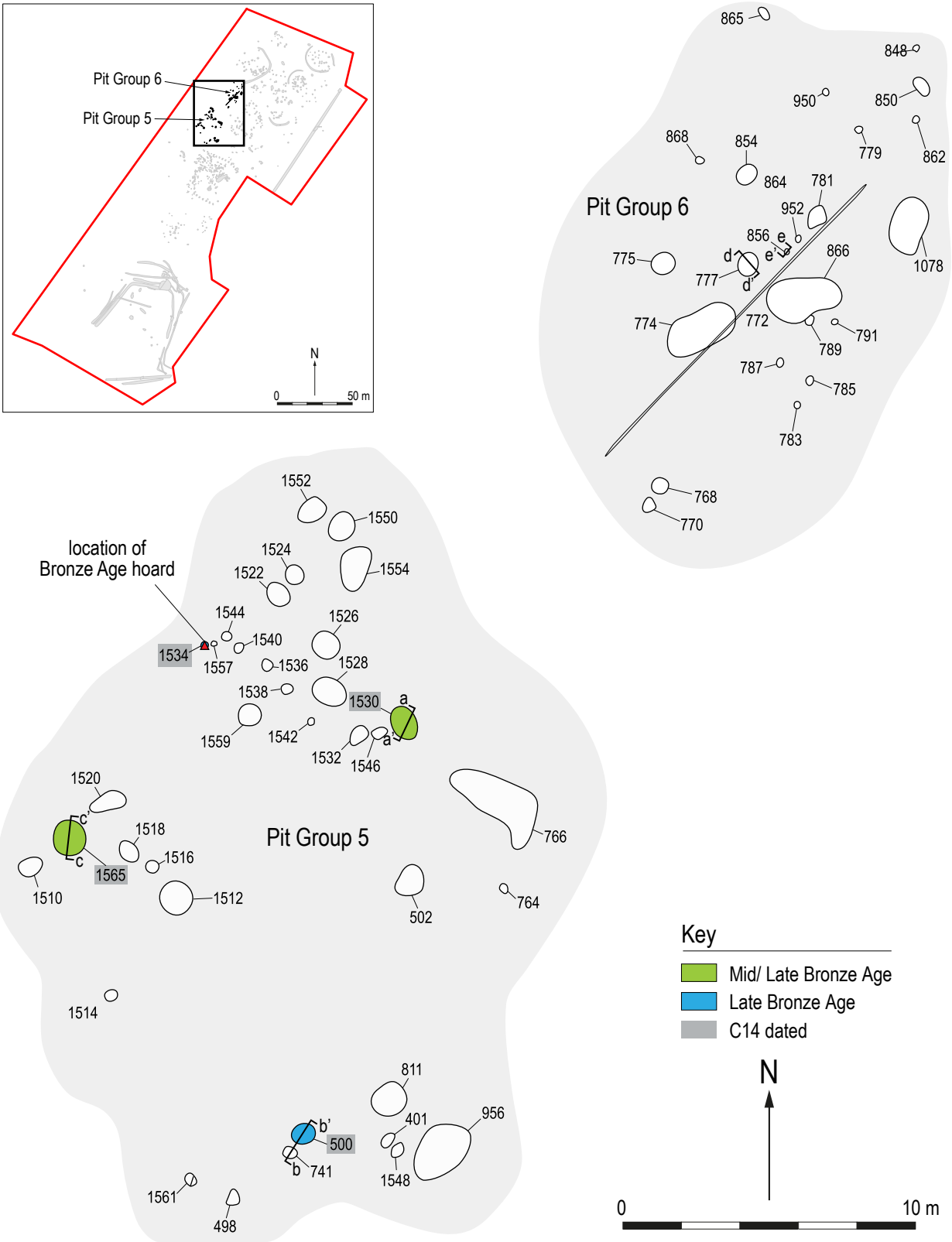

Figure 2.37: Pit Groups 5 and 6 with location of hoard.

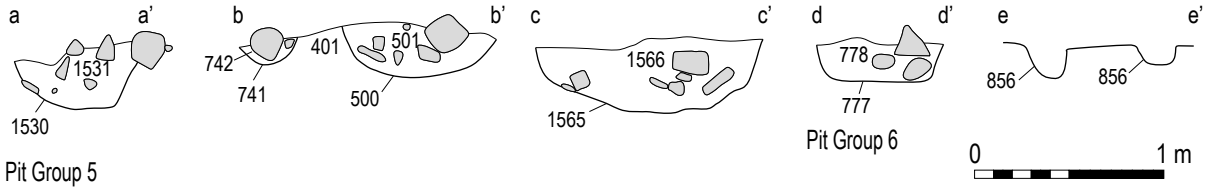

Figure 2.38: Pit Groups 5 and 6 with selected section drawings.

Figure 2.39: Pits of Pit Group 5 as excavated with pit (1554) front right. Facing south-west.

Figure 2.40: Location of pit (1534) containing bronze hoard (SF 271). Facing north-west.

Figure 2.41: Excavation of posthole (1532). Facing south-west.

Figure 2.42: NNE-facing section of pit (1512).

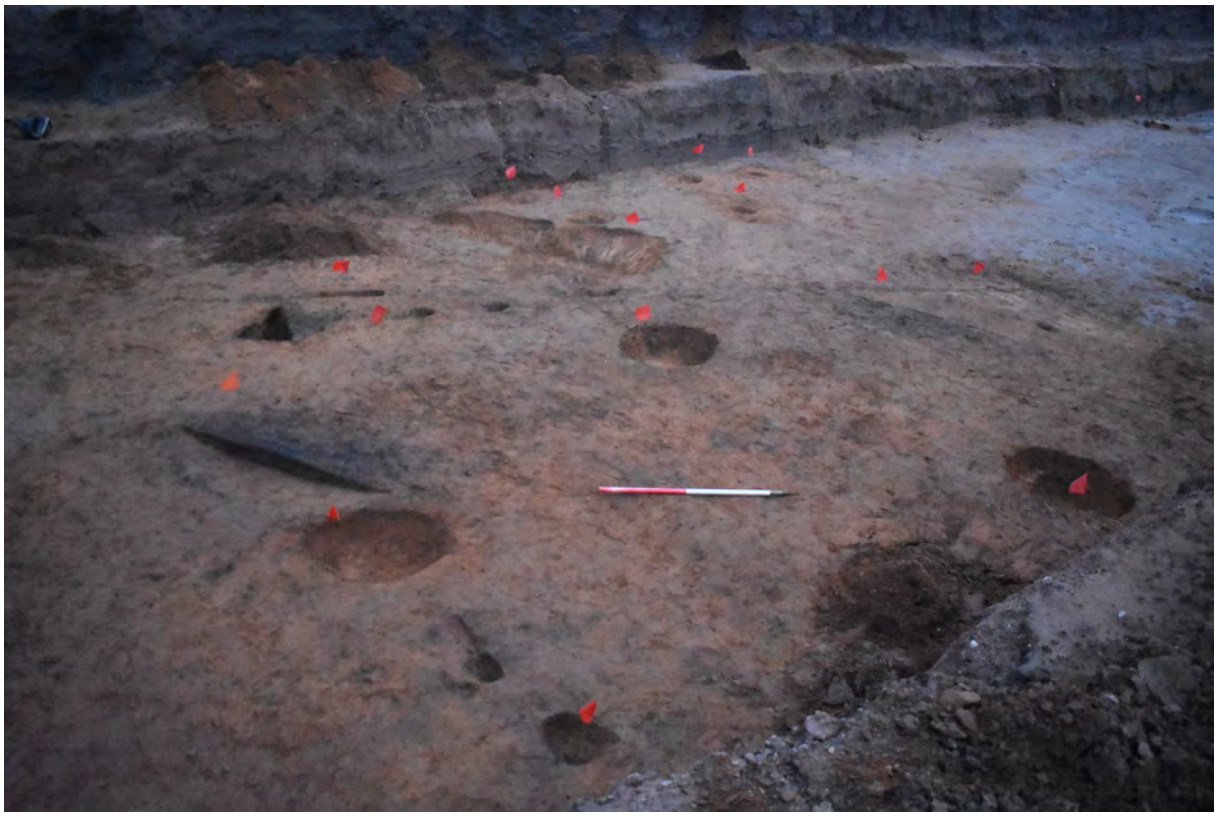

Figure 2.43: Pit Group 6. Facing south.

Pits (775, 777 and 854) were three stone-packed postholes, generally circular in plan and ranged in diameter from 0.66 m to 0.85 m with depths c. 0.27 m. These were situated 3 m from one another, and formed a triangle along the north-west side of the group. Each contained greyish-brown sandy charcoal flecked silt, with numerous stones used as packing. Postholes (775 and 775) contained a number of artefacts: posthole (775) contained several coarse stone tools re-used as packing stones - hammerstone (SF 123), a quern rubber (SF 127) and an irregular core of quartz (SF 122); posthole (777) contained an anvil stone (SF 130).

Small postholes (779, 783, 785, 787, 791, 848, 850, 862 and 950) were generally circular-shaped pits 0.25 m in diameter and 0.11 m to 0.2 m in depth. They were situated in two clusters in the north-east and south sides of the pit group and probably represented structural settings. The north-east grouping of five stake-holes (779, 848, 850, 862 and 950) formed an arc 3 m by 3 m that was open to the north-west, and possibly represent an ephemeral structure. The additional small postholes did not form a clear pattern.

Nine pits (768, 770, 781, 789, 856, 865, 868, 952 and 1078), could not be ascribed definite functions as they were distributed across the group. These were oval and circular in plan and ranged in diameter from 0.24 m to 1.75 m, with depths ranging from 0.06 m to 0.35 m. Their fills were somewhat variable, but generally consisted of brown and dark brown sandy silt, with only two containing stones. Pit (866) was sub-oval in plan, measuring 2.15 m by 0.63 m with a fill of black charcoal-rich sandy silt.

A thin linear feature 13 m long by 0.11 m wide and 0.16 m deep, aligned NE/SW, bisected the pit group. It contained brownish-grey loamy sand with some sub-rounded stones throughout. It was thought to represent a division of activity areas.

Enclosure and Pit Group 7

Pit Group 7 formed a large and scattered assortment of forty-six pits (Figures 2.44 and 2.45), all of which were surrounded by a large enclosure. The enclosure (1150) was only briefly visible due to differential drying. An additional five pits were identified prior to the observation of the enclosure and it is suspected that they may have either been part of the original enclosure, or features situated below it.

The enclosure was observed only briefly on a single day during a sunny afternoon that had followed a rainy morning (Figure 2.46). Moisture was retained within the natural slightly stony sand, forming a sharply defined curvilinear course extending across a previously stripped area. There was no visible cut or deposit associated with it and there was only the slightest suggestion of a harder compaction than the dry natural subsoil either side of it. This feature measured a visible length of approximately 40 m, creating a corner open to the north-west, with both ends presumably continuing through the additional areas but not observed at the time of stripping. Its width varied between 0.8 m and 1.5 m and it noticeably enclosed the large pit group.

Prior to the discovery of the enclosure, five pits had been identified within its footprint (989, 991, 993, 995 and 997). These were circular in plan, measuring 0.15 m to 0.4 m in diameter and shallow between 0.06 m and 0.11 m in depth. Most contained brown sandy silts with some charcoal flecks, with (989) also containing a few rare small cobbles. These pits had no discernible function at the time of excavation.

The enclosure encircled a large pit group of forty-six pits, densely packed towards the south-east and more dispersed to the north-west (Figure 2.47). They varied in size but were generally oval to circular in shape and between 0.3 m and 0.9 m in length. Several pits exceeded 1 m in length and were between 0.15 m and 0.25 m in depth. There was some variation in the colour of the sediments within their fills, but the vast majority differed only slight in colour and composition from orange to brown sandy silt, most of which contained charcoal flecks and few stones. The majority of these features could only be interpreted as prehistoric pits of unknown function, with a few exceptions as below.

Of these forty-six pits, two were described as possible postholes or stone-lined refuse pits (1009 and 1027), and one was described as a possible stake-hole (1035). These three features were oval to circular in plan, between 0.35 m and 0.6 m in length and between 0.24 m and 0.34 m in depth. They contained stones, some fire-cracked, concentrated at their edges. Their fills varied in colour from mottled orange to dark brown, but they all had charcoal flecks present.

Twelve pits were observed to contain a high proportion of charcoal and fire-cracked stone and were recorded as probable refuse pits containing hearth/cooking waste (799, 979, 981, 983, 985, 1003, 1005, 1007, 1015, 1023, 1025 and 1045). Notable amongst this group are two conjoined or double-pits (979/981 and 983/985). These pits were clustered together, forming a slight arc in the south-east portion of the pit group, while the rest were fairly scattered through the group.

Several pits contained artefacts, including: quern rubber (SF 118) and middle Neolithic pottery (SF 117) in pit (793), prehistoric pottery SF 120 in pit (795), prehistoric pottery (SF 155) in pit (983), prehistoric pottery (SF 154) in pit (1001), Vessels 10 and 11 of middle and middle/late Neolithic date and a quartz flake (SF 159) in pit (1015), middle Neolithic Vessel 12 and pounder SF 161 in pit (1023), Neolithic Vessel 13 in pit (1027), middle Neolithic Vessels 14 and 15 in pit (1031), middle Neolithic Vessel 16 in pit (1035), middle Neolithic Vessel 17 in pit (1039), and prehistoric pottery SF 167 in pit (1045). Overall, the area appeared to represent areas of deliberate deposition of material culture into pits, potentially as part of a ritual purpose.

Pit Group 8

Pit Group 8 was the most northerly pit group and comprised 21 pits that extended across an area 14 m by 8 m. (Figures 2.3 and 2.48). There was a small cluster of the features at the very northern extent, possibly continuing below the trench edge, and a few additional features formed a peripheral cluster to the south. During the excavation all of these features were affected by heavy rain and run off from the hill, requiring rapid excavation and recording. Their contents became water-logged and only limited sampling was undertaken. The pits generally ranged in diameter from 0.37 m to 0.7 m, and they contained single fills of brown sandy silt with some charcoal fragments.

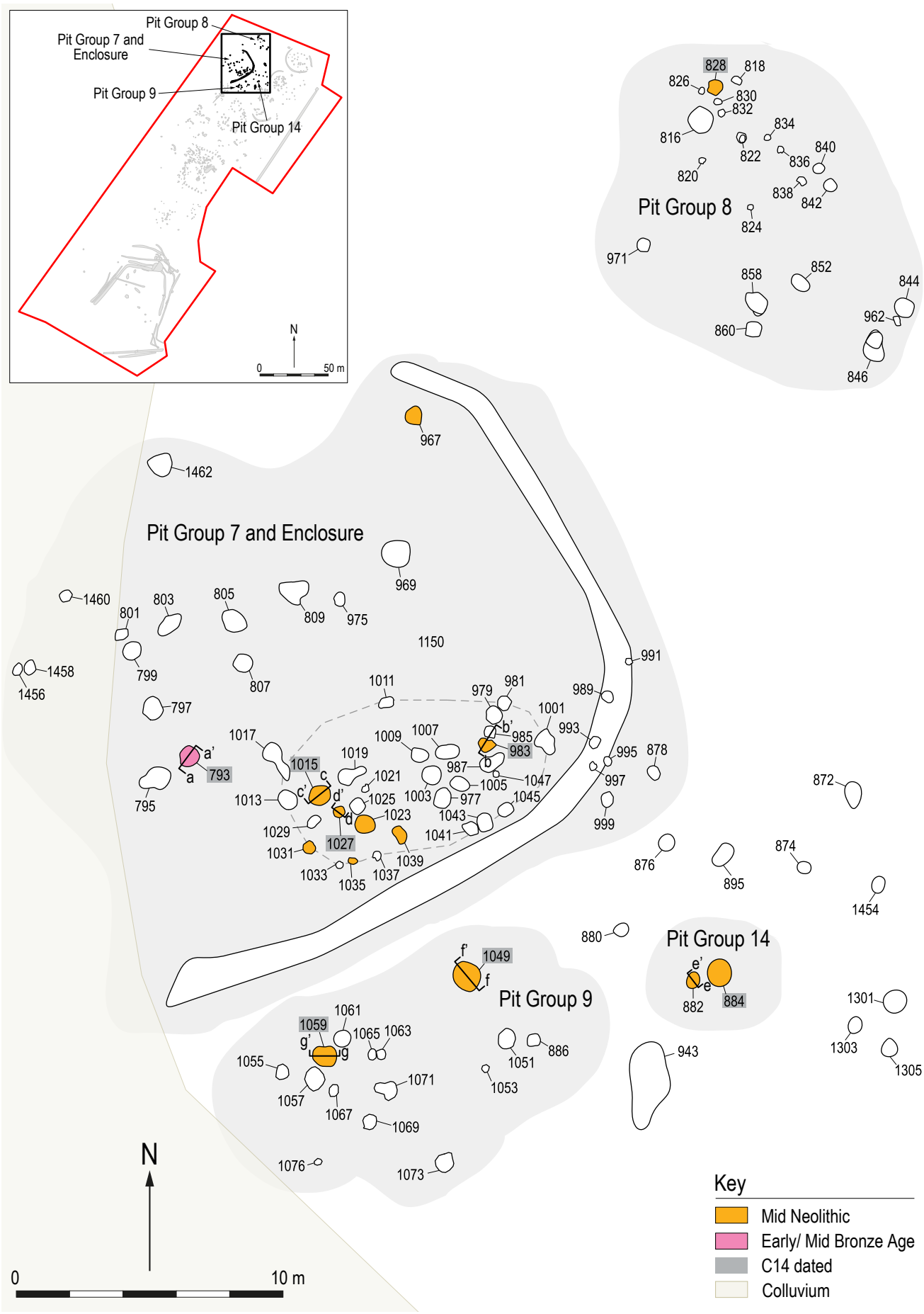

Figure 2.44: Pit Groups 7, 8, 9 and 14.

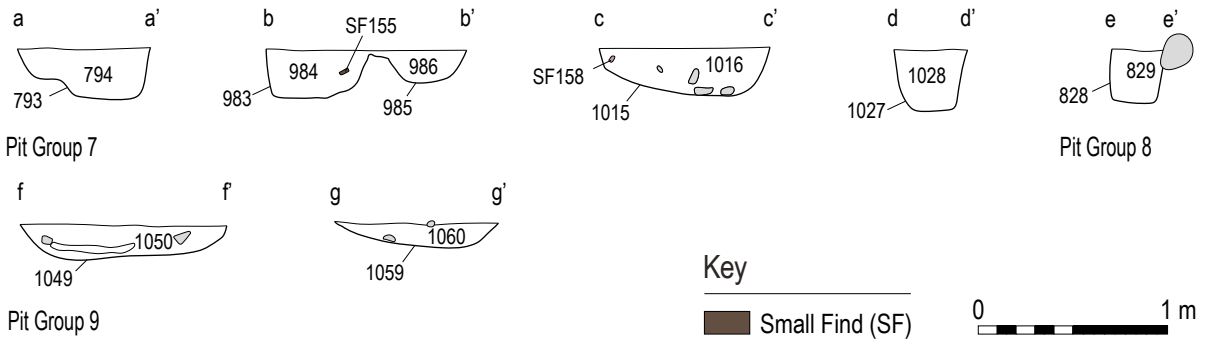

Figure 2.45: Pit Groups 7, 8 and 9 with selected section drawings.

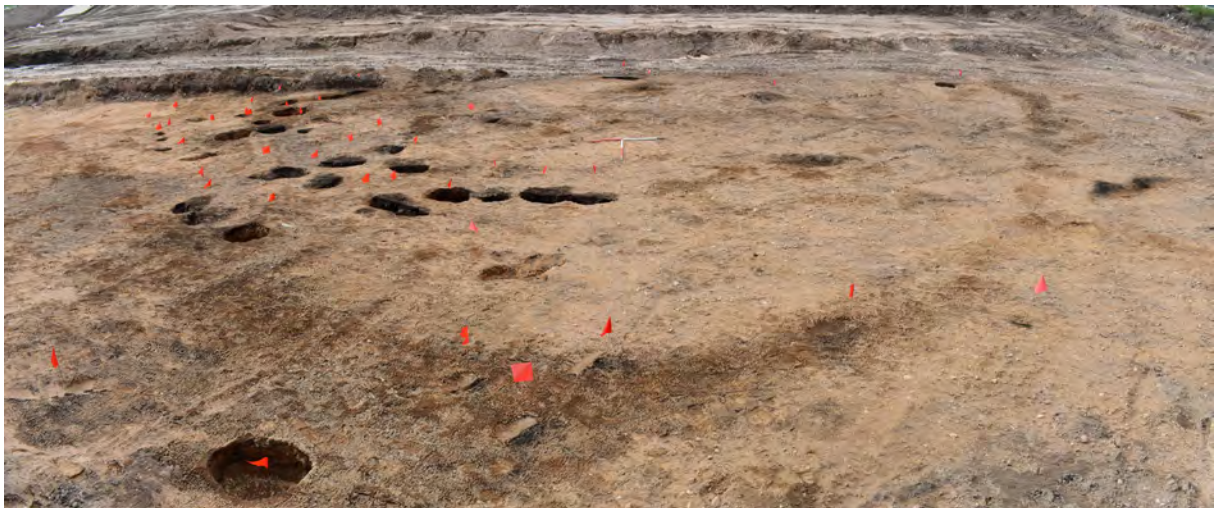

Figure 2.46: Pit Group 7 with the visible outline of the enclosure (1150). Facing west.

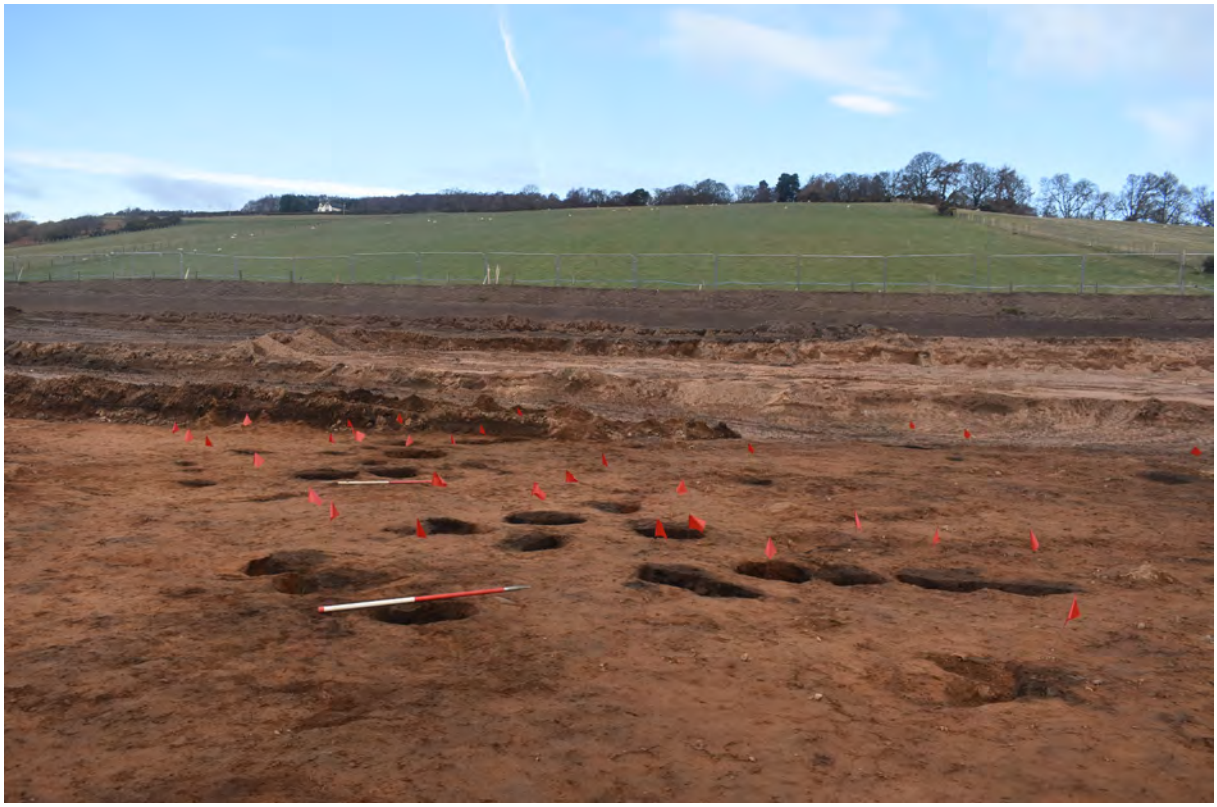

Figure 2.47: Overview of Pit Group 7 during excavation. Facing west.

Figure 2.48: Overview of Pit Group 8. Facing south-east.

Pits (818, 820, 822, 828, 830, 832, 834, 836, 838, 844, 846, 858 and 962) were interpreted as postholes based on the presence of sub-rounded stones lining them. These appeared somewhat haphazardly distributed through the pit group, however, pits (818 to 838) may possibly represent the partially exposed extent of a small structure, similar to those formed by Pit Groups 2 and 3. Posthole (832) had a small quartz flake (SF 121) present.

Three pits (840, 842 and 852) measured between 0.37 m and 0.62 m in diameter. The former two pits contained charcoal fragments and the surrounding natural subsoil was reddened and heat-affected, while pit (852) contained several sub-rounded fire-cracked stones, suggesting these may all have been fire-pits.

Pit Group 9

Pit Group 9 comprised a scatter of fifteen pits distributed across an area of 10 m by 7 m (Figures 2.44 and 2.49). These were generally circular in plan and measured between 0.4 m to 0.5 m in diameter, with the largest 1.08 m in diameter. The contents of these features were fairly similar, comprising dark brown or greyish-brown sandy silt.

Some of the pits (886, 1061, 1063, 1065 and 1071) contained sub-rounded stones suggesting these were postholes. These features did not define a clear structure at the time of excavation, but could indicate that the surrounding pits may have had more structural functions than was evident. Postholes (1063 and 1065) intercut one another. Pits (1049 1057, 1059 and 1067) contained fire-cracked stones, with burn bone present in pits (1059 and 1069) and therefore they were interpreted as hearth or fire-pits. The remainder of the pits had no discernible function and no artefacts were recovered from the features in this pit group.

Pit Group 10

Pit Group 10 comprised a group of 18 pits that covered an area c. 10 m by 4 m (Figures 2.34 and 2.50) situated south-east of Roundhouse 2 and west of Roundhouse 5. The majority of its pits were circular in plan, measuring between 0.25 m and 0.45 m in diameter, with those towards the south side of the group tending to be smaller. Their depths ranged between 0.1 m and 0.25 m.

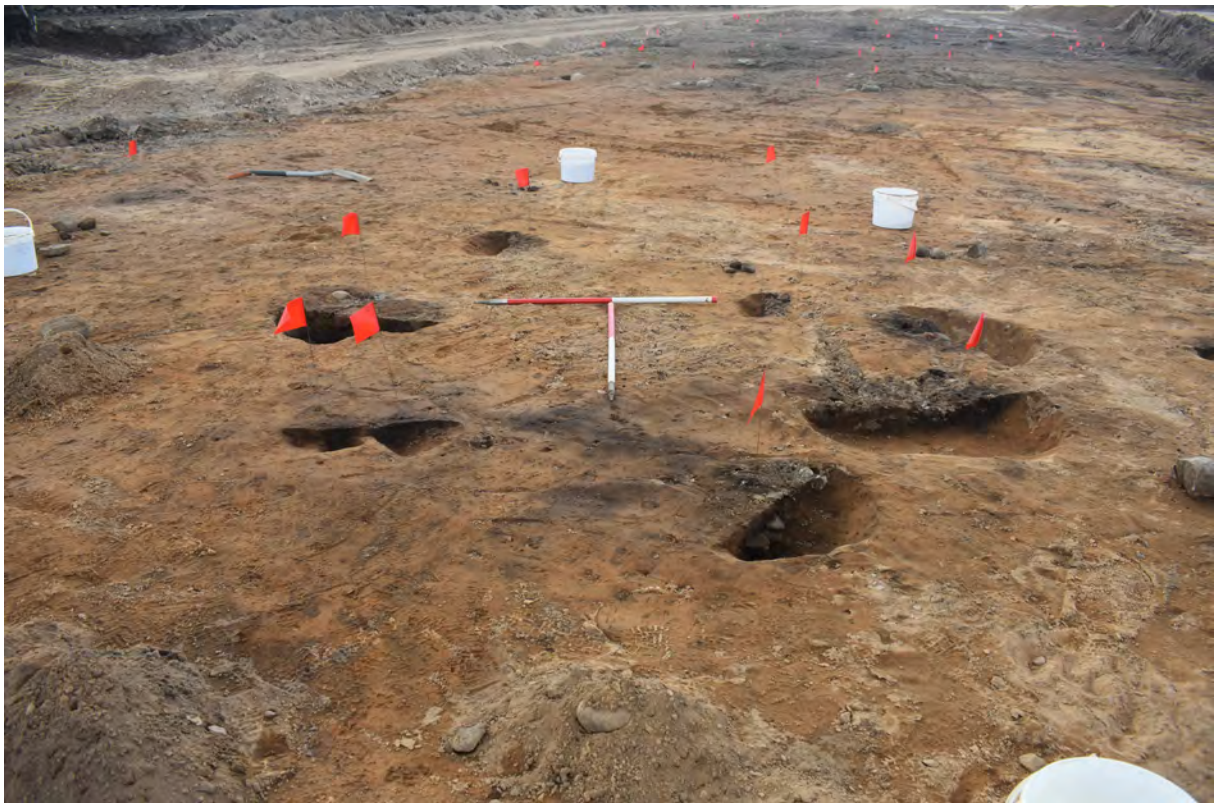

Figure 2.49: Pits (1055-1073) of Pit Group 9. Facing south-east.

Figure 2.50: Pits of Pit Group 10 during exavation. Facing ESE.

All of these features were interpreted as probable postholes forming post settings for small structures or work areas. The majority contained stone packing within sandy silt that varied in colour from greyish-brown to dark brown and contained charcoal flecks.

Pit Group 11 - Roundhouse

Pit Group 11 was situated to the south-east of Roundhouse 2 and comprised 26 features (Figures 2.34 and 2.51) that extended across an area 14 m by 11 m. The majority of its features were dug into colluvium (1105) but in some instances were overlain by it, as well as by the lower plough soil horizon (039). Like Pit Group 6, these features were difficult to discern at times due to the lack of variation between their fills and the colluvium (1105).

Ten of these features (1108, 1110, 1112, 1114, 1116, 1122, 1130, 1136, 1144 and 1162) were oval to circular in plan, measuring between 0.35 m to 1.4 m in diameter, although they generally were between 0.5 m and 0.65 m in diameter with depths between 0.11 m and 0.4 m. The fills of these features was blackish-brown with charcoal flecks, almost identical to the surrounding (1105) into which they were dug. However, many of them contained packing stones indicating they were stone-packed postholes. Pit (1158) had a step in the profile which may indicate deliberate dismantlement or reuse. Pits (1128, 1132 and 1138) lacked any packing stones and were described as possible postholes. Posthole (1114) contained a saddle quern fragment (SF 179) reused as a packing stone, and contained Vessel 18, possibly Bronze Age in date, and posthole (1144) prehistoric pottery SF 180. Provisional interpretation is that these postholes are thought to represent the remains of a roundhouse, similar in size to Roundhouse 2.

A large slab measuring 0.78 m in length and 0.28 m in thickness of micaceous schist was uncovered within (1105) colluvium with small fragments of burnt bone evidently surrounding the stone. During its exposure and excavation the fragmentary remains of a cobble-built cist chamber (1121) were exposed to the north, less than 0.5 m away from the large slab (Figure 2.52), that was later identified as its capping slab. The chamber oriented east/west was sub-rectangular, measuring 0.86 m by 0.72 m by 0.47 m, but its contents were disturbed. The structure

Figure 2.51: Pit Group 11 during excavation with cist (1121) at centre of image. Facing south-east.

had walls built from sub-rounded beach stones up to 0.2 m in length, but completely lost on its west side, but otherwise surviving to a maximum height of 0.2 m. A hammerstone (SF 177) was built into the south-east corner of the cist, and an unusual clay-like concretion (1157) containing fragments of burnt bone was wedged against this same corner. The cist infill material was intrusive (1105), and its upper fill (1119) is disturbed. It contained a bipolar core in flint (SF 176) and prehistoric pottery sherds SF 175. Posthole (1122) was located close to the cist.

Pit (1103) appeared to be present within or dug through colluvium deposit (1105). The feature contained a significant amount of marine shell extending in an oval shape 0.7 m by 3 m, visible in two distinct lenses lining a potentially rounded feature 0.3 m deep (Figure 2.53). The lenses comprised one of mussel and the other of winkle, with worked bone (SF 170) present. This was the only significant shell observed on the site.

Pit (1140) was sub-oval in plan and measured 0.8 m by 0.6 m by 0.1 m in depth. Its fill was identical to (1105), and the feature was visible only through the presence of a large number of stones which included several artefacts: a possible polishing stone (SF 182), a quern rubber (SF 183), and prehistoric pottery (SF 192).

Pit (935) was sub-oval measuring 0.88 m by 0.65 m by 0.28 m. It contained a dark greyish brown sandy silty fill, with frequent charcoal, burnt bone, a serrated piece in flint (SF 152) and prehistoric pottery (SF 137). It also contained a large proportion of stone, some fire-cracked, including fragments of a quern rubber (SF 151) and appears to have been a fire-pit.

Pits (937, 945, 1106, 1124, 1134, 1158, 1160 and 1164) were circular to oval in plan, with diameters ranging from 0.5 m to 0.9 m and depths between 0.1 m and 0.3 m. Their function is unknown.

Pit Group 12

Pit Group 12 comprised a scatter of eight pits and small curvilinear feature (Figure 2.3) in the south-east part of Area 3 (Figure 2.54). The features were distributed over an area of approximately 15 m square, and were situated within or below the layer of colluvium (1105).

Figure 2.52: Cist (1121) revealled with capstone (1120) to the rear. Facing south-east.

Figure 2.53: WSW-facing section of pit (1103) with shell within colluvium (1105).

Figure 2.54: East extent of Pit Group 12 after excavation. Facing north-west.

The pits were generally circular in shape, with most measuring 0.2 m in diameter, but pits (948, 1174 and 1176) measured 0.6 m to 0.7 m in diameter. The depths of these features varied between 0.08 m and 0.25 m. There was some variation amongst their fills, from greyish-brown sand to dark brown silty sand. The fills of (948 and 1176) contained some charcoal, with burn bone present in the latter and some fire-cracked stone.

Pits (948, 1166, 1168, 1172 and 1174) were interpreted as probable postholes but they did not appear to form a coherent structure. Pit (1170) was a very shallow and may have been an infilled hollow, and pit (1176) contained material suspected to be hearth/cooking debris.

The curvilinear feature (954) measured 2.5 m in length and 0.75 m in width, with steeply angled sides. It was 0.3 m deep at its west end and 0.24 m deep at its east end. Its fill was similar to that of the pits, but with an in situ burnt stake or wood in its west side. No artefacts were recovered from these features.

Isolated Pits

There were several isolated pits (Figure 2.3) in Area 3, including (504, 814, 876, 878, 880, 893, 895 and 999). Pit (504) was located west of Pit Group 11. The pit measured 0.6 m in diameter and was 0.24 m in depth. It contained dark brownish-grey loamy sand with several packing stones.

Pits (876, 878 and 999) were circular to oval in plan, measuring between 0.5 m and 0.55 m in diameter. Their fills of greyish-brown sandy silt had frequent charcoal flecks, some small stones, and rare burnt bone fragments in the case of pit (876). Pit (999) contained early Neolithic Vessel 1.

Pit (893) was sub-oval in plan, measuring 2.6 m by 1.4 m. In profile, the feature had a somewhat undulating base with three distinct troughs: the central one possibly the original feature was 0.42 m deep, but the slight pits to either side of it may have been the result of truncation. The feature contained intensely dark grey and black silty sand with frequent charcoal and occasional small stones, which were interpreted as a possibly representing the location of a large cooking pit or kiln.

Pits (814, 880 and 895) were fairly unremarkable in form and content and were recorded as possible prehistoric pits of unknown function.

Area 4

Summary

Area 4 formed the north-east part of the site (Figure 2.3). The topsoil was noticeable shallower towards the east side at 0.4 m to 0.6 m than elsewhere on site, and deepening to the west. The lower plough soil (039) was visible only along the westernmost extent of the area. The subsoil in this area comprised orange and brown sands to the west, becoming increasingly stonier with both gravelly patches and areas of sub-rounded pebbles and larger stones towards the east and south-east. Several large unworked stones and one saddle quern (SF 174) were located in the topsoil, indicating that ploughing activities truncated prehistoric features in the vicinity and dislodged stones that were likely used as packing within postholes.

Area 4 contained: the remains of four prehistoric roundhouses, Roundhouses 3 to 6; Pit Groups 13 and 14, which included a possible pottery firing pit (874); a post-medieval ditch (1325), and several isolated prehistoric pits and postholes. The roundhouses were aligned roughly NE/SW, closely situated and respecting one another. Although they shared characteristics, each retained individuality despite having all been affected by truncation to some degree. It is possible that the area represents one period of settlement.

Roundhouse 3

Roundhouse 3 was the most northerly of the roundhouses and suffered a degree of truncation. It comprised an oal-shaped penannular ditch or gully (1182) enclosing 23 internal postholes, stake-holes and pits (Figures 2.55, 2.56 and 2.57).

The ditch was open to the south-east and formed an internal length of 20 m and an extrapolated diameter of 17 m as the trench edge partially overlay the ditch on its north side. Its width varied throughout, ranging between 0.4 m and 1.2 m with the widest section to the south (Figures 2.58 and 2.59). Three 2 m wide and two 1 m wide slot trenches were excavated through it, demonstrating that its form varied throughout,

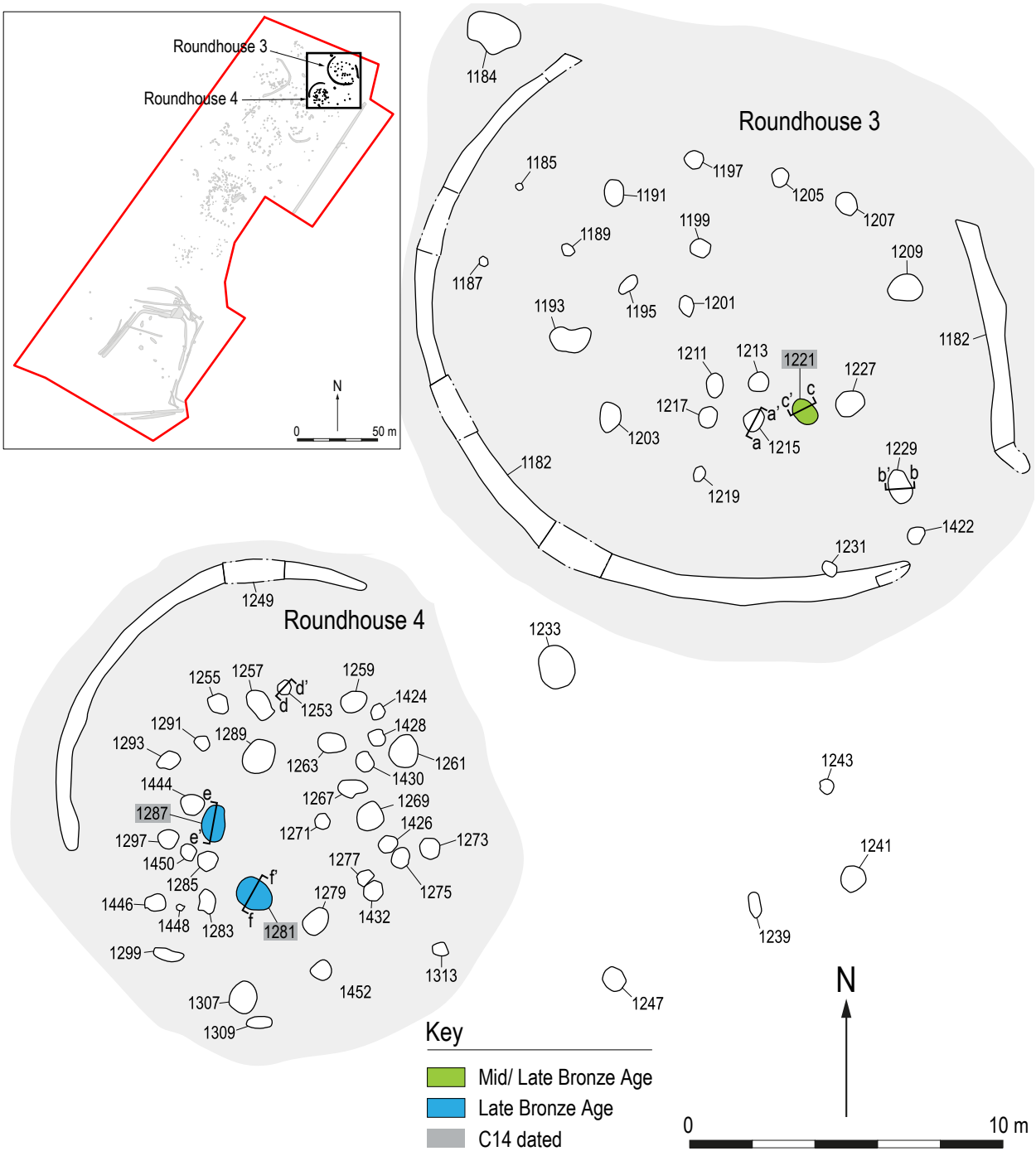

Figure 2.55: Roundhouse 3 and Roundhouse 4.

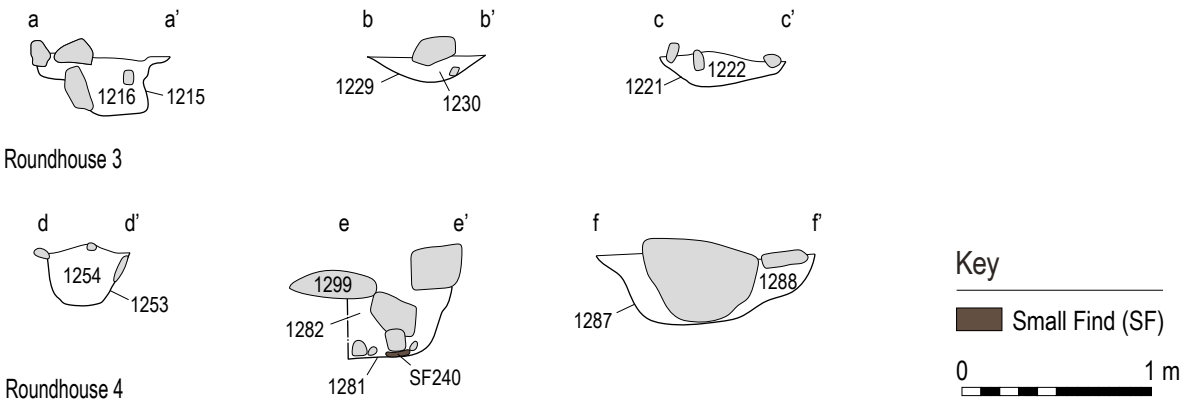

Figure 2.56: Roundhouse 3 and Roundhouse 4 with selected section drawings.

Figure 2.57: Aerial view of Roundhouse 3.

Figure 2.58: Pre-excavation image of Roundhouse 3. Facing ESE.

with shallow areas on the north side (between 0.03 m and 0.08 m in depth) with the depth increasing in the south-west arc to 0.2 m with a slightly stepped profile. There was no indication of any post- or stake-holes within the ditch, but a single later pit (1231) was dug through the ditch on its internal edge. The lack of evidence for any posts indicated the ditch was a drip gully for the roundhouse.

Figure 2.59: North-west-facing section of slot 3 through ditch (1182).

The 23 internal features comprised a range of stone-packed postholes, small post- or stake-holes, and pits of unknown function. Features appeared to be shallower on the north side, and likely suffered more intense truncation than those elsewhere.

Ten stone packed postholes (1199, 1203, 1205, 1207, 1211, 1213, 1215, 1217, 1221 and 1229) defined an area c. 10 m in diameter. They were generally sub-circular or sub-oval in plan, measuring between 0.6 m to 0.9 m in diameter and their depths ranged from 0.08 m - 0.3 m. Sub-rounded unworked stones lined the postholes and their fills generally contained charcoal flecks, with at least two postholes (1205 and 1213) having evidence for in-situ burnt posts through larger fragments of charcoal and heat-affected sediments.

Pits (1189, 1191, 1193, 1195, 1197, 1201, 1209, 1219, 1227, 1231 and 1422) ranged from 0.3 m to 1.0 m in length and 0.05 m to 0.19 m in depth. These were generally shallower pits with less stone content than the postholes, but were suspected of being so based on their positioning respective to the other obvious structural elements of the roundhouse. They possibly represented internal partitions or similar and no artefacts were associated with them. Charcoal inclusions were observed only in pit (1197).

Pits (1185 and 1187) lay to the north-west and outside the general cluster of internal features. These were small features measuring no more than 0.2 m in diameter, and were shallow at 0.08 m and 0.05 m respectively.

Pits (1231 and 1422) could not easily be described as postholes. Pit (1231) was sub-circular measuring 0.3 m in diameter and 0.05 m in depth. It appeared to truncate ditch (1182), but may have been a natural feature due to bioturbation. Pit (1422) was the south-easternmost pit, situated just north of the south terminus of ditch (1182). It was oval in plan and measured 0.6 m by 0.3 m, and was 0.07 m deep. Its fill appeared similar to the surrounding subsoil and it may have been a natural feature or perhaps a small posthole associated with the roundhouse entrance.

Situated 1.5 m to the north-west of Roundhouse 3 were the remains of a burnt deposit (1184), possibly associated with vegetation clearance and was similar to features observed in Area 1. The deposit was amorphous in plan, measuring 1.6 m by 1.1 m and partially underlay the trench edge on its north side. The deposit comprised black sandy silt with charcoal flecks with leaching of colour towards the edges of the deposit.

Roundhouse 4

This roundhouse was situated 5 m south-west of Roundhouse 3. It had a more fragmentary enclosing ditch or gully than (1182), and the structure comprised 40 pits and postholes (Figures 2.56, 2.57).

Only the north-west arc of the ditch (1249) survived, with the remainder truncated to the south and east by ploughing activity and to the north-east by an evaluation trench. It is estimated from the surviving portion that it was c. 16 m in length, and either circular or oval in shape with a c. 15 m diameter enclosing an area of 177 m2. Three 2 m - wide slot trenches were excavated across it that demonstrated that there was a lack of uniformity through the feature, similar to that of (1182) surrounding Roundhouse 3. The width of the ditch varied from 0.4 m to 0.8 m

and its depth was 0.06 m to 0.14 m, but it was noticeably shallower towards the north. The fill of the ditch contained somewhat homogenous brown silt with a few charcoal flecks but no artefacts. Ephemeral features (1251 and 1311) are likely to be exceedingly truncated portions of the ditch that barely survived on the south side of the roundhouse. Similar to Roundhouse 3, this feature contained no evidence of posts or stakes within it and is therefore interpreted as a drip gully formed by the roof of the structure.

A dense cluster of forty features including stone-packed postholes, earth filled postholes, stake-holes, and pits of unknown function were contained within the arc of the ditch (1249). Eighteen of these were clearly stone-packed postholes and included (1253, 1255, 1259, 1261, 1267, 1271, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1424, 1426 and 1432) (Figures 2.60 and 2.61). They varied between oval- and circular-shaped in plan and between 0.48 m and 1.2 m in diameter. Their depths ranged between 0.12 m and 0.4 m and their fills were fairly similar, containing sub-rounded packing stones against the edges of the postholes with an infill of brown silty sand and charcoal flecks. These features enclosed an area 8 m by 10 m in diameter.

Posthole (1281) showed clear phasing with two earlier posts (1480 and 1481) seemingly burnt in-situ and then sealed by stone-packing (1280) filling the pit to hold an additional later post. Fragments of Vessel 39 of possible late Bronze Age date were recovered from posthole (1480) and pottery sherds SF 259 and SF 260 were recovered from posthole (1482).

Several packing stones were re-used stone tools and included stone tool, a quern rubber (SF 203) from posthole (1271); a saddle quern (SF 200) from posthole (1281) together with sherds of a plain pottery vessel (SF 221); a quern rubber (SF 202) from posthole (1283). Posthole (1287) contained plain sherds (SF 197) and a flint tool (SF 198).

An additional fifteen features were interpreted as pits or possible postholes that may have either been somewhat ephemeral, truncated, or perhaps deliberately dismantled (1257, 1263, 1269, 1273, 1275, 1295, 1297, 1307, 1313, 1428, 1430, 1444, 1448, 1450 and 1452). These features, generally circular or oval in plan, did not contain stone-packing linings as observed in the above postholes, but they did contain frequent similarly-sized stones through their fills.

Figure 2.60: Aerial view of Roundhouse 4.

Figure 2.61: Roundhouse 4 during excavation with ditch/gully in foreground. Facing SSE.

The features varied between 0.4 m to 1.1 m in diameter and the vast majority were less than 0.2 m deep with many less than 0.1 m deep. Artefacts were noticeably absent among these features, and charcoal was also rarely observed within their fills. These features may represent a series of small posts representing work or activity areas.

The remaining pits (1299, 1309, 1315, 1331 and 1446) were interpreted as either natural features or highly truncated features associated with Roundhouse 4 with no clear function. No artefacts were recovered from them.

Roundhouse 5

This roundhouse was the most southerly of the cluster of four roundhouses in Area 4. It comprised 17 prehistoric features including a fragment of ditch or gully, 11 stone-packed postholes, four pits of unknown function and a soil deposit (Figures 2.62 and 2.63).

The remains of a ditch or gully (1391) formed an arc around the south extent of the probable roundhouse (Figures 2.64 and 2.65). An evaluation trench had truncated its eastern extent and a portion of its western arc, which has an artificially created terminus due to plough truncation. The surviving portion measured c. 16 m in length, with its width varying between 0.8 m - 1 m. Like Roundhouse 4, not enough of the ditch survived to discern its original shape and the internal features did not respect it or formed a recognisable ring of posts within it. Three 2 m wide slot trenches were excavated through the ditch and demonstrated that there was some degree of uniformity unlike the previously described roundhouse ditches (1182 and 1249). The ditch was 0.12 m - 0.16 m deep with steeply-angled sides and a flat base. Its fill was homogenous orangey-brown sandy silt with infrequent charcoal fragments and small stones, and a single sherd of pottery Vessel 40. This was the only roundhouse ditch with a posthole (1403) dug into it.

The ten internal stone-packed postholes (1369, 1371, 1373, 1377, 1379, 1387, 1389, 1393, 1397 and 1399) formed a rough 'D'-shape. The interior space defined by the postholes measured 5.5 m by 2.5 m. The postholes were circular or oval-shaped in plan and were generally between 0.6 m - 0.7 m in diameter. Posthole (1389) was somewhat larger at 1.2 m in length, but its abnormal size was due to the displacement of packing stones by ploughing. The posthole depths ranged between 0.15 m - 0.5 m but survived generally deeper than those of Roundhouse 3 and Roundhouse 4. They were lined with medium to large sub-rounded stones and filled with dark brown to orangey-brown sandy silts with charcoal flecks. Plough scars were evident on the packing stones within postholes (1369 and 1373) and some of the stones within posthole (1393) were fire-cracked.

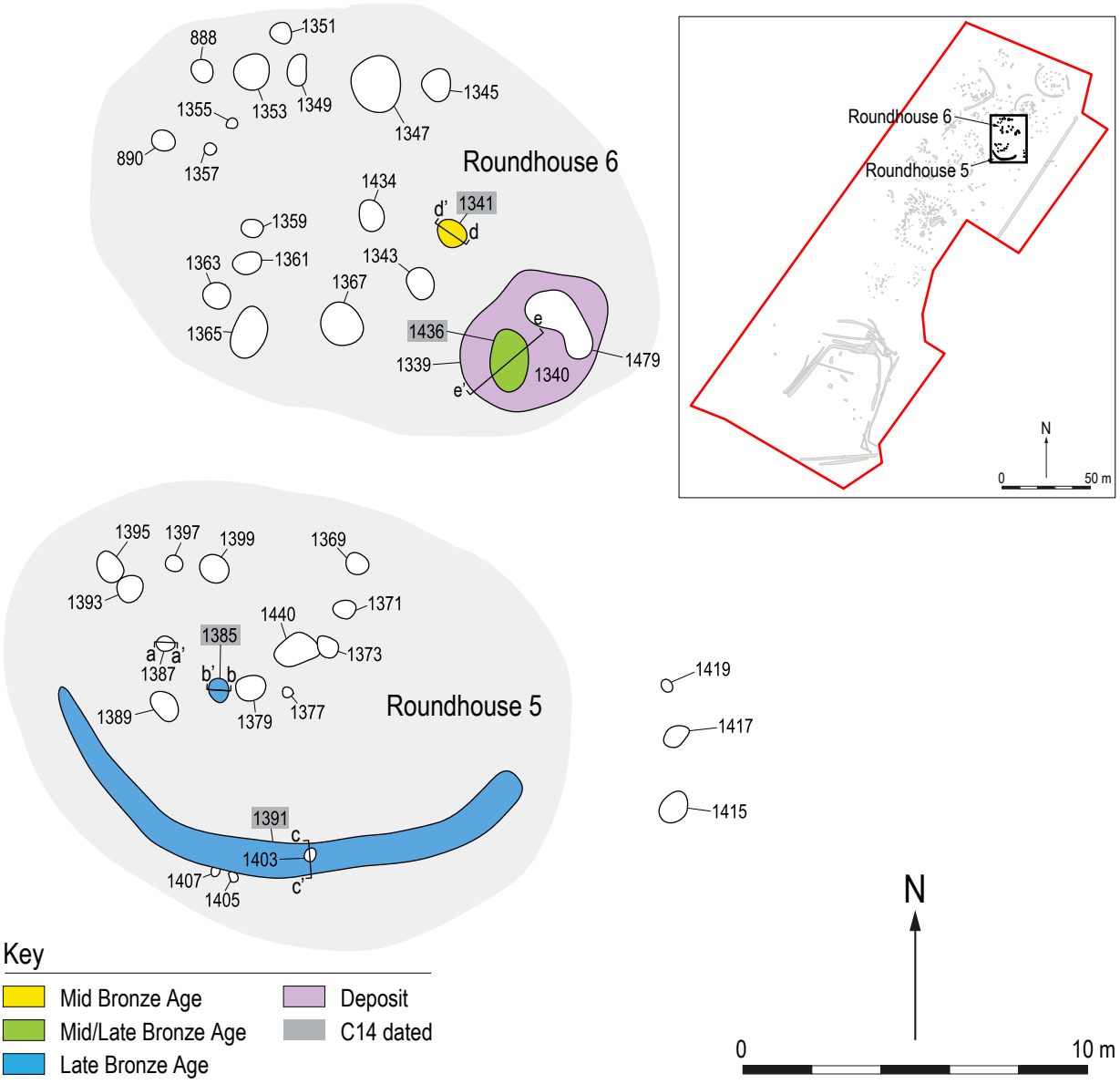

Figure 2.62: Roundhouse 5 and Roundhouse 6

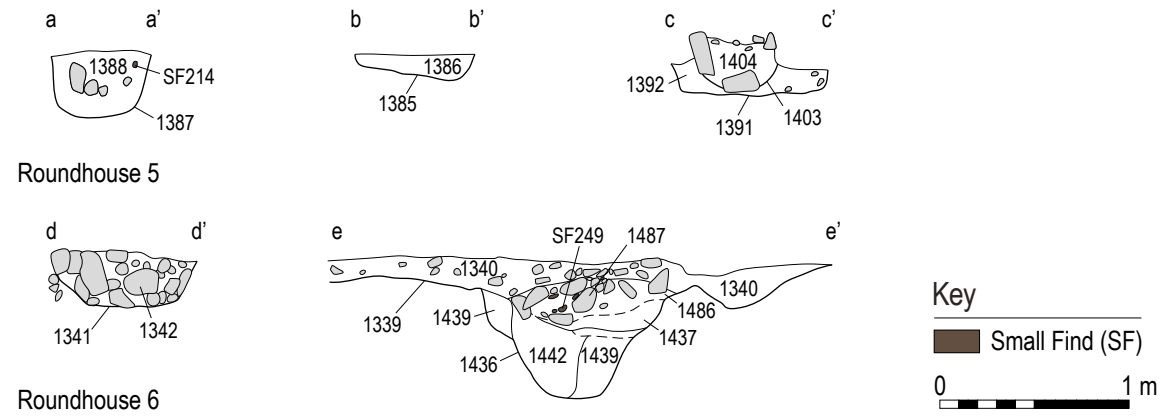

Figure 2.63: Roundhouse 5 and Roundhouse 6 with selected section drawings.

Figure 2.64: Aerial view of Roundhouse 5.

Figure 2.65: Roundhouse 5 during excavation. Facing east.

Half the postholes contained artefacts, the majority of which were re-used as packing stones. These comprised a quartz flake (SF 219) in (1369); a pounder (SF 216), anvil (SF 236) and quern rubber (SF 248) in (1371); a quern rubber (SF 245) in (1374); a pottery tool (SF 214) in (1387); and a pounder (SF 239) in (1397). An intrusive sherd of medieval pottery (SF 230) was found at the top of the fill of posthole (1389).

Two pits (1385 and 1395), were located amongst the internal postholes. They were circular and oval-shaped respectively. The former measured 0.62 m in diameter and the latter 1 m by 0.7 m. Both were c. 0.1 m deep and filled with dark grey sandy silt with charcoal fragments with some stones in pit (1395). Pit (1385) contained a sherd of prehistoric pottery (SF 21).

An additional two small circular pits (1405 and 1407) were situated at the very edge of the south side of the ditch (1392). They were c. 0.3 m in diameter with similar fills of mottled sandy silt with charcoal flecks. They may be natural hollows filled with anthropogenic material from nearby features.

A soil deposit (1440) extended west from posthole (1373) over an area of 1.2 m by 1.1 m by 0.1 m. It comprised mottled brown and black sandy silt with charcoal flecks several sub-rounded stones including a saddle quern (SF 232). This material is likely plough disturbed and displaced the upper portion of posthole (1373).

Roundhouse 6

This roundhouse was situated between Roundhouses 4 and 5. It comprised 21 features (Figures 2.62 and 2.63) 17 of which formed a circle of eight stone-packed postholes, seven pits, and two possible pits. Two further modified stone-packed postholes were located to the south-east, and another ambiguous feature lay to the north-west.

The stone-packed postholes (888, 890, 1341, 1343, 1345, 1349, 1351 and 1363) formed a ring of posts 9 m to 10 m in diameter (Figure 2.66). The postholes were predominantly circular in shape with diameters ranging from 0.5 m to 1.1 m and depths between 0.22 m to 0.45 m. They were lined with medium-sized sub-rounded stones and filled with dark brown sandy silt, with some rare charcoal flecks.

Four of the eight postholes contained artefacts, mainly stone tools re-used as packing stones, and included: pounder (SF 209) in posthole (1341), which also contained pottery sherds (SF 208 and SF 262), and the unusual deposition of cattle bones (SF 212, Figure 2.67); posthole (1343) contained Vessel 41, possibly late Bronze Age in date; posthole (1352) contained a quartz scraper (SF 205) and one pottery sherd (SF 206); a quern rubber (SF 243a), a pounder/hammerstone (SF 243b), and a possibly worked cetacean bone (SF 210), which were all used as packing in posthole (1363).

Figure 2.66: East-facing section of posthole (1345).

Figure 2.67: Posthole (1341) with deer/cow skull during excavation.

Seven pits were poorly-preserved and less-definable than the postholes but were suspected to be structural and similar to the truncated pits identified in Roundhouse 4. These features (1347, 1353, 1359, 1361, 1365, 1367 and 1434), were more oval in plan compared with the stone-packed postholes, and generally measured between 0.5 m and 1.5 m in length, with the predominant size being generally over 1 m. They were shallow with depths between 0.07 m and 0.17 m. Their fills were homogenous, containing flecks of charcoal and small sub-rounded stones throughout. Pit (1434) also contained burnt bone fragments.

Situated less than 1 m apart in the western extent of the structure and possibly respecting postholes (888 and 890), were two small postholes (1355 and 1357). Both measured 0.25 m in diameter and were shallow at 0.05 m to 0.07 m in depth. Their fills were homogenous, with (1357) containing some possible packing stones.

Located approximately 5 m to the south-east of the internal ring of posts, and possibly respecting postholes (1341 and 1367), were two pits (1436 and 1479) sealed beneath deposit (1340), which defined a roughly oval shape 4.3 m by 2 m. The deposit was multi-coloured and mottled charcoal flecked sandy silt with small to medium-sized shattered stones forming a compact mass. Recovered from this were a quartz flake SF 235 and a medieval ceramic sherd (SF 223).

The removal of the deposit (1340) revealed two pits (1436) and (1479) located 0.5 m from one another. The south-westernmost of the two, pit (1436), measured 1.5 m by 1.4 m by 0.6 m. It had steeply-angled sides that had a break of slope midway to drop vertically to the flat base (Figure 2.68). The remnants of a post with post-pipe (1442) defined a 0.5 m diameter circle with redeposited natural (1439) visible around it. Brown-black sandy silt (1437) with rare charcoal, and tiny fragments of cremated bone, partially sealed the pit after the removal of the post. A rough layer of stone (1487) was constructed over this silt layer, considered to be a possible post pad at the centre of the pit. The disturbed fill (1486) of this feature, was compact dark brown sandy silt, below deposit (1340) also contained sherds of Vessel 45 of later Bronze Age date, directly overlying the stone setting (1487).

Figure 2.68: North-west-facing section of pit (1436).

Pit (1479) was similarly complex. It measured 2.1 m by 1.15 m and surrounded a primary rectangular posthole (1491) towards its centre that was 0.4 m by 0.34 m by 0.14 m, with a steep sloping side to the east, vertical sides elsewhere and a flat base. Its fill (1492) comprised charcoal flecked silty grit with some probably packing stones along its west side. Pit (1479) possibly represents a deliberate recutting of the pit in order to house a second post. Posthole (1491) was sealed by dark sandy silt (1490), which contained charcoal flecks and small stones, a deposit that acted as a bedding matrix for a stone setting (1489). The latter formed a slightly concave layer of stone, somewhat similar to the setting (1487) in pit (1436) described above, and formed a stone platform for a second post. The primary fill of this stone setting was orangey-brown sandy silt (1488) with charcoal fragments and a sherd of pottery (SF 265) positioned directly over the stone (1487). Overlying this layer was (1466), a slightly less compact lens of (1340).

Situated 2 m to the north-west of the ring of posts was oval-shaped pit (943) that measured 3.3 m by 1.45 m by 0.23 m. Its fill was dark grey mottled silty sand with frequent charcoal flecks at the top of the feature and containing rare small stones and a single larger stone. The feature was hesitantly interpreted as a possible truncated kiln.

Pit Group 13

Pit Group 13 comprised four similar pits (1471, 1473, 1475 and 477) closely situated to one another (Figures 2.34 and 2.35). They measured between 0.55 m and 0.9 m and were between 0.12 m and 0.26 m deep. The fills of pits (1471

and 1475) contained dark greyish-brown sandy silt with charcoal flecks and sub- stones, some of which were fire-fracked. Pit (1471) also contained fragments of burnt bone. Pit (1477) contained a slightly orangey fill with a few rounded stones situated on its ENE side. Pit (1473) contained pottery sherds of middle Neolithic Vessel 19. These features are loosely interpreted as postholes for a small structure.

Pit Group 14

Two pits (882 and 884) situated less than 0.5 m apart comprised a small group on the westernmost edge of Area 4 (Figure 2.69). Pit (882) was 0.53 m in diameter and 0.13 m deep. It was filled with dark brown sandy silt with charcoal flecks and sub-angular stones throughout, and Vessel 20 of middle Neolithic date. Pit (884) was larger at 1.1 m in diameter by 0.3 m in depth and contained two fills: an upper fill of dark brown compact sandy silt with charcoal flecks and fire-cracked stones. The primary fill comprised black gritty sandy silt with charcoal fragments and several stones at its base with two prehistoric sherds (SF 136). Both pits may have been fire-pits.

Isolated pits east and south of Roundhouses 3-6

Twenty isolated features were identified to the east and south of the roundhouses in Area 1. These generally were circular, shallow pits.

Pit (1467) located 8 m south of Pit Group 13, measured 0.8 m in diameter with steep-sides to the ESE and with a flat base. Despite its shallow depth of 0.13 m, the pit contained several sherds of Vessel 43, possibly late Bronze Age in date, concentrated in the southern half of the pit.

Pit (1469) was a sub-rectangular-shaped pit measuring 1.4 m by 0.94 m by 0.2 m with a flat base. It contained a sandy fill and was interpreted as a probable tattie pit.

The remaining 18 pits (1239, 1241, 1243, 1247, 1317, 1319, 1321, 1323, 1327, 1329, 1335, 1409, 1411, 1413, 1415, 1417, 1419 and 1567) formed a scatter in a broad NE/SW alignment along the eastern edge of the roundhouses. They ranged from circular to oval in plan, were less than 1 m in diameter/length, and most were less than 0.2 m deep. The fills of these pits varied from greyish-brown to orange sandy silt, some with

Figure 2.69: Small pit (882) with larger pit (884) during excavation. Facing north-west.

charcoal flecks and stones, but no artefacts were recovered from them. These features are considered prehistoric in date due to their proximity to the roundhouses.

Isolated pits in close proximity to Roundhouses 3 to 6

Seven pits were located in the immediate vicinity of the roundhouses, although there was no clear association between them and the structures.

Pit (1233) was 1.1 m in diameter and situated between Roundhouse 3 and Roundhouse 4. It contained a large sub-rounded stone at its centre and although it may be a prehistoric pit of unknown function, it is more likely it is an accumulation of anthropogenic material derived from nearby archaeological features that accumulated around the stone though ploughing.

Pits (1301, 1303 and 1305) formed a small triangle less than 1 m apart and 1 m west of ditch (1249) of Roundhouse 4. They appeared sub-circular in plan with diameters ranging from 0.58 m to 0.84 m and depths of between 0.15 m to 0.30 m. Pits (1301 and 1303) contained similar fills of dark brown to black sandy silt, with pit (1301) containing many charcoal fragments and pit (1303) containing only some. Unlike pit (1305), which was lined by numerous medium-sized stones, pits (1301 and 1303) did not contain many stones.

Pit (1454) was located 3.5m north of pits (1301 to 1305) and measured 0.5 m in diameter with a lopsided profile showing a vertical side to the east and an inclining one to the west. The feature was only 0.1 m deep and contained blackish-brown sandy silt with occasional charcoal fragments. Pit (872) was situated 3 m north-west of (1454) and was an oval-shaped pit 0.8 m by 0.7 m by 0.2 m. The pit contained a fill with rare stones and charcoal flecks. Pit (874) lay 3 m southwest of pit (872), was oval in plan and measured 0.6 m by 0.46 m. It had steeply angled sides in a V-shaped profile with a similar fill to (872).

Ditch (1325)

This was a large straight ditch 80 m in length (Figures 2.3 and 2.70), aligned NE/SW parallel with Courthill Road on the eastern side of the excavated area, with both its ends extending beyond the limits of the excavation. Its width varied from 1.3 m to 1.65 m and it had a broad U-shaped profile with steeply angled sides and flat base c. 0.55 m to 0.72 m deep. Three 2 m wide slot trenches were excavated across it, demonstrating a notable step in the profile towards its southern extent. The ditch fill comprised thin layers of orange and brown sands with some grittier lenses and the occasional stone concentrated towards the edges of the ditch. Its fill is identical to the surrounding subsoil (002) with a very slight darker lens at its base that may indicate the feature was left open for a short time before being quickly filled in. No artefacts were recovered from it and it may represent post-prehistoric activity.

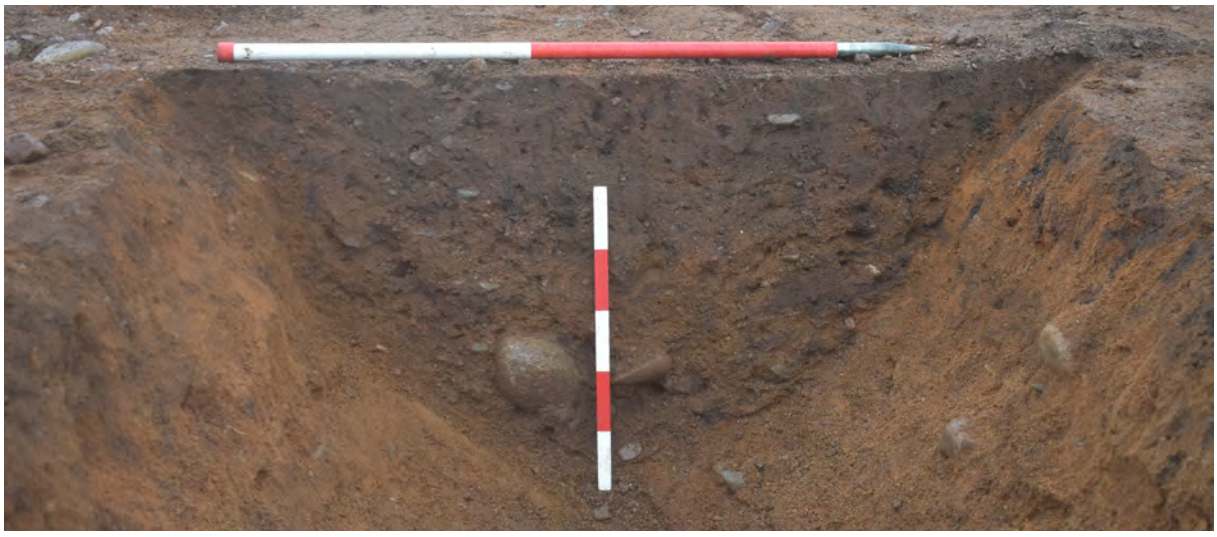

Figure 2.70: South-west-facing section of slot 3 through ditch (1325).

PART 3: Dating, the Changing Environment and Subsistence Economy

Radiocarbon Dating

By Iraia Arabaolaza

A total of 38 radiocarbon dates were selected from the site, including two that were collected from the hoard assemblage. The earliest date, obtained the cist from an intrusive carbonised birch sample produced a Mesolithic date. Radiocarbon dating results indicate an earlier occupation of the Rosemarkie site during the early and middle Neolithic, especially 3500-3100 BC. However, it is difficult to identify specific structures as Neolithic, apart from a possible oval structure in Pit Group 7, given subsequent disturbance of this plough-truncated site.

Most of the structures, including several roundhouses, yielded late Bronze Age dates, suggesting settlement between c. 1200 and 800 BC. The hoard itself, specifically bast fibres used to tie several bracelets together, has been dated to 894-794 BC. The radiocarbon dates are listed in Table 3.1 and they are ordered chronologically in Table 3.2.

UB No	Sample No.	Context	Material	Radiocarbon Age BP	Calibrated 1–sigma (68.3% probability)	Calibrated 2–sigma (95.4% probability)
UBA-56004	005	027 fill of pit 026	Corylus cf avellana	4207 ± 29	2888 – 2865 cal BC 2803 – 2761 cal BC 2718 – 2705 cal BC	2897 – 2846 cal BC 2812 – 2742 cal BC 2730 – 2674 cal BC
UBA-56005	022	234 fill of pit 233	Corylus cf avellana	4619 ± 30	3494 – 3458 cal BC 3377 – 3360 cal BC	3513 – 3426 cal BC 3409 – 3396 cal BC 3383 – 3347 cal BC
UBA-56006	025	257 deposit	Salix sp	4475 ± 27	3328 – 3220 cal BC 3184 – 3154 cal BC 3116 – 3096 cal BC	3339 – 3206 cal BC 3198 – 3083 cal BC 3060 – 3029 cal BC
UBA-56007	030	274 lower fill in pit 273	Alnus cf glutinosa	4222 ± 31	2895 – 2866 cal BC 2803 – 2770 cal BC 2715 – 2707 cal BC	2906 – 2848 cal BC 2810 – 2745 cal BC 2728 – 2695 cal BC 2684 – 2678 cal BC
UBA-56008	039	332 fill of pit 331	Salix sp	4956 ± 33	3768 – 3719 cal BC 3716 – 3701 cal BC 3682 – 3655 cal BC	3796 – 3647 cal BC
UBA-56009	053	409 fill of pit 408	Salix sp	4949 ± 32	3764 – 3732 cal BC 3714 – 3697 cal BC 3690 – 3654 cal BC	3786 – 3648 cal BC
UBA-56010	057	501 fill of pit 500	Corylus cf avellana	2684 ± 27	893 – 878 cal BC 835 – 806 cal BC	899 – 853 cal BC 849 – 803 cal BC
UBA-56011	083	713 fill of pit 712	Corylus cf avellana	2868 ± 28	1110 – 1090 cal BC 1087 – 1063 cal BC 1059 – 1003 cal BC	1125– 929 cal BC
UBA-56012	088	729 fill of pit 728	Corylus cf avellana	2806 ± 27	999 – 992 cal BC 990 – 923 cal BC	1046 – 1030 cal BC 1019 – 898 cal BC 867 – 856 cal BC
UBA-56013	101	794 fill of pit 793	Corylus cf avellana	3236 ± 27	1530 – 1526 cal BC 1518 – 1494 cal BC 1479 – 1454 cal BC	1598 – 1593 cal BC 1541 – 1432 cal BC

Table 3.1: All radiocarbon dates from the excavated area.

UB No	Sample No.	Context	Material	Radiocarbon Age BP	Calibrated 1–sigma (68.3% probability)	Calibrated 2–sigma (95.4% probability)
UBA-56014	109	829 fill of pit 828	Salix sp	4481 ± 28	3330 – 3218 cal BC 3186 – 3153 cal BC 3120 – 3098 cal BC	3340 – 3089 cal BC 3056 – 3032 cal BC
UBA-56015	120	894 lower fill in pit 884	Salix sp	4465 ± 30	3327 – 3228 cal BC 3182 – 3156 cal BC 3110 – 3089 cal BC 3055 – 3033 cal BC	3337 – 3209 cal BC 3195 – 3024 cal BC
UBA-56016	125	906 fill of pit 905	Corylus cf avellana	2951 ± 26	1213 – 1123 cal BC	1258 – 1244 cal BC 1231 – 1053 cal BC
UBA-56017	140	984 fill of pit 983	Corylus cf avellana	4481 ± 30	3330 – 3218 cal BC 3186 – 3153 cal BC 3121 – 3098 cal BC	3342 – 3087 cal BC 3057 – 3031cal BC
UBA-56018	148	1016 fill of pit 1015	Corylus cf avellana	4456 ± 31	3324 – 3234 cal BC 3179 – 3158 cal BC 3107 – 3081 cal BC 3061 – 3028 cal BC	3339 – 3207 cal BC 3197 – 3012 cal BC
UBA-56019	151	1028 fill of pit 1027	Corylus cf avellana	4485 ± 31	3331 – 3260 cal BC 3252 – 3216 cal BC 3188 – 3151 cal BC 3126 – 3099 cal BC	3344 – 3089 cal BC 3056 – 3032 cal BC
UBA-56020	156	1050 fill of pit 1049	Salix sp	4529 ± 30	3357 – 3326 cal BC 3231 – 3181 cal BC 3157 – 3109 cal BC	3363 – 3281 cal BC 3279 – 3265 cal BC 3244 – 3102 cal BC
UBA-56021	159	1060 fill of pit 1059	Corylus cf avellana	4442 ± 32	3317 – 3292 cal BC 3290 – 3238 cal BC 3172 – 3164 cal BC 3105 – 3020 cal BC	3332 – 3215 cal BC 3189 – 3149 cal BC 3136 – 3007 cal BC 2988 – 2930 cal BC
UBA-56022	166	1085 fill of pit 1084	Corylus cf avellana	2821 ± 25	1007 – 965 cal BC 959 – 930 cal BC	1047 – 1027 cal BC 1022 – 906 cal BC
UBA-56023	171	1104 fill of pit/ shell midden 1103	Betula sp	1176 ± 25	cal AD 775 – 788 cal AD 827 – 890	cal AD 774 – 897 cal AD 922– 953
UBA-56024	176	1126 fill in cist 1121	Betula sp	8609 ± 39	7706 – 7699 cal BC 7653 – 7622 cal BC 7610 – 7582 cal BC	7734 – 7579 cal BC
UBA-56025	180	1141 fill of pit 1140	Corylus cf avellana	2785 ± 28	984 – 901 cal BC	1009 – 893 cal BC 879 – 836 cal BC
UBA-56026	186	1167 fill of pit 1166	Betula sp	5097 ± 31	3958 – 3938 cal BC 3872 – 3808 cal BC	3969 – 3893 cal BC 3882 – 3798 cal BC
UBA-56027	204	1222 fill of pit 1221	Alnus cf glutinosa	2874 ± 29	1111 – 1090 cal BC 1087 – 1063 cal BC 1059 – 1008 cal BC	1190 – 1177 cal BC 1157 – 1146 cal BC 1127 – 970 cal BC 960 – 931 cal BC
UBA-56028	216	1282 top fill in pit 1281	Corylus cf avellana	2786 ± 28	984 – 901 cal BC	1009 – 893 cal BC 879 – 837 cal BC
UBA-56029	217	1288 fill of pit 1287	Corylus cf avellana	2849 ± 33	1052 – 970 cal BC 957 – 931 cal BC	1118 – 919 cal BC
UBA-56030	226	1342 fill of pit 1341	Prunoideae	3107 ± 31	1422 – 1381 cal BC 1343 – 1307 cal BC	1441 – 1281 cal BC
UBA-56031	236	1386 fill of pit 1385	Salix sp	2717 ± 27	898 – 866 cal BC 854 – 824 cal BC	910 – 810 cal BC

Table 3.1 (continued): All radiocarbon dates from the excavated area.

UB No	Sample No.	Context	Material	Radiocarbon Age BP	Calibrated 1–sigma (68.3% probability)	Calibrated 2–sigma (95.4% probability)
UBA-56032	240B	1392 fill of curvilinear ring ditch 1391	Corylus cf avellana	2853 ± 32	1103 – 1101 cal BC 1076 – 1072 cal BC 1054 – 973 cal BC 955 – 933 cal BC	1119 – 922 cal BC
UBA-56033	256	1472 fill of pit 1471	Alnus cf glutinosa	4415 ± 33	3096 – 3009 cal BC 2983 – 2933 cal BC	3322 – 3236 cal BC 3177 – 3160 cal BC 3106 – 2917 cal BC
UBA-56034	261	1486 top fill in pit 1436	Corylus cf avellana	2873 ± 29	1111 – 1090 cal BC 1087 – 1063 cal BC 1059 – 1007 cal BC	1190 – 1178 cal BC 1156 – 1147 cal BC 1126 – 969 cal BC 961 – 931 cal BC
UBA-56035	265	1499 fill of pit 1498	Prunoideae	2942 ± 27	1214 – 1114 cal BC	1257 – 1246 cal BC 1228 – 1048 cal BC 1025 – 1023 cal BC
UBA-56036	270	1531 fill of pit 1530	Alnus cf glutinosa	2890 ± 28	1116 – 1043 cal BC 1035 – 1016 cal BC	1201 – 1142 cal BC 1131 – 984 cal BC
UBA-56037	276	1566 fill of pit 1565	Corylus cf avellana	2992 ± 26	1267 – 1197 cal BC 1172 – 1163 cal BC 1142 – 1131 cal BC	1373 – 1354 cal BC 1298 – 1124 cal BC
UBA-56038	063	515 deposit	Alnus cf glutinosa	2835 ± 27	1041 – 1037 cal BC 1015 – 967 cal BC 960 – 931 cal BC	1107 – 1096 cal BC 1081 – 1068 cal BC 1056 – 909 cal BC
UBA-56039	061	511 middle fill in pit 402	Hordeum Vulgare var nudum	2710 ± 26	897 – 868 cal BC 846 – 816 cal BC	905 – 809 cal BC
UBA-56040	SF018	001 outer fill of hoard	Corylus cf avellana	2792 ± 28	984 – 905 cal BC	1012 – 894 cal BC 878 – 838 cal BC
UBA-56041	SF42/43	Bast fibre from hoard	cf Fabrinus bast fibre	2660 ± 21	822 – 803 cal BC	894 – 876 cal BC 833 – 794 cal BC

Table 3.1 (continued): All radiocarbon dates from the excavated area.

UB No	Sample No.	Context	Material	Radiocarbon Age BP	Calibrated 1–sigma (68.3% probability)	Calibrated 2–sigma (95.4% probability)	Period	Structure / Area
UBA-56024	176	1126 fill in cist 1121	Betula sp	8609 ± 39	7706 – 7699 cal BC 7653 – 7622 cal BC 7610 – 7582 cal BC	7734 – 7579 cal BC	Mesolithic	PG11
UBA-56026	186	1167 fill of pit 1166	Betula sp	5097 ± 31	3958 – 3938 cal BC 3872 – 3808 cal BC	3969 – 3893 cal BC 3882 – 3798 cal BC	EN	PG12
UBA-56008	039	332 fill of pit 331	Salix sp	4956 ± 33	3768 – 3719 cal BC 3716 – 3701 cal BC 3682 – 3655 cal BC	3796 – 3647 cal BC	EN	RH1, encl.
UBA-56009	053	409 fill of pit 408	Salix sp	4949 ± 32	3764 – 3732 cal BC 3714 – 3697 cal BC 3690 – 3654 cal BC	3786 – 3648 cal BC	EN	RH1, encl.
UBA-56005	022	234 fill of pit 233	Corylus cf avellana	4619 ± 30	3494 – 3458 cal BC 3377 – 3360 cal BC	3513 – 3426 cal BC 3409 – 3396 cal BC 3383 – 3347 cal BC	MN	Area 1
UBA-56020	156	1050 fill of pit 1049	Salix sp	4529 ± 30	3357 – 3326 cal BC 3231 – 3181 cal BC 3157 – 3109 cal BC	3363 – 3281 cal BC 3279 – 3265 cal BC 3244 – 3102 cal BC	MN	PG9

Table 3.2: Radiocarbon dates by period and structure.

UB No	Sample No.	Context	Material	Radiocarbon Age BP	Calibrated 1–sigma (68.3% probability)	Calibrated 2–sigma (95.4% probability)	Period	Structure / Area
UBA-56019	151	1028 fill of pit 1027	Corylus cf avellana	4485 ± 31	3331 – 3260 cal BC 3252 – 3216 cal BC 3188 – 3151 cal BC 3126 – 3099 cal BC	3344 – 3089 cal BC 3056 – 3032 cal BC	MN	PG7
UBA-56017	140	984 fill of pit 983	Corylus cf avellana	4481 ± 30	3330 – 3218 cal BC 3186 – 3153 cal BC 3121 – 3098 cal BC	3342 – 3087 cal BC 3057 – 3031cal BC	MN	PG7
UBA-56014	109	829 fill of pit 828	Salix sp	4481 ± 28	3330 – 3218 cal BC 3186 – 3153 cal BC 3120 – 3098 cal BC	3340 – 3089 cal BC 3056 – 3032 cal BC	MN	PG8
UBA-56006	025	257 deposit	Salix sp	4475 ± 27	3328 – 3220 cal BC 3184 – 3154 cal BC 3116 – 3096 cal BC	3339 – 3206 cal BC 3198 – 3083 cal BC 3060 – 3029 cal BC	MN	PG3
UBA-56015	120	894 lower fill in pit 884	Salix sp	4465 ± 30	3327 – 3228 cal BC 3182 – 3156 cal BC 3110 – 3089 cal BC 3055 – 3033 cal BC	3337 – 3209 cal BC 3195 – 3024 cal BC	MN	PG14
UBA-56018	148	1016 fill of pit 1015	Corylus cf avellana	4456 ± 31	3324 – 3234 cal BC 3179 – 3158 cal BC 3107 – 3081 cal BC 3061 – 3028 cal BC	3339 – 3207 cal BC 3197 – 3012 cal BC	MN	PG7
UBA-56021	159	1060 fill of pit 1059	Corylus cf avellana	4442 ± 32	3317 – 3292 cal BC 3290 – 3238 cal BC 3172 – 3164 cal BC 3105 – 3020 cal BC	3332 – 3215 cal BC 3189 – 3149 cal BC 3136 – 3007 cal BC 2988 – 2930 cal BC	MN	PG9
UBA-56033	256	1472 fill of pit 1471	Alnus cf glutinosa	4415 ± 33	3096 – 3009 cal BC 2983 – 2933 cal BC	3322 – 3236 cal BC 3177 – 3160 cal BC 3106 – 2917 cal BC	M-LN	PG13
UBA-56007	030	274 lower fill in pit 273	Alnus cf glutinosa	4222 ± 31	2895 – 2866 cal BC 2803 – 2770 cal BC 2715 – 2707 cal BC	2906 – 2848 cal BC 2810 – 2745 cal BC 2728 – 2695 cal BC 2684 – 2678 cal BC	LN	PG2
UBA-56004	005	027 fill of pit 026	Corylus cf avellana	4207 ± 29	2888 – 2865 cal BC 2803 – 2761 cal BC 2718 – 2705 cal BC	2897 – 2846 cal BC 2812 – 2742 cal BC 2730 – 2674 cal BC	LN	PG1
UBA-56013	101	794 fill of pit 793	Corylus cf avellana	3236 ± 27	1530 – 1526 cal BC 1518 – 1494 cal BC 1479 – 1454 cal BC	1598 – 1593 cal BC 1541 – 1432 cal BC	E-MBA	PG7
UBA-56030	226	1342 fill of pit 1341	Prunoideae	3107 ± 31	1422 – 1381 cal BC 1343 – 1307 cal BC	1441 – 1281 cal BC	MBA	RH6
UBA-56037	276	1566 fill of pit 1565	Corylus cf avellana	2992 ± 26	1267 – 1197 cal BC 1172 – 1163 cal BC 1142 – 1131 cal BC	1373 – 1354 cal BC 1298 – 1124 cal BC	M-LBA	PG5
UBA-56016	125	906 fill of pit 905	Corylus cf avellana	2951 ± 26	1213 – 1123 cal BC	1258 – 1244 cal BC 1231 – 1053 cal BC	M-LBA	PG10
UBA-56035	265	1499 fill of pit 1498	Prunoideae	2942 ± 27	1214 – 1114 cal BC	1257 – 1246 cal BC 1228 – 1048 cal BC 1025 – 1023 cal BC	M-LBA	PG4
UBA-56036	270	1531 fill of pit 1530	Alnus cf glutinosa	2890 ± 28	1116 – 1043 cal BC 1035 – 1016 cal BC	1201 – 1142 cal BC 1131 – 984 cal BC	M-LBA	PG5
UBA-56027	204	1222 fill of pit 1221	Alnus cf glutinosa	2874 ± 29	1111 – 1090 cal BC 1087 – 1063 cal BC 1059 – 1008 cal BC	1190 – 1177 cal BC 1157 – 1146 cal BC 1127 – 970 cal BC 960 – 931 cal BC	M-LBA	RH3

Table 3.2 (continued): Radiocarbon dates by period and structure.

UB No	Sample No.	Context	Material	Radiocarbon Age BP	Calibrated 1–sigma (68.3% probability)	Calibrated 2–sigma (95.4% probability)	Period	Structure / Area
UBA-56034	261	1486 top fill in pit 1436	Corylus cf avellana	2873 ± 29	1111 – 1090 cal BC 1087 – 1063 cal BC 1059 – 1007 cal BC	1190 – 1178 cal BC 1156 – 1147 cal BC 1126 – 969 cal BC 961 – 931 cal BC	M-LBA	RH6
UBA-56011	083	713 fill of pit 712	Corylus cf avellana	2868 ± 28	1110 – 1090 cal BC 1087 – 1063 cal BC 1059 – 1003 cal BC	1125– 929 cal BC	LBA	RH1, encl.
UBA-56032	240B	1392 fill of curvilinear ring ditch 1391	Corylus cf avellana	2853 ± 32	1103 – 1101 cal BC 1076 – 1072 cal BC 1054 – 973 cal BC 955 – 933 cal BC	1119 – 922 cal BC	LBA	RH5
UBA-56029	217	1288 fill of pit 1287	Corylus cf avellana	2849 ± 33	1052 – 970 cal BC 957 – 931 cal BC	1118 – 919 cal BC	LBA	RH4
UBA-56038	063	515 deposit	Alnus cf glutinosa	2835 ± 27	1041 – 1037 cal BC 1015 – 967 cal BC 960 – 931 cal BC	1107 – 1096 cal BC 1081 – 1068 cal BC 1056 – 909 cal BC	LBA	RH1
UBA-56022	166	1085 fill of pit 1084	Corylus cf avellana	2821 ± 25	1007 – 965 cal BC 959 – 930 cal BC	1047 – 1027 cal BC 1022 – 906 cal BC	LBA	RH2
UBA-56012	088	729 fill of pit 728	Corylus cf avellana	2806 ± 27	999 – 992 cal BC 990 – 923 cal BC	1046 – 1030 cal BC 1019 – 898 cal BC 867 – 856 cal BC	LBA	RH1, encl.
UBA-56040	SF018	001 outer fill of hoard	Corylus cf avellana	2792 ± 28	984 – 905 cal BC	1012 – 894 cal BC 878 – 838 cal BC	LBA	hoard
UBA-56028	216	1282 top fill in pit 1281	Corylus cf avellana	2786 ± 28	984 – 901 cal BC	1009 – 893 cal BC 879 – 837 cal BC	LBA	RH4
UBA-56025	180	1141 fill of pit 1140	Corylus cf avellana	2785 ± 28	984 – 901 cal BC	1009 – 893 cal BC 879 – 836 cal BC	LBA	PG11
UBA-56031	236	1386 fill of pit 1385	Salix sp	2717 ± 27	898 – 866 cal BC 854 – 824 cal BC	910 – 810 cal BC	LBA	RH5
UBA-56039	061	511 middle fill in pit 402	Hordeum Vulgare var nudum	2710 ± 26	897 – 868 cal BC 846 – 816 cal BC	905 – 809 cal BC	LBA	RH1, encl.
UBA-56010	057	501 fill of pit 500	Corylus cf avellana	2684 ± 27	893 – 878 cal BC 835 – 806 cal BC	899 – 853 cal BC 849 – 803 cal BC	LBA	PG5
UBA-56041	SF42/43	Bast fibre from hoard	cf Fabrinus bast fibre	2660 ± 21	822 – 803 cal BC	894 – 876 cal BC 833 – 794 cal BC	LBA	hoard
UBA-56023	171	1104 fill of pit/shell midden 1103	Betula sp	1176 ± 25	cal AD 775 – 788 cal AD 827 – 890	cal AD 774 – 897 cal AD 922– 953	LIA/E-Medieval	PG11

Table 3.2 (continued): Radiocarbon dates by period and structure.

Archaeobotany

By Susan Ramsay

(Editor's note: The identification and discussion of plant fibres from the hoard can be found in Part 5: Archaeobotany of the Hoard)

Introduction and methodology

This archaeobotanical report details the processing, analysis and interpretation of botanical remains recovered from samples taken during an archaeological watching brief at Greenside Farm, Rosemarkie, Highland.

Bulk sample processing

A programme of bulk sampling was undertaken in order to examine the carbonised archaeobotanical remains from Rosemarkie. In total, 250 bulk samples were analysed for the presence of botanical remains. The bulk samples were processed by flotation for the recovery of carbonised remains, using standard methods and sieves of mesh diameter 1 mm and 500 µm for flots and 2 mm and 4 mm for retents from flotation. There was no indication that any of the samples had the potential for the preservation of uncarbonised plant remains through waterlogging.

Macrofossil analysis

Dried flots and sorted retents were examined using a binocular microscope at variable magnifications of x4 to x45. For each sample, an estimation of the total volume of carbonised material >4 mm was made. For each sample, all the charcoal >4 mm was identified unless this proved to be too large an amount, in which case a known percentage of the total charcoal >4 mm was identified. All carbonised seeds were also identified and any other plant macrofossil remains were noted.

The testa characteristics of small seeds and the internal anatomical features of all charcoal fragments were further identified at x200 magnification using the reflected light of a metallurgical microscope. Reference was made to Schweingruber (1990), Gale and Cutler (2000) and Cappers et al. (2006) to aid identifications and vascular plant nomenclature follows Stace (1997).

Results

Results are discussed by area and by feature group, following the order and groupings contained within the Data Structure Report (Williamson 2021). The full results are given in Appendix 1: Tables 3.3-3.22 in the Appendices.

Area 1

Area 1 was the southernmost of the four areas investigated. The feature groups identified included a series of ditches, a number of pits including Pit Group 1 and an area of in situ burning.

Ditches (Table 3.3)

A number of fragmentary ditches were located in Area 1. These included ditches (009, 016 and 018). Ditch (009) was located to the south-east and included fragments of slate and a possible furnace base. Its fill (014) produced a mixed charcoal assemblage of broom/gorse, heather type, Scots pine type and cherry type, along with some fragments that may be burnt peat. This mixed assemblage is consistent with hearth waste, although the types included are not the ones found most commonly in a domestic context. The presence of the possible furnace base might suggest this is fuel waste from an industrial process.

The fill (017) of ditch (016) produced only traces of birch and willow charcoal, while the fill (019) of ditch (018) produced only small amounts of alder charcoal.

Pit Group 1 (Table 3.3)

Pit group 1 consisted of a cluster of five pits, of which (026, 030 and 032) were analysed for the presence of carbonised remains. Their fills (027, 031 and 033) produced very similar carbonised assemblages dominated by hazel charcoal, with fragments of hazel nutshell, and large amounts of indeterminate charcoal. In addition, fill (027) also produced small amounts of willow charcoal. This material may be hearth waste but could also be the remains of a wattle structure or panel that had been destroyed by fire. Hazel charcoal from fill (027) was radiocarbon dated to 2897 – 2674 cal BC (UBA-56004).

Additional pits (Table 3.3)

Pit (054), fill (055) was approximately circular, around 1.3 m in diameter, and immediately to the east of ditch (011). Large fragments of willow charcoal were identified from this fill, along with smaller quantities of indeterminate charcoal. The DSR suggest that this may be tree limbs or roots, but could also be the remains of burnt wattle.

Pit (271), fill (272) was located in the north-west of the area and comprised a circular pit with fire-cracked stones. It was suggested in the DSR that this may be the remains of a hearth. The charcoal assemblage comprised large amounts of hazel charcoal and nothing else. Again, this may be hearth waste but the fact that all the charcoal is hazel is more suggestive of burnt wattle.

Several pits (040, 045, 231, 233 and 235) were located within an area defined by the linear ditches. Pits (040 and 045) were located to the south-east of the area. The fill (042) of pit (040) contained only oak charcoal and so may be the remains of a burnt post. The fill (046) of pit (045) produced only indeterminate charcoal. Pits (231, 233 and 235) were located in the north-west of the area. Pit (231), fill (232) produced large quantities of hazel charcoal, again suggesting the remains of burnt wattle. Pit (233), fill (234) also produced hazel charcoal, but only a trace amount. In contrast, pit (235), fill (236) produced a mixed charcoal assemblage of alder, hazel, oak and rose family, suggesting the remains of domestic hearth waste. Hazel charcoal from fill (234) produced a radiocarbon date of 3513 – 3347 cal BC (UBA-56005).

Areas of burning (Table 3.3)

An area of in situ burning (047) was located to the south of pit (045). No stone setting was visible, just a patch of heat-affected soil. The charcoal assemblage was dominated by oak, with small amounts of hazel and fragments of hazel nutshell also present. This could be hearth waste but would also be consistent with burnt structural material.

Area 2

Area 2 was located in the central part of the development area. A prehistoric ground surface (401) covered a large proportion of the western part of the area. Features within this area included three pit groups, a roundhouse within a timber palisade enclosure defined by double postholes, and grain drying kilns.

Roundhouse 1 (Table 3.4)

At the north-east end of this area were a large number of features including the remains of Roundhouse 1, which was located in the north-eastern half of a palisade enclosure.

The roundhouse was defined by a series of postholes, including (513, 514, 549, 580, 586, and 612). All the posthole fills produced small amounts of oak charcoal, but not enough to suggest posts burnt in situ. In addition, fragments of birch, hazel and heather type charcoal were recorded in these posthole fills, along with traces of hazel nutshell and carbonised barley grains. These assemblages suggest the remains of domestic hearth waste that trickled down into the posthole fills.

A further series of postholes that included (620, 715, 722 and 725) formed a porch that extended south-east from the roundhouse. Their fills produced similar mixed charcoal assemblages to those in the structure. All fills produced oak charcoal, with birch, alder, hazel and cherry type charcoal present in some of the fills, with traces of cereal and hazel nutshell also recorded. As above, these assemblages suggest the scattered remains of hearth waste.

A possible fragment of ring ditch (566) was located on the south-east side of the roundhouse. Its fill (567) produced small amounts of birch and hazel charcoal, probably from scattered domestic hearth waste.

Within the interior of the roundhouse were a number of pits and deposits. The fill (597) of pit (596) produced small amounts of birch, hazel and oak charcoal with fragments of hazel nutshell. The fill (713) of pit (712) was dominated by Scots pine type charcoal with traces of hazel also present. Hazel charcoal from fill (713) was radiocarbon dated to 1125 – 929 cal BC (UBA-56011). The fill (729) of pit (728) also produced a mixed assemblage of hazel, Scots pine and oak charcoal, with traces of indeterminate cereal. Occupation deposits (515, 704 and 705) produced charcoal of alder, hazel, Scots pine type and oak,

together with traces of barley and hazel nutshell. This material is similar to that seen in the fills of the roundhouse postholes, providing further evidence for scattered domestic hearth waste over much of the inside of the roundhouse. Alder charcoal from deposit (515) was radiocarbon dated to 1107 – 909 cal BC (UBA-56038), which is consistent with the late Bronze Age date obtained from fill (713).

Double posthole palisade enclosure (Table 3.5)

A palisade enclosure comprised pairs of postholes forming a sub-oval enclosure approximately 28 m by 20 m, although the palisade was only preserved on three sides.

The fills of postholes (121, 139, 141, 153, 239, 303, 305, 307, 309, 456, 624, 628, 636, 644 and 688) were examined for the presence of carbonised botanical remains. Most posthole fills contained small amounts of mixed charcoal, with hazel, oak and willow the commonest types present. Although this combination of types might suggest the remains of structural material, the quantities involved are not sufficient to indicate any substantial section of a palisade was burnt in situ.

The fill (457) of posthole (456) differed in containing only Scots pine type charcoal, although probably not enough to suggest a post burnt in situ. However, the fill (690) of posthole (688) produced very large quantities of oak charcoal and so this fill may be evidence for an oak post burnt in situ. The fill (304) of posthole (303) produced hazel charcoal but also very large numbers of hazel nutshell fragments. It may be that this waste material had been deliberately used as post-packing in the posthole. The fill (310) of posthole (309) produced a mixed charcoal assemblage of alder, birch, hazel, oak and willow, with hazel nutshell, suggesting the remains of scattered domestic hearth waste.

The surrounding colluvium deposit (681) also produced small amounts of mixed charcoal and hazel nutshell, suggesting domestic hearth waste was scattered across the area.

Features south-west of Roundhouse 1 (Table 3.6)

A cluster of pits and postholes lay to the south-west of Roundhouse 1. Postholes included (325, 333, 339 and 341) that appeared to form a figure-of-eight shape. Their fills (326, 334, 340 and (342) produced trace amounts of alder, birch, hazel, oak and willow charcoal between them, with traces of hazel nutshell in (334). This assemblage suggests that domestic hearth waste was scattered across the area and became incorporated into the posthole fills.

Pit (321), fill (322), contained 'burnt material' and fragments of possible metal-working moulds. However, only a trace of oak charcoal was recovered from this fill, which was not enough to say that oak had been used as fuel on a metalworking hearth.

Pits (331, 347 and 398) may be the remains of refuse pits or even degraded postholes. The fill (332) of pit (331) produced small amounts of oak and willow charcoal, with fragments of hazel nutshell. Willow charcoal from (332) was radiocarbon dated to 3796 – 3647 cal BC (UBA-56008). Fill (348) of pit (347) and fill (399) of pit (398) both produced small amounts of hazel and willow charcoal.

A large pit (323) lay to the south of this group and was interpreted on site as a possible grain drying kiln. However, the fill (400) produced only small amounts of oak charcoal but no evidence for any carbonised grain.

A group of about twenty small features straddled the palisade on the southwest side but only the fill (128) of pit (127) was examined for the presence of carbonised remains. Traces of hazel charcoal, indeterminate cereal grain and hazel nutshell were recorded, suggesting the remains of scattered domestic hearth waste.

Features north-west of Roundhouse 1 (Table 3.7)

A number of pits and postholes were located to the north-west of the roundhouse, with some located inside and some outside the palisade.

Within the palisade features included posthole (540) and pits (319, 412 and 420). The fill (541) of posthole (540) contained small amounts of hazel charcoal, carbonised barley (including the naked variety) and a fragment of hazel nutshell. This material is consistent with domestic hearth waste rather than evidence of a post having been burnt in situ. The fills (320, 413 and 421) of pits

(319, 412 and 420) produced mixed charcoal assemblages with alder, birch, hazel, oak and willow all represented, along with carbonised barley, including the naked variety, and fragments of hazel nutshell. As with the posthole fill, these assemblages are consistent with domestic hearth waste and the presence of naked barley is indicative of a Bronze Age or earlier date for these features.

A further group of features lay outside the palisade. These features were sealed beneath a layer of colluvium (401) that produced a very mixed charcoal assemblage of alder, birch, hazel, Scot's pine type, oak and elm, suggesting that hearth waste may have been scattered across the site.

Postholes (406), fill (405), and (408), fill (409), both produced charcoal of hazel, oak and willow, with traces of Scot's pine type in (407) and fragments of hazel nutshell in (409). There is no evidence for posts having been burnt in situ and these assemblages are more likely to be from domestic hearth waste. Willow charcoal from fill (409) produced a radiocarbon date of 3786 – 3648 cal BC (UBA-56009).

Pits (404), fill (405), and (436), fill (437), both produced small amounts of hazel and oak charcoal, with fragments of hazel nutshell in (405). Although hazel and oak may indicate the presence of burnt structural material, the quantities involved are more likely to be from scattered hearth waste. Pit (508), fill (507), produced only traces of willow charcoal.

Kilns (Table 3.8)

A keyhole-shaped kiln pit (402) was located 5 m to the north-west of the palisade. The basal fill (512) contained alder, hazel, oak and willow, together with significant numbers of carbonised barley grains, over half of which were identifiable as the naked variety. Traces of hazel nutshell were also recorded. This fill was overlain by a thin black lens (511) that produced only traces of hazel and heather type charcoal, but 585 carbonised cereal grains, of which almost half were identifiable as naked barley and 19 were emmer wheat. A sample of naked barley from (515) was radiocarbon dated to 1107 – 909 cal BC (UBA-56038), which is consistent with the expected date for the cereal assemblage recorded. Pit (509), fill (510) lay only 50 mm from pit (402) and produced oak charcoal and fragments of hazel nutshell.

Kiln pit (676) was cut through by palisade post (674) on the east side of the enclosure. It was interpreted on-site as a possible grain drying kiln. The basal deposit (739) did not produce any carbonised plant material. Overlying this basal layer was a dense burnt layer (738) but only small amounts of oak charcoal were recovered. Fill (736) partially overlay (738) and again produced only small amounts of oak charcoal, but with a single trace of hazel nutshell. The uppermost deposit (734) produced much larger quantities of oak charcoal with traces of barley and indeterminate cereal grain. It is possible that this is a grain drying kiln, but the selection of oak as fuel and the general lack of cereal grains suggest it may be more likely to be a kiln with an industrial purpose.

Pit Group 2 (Table 3.8)

A small group of pits was located in the south-east of Area 2 and included pits (273, 283 and 291). Pit (273), fill (274), was the largest of the group and contained very large quantities of alder and willow charcoal, providing further evidence for its use as a fire-pit. Alder charcoal from (274) produced a radiocarbon date of 2906 – 2678 cal BC (UBA-56007). The fill (284) of pit (283) produced only a trace of birch charcoal. The fill (358) of pit/posthole (291) was initially identified on site as the remains of a post burnt in situ but there was no identifiable charcoal in this feature. The burnt material appeared to be burnt soil mixed with small fragments of charcoal and it is not possible to say whether this is actually the remains of a post.

Pit Group 3 (Table 3.9)

Pit group 3 was located in the south-west of Area 2 and comprised a series of pits including (189, 217, 221, 223, 258, 262, 264, 360 and 372), together with a prehistoric soil layer (257).

The prehistoric soil layer (257) produced very large quantities of oak and willow charcoal, suggesting that this soil layer contained the remains of burnt wattle/structural material. It was suggested in the DSR that this deposit might

be the sunken floor surface of a small structure that had burnt down and the carbonised assemblage would support this theory. Willow charcoal from (257) produced a radiocarbon date of 3339 – 3029 cal BC (UBA-56006). A possible posthole (360), fill (361), beneath (257) did not produce any carbonised remains.

Pits (262 and 264) and posthole (372) all produced significant amounts of Scot's pine type charcoal and no other charcoal type, possibly suggesting that these features are all the remains of postholes that once held posts made from Scot's pine.

Pits (189 and 217) both contained small amounts of mixed charcoal, suggesting the remains of scattered hearth waste. Pit (221), fill (222), contained a significant amount of oak charcoal and hazel nutshell, perhaps suggesting an earlier prehistoric date for this feature. Pit (223), fill (224), contained significant amounts of willow charcoal as well as indeterminate charcoal that may also be willow. This abundance of a single type suggests the remains of a burnt wattle panel or a wicker object.

Pit Group 4 (Table 3.9)

Pit Group 4 was located to the north-west of Roundhouse 1 but only two of the five pits produced carbonised remains: (1498 and 1506). Pit (1498), fill (1499), produced alder, hazel, cherry type, and oak charcoal, together with traces of indeterminate cereal grain, suggesting domestic hearth waste. Cherry type charcoal from (1499) was radiocarbon dated to 1257 – 1023 cal BC (UBA-56035). Pit (1506), fill (1507), produced small amounts of alder and hazel charcoal, with a trace of hazel nutshell.

Vegetation remnants (Table 3.9)

To the southwest of Roundhouse 1 was an area with patches of blackened silt with charcoal flecks and white leached sandy halos around the patches. It was suggested that these patches might be the remains of tree root systems. Feature (1494) produced significant amounts of oak charcoal but no other carbonised remains and so may be the remnants of the root system of an oak tree.

Area 3

Area 3 was located in the north-west of the site and contained Pit Groups 5-12, with Roundhouse 2 situated in the centre of the area.

Roundhouse 2 (Table 3.10)

Roundhouse 2 was defined by a series of pits and postholes including (1082, 1084, 1088, 1090, 1092 and 1098). Postholes (1084, 1091 and 1093) contained hazel charcoal with traces of cereal in fill (1089 of 1090) and hazel nutshell in fill (1085 of 1084) and fill (1089 of 1090). Postholes (1088 and 1098) contained traces of hazel and willow charcoal. The presence of hazel and willow charcoal might suggest the remains of a burnt wattle structure, although the quantities involved are not particularly significant. Hazel charcoal from fill (1085) was radiocarbon dated to 1047 – 906 cal BC (UBA-56022).

Pit (1082), fill (1083), produced a very mixed charcoal assemblage with birch, hazel, Scot's pine type and oak charcoal all present. This material was probably scattered from a domestic hearth.

Pit Group 5 and Bronze hoard (Tables 3.11 and 3.12)

Pit Group 5 was a large collection of features situated along the western edge of Area 3, with clusters in the north-west, south-west and south-east.

Features in the northwest include postholes (1526, 1528, 1530, 1532, 1538 and 1550). The fills (1527, 1529, 1531, 1533, 1539 and 1551) produced mixed charcoal assemblages with alder, birch, hazel, broom/gorse, Scots pine type, cherry type, oak and willow all represented to a greater or lesser degree. A single grain of barley was found in fill (1531) and traces of hazel nutshell in (1531 and 1551). These assemblages are consistent with domestic hearth waste suggesting these postholes may be the remains of a domestic structure. Alder charcoal from (1531) was radiocarbon dated to 1201 – 984 cal BC (UBA-56036). Pit (1552) contained hazel charcoal and fire cracked stones, with the underlying natural also appearing to be heat-affected. This suggests the remains of a fire-pit. The Bronze Age hoard was also found within pit (1534) within this group of features but will be discussed at the end of this section.

The second group of features were located to the south-east and comprised more isolated pits and postholes, including (500, 764, 766, 811, 965 and 1561). Posthole (500), fill (501), produced a large number of pottery sherds, quern fragments and possible stone tools, all perhaps used as post-packing. Its fill also produced a mixed charcoal assemblage of alder, birch, hazel, cherry type and oak, traces of barley and hazel nutshell. This is evidence for hearth waste rather than a post burnt in situ. Hazel charcoal from (501) produced a radiocarbon date of 899 – 803 cal BC (UBA-56010).

The remaining pits and postholes in this group contained small amounts of mixed charcoal, although a more significant amount of hazel nutshell was recorded in the fill (765) of posthole (764). None of the postholes appeared to show the remains of posts burnt in situ and all carbonised remains are thought to have originated from hearth waste.

A small group of pits were recorded in the south-west of Pit Group 5. The fill (1517) of pit (1516) produced a mixed charcoal assemblage of alder and hazel charcoal. Pit (1565), fill (1566), also contained alder and hazel charcoal and hazel nutshell but also produced over 400 carbonised cereal grains, with naked barley, emmer wheat and bread wheat all represented. Hazel charcoal from (1566) was radiocarbon dated to 1373 – 1124 cal BC (UBA-56037), which is consistent with the expected date for this cereal assemblage.

Bronze Age hoard

The Bronze Age hoard was located in pit (1534) and consisted of nine bronze artefacts, including one complete neck ring, one partial neck ring, six penannular bracelets and one cup-ended penannular bracelet. It was clear during excavation that plant material was also present within this pit and it appeared that some kind of fibrous material had been tied or knotted around some of the bronze objects. There was speculation that some of this plant material might be the remains of a woven basket or bag. The pit fill was lifted as a single block and then subjected to micro-excavation. In total, 54 micro samples of organic/plant material were taken during this phase of the excavation and presented for analysis. The plant material was generally not carbonised although a few fragments of alder, birch and hazel charcoal were recorded. Hazel charcoal from the outer fill of the hoard was radiocarbon dated to 1012 – 838 cal BC (UBA-56040). The uncarbonised plant material appeared to have survived as a result of its close proximity to the bronze objects, with the copper in the bronze prohibiting microbial decay (see Part 5: The late Bronze Age Metal Hoard). The identifiable plant material was almost all fragments of bracken (Pteridium aquilinum), with stems and pinnae (individual 'leaflets' on a fern frond) present. The other main category of plant material recovered was what appeared to be tree bast, which is a type of plant fibre that comes from the inner bark of trees. Specific identification of this material was problematical but a few fragments had a morphology that was most similar to ash (Fraxinus sp). The tree bast seemed to form the fibrous material that had been used to tie the bronze objects together. No evidence of a bag or basket was noted. No other identifiable plant material was recorded and no seeds were recovered from this pit fill.

Pit Group 6 (Table 3.13)

Pit Group 6 lay to the north-west of Roundhouse 2. Features (775, 777 and 854) were stone-packed postholes that contained some stone artefacts as packing material. However, their fills (776, 778 and 855) produced only traces of mixed charcoal and hazel nutshell, probably reflecting hearth waste scattered across the site. Pit (779), fill (782), might also be a small posthole but did not produce any carbonised remains.

The remaining pits (768, 866 and 952), with fills (769, 867 and 952), also produced only traces of mixed charcoal and hazel nutshell.

Pit Group 7 (Table 3.14)

Pit Group 7 was a large scattered group of forty six pits, of which pits (793, 795, 797, 809, 967), (969), 977, 981, 983, 991, 1001, 1003, 1007, 1015, 1023, 1025, 1027, 1031, 1035 and 1043) were examined for carbonised remains. Their fills 794, 796, 798, 810, 968, 970, 978, 982, 984, 992, 1002, (1004), 1008, 1016, 1024, 1026, 1028, 1032, 1036 and 1044) generally produced small amounts of mixed charcoal with birch, hazel, Scots pine type, oak, willow and elm all

represented. Fills (984, 1024, 1028 and 1036) also produced small amounts of carbonised cereal grain with naked barley and emmer wheat recorded. Most notably, were large quantities of carbonised hazel nutshell in many of the fills with fills (984, 1004 and 1024) all producing several hundred fragments of nutshell. These findings are in keeping with the identification of these features as refuse pits. Hazel charcoal from (794) was radiocarbon dated to 1598 – 1432 cal BC (UBA-56013) but fills (984, 1016 and 1028) produced significantly earlier late Neolithic dates of 3342 – 3031 cal BC (UBA-56017), 3339 – 3012 cal BC (UBA-56018) and 3344 –3032 cal BC (UBA-56019) respectively.

Pit Group 8 (Table 3.15)

Pit Group 8 was the most northerly pit group and included pits/postholes (824, 828, 844, 846, 858 and 860). Although some features were identified as pits, they may be degraded postholes. Their fills (825, 829, 845, 847, 859 and 861) produced small amounts of mixed charcoal, with traces of hazel nutshell in fills (847 and 849). Although hazel and oak charcoal were the most common types present, the quantities involved are not enough to suggest the remains of structural components within these assemblages. Willow charcoal from (829) was radiocarbon dated to 3340 – 3032 cal BC (UBA-56014).

Pit Group 9 (Table 3.15)

Pit Group 9 included pits (1049, 1053, 1059, 1061, 1067, 1069, 1071 and 1073). Pits (1049, 1059 and 1067) contained fire-cracked stones and pits (1059 and 1069). The pits were identified on site as hearth or fire-pits. Their fills (1050, 1054, 1060, 1062, 1068, 1070, 1072 and 1074) generally produced one or more of hazel, oak and willow charcoal, with naked barley in fills (1060 and 1062). All fills produced hazel nutshell fragments with significant amounts present in fills (1060 and 1062). The carbonised assemblages from these pits are very similar to those from Pit Group 7, which were identified as the contents of refuse pits. Willow charcoal from fill (1050) and hazel charcoal from fill (1060) both produced late Neolithic radiocarbon dates of 3363 – 3102 cal BC (UBA-56020) and 3332 – 2930 cal BC (UBA-46021) respectively.

Pit Group 10 (Table 3.15)

Pit Group 10 was located to the south-west of Roundhouse 2 and east of Roundhouse 5. The 'pits' are thought to be the remains of postholes or stakeholes and included (899, 901, 905, 909 and 960). Their fills (900, 902, 906, 910 and 961) produced small amounts of mixed charcoal with one or more of alder, birch, hazel and oak recorded. A single barley grain was found in fill (906) and traces of hazel nutshell in (900, 902 and 910). As previously, this material is consistent with domestic hearth waste that has been scattered across the site. Hazel charcoal from (906) was radiocarbon dated 1258 – 1053 cal BC (UBA-56016).

Pit Group 11 (Table 3.16)

Pit Group 11 was situated to the south-east of Roundhouse 2 and included features (935, 937, 945, 966, 1103, 1114, 1122, 1130, 1134, 1140, 1158, 1160, 1162 and 1164). The majority of the fills contained mixed charcoal assemblages, with alder, birch, hazel, heather type, cherry type, oak, willow and elm all represented. Many of the fills also contain carbonised hazel nutshell and traces of cereal grain. Fill (1135) of pit (1134) produced more evidence for cereal grains including naked barley. Birch charcoal from fill (1104) of (1103) was radiocarbon dated to cal AD 774 – 953 (UBA-56023) but fill (1141) of (1140) produced a much earlier date of 1009 – 836 cal BC (UBA-56025).

Pit (945) and possible slot (966) differed from the other features in that their fills (946 and 947) produced significant amounts of Scot's pine type charcoal and no other charcoal types.

A large stone slab covered the remains of a cobble-constructed cist chamber (1121) that contained small fragments of burnt bone. The fills (1119 and 1126) produced small amounts of mixed charcoal, with alder, birch, hazel and oak all represented together with traces of naked barley, emmer wheat and hazel nutshell. It is possible that these carbonised assemblages are the remains of pyre fuel but it seems more likely that the represent the remains of scattered hearth waste that have become incorporated into the cist fill. A fragment of birch charcoal from fill (1126) produced a Mesolithic date of 7734 – 7579 cal BC (UBA-56024) suggesting that at least some much earlier charcoal has become incorporated into this fill.

The long span of time shown by the three radiocarbon dates from this pit group indicates that this is not a contemporaneous group of features and is, therefore, an artificial grouping.

Pit Group 12 (Table 3.17)

Pit Group 12 comprised a series of pits including (948, 1166, 1168, 1172 and 1176) and a curvilinear feature (954). The pits generally contained small amounts of mixed charcoal, with traces of barley and hazel nutshell, suggesting the presence of dumped or scattered domestic hearth waste. Birch charcoal from fill (1167) of pit (1166) was radiocarbon dated to 3969 – 3798 cal BC (UBA-56026). The curvilinear feature (954), fill (955), produced very large quantities of Scots pine type charcoal with small fragments of carbonised pine cones and hazel nutshell. If this material was structural then it would be difficult to explain the presence of the pine cones, unless it was a very rough fence line made of pine branches rather than cleaned posts.

Isolated pits (Table 3.17)

There were several isolated pit features in Area 3 including (504, 876 and 999). The fills (505, 877 and 1000) produced small amounts of mixed charcoal, with hazel nutshell in (877 and 1000). This is similar to the scattered domestic hearth waste seen elsewhere on site.

Area 4

Area 4 formed the northeast part of the site and contained the remains of four prehistoric roundhouses (Roundhouses 3-6), Pit groups 13 and 14, a post-Medieval ditch and several isolated pits and postholes.

Roundhouse 3 (Table 3.18)

Roundhouse 3 was the most northerly of the roundhouses and was defined by a ditch (1182) and a number postholes, stakeholes and pits. The fills (1200, 1204, 1206, 1212, 1214, 1216, 1218 and 1222) of postholes (1199, 1203, 1205, 1211, 1213, 1215, 1217 and 1221) all produced mixed charcoal assemblages with alder, birch, hazel, oak and willow all represented together with traces of barley in (1204 and 1218) and hazel nutshell in (1216, 1218 and 1222). These assemblages are consistent with domestic hearth waste. Alder charcoal from fill (1222) of pit (1221) was radiocarbon dated to 1190 — 931 cal BC (UBA-56027). The fill (1230) of posthole (1229) produced only oak charcoal and so may be the remains of an oak post burnt in situ although the quantity of charcoal recovered was not large.

Pits (1197 and 1227) may actually be degraded postholes. Their fills (1198 and 1228) produced small amounts of mixed charcoal with traces of barley in (1228), similar in nature to the posthole fills described above. The ditch (1182), fill (1183), produced small amounts of hazel and oak charcoal, but not enough to confirm the remains of structural material.

Burnt deposit (1184) lay to the north-west of Roundhouse 3 and was suggested in the DSR to be the remains of vegetation clearance. The charcoal assemblage comprised small amounts of birch and oak charcoal but not in sufficient quantities to suggest any significant vegetation burning occurred on site.

Roundhouse 4 (Table 3.19)

Roundhouse 4 was situated 5 m south-west of Roundhouse 3 and also comprised a surrounding ditch and a number of pits and postholes. The ditch (1249), fill (1250), produced only traces of birch and hazel charcoal.

A number of stone-packed postholes defined the roundhouse and included (1253, 1255, 1261, 1267, 1271, 1281, 1287, 1480 and 1482). Their fills (1254, 1256, 1262, 1268, 1272, 1282, 1288, 1481 and 1483) generally produced mixed charcoal assemblages, with alder, hazel, Scots pine type and cherry type all represented, together with traces of hazel nutshell. Interestingly, no oak was recorded from these posthole fills. Postholes (1281, 1287 and 1280) also produced carbonised cereal grain, including naked barley and a single grain of wheat in fill (1483) of posthole (1280). These carbonised assemblages are consistent with domestic hearth waste and fills (1282 and 1288) both date to the late Bronze Age with radiocarbon dates of 1009 – 837 cal BC (UBA-56028) and 1118 – 919 cal BC (UBA-56029) respectively. Only the fill (1254) of posthole (1253) produced a very different assemblage with large amounts of possibly alder charcoal, traces of hazel nutshell and a single possible pea seed. The charcoal was very poorly preserved and may have been subjected to intense heat as it was glassy in appearance.

The fills (1270, 1274, 1276, 1298, 1429, 1445, 1453 and 1332) of pits (1269, 1273, 1275, 1297, 1428, 1444, 1452 and 1331) also produced mixed charcoal assemblages with alder, birch, hazel, heather type, Scots pine type and oak all represented. Fills (1298 and 1429) also produced traces of hazel nutshell and fill (1274) produced carbonised barley grains, including the naked variety.

Roundhouse 5 (Table 3.20)

Roundhouse 5 was the most southerly of the roundhouses in Area 4 and again comprised a fragment of ditch, together with postholes and pits.

Ditch (1391), fill (1392), produced small amounts of birch, hazel and oak charcoal with a few carbonised cereal grains, including naked barley. Hazel charcoal from (1392) was radiocarbon dated to 1119 – 922 cal BC (UBA-56032). Stone-packed postholes (1387, 1389 and 1399, with fills (1388, 1390 and 1400) produced traces of alder, birch, hazel and cherry type charcoal with a single cereal grain in (1390). Posthole (1403) was isolated from the other postholes and was dug into the ditch. Its fill (1404) also produced traces of mixed alder, birch and hazel charcoal.

Two pits (1385 and 1395) were located amongst the postholes. Their fills (1386 and 1396) produced small amounts of mixed charcoal of alder, hazel, willow and hazel nutshell. Willow charcoal from fill (1386) was radiocarbon dated to 910 – 810 cal BC (UBA-56031).

Roundhouse 6 (Table 3.21)

Roundhouse 6 was situated between Roundhouse 4 and Roundhouse 5 and comprised a series of postholes and pits, but there was no evidence for an enclosure ditch. The stone-packed postholes included (1341, 1343, 1345, 1349 and 1363). Their fills (1342, 1344, 1346, 1350 and 1364) generally contained mixed charcoal assemblages with alder, birch, hazel, heather type, cherry type and oak, with occasional traces of hazel nutshell and a single grain of barley in (1364). Cherry type charcoal from (1342) was radiocarbon dated to 1441 – 1281 cal BC (UBA-56030). Fill (1350) of posthole (1349) produced more significant amounts of hazel charcoal with a trace of oak but is probably not enough to suggest the remains of structural material.

Pits (1353, 1359, 1365, 1367 and 1434) were thought to be structural in nature but poorly preserved. Their fills (1354, 1360, 1366, 1368 and 1435) contained mixed charcoal assemblages with alder, birch, hazel, cherry type, oak and willow represented together with traces of hazel nutshell in fills (1354 and 1360). These assemblages are consistent with domestic hearth waste.

Approximately 5 m to the south-east of the ring of postholes were two further pits (1436 and 1479). The fills (1437 and 1486) of pit (1436) produced a mixed charcoal assemblage, traces of hazel nutshell and a few cereal grains with barley and possibly oats represented. It is likely that the oats are the wild type considering that hazel charcoal from fill (1486) was radiocarbon dated to 1190 – 931 cal BC (UBA-56034). The fill (1466) of pit (1479) also produced small amounts of mixed charcoal and hazel nutshell.

Approximately 2 m to the north-west of the post-ring was a further pit (943) that was interpreted on site as a possible kiln. Its fill (892) produced only small amounts of birch, Scots pine type and willow charcoal, but the quantities involved do not suggest this feature was used as a kiln.

Pit Group 13 (Table 3.22)

Pit Group 13 contained four pits but only pits (1471 and 1475) were examined for the presence of carbonised remains. The fill (1472) of pit (1471) produced a mixed charcoal assemblage together with a few carbonised barley grains (including the naked variety) but the main find was a very large number of hazel nutshell fragments, suggesting that processing of hazel nuts was taking place nearby. Alder charcoal from (1472) was radiocarbon dated to 3322 – 2917 cal BC (UBA-56033). The fill (1476) of pit (1475) also produced mixed charcoal and naked barley but no carbonised hazel nutshell.

Ditch (1325) (Table 3.22)

Ditch (1325) was a large linear feature aligned NE/SW but no artefacts were recovered from the fill to give an idea of its date. Its fill (1326) produced traces of birch, heather type and oak charcoal with a barley grain and a possible grain of oats. This carbonised assemblage suggests domestic hearth waste but does not indicate a date for the feature.

Pit Group 14 (Table 3.22)

Only two pits were present in Pit Group 14 on the westernmost edge of Area 4. Only pit (884) was investigated for the presence of carbonised remains. The pit fill (894) produced a mixed charcoal assemblage of birch, hazel and willow, together with large amounts of hazel nutshell and willow charcoal was radiocarbon dated to 3337 – 3024 cal BC (UBA-56015).

Pits to the east of Roundhouses 3-6 (Table 3.22)

A number of isolated pits (1411, 1415 and 1419) were located to the east of the roundhouses in Area 4. Their fills (1412, 1416 and 1420) produced small amounts of mixed charcoal with nothing specific to suggest a date for these features.

Pits in close proximity to Roundhouse3-6 (Table 3.22)

A number of other pits were located in the immediate vicinity of the roundhouses although there is no indication that they were associated. Pit (1301), fill (1302), contained a mixed charcoal assemblage with hazel nutshell, suggesting domestic hearth waste. The fill (1306) of posthole (1305) Produced very significant amounts of hazel charcoal and nothing else. This may be the remains of burnt wattle. Pit (1454) was located to the north of pits (1301 and 1305) and produced only Scots pine type charcoal.

Discussion

Woodland and heathland resources

The contexts examined from Rosemarkie produced a diverse range of charcoal types, including alder, birch, hazel, broom/gorse, heather type, ash, Scots pine type, cherry type, oak, rose family, willow and elm. All of these types are native trees or shrubs that could have been sourced locally.

Hazel, willow and oak were common in many contexts, with a few specific contexts that had either significant amounts of alder or Scots pine present and nothing else. Hazel and/or willow charcoal were especially abundant in the fills associated with Pit Groups 1, 3 and 7 and may represent the remains of burnt wattle structures.

Oak charcoal was found as the sole or dominant charcoal type in several specific contexts on the site. Pit (040) and an area of burning (047) in Area 1 both produced significant amounts of oak charcoal, possibly suggesting burnt structural material. Postholes (580 and 688), associated with Roundhouse 1, both produced very significant quantities of oak charcoal, suggesting the burning of oak posts in situ. Possible evidence for the use of oak in a structural context was also recorded in (221 and 257) associated with Pit Group 3.

Kiln (676) in Area 2 produced only oak charcoal and no other charcoal types. This suggests that the kiln was fuelled using oak alone. Initially, the kiln was thought to be for grain drying but only trace amounts of cereals were recovered from this feature and it is more likely that this kiln had some kind of industrial use. Oak wood and charcoal have a higher calorific than most other European woods (Gale and Cutler 2000) and so can maintain the even, high temperatures that are required for metalworking or perhaps firing pottery.

Possible evidence for the presence of an in situ oak tree were located in deposit (1494), which was identified as the possible remnants of a tree root system and which produced only oak charcoal.

Large quantities of cf alder charcoal were identified from the fill (1254) of posthole (1253) associated with Roundhouse 4. Alder is not usually used as a building material as it is not very durable, and is not generally considered a good wood for burning when green. However, it does burn very well and with a high heat if it has been properly seasoned first. It is also one of the favoured wood types for making charcoal, which can then be burned to provide the higher heat often required by industrial processes (Gale and Cutler 2000). That might explain the glassy preservation of this charcoal which made confident identification impossible.

Large quantities of Scots pine charcoal (and little or nothing else) were found in posthole (456) of the palisade around Roundhouse 1, in pits (262 and 264) and posthole (372) of Pit Group 3, pit

(945) and slot (966) of Pit Group 11 and slot (954) of Pit Group 12. These examples suggest that Scots pine type may have been used in some structural capacity on the site. However, the fill (955) of slot (954) also produced fragments of burnt pine cones, which suggests that branches rather than cleaned posts of Scots pine might have been burned here.

Many contexts contained a diverse mix of charcoal types, which are thought to represent the remains of dumped domestic hearth waste of midden material. It may be that much of the site had a general background scatter of this type of hearth waste, which then became incorporated into the fills of many features.

Heather type charcoal was only noted in a few contexts and never in significant amounts. It might be expected that more use would have been made of heathland resources in this location but there is no evidence for this in the carbonised remains.

Cereal grain

A range of cereal types were recorded from Rosemarkie although naked barley was the commonest type recorded. Naked barley (Hordeum vulgare var nudum) is particularly prevalent in the Bronze Age and Neolithic in Scotland and often occurs with wheat (Bishop et al. 2009). Naked barley was found in significant amounts in pit (319) associated with Roundhouse 1, from pit (1134) in Pit Group 11 and from pits/postholes (1281 and 1273) from Roundhouse 4. Naked barley was also found with emmer wheat in kiln (402) and with emmer and bread wheat in posthole (1565) from Pit Group 5. Several of these features produced late Bronze Age radiocarbon dates.

The greatest concentrations of cereal grains were recovered from the grain drying kiln (402), fills (511 and 512), where almost 550 grains of barley were recorded, with around 70% of these further identifiable as the naked variety. In addition, 19 grains of emmer wheat were also identified. Birch, hazel, heather type, oak and willow charcoal were present in these fills, suggesting that there was no deliberate selection of wood types to fuel this drying kiln. There is no evidence for crop processing waste or weed seeds in these contexts, suggesting the crop had been fully processed prior to drying in the kiln. Naked barley from this kiln also produced a late Bronze Age date.

Emmer and bread wheat are recorded in Scotland from the Neolithic period onwards, although after the Neolithic period bread wheat is often more associated with higher status sites. In Scotland, emmer wheat is not commonly found in sites that date to later than the Iron Age.

Other food plants

Other than cereal grains, few other types of possible food plant remain were recorded from this site. Hazel nutshell was found at trace levels in many contexts, suggesting that hazel nuts were being eaten, probably throughout the occupation of the site. However, very large quantities of hazel nutshell fragments were found in posthole (303) from the palisade of Roundhouse 1, as well as many of the pit fills from Pit Group 7 and Pit Group 9, pit (1471) from Pit Group 13 and pit (884) from Pit Group 14. Large quantities of hazel nutshell are often associated with Mesolithic or Neolithic features, with this quantity of nutshell suggesting processing of hazelnuts that may have been stored for winter use. However, it is possible that this practice continued for much longer in areas where other foodstuffs were scarce in winter. Charcoal from Pit Groups 7, 9 and 13 produced early Neolithic radiocarbon dates.

The only other possible food plant recorded was a tentative identification of a pea seed, although this may well be from a wild species rather than a cultivated pea.

Animal Bone

By Catherine Smith

Introduction

Animal bones were recovered as small finds during excavations at Rosemarkie and as retent finds following post-excavation processing of soil samples from the site. Most of the animal bones originated from pits and postholes although a smaller quantity of fragments was also recovered from ditch deposits. The pits, postholes and ditches were considered to be prehistoric in date. A topsoil deposit containing finds dating from prehistoric to post-Medieval and the early modern period also contained two fragments of animal bone. Animal bone was separated from cremated human remains where possible.

As regards condition of the bones, the majority of the hand-excavated fragments recovered as small finds were unburnt, although calcined fragments were also present. However, those recovered as retents from processed soil samples were more often calcined (and not unsurprisingly of much smaller size than the small finds.) From a total of 20 contexts, 16 contained calcined bone.

In the accompanying Appendix 2, condition scores are attributed only to those fragments of larger size recovered as small finds. In this scheme, subjective scores are based on observations of general condition, degree of abrasion, density and friability. The condition scores for the Rosemarkie bones indicate although some show a degree of abrasion, their overall condition is reasonably fair.

Species present

Due to their small size and exposure of many of the fragments to high temperatures which has resulted in distortion of shape and cracking of the bones, diagnostic certainty is not possible in all cases and some broad taxonomic categories have been assigned to allow for this. It has not always been possible to differentiate between large ungulate (LU) (cattle/horse/large deer) and large mammal (LM) or between small ungulate (SU) sheep/goat/pig/small deer) and medium mammal (MM). Indeterminate mammal (IM) includes all other mammalian fragments.

There is however definite evidence for the presence of cattle, sheep/goat, horse, red deer (Cervus elaphus), Cetacean, amphibian and most significantly, bear (Ursus cf arctos). Pigs were also likely to have been present: a possible juvenile skull fragment was present in a pit deposit (1177), (sample 190). Fragments are listed in Appendix 2 and Table 3.23.

Species	Small finds no.	Retents no.*	Total
cattle	9	14	23
cf cattle	1		1
sheep/goat	2	1	3
cf pig		1	1
pig/sheep		1	1
horse	4		4
red deer		3	3
bear		1	1
Cetacean	1		1
LM/LU	1	1	2
LU	1	1	2
MM/SU		3	3
IM**	68	754	822
amphibian		1	1
cf amphibian		1	1
total	87	782	869

M - large mammal

LU - large ungulate

MM - medium mammal

SU - small ungulate

IM- indeterminate mammal

*retents: as might be expected the average size of these fragments is of the order of a few millimetres;

**number of indeterminate mammal (IM) fragments in retents has been estimated by rapid scanning

Table 3.23: Total number of mammal fragments by species.

It is not possible to determine the relative importance of the main domesticates based on such a small overall sample size. However although there were more cattle fragments than those of other species, perhaps only one or two animals were represented. Most of the cattle bones were unburnt and were retrieved from the fill of a posthole (1342). They consisted of fragments of mandible, cheek teeth (including both left and right lower third molars) as well as pieces of radius, tibia and calcaneum (SF 212 and sample 226). Notably, although the tooth wear

pattern and a fused distal radius indicates an adult animal was present, two unfused proximal tibia fragments, possibly from the same bone, might have come from a younger animal. However given that the tibia is a late-fusing element, all of the fragments could well have come from the same animal.

The posthole (1341) from which most of the cattle bone came also contained two bones of sheep/goat, two teeth and a fused distal tibia from an adult horse and numerous recently broken fragments of long bone shaft from indeterminate mammal (probably originating from the cattle and horse bones. A botanical sample (Prunoideae) from the posthole (1341) dated the deposit to 1441 –1281 cal BC (UBA-56030).

The only other possible cattle fragment was part of a proximal metapodial (SF 168) recovered from (1060). This fragment came from a fire-pit (1059) and was unsurprisingly calcined by heat. Radiocarbon dating of Corylus cf avellana charcoal from this pit provided a date within the middle Neolithic 3332 – 2930 cal BC (UBA-56021).

Horse remains were also recovered. The distal end of a horse metapodial (SF 42) recovered from plough soil (001) was sawn across the shaft and therefore most likely of fairly recent date, medieval at the earliest but possibly as late as the 19th century. However two equine teeth and distal tibia were recovered from a posthole (1341) in association with cattle, sheep/goat and indeterminate mammal bones and were therefore of much earlier date.

Red deer remains, consisting of fragments of unburnt metatarsal and naviculo-cuboid tarsal (sample 171), most probably articulating, were recovered from the fill of pit (1103/1104). In association with the somewhat abraded red deer bones was a well-preserved long bone splinter (SF 170). Measuring 50.3 mm in length, 9.8 mm in width and 4.2 mm in thickness, this fragment was broken at the wider end of the shaft tapering to a blunt point. No use-wear was easily observable on the narrowest pointed end but it may be interpreted as a bone needle or awl rather than a butchery offcut.

A fragment of Cetacean vertebral centrum, minus both central epiphyseal plates (SF 211), was recovered from a posthole (1363/1364) in Roundhouse 6. Measuring 96 by 105 mm in diameter, one epiphyseal surface of the vertebra was scored with multiple parallel tool marks, with another series at right angles. The opposite face of the vertebra is broken but displays at least four parallel chop marks. Whalebone vertebrae with such chop marks are often interpreted as chopping blocks. Following damage through repeated use in this way, the fragment may have been re-purposed as a post pad within the posthole (1363).

A calcined second phalanx (sample 062) from a bear, most probably brown bear, Ursus arctos, was recovered in retents from (512) (Figure 3.1). Although the phalanx seems small in comparison to unburnt examples (Kate Britton and Alicia Sanz-Royo pers comm.), the proximal epiphysis is fused and therefore comes from an animal which has passed the juvenile stage. However, as this is an intermediate fusing bone it cannot be determined whether it is from an immature animal or an adult. Its small size may in part be due to loss of mass caused by burning off of the bone's organic content due to the high temperature to which it has been exposed. Experimental heating of bones to 1000°C has been shown to result in the loss of 15% of bone size and 50% of the original weight (von den Driesch 1976, 3). Anatomical measurements following burning/calcination are therefore of limited comparative value (ibid.) but are provided here due to the relative rarity of the find: GL (greatest length) 23.9 mm, Bp (greatest depth of proximal end) 13.7 mm, Bd (greatest depth of distal end) 12.0 mm, Sd (smallest breadth of diaphysis) 10.0 mm, Dp (greatest depth of proximal end) 13.2 mm.

It should also be stated that in addition there is a degree of sexual dimorphism in bears, that is, males are generally much larger than females, and the relatively small size of the bone may be due to its sex as well as its heat-shrunken state.

Interpretation

This site, although providing evidence of bones of domestic mammals (cattle, sheep/goat, possibly pig and horse) was notable for the presence of a single calcined second phalanx

from a bear, probably brown bear, Ursus arctos. The whalebone vertebra, possibly used as a chopping block then re-used as a post pad is also of interest.

Research on brown bears by Kitchener and Britton (2024) has found a paucity of both palaeontological and archaeological evidence for the species in Scotland, probably due in part to adverse conditions of preservation. Bear fossils dating to the Late Pleistocene and Holocene periods are present in the famous bone caves of Allt nam Uamh of Sutherland as well as other adjacent cave systems (ibid.). Archaeological finds include a bear tooth from Keiss Broch, Caithness, possibly of Iron Age date, and a bear tooth with runic inscriptions of possible Norse date, although the latter may have been an older specimen, re-used (ibid).

All known instances of bear finds in Britain up to 1999 were listed by Yalden (1999, 112-116). The latest date quoted for an English bear is perhaps 13th to 14th century, as is a single Scottish example from Dunbar (Smith 2000, 236). These later medieval bears were possibly imported to Britain from continental Europe for the purposes of 'entertainment'.

The Rosemarkie bear bone was retrieved from the basal fill of a pit (402) later used as a kiln. The middle fill (511) of this pit was radiocarbon dated to 905 – 809 cal BC (UBA-56039), the late Bronze Age. Such a date indicates the Rosemarkie bear was likely to have been native to the area. It is probably significant that the lowest fill of this feature from which the bone came also contained a pitchstone side scraper (CAT 23) and a polished flint axehead (CAT 19) dated to the early Neolithic and Neolithic periods respectively (see Part 4: Lithic Assemblage) The feature was originally interpreted as a kiln pit and the bones found in its lower deposits were certainly affected by heat. It seems possible that the bear bone and lithics may have been deliberately selected for deposition within it, although the intention cannot be known. The relative rarity of bear remains in archaeological deposits, however, may suggest the action had some special significance.

Marine shell

By Laura Muser

Introduction and condition of material

The shell assemblage consisted of exclusively of soil sample retents. A total of four contexts produced 175.7 g of shell material prior to analysis. After analysis 163.1 g were identified as shell material. The majority of the shell was recovered from context (1104) fill of posthole (1084) in Roundhouse 2. The remaining 10 g were recovered from contexts (1288) fill of pit (1287) in Roundhouse 4, (1486) final fill of posthole (1436) in Roundhouse 6 and the post pipe fill (650) of posthole 580 of Roundhouse 1.

The assemblage is mostly made up of small fragments. Twelve intact shells were identified, consisting of elven periwinkle shells and one limpet shell.

Categorisation

The sample retents were inspected for marine shell material, followed by weight measurements and species identification where possible, as well as a quantification of a minimum number of individuals (MNI) present. Individual, intact shells were also examined to see whether they had been worked in any way.

For larger shell assemblages, an MNI value is usually either established via the count of a non-repetitive element (NRE) or by weighing the shell material (Allen 2017). For smaller assemblages, such as the one present here, neither method was entirely definitive. The MNI often used for bivalves, such as mussels, is the umbo, as each individual has a right and a left one (Bowlder 2013). Identification of the marine shell material was based on Fish and Fish 2011.

Results

Sample 171 from pit 1103/1104, the Pit Group 11 Roundhouse.

The dominant family of the shell material from this sample is mussel (Family Mytilidae). The mussel material recovered weights 56.6g in total (Table 3.24) and apart from very few exceptions,

the periostracum has degraded and is not present and only the prismatic and nacre layers survive. A total of 118 umbones were identified. After siding them there were 64 right umbones and 54 left umbones present. The MNI is 64 mussels present.

The majority of the mussel material appears to be from the common mussel (Mytilus edulis), with some horse mussel (Modiolus modiolus) individuals also present. A total of 14 likely horse mussel umbones were identified (6 left umbones, 8 right umbones), with an MNI of 8.

Six umbones of common mussel (Mytilus edulis) (3 left, 3 right) presented with a light grey colour, suggesting they were exposed to high heat or burning. They weighed 0.8 g in total.

	Species	Weight (g)	NMI	Comments
Sample 171				
Mussels	Mytillus edulis	56.6	64	
	Mytillus edulis	0.8	3	Burnt
	Mytillus edulis	5.8		Fragments
	Modiolus modiolus	?	8	
	Littorina littorea	35.5	11	
	Patella vulgate	10.1	6	
	Unidentified bivalve	39.8		Fragments some burnt
Gastropods	Gibbula cineraria	0.2	3	
	Littorina saxatilis	0.2	1	
	Buccinum undatum	0.1	1	
	Unidentified	2.8		Fragments
Sample 261	Unidentified	0.4		Fragments
Sample 217	Unidentified	0.5		Fragments
Sample 650	?	9.1?		
	Totals	152.8	97	
		175.7g in report		

Table 3.24: Marine Shell analysed.

The next most prevalent species identified is the edible periwinkle (Littorina littorea), making up 35.5 g of the shell material. In the case of the edible periwinkle, a gastropod, the apex was used as the NRE. Eleven apices were identified, representing an MNI of eleven.

The third species identified was the common limpet (Patella vulgate), making up 10.1 g of the shell material. Just like the periwinkle, the common limpet is a gastropod and a total of six aspices were identified, representing an MNI of six.

The remaining shell material consists of small bivalve fragments, weighing 46.8g. Of these fragments 5.8 g were identified to likely be from less degraded common mussel (Mytilus edulis), however, the other 41.0 g of small fragments cannot be further identified than the class of bivalve. Out of the small bivalve fragments 8.0 g show signs of heat exposure.

Only a small amount of the assemblage was gastropod shell material, weighing 3.2 g. Amongst the gastropods identified were grey top shell (Gibbula cineraria), three specimen weighing 0.2 g, one rough periwinkle (Littorina saxatilis), weighing 0.2 g and one small, partial common whelk (Buccinum undatum) weighing less than 0.1 g. Out of the gastropod shells, 2.8 g of fragments could not be further identified.

Sample 261 from Roundhouse 6, within a subcircular prehistoric pit

The shell material from this sample weighed 0.4 g and consisted of very small, fine fragments. While the fragments are too small to identify them definitively, some of the fragments are likely from a common limpet (Patella vulgate). Further distinctions cannot be made.

Sample 217 from Roundhouse 6, within oval shaped prehistoric pit

The shell material from this sample weighed 0.5 g and consisted of very small fragments most likely from an unidentified gastropod.

Sample 078 from within the post pipe of a prehistoric posthole (580)

The material from this sample weighed 0.1 g and upon analysis turned out to be stone and not shell material.

Discussion

The shell assemblage from sample 171 reflects the findings of the excavators, when they excavated pit (1103) in Pit Group PG11. There were two lenses of shell, one predominantly mussel and the other winkle (Williamson 2021). The interpretation of a refuse pit for food preparation waste is supported by the shell analysis.

The two lenses of shells were described in the initial report as comprising 'one of mussel and the other of winkle'. This difference in dominant species could be due to a seasonal preference for harvesting each of the different shells.

Mussels are still a very common species in north-west Europe. They can be found on rocky shores, where they attach themselves to rocks, but can also be found in softer sediments, such as sands (Fish and Fish 2011, 255). They are very resilient and can survive in very low salinity, which makes them very well adapted for estuaries, such as the Firth of Moray, where Rosemarkie is located. Mussels spawn and grow mostly in spring and summer during warmer seasons, which could have been a reason to harvest more periwinkles at that time of year and focus on mussels as a food source during the colder months.

Similarly to mussels, periwinkles are still common and live in very similar environments, such as rocky shores, mud-flats, and estuaries. In its life-cycle the larvae settle around June and July and reach adulthood at around two to three years old (Fish and Fish 2011, 216). Periwinkle can be harvested all year around.

Mussel and periwinkle served as common food sources through time. It is likely that, apart from the limpet, the smaller species identified, such as the grey top shell, were a byproduct of the collection of other species or even seaweed.

The heat exposed pale grey shell mixed with unburnt shell further supports that this was a refuse pit for food preparation debris. The lack of charcoal in the pit fill further supports this interpretation.

The shell material retained from samples 217 and 261 are too small to aid in any further interpretation of the features they were found in.

Cremated Human Bone

By Amanda Gilmore

Introduction

The focus of this report is the analysis of burnt human bone from across the site and from the disturbed Bronze Age burial cist located within Pit Group 11 to the south-east of Roundhouse 2. Varying amounts of burnt bone were also recovered from Pit Groups 1-13, and Roundhouses 1-6, from pits, postholes fire-pits and floor surfaces identified as likely used for cooking or for refuse. As such, it is most likely that the unidentified bone from these samples is animal in origin (see Part 3: Animal Bone). Any possible human bone identified in the features other than the cist may suggest ritualised depositions, which were not uncommon in Bronze Age Scottish populations (Brück 2006), or a difference of interpretation and identification. Due to the poor preservation of the burnt bone, it is possible that animal and human bone may be misidentified.

Methodology

The burnt bone was passed through three stacked sieves with meshes of 9 mm, 4.75 mm and 2 mm. All the bone over 9 mm and 4.75 mm was sorted into either specific or main skeletal elements where preservation allowed, then catalogued and weighed. The bone material less than 4.75 mm was visually inspected for any diagnostic skeletal elements and catalogued. The bone fragments were then weighed, and the largest fragments were measured to identify the maximum fragment size. Some fragments that could not be identified as specific or main skeletal elements were recorded as unidentified. The bone from the <2 mm fraction was scanned and any diagnostic fragments recorded. Identifiable animal bone was removed from the samples.

The bone was recorded in accordance with the British Association of Biological Anthropologists and Osteoarchaeologists/Chartered Institute for Archaeologists standards for human bone analysis (Brickley and McKinlay 2004) and Historic Environment Scotland framework for the treatment of Human Remains in Archaeology (1997).

Preservation

The process of cremation involves dehydration and oxidation of the organic components of the body, leaving only the mineral component of bone in fully oxidised state. In combustion of bone the mineral reaction results in shrinking, distortion and fracturing of the bone (McKinley 2013).

The bone in the assemblage from Rosemarkie was assessed for preservation based on the following criteria: the surface appearance of the bone and the size of fractions in each sample taken from the cremation deposits. Factors that may affect the preservation of each sample include the nature of the original cremation ritual, including the collection and burial after burning; post-depositional processes including weathering, for example freeze and thaw cycles and water disturbance that may result in changes to the surface appearance and fragmentation of the bone.

Overall, the preservation of the burnt bone in samples retained from Rosemarkie displayed a significant amount of surface erosion and taphonomic breakage, rendering most of the burnt bone unidentifiable.

Determination of Species

Determination of species can be more difficult when assessing cremated remains. The cremation process warps, shrinks, fragments, and changes the colour of bone which all challenge identification. Size, morphology, density, as well as surface colour and texture can determine the species the bone belongs to, but these are all obscured and altered by the cremation process. However, animal bone retains a greater ratio of cortical to trabecular bone which can remain observable after burning (Spence 1968).

Minimum number of individuals

The minimum number of individuals (MNI) was calculated by identifying any repeated skeletal elements from the same side (left/right) or different age categories, where possible.

From the possible human remains identified from the dismantled cist, one individual of undetermined age and sex was identified, while in Pit Group 5 within the fill of posthole (500) the remains of a possible sub-adult were identified based on their skull size (Table 3.25).

Location	Description	Determination	Weight (g)
Pit Group 11 Cist (1157)	Individual 1	Indeterminate	3 g
Pit Group 5 (501)	Individual 2	Sub-adult?	0.2 g
	MNI total 2		

Table 3.25: Minimum number of individuals.

From the other deposits, possible human remains were identified in a further eighteen contexts. These remains were mostly unidentifiable by left or right skeletal element, age at death, or biological sex, aside from possible sub-adult remains in Pit Group 5 (501). However, the possibility of one individual being 'divided' up and interred at multiple sites (Brück 2006) and the high possibility of misidentification of human and animal remains due to their poor preservation suggests that the minimum number of individuals cannot be accurately measured, and the one individual recorded from within the cist, combined with the possible sub-adult in Pit Group 5 (501) is most likely the best representation of humans interred at Rosemarkie.

Age at death

Methods for determining age at death for cremated human remains are largely the same as those utilised in the analysis of inhumations. For sub-adult remains, dental eruption and the stage of epiphyseal fusion are the most widely used methods. For adult remains, the pubic symphyses, sternal rib ends, and degenerative changes in the auricular surface are the most widely used. Cranial suture closure has, in the past, been used as a method for ageing adult remains but is no longer considered to be accurate (Bass 1971; Brooks and Suchey 1990; Buikstra and Ubelaker 1994; Meindl et al. 1985; Scheuer and Black 2016).

Because the cremation process can alter the size and shape of bone, the utilisation of narrow age group categories (based on Buikstra and Ubelaker 1994) is not useful in this analysis. Instead, a simplified system of categorisation into sub-adult (below the age of 18 years at death) and adult

(above the age of 18 years at death) was deemed the most appropriate.

Only one possible sub-adult was identified in Pit Group 5, sample 57 context (501). This was inferred by the thickness of the cranial table. All other remains, if indeed human, appeared to be from adult individuals or are of indeterminate age.

Biological sex determination

Determination of biological sex of human remains is based on pelvic and cranial morphology, as well as post cranial metrics (White and Folkens 2005). None of the possibly human burnt bone remains from Rosemarkie were well enough preserved to allow for biological sex determination.

Non-metric traits

Non-metric traits are traits which are simply recorded as being absent or present. They may be genetic or linked to environment, occupation, or lifestyle. Their presence or absence can be utilised to identify and compare different genetic groups. The presence/absence of non-metric traits, much like the markers for age at death identification and biological sex determination, may be altered or obscured by the process of cremation and the level of preservation. Presence or absence of non-metric traits was not observable in the assemblage of bone retained from Rosemarkie.

Pathology

It is possible to identify the presence of disease and trauma on cremated remains, although initial identification and differential diagnosis can be made difficult due to the cremation process and preservation of the fragmented remains. Pathology and evidence of trauma can suggest possible causes of death either as primary or secondary causes. Pathologies and trauma to bone should only be considered in the context of the osteological paradox, and not be stated as definite causes. Also considered are variation in disease, mortality, and population that affect skeletal remains (Wood et al. 1992). However, no pathologies or evidence of trauma were observable during analysis of the samples retained from Rosemarkie.

Details of the cremation process as mortuary practice

The process of cremation includes a wide span of temperatures in which the burning of the dead takes place. This can be categorised into grades (Oestigaard 2013):

Grade 0: Unburnt. The bones have been exposed to fire, but at a temperature not exceeding 200°C and can appear brown or orange in colouration.

Grade 1: Sooting. The bones are slightly and imperfectly cremated due to a lack of oxygen, at a temperature barely exceeding 400°C and can appear black, blue, or grey in colour.

Grade 2: Slight burning. Bones appear clearly burnt, having reached a maximum temperature of 800°C, and appear pale white in colour.

Grade 3: Moderate burning. Bones appear in similar condition to those described in Grade 2 but may be even paler in colour after reaching a temperature of up to 1100°C.

Grade 4: Hard burning. Bones are almost completely white in colour and may have a chalky consistency after being exposed to maximum temperature of 1300°C.

The majority of burnt bone from Rosemarkie was observed to be white-grey or beige in colour, with surface erosion and transverse cracking, indicating a range of Grades 0-2, or <200°C to <800°C; with transverse cracking indicating the bone was burnt while flesh remained on the bone. Where burnt remains appeared eroded but with evidence of cracking in a mosaic-like pattern, this indicates that it was burnt after it had been either de-fleshed or left to decompose to skeletonization. This fits in with the theory that many of the pits were cooking fires or hearths, spot fires, or refuse pits.

The most likely sample of human remains identified in the dismantled cist appeared mostly white, blue, and grey in colour, with mild transverse cracking. This suggests a burning Grade of 1-2, or 400-800°C, with the flesh removed from the bone. There was an amount of unidentified cortical bone in the cist sample as having mosaic-pattern cracking, indicating the

removal of the flesh before burning; however, this was not able to be positively identified as human.

Discussion

A total of 293.5 g of burnt bone was recovered from Pit Groups 1-13, 213.6 g from Roundhouses 1-6, and 1.1 g from unspecified features. This included 3 g of probable human bone from the cist in Pit Group 11, and the remaining majority amount of bone recovered is classed as unidentifiable.

The cist excavated in Pit Group 11 was the most likely interment site for any positively identified human remains at Rosemarkie. The probable human remains in the cist, found alongside prehistoric pottery sherds and a flint core, is a common example of a Bronze Age cremation burial and mirrors others recorded in the area (Fraser 2014), in spite of the intrusive organic radiocarbon date with a Mesolithic range of 7734 – 7579 cal BC (UBA-56024). The fill of posthole (500) in Pit Group 5 where a single individual, a possible sub-adult, but of undetermined age and sex returned a radiocarbon date range of 899 – 803 cal BC (UBA-56010). The context of this human bone suggests that it was intrusive, and was probably accidentally incorporated into the material infilling the posthole.

The majority of the bone, however, was gathered from prehistoric pits, postholes, and floor surfaces across the wider site (with highest concentrations from Pit Group 11, 173.3 g; and Roundhouse 6, 162.8 g).

The presence of possible human remains in these other, less obvious burial features could possibly be attributed to disturbance of earlier burials during domestic or construction activities. Although ritualised division and interment of cremated human remains as a funerary rite, is not uncommon among Bronze Age populations (Brück 2006). When this possibility is considered the idea of division of the cremated dead as a funerary rite seems entirely plausible in the context of Rosemarkie. However, it cannot be discounted that the distribution of human bone at Rosemarkie is accidental.

Conclusion

The burnt bone analysed from Rosemarkie reveals a complex story of its burial and distribution. The presence of the cist and possible evidence for the division of cremated remains as a funerary rite suggests Rosemarkie was the site of a population with similarities to other communities in the area for the time period (see Fraser 2014).

PART 4: Exploitation, Procurement and use of Resources

The lithic assemblage

By Torben Bjarke Ballin

Introduction

The Greenside Farm investigation produced a small lithic assemblage. The purpose of this analysis is to characterize it in detail, with special reference to raw-materials, typological composition and technology. From this characterization, it is sought to date and interpret the finds to the degree this is possible. The evaluation of the lithic material is based upon a detailed catalogue of all the lithic finds from Rosemarkie. The artefacts are referred to by their catalogue (CAT) number.

The assemblage

General overview

During the archaeological investigations at Rosemarkie, 179 lithic artefacts were recovered (Table 4.1). In total, 94% of the artefact assemblage is debitage, 2% is cores, and 4% is tools.

The lithic typology applied in the present report follows Ballin (2021). The abbreviation 'GD' is used for 'greatest dimension'.

Raw material – types, sources and condition

As shown in Table 4.2, the assemblage is dominated by flint (71%) and quartz (26%), supplemented by small amounts of pitchstone, jet and other raw materials.

Most of the flint is fine-grained, orange-brown material or light-coloured corticated material (*sensu* Shepherd 1972), most likely of local origin, that is, collected along the North Sea shores. The scale-flaked knife (CAT 179), serrated blade (CAT 28) and retouched piece (CAT 31), for example, are all orange-brown, whereas polished flake (CAT 19) that was detached from a polished flint axehead is white and corticated. Two pieces belong to the category popularly referred to as black flint (see example in Figure 4.1), and this material has exceptionally fine flaking properties. Although there is some flint of this sort in the general Yorkshire area (Ballin 2011b), it is more common in south-east England and could have been procured from the mines at Grimes Graves in Norfolk (Saville 1981) or from Suffolk where black flint was mined in more recent times for gunflints (Brandon; Ballin 2012). In Scotland, this type is associated with Late Neolithic Grooved Ware assemblages (e.g., Overhowden in the Borders. Ballin 2011b; Guardbridge in Fife, Ballin 2025; Ballin forthcoming d; Midmill in Aberdeenshire, Ballin forthcoming b).

Figure 4.1: Scale-flaked knife in black flint from GUARD Archaeology's excavations at Guardbridge, Fife (Ballin 2025).

Type	Flint	Quartz	Pitch-stone	Jet	Sand-stone	Amphi-bolite	Total
Debitage							
Chips	94	25	1				120
Flakes	21	18		1		1	41
Blades	1	1					2
Microblades	4						4
Total debitage	120	44	1	1		1	167
Cores							
Pebbles	1						1
Irregular cores		1					1
Bipolar cores	1						1
Total cores	2	1					3
Tools							
Side-scrapers		1	1				2
Scale-flaked knives	1						1
Serrated pieces	1						1
Pieces w dorsal polish	1						1
Pieces w edge-retouch	2						2
Pounders		1					1
Pecked stones					1		1
Total tools	5	2	1		1		9
TOTAL	127	47	2	1	1	1	179

Table 4.1: General artefact list.

Type	Number	Percent
Flint	127	70.7
Quartz	47	26.4
Pitchstone	2	1.1
Jet	1	0.6
Sandstone	1	0.6
Amphibolite	1	0.6
TOTAL	179	100

Table 4.2: Raw material composition.

The quartz varies between massive white milky quartz and white saccharoidal (grainy) quartz. Both forms have abraded cortex, and they were probably procured from local beach walls (Ballin 2008).

Two pieces of Arran pitchstone were recovered: chip CAT 159 and side-scraper CAT 23. The former is in black, aphyric pitchstone, probably from Corriegills in eastern Arran, whereas the latter is in heavily porphyritic pitchstone (see examples in Figure 4.2), probably from sources in northern Arran (Ballin 2009; Ballin and Faithfull 2009). CAT 23 is discoloured (light-green) and fire-crazed, and it has disintegrated into three refitting fragments. Most pitchstone from central, southern and eastern Scotland is black and aphyric (mostly dating to the early Neolithic), whereas there are higher proportions of porphyritic pitchstone in western Scotland (mostly post-dating the early Neolithic; see for example the assemblage from Blackpark Plantation on Bute (Ballin et al. 2009), all the way up to Orkney (e.g. Barnhouse; Ballin 2013b). Considering the near-absence of porphyritic flint in southern, central and eastern Scotland, in conjunction with the fact that Rum bloodstone reached the Black Isle during early prehistory (Tarradale; Ballin forthcoming a), it is most likely that the porphyritic pitchstone reached the present site via a route through the Great Glen.

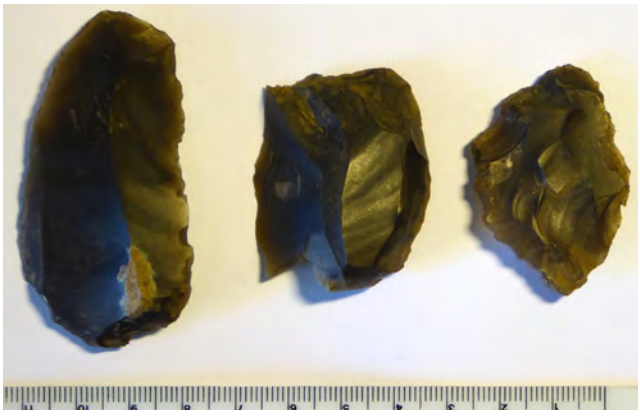

Figure 4.2: Porphyritic pitchstone from Blackpark Plantation, Bute (Ballin et al. 2009).

CAT 38 is a small abraded flake of a material belonging to the jet family. The jet family includes jet proper, cannel coal, lignite and oil shale (Watts sand Pollard 1998). Jet proper occurs on the beaches at Whitby in Yorkshire, whereas other raw materials of the jet family could be procured from a number of sources, including locations in Scotland. Oil shale, for example has in the past been mined from outcrops in the Lothian counties (Cameron and Stephenson 1985, 62), whereas cannel coal has been obtained from sources at Brora in Sutherland (Shepherd 1985, 204).

Sandstone and amphibolite may have been collected in the form of erratic nodules around the site, *mainly for the production of larger stone tools.*

Debitage

In total, 167 pieces of debitage were recovered from the site, mostly in the form of small chips (120 pieces), supplemented by some flakes (41 pieces). Only two broad blades and four microblades were retrieved. The assemblage is too numerically small and scattered across a very large area to allow the definition of any prehistoric industries. However, it is worth mentioning that flint flake (CAT 10) and edge-retouched flint flake (CAT 13) both have finely faceted platform remnants, defining them as blanks from middle or late Neolithic Levallois-like cores. The latter is in black flint narrowing the date down to the late Neolithic period.

Cores

Only three cores were recovered at Rosemarkie: one raw flint pebble (CAT 7), one irregular quartz core (CAT 27) and one bipolar core of black flint (CAT 30).

The flint pebble (CAT 7; GD = 39 mm) may represent collected and stored raw material. The irregular quartz core (CAT 27; GD = 77 mm) was reduced from multiple directions, and all flakes were detached by strikes to a cortical platform. CAT 30 is a bipolar core in exotic black flint, measuring 31 by 17 by 12 mm. As shown in Figure 4.3 (the first piece is a large blade-scraper), the black flint imported into Scotland during the late Neolithic period was used, among other things, for the production of impressively large blades, but this raw material was clearly considered so precious that it would be attempted to exhaust the nodules completely, with the worn-out blade-cores then being used up completely by hammer-and-anvil technique. The assemblage from Guardbridge I Ballin forthcoming d) also included a bipolar core in black flint. CAT 30 is also burnt.

Tools

As shown in Table 4.1, nine lithic tools were recovered from Rosemarkie, which were two side-scrapers, one scale-flaked knife, one broad blade with serration, one piece with dorsal polish, two pieces with edge-retouch, one flake struck off a pounder and one flake with a pecked surface. These pieces form a very heterogeneous group, representing flake and blade technology as well as different forms of modification (edge-retouch polish and pecking).

The two *side-scrapers* include one piece in pitchstone (CAT 23) and one in quartz (CAT 32). The former is, unusually, based on notably porphyritic pitchstone, and it is burnt and discoloured (light-green). Due to the burning, it disintegrated into three refitting fragments. It has coarse retouch along the right lateral side and some blunting retouch at the proximal and distal ends, and it measures 43 by 33 by 11 mm. The latter is a large quartz flake with coarse retouch along its right lateral side. The distal end is missing, and it measures 63 by 59 by 19 mm.

CAT 179 is a small *scale-flaked knife* on a hard-hammer flake, and it has a cutting-edge along its left lateral side. It measures 23 by 17 by 5 mm (Figure 4.3).

CAT 28 is the medial-distal segment of a long, regular broad blade with fine *serration* along both lateral sides (c. 10 teeth per cm). It is in local orange-brown flint (Figure 4.3). The piece measures 44 by 13 by 4 mm and it displays notable *gloss* at the centre of its right lateral side, ventral face. Use-wear analysis by Randy Donahue, University of Bradford showed that four scale-flaked knives with *gloss* from sites near the Overhowden Henge, Scottish Borders (Ballin 2011b, 24) had been used for cutting cereal or grasses/reeds.

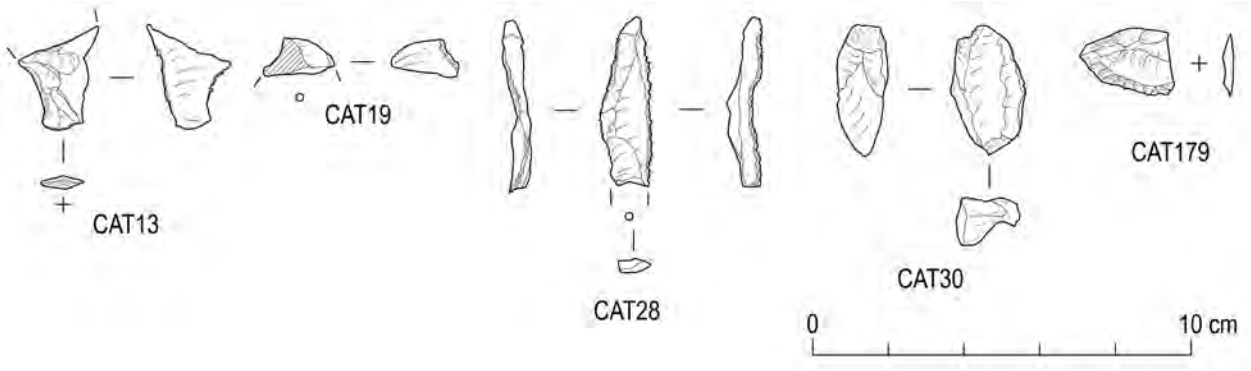

Figure 4.3: CAT 13 a retouched piece based on a Levallois-like flake, CAT19 small flint flake with dorsal polish, CAT 28 a broad blade with fine serration, CAT 30 a bipolar core and CAT 179 a scale flaked knife.

CAT 19 is the distal fragment of a small flint flake (GD = 17 mm) with *dorsal polish*, and it probably represents the scavenging and recycling of the flint from a Neolithic polish axehead (Figure 4.3). It also has a short stretch of retouch along the left lateral side, dorsal face. For a discussion of how broken polished axeheads were recycled, see Ballin (2013a).

Two *flakes of flint with edge-retouch* were also discovered at Rosemarkie. CAT 31 (GD = 30 mm) is based on a Levallois-like flake of black flint, and the type of flint, in conjunction with the applied reduction technique, makes it almost certain that this piece dates to the late Neolithic (Ballin 2011a; 2011b). CAT 31 (GD = 21 mm) is just a plain hard-hammer flake in orange-brown local flint.

CAT 6 is a robust quartz flake (68 by 43 by 28 mm) struck off a *pounder* (cf. Ballin 2018). It has an abraded cortical dorsal surface, and at the proximal end it has a pecked area which is clearly demarcated against the original cortical surface by obvious facets. CAT 8 is a large sandstone flake (72 by 74 by 17 mm) with pecking across its abraded dorsal face, and it may have been used as an anvil in connection with bipolar reduction.

Distribution

Table 4.3 shows the distribution of lithic finds across the various roundhouses and pit groups. As no sub-assemblage includes more than 27 pieces (mostly diminutive chips), it has not been possible to define any distinct (that is, diagnostic) industries or reduction techniques/operational schemas.

The interesting, and to some degree diagnostic, elements were distributed as follows:

1) From Area 1, pit (233), a small scale-flaked knife (CAT 179) was recovered. The pit was located in the north-western corner of the enclosed area. According to the context information, this feature may be a tree throw that was dated between 3513 – 3347 cal BC (UBA-56005), the middle Neolithic.

2) A side-scraper in porphyritic pitchstone (CAT 23) was recovered from a posthole (513) in Roundhouse 1. The deliberate deposition of pitchstone in the postholes of significant structures is not uncommon (see for example the deposition of pitchstone at the early Neolithic timber hall at Doon Hill, East Lothian; Ballin forthcoming c). A flake from a polished flint axehead (CAT 19) was also recovered from Roundhouse 1, kiln (402), immediately outside the enclosure. Polished flint is quite rare in Scottish lithic assemblages, and it is possible that this represents a *pars pro toto* deposition (Henriksen 1998). It is possible that this is not a kiln but a pit for ritual deposition, which is supported by the fact that burnt bone was also recovered from the feature. This feature was not radiocarbon dated.

3) A small chip in aphyric pitchstone (CAT 159) was found in ditch (1182) of Roundhouse 3. The feature probably represents the drip gully of the building. It is uncertain whether this tiny piece was deposited deliberately or ended up in the feature with the back-fill. This feature was not radiocarbon dated.

4) From Pit Group 3, a Levallois-like flake (CAT 10) and a retouched piece based on a Levallois-like flake (CAT 13, Figure 4.3) were retrieved. The former was found in pit (258), and the latter in floor deposit (257). CAT 13 is based on exotic black flint. The floor deposit was dated to the middle Neolithic 3339 – 3029 cal BC (UBA-56006).

5) From Pit Group 11, a bipolar core in exotic black flint (CAT 30) was recovered, as well as one regular blade with fine double-sided serration (CAT 28). The former was found in cist (1121) and the latter in pit (935). The former feature may be a cremation, including, in addition to the black flint core, burnt bone and pottery. Although it is suggested that pit (935) may be a fire-pit, the combination of a well-executed, well-used curated flint tool, burnt bone and pottery suggests that this feature may represent a deliberate deposition of a non-domestic nature. The sample from the cist was dated to the late Mesolithic 7734-7579 cal BC (UBA-56024).

The post-Mesolithic pounder fragment (CAT 6) is an uncontexted piece from the topsoil. Jet flake CAT 38 is also uncontexted from Trench 12.

	Area 1	RH 1	RH 3	RH 4	RH 6	PG 1	PG 3	PG 5	PG 6	PG 7	PG 8	PG 9	PG 10	PG 11	PG 12	PG 13	US	Total		
Debitage																				
Chips	7	12	3	4	4	20	3	2		22		12	1	21	8	1		120		Chip in pitchstone
Flakes	6	7			2	3	9	1		4	1	1	1				6	41		Levall flake
Blades		1					1											2		
Microblades									1	1		1					1	4		
Total debitage	13	20	3	4	6	23	13	3	1	27	1	14	2	21	8	1	7	167		
Cores																				
Pebbles																	1	1		
Irregular cores									1									1		
Bipolar cores														1				1		Bip core in black flint
Total cores									1					1			1	3		
Tools																				
Side-scrapers		1			1													2		Pitchstone side-scraper
Scale-flaked knives	1																	1		
Serrated pieces														1				1		Serrated blade
Pieces w dorsal polish		1																1		Flake from polished axehead
Pieces w edge-retouch				1			1											2		Retouched Levall flake in black flint
Pounders																	1	1		
Pecked stones																	1	1		
Total tools		2		1	1	1	1							1			2	9		
TOTAL	14	22	3	5	7	23	14	3	2	27	1	14	2	23	8	1	10	179		
		Later Neo?					LN							LN						

Table 4.3: Distribution of lithic artefacts across the site. The location of special pieces is highlighted.

Dating

The assemblage includes a number of diagnostic elements, relating to raw material preferences, technology as well as typology.

Raw materials

A number of raw materials are diagnostic such as the black flint and the various forms of pitchstone. Jet flake (CAT 38) is definitely post-Mesolithic, but this piece is uncontexted and of little value to the interpretation of the site.

Two pieces of black flint were recovered: bipolar core (CAT 30) and retouched flake (CAT 13). This form of flint is definitely exotic and may have been imported either from Yorkshire or East Anglia. In Scotland, pieces in first-class black flint tend to be associated with late Neolithic Grooved Ware assemblages. This date is also supported by the fact that (CAT 13) is based on a Levallois-like flake blank.

In Scotland off Arran, pitchstone almost certainly dates to post-Mesolithic times. Pitchstone from early Neolithic contexts – and from southern, central and eastern Scotland in general – tends to be aphyric, whereas in western Scotland pitchstone post-dating the early Neolithic may occasionally be porphyritic. The date of aphyric chip (CAT 159) is uncertain (other than that it is likely to post-date the Mesolithic period), but porphyritic side-scraper (CAT 23) is almost certainly late.

Technology

Three approaches to the treatment of lithic materials are diagnostic, namely the Levallois-like technique, the polishing of flint and the use of scale-flaking (invasive retouch). The Levallois-like technique (Ballin 2011a) leaves distinct finely faceted platform remnants, and in Scotland this approach was used during the middle and late Neolithic periods. As mentioned above, at Rosemarkie finely faceted platform remnants were identified on two pieces: flake (CAT 10) and retouched piece (CAT 13). As the latter is based on black flint, this piece is almost certainly of late Neolithic date.

The polishing of flint was used during the Scottish Neolithic period (Ballin 2021), partly to produce the sharp edges of some knives, but also, and primarily, to polish some axeheads entirely or partially (the edge). Polished flake (CAT 19) is undoubtedly from a cannibalised/recycled axehead, but it is not possible to determine which Neolithic period it dates to. The small flint knife (CAT 179) had been provided with a sharp cutting-edge by scale-flaking, which is an approach only used during the Scottish Neolithic and early Bronze Age periods.

Typology

A number of diagnostic tool types were recovered at the location, such as the scale-flaked knife (CAT 279), a serrated flint blade (CAT 28), the flake from a polished flint axehead (CAT 19) and a flake from a quartz pounder (Ballin 2021). All these types are datable to the post-Mesolithic period, but it is not possible to specify which period. Although serrated pieces may on rare occasions be found on Mesolithic sites, they are more common on post-Mesolithic sites. The fact that (CAT 28) is on a broad blade and has *gloss* makes it almost certain that it is post-Mesolithic and pre-Bronze Age. The polished piece can only be dated to the Neolithic period, as in Britain the polishing of flint is a post-Mesolithic and pre-Bronze Age technique. In Britain, scale-flaking (CAT 179; see above) was only used during the Neolithic and early Bronze Age periods. It is uncertain exactly what pounders were used for, but they do not occur in pre-Neolithic assemblages.

Radiocarbon dates

Relevant radiocarbon-dates are listed in the distribution section above. Scale-flaked knife (CAT 179) was radiocarbon-dated to the middle Neolithic, as was retouched Levallois-like flake (CAT 13). Bipolar core (CAT 30) in exotic black flint was recovered from cist (1121), which was radiocarbon-dated to the late Mesolithic. However, in Scotland black exotic flint is generally associated with the middle Neolithic – late Neolithic continuum, and as it was associated with burnt bone and pottery (indicating that this may be a cremation), the radiocarbon-date probably represents residual charcoal which entered a middle Neolithic/late Neolithic feature with the back-fill.

Discussion

Due to the small numerical size of the lithic assemblage, it is not possible to determine exactly how many lithic industries are represented in the Rosemarkie assemblage. Some diagnostic pieces indicate a generally Neolithic date (aphyric pitchstone, polished flint, finely serrated broad blade, pounder); some indicate a later middle to late Neolithic date (porphyritic pitchstone, Levallois-like technique); one piece (the scale-flaked knife) indicates a Neolithic date and some indicate a middle/late Neolithic date (black flint). It is possible that several industries are represented in the assemblage, but all diagnostic elements could be covered by a middle/late Neolithic date. Two lithics are associated with middle Neolithic radiocarbon-dates, whereas one likely middle to late Neolithic piece is associated with residual late Mesolithic charcoal.

The near-absence of evidence for primary production (few chips, two technologically unsophisticated cores) means that it cannot be determined whether tool blanks were produced at the site. The finely serrated regular broad blade suggests that regular fluted cores should have been present, and the fact that two pieces/blanks had finely faceted platform-remnants indicates that Levallois-like cores should also have been present. It is possible that primary production took places immediately outside the project area.

However, the relatively broad-spectred, although numerically small, tool assemblage indicates that several tasks were carried out at or around Rosemarkie. The scrapers may have been used to process skin or hides; the finely serrated blade with gloss is probably a sickle used for the harvesting of cereals or grasses/reeds; the scale-flaked knife could have been used for butchering or harvesting cereals or grasses/reeds; and the pounder may have been used for the processing of vegetable matter (a pestle) or possibly to peck hard material (roughening-up a quern working surface).

Worked and unworked stone

By Beverley Ballin Smith

Introduction and methodology

A total of 142 stones were collected from the excavation as artefacts for further analysis. Many of these were large in size, but were often unworked (95 stones). The total number of worked stones is 47. They came from across the excavated area and from pit groups as well as roundhouses.

Before examination most of the stones were brushed or washed. Where possible they have been examined to identify their lithology, weighed, measured, photographed and examined in detail for tooling or wear marks, and their attributes and statistics were compiled in an archiveable database devised using Microsoft Excel. Unworked pieces have been separated from the worked stone and have beeen discarded. The assemblage was analysed according CIfAs *Standards and Guidance for the collection, documentation, conservation and research of archaeological materials* (2014, revised 2020).

The raw material origins

Lying along the Great Glen Fault, the geology of the Fortrose and Rosemarkie area is complex and the origin of the raw materials used by the prehistoric inhabitants of the excavated area is not easily determined. Resources utilised by peoples living at Rosemarkie in the past will have included the Moray Firth where loose rocks were dumped at the coast from the effects of ice sheet movement from higher inland areas, and by the movement of stones by water action down the River Ness and also the Rosemarkie Burn to the coast. The origins stones moved by ice and water will have affected the range of different material types available for tool use. Locally available lithologies include sandstones (Alves Sandstone and Raddery Sandstone), metamorphic rocks of gneiss, psammite, amphibolite and horneblend

schist (Rosemarkie Metamorphic Complex), and granite to the north-west along the Rosemarkie Burn. Not all these rock types were exploited, but quartz, quartzite, schist, mica schist, sandstone and dolerite were preferred lithologies people procured and used. The rounded forms of many of these pieces suggest they were not only scoured by ice but by the sea as sea-worn boulders and cobbles would have been picked up along the nearby coastline. Most of the stones were brought to the site as appropriate pieces or suitably-sized rocks that were not available within the sands and gravels of the glaciolacustrine deposits forming the subsoil or superficial deposits into which the archaeological features were dug (BGS Geology Viewer 2025). The only quarried pieces were sandstones, used for architectural pieces and a millstone, which have a more recent history.

The most popular rock types collected for use as both worked and unworked stones were mica-schist, quartzite and sandstone in that order. Mica schist tends to be a soft, flaky rock in many examples in this assemblage, where both use and post-deposition weathering have affected the viability of the stone. Harder examples are also present, but the use of the stone is an interesting one and it is discussed further below. Cobbles were used for smaller tools during later prehistory as they were naturally smooth, fitted well in the hand, and depending on the stone's lithology, could be used for a variety of purposes. They were expendable and easy to replace if there was an ample raw material supply close by. Table 4.4 displays the types of lithologies used for tools and the numbers of tools of that type.

Results of the analysis

Prehistoric tools

Pounders and a pestle

These nine hand-sized stones were all cobbles that were used for light hammering or pecking. The smallest weighs 360 g and the largest 3432 g (see Appendix 3: *Worked Stone Catalogue*). They are all made on heavy dense lithologies such as quartz, quartzite and dolerite. The areas of wear on the stones are identified at one or both ends, with SF 83 and SF 239 indicating wear also down one or more sides of the tool. Four of the tools (SFs 161, 209, 241 and 278) show facetted wear, where the tool has been used persistently from one angle before being turned and the same end used again from a different angle. SF 76 is clearly a pestle as it has a distinct area of pecking at one end, and has slight faceting though being ground smooth at the other. Some of the tools such as SF 9 and SF 216 were only slightly used and the wear on the stones is discrete. SF 239, one of the largest and heaviest of the tools may have been used as a hammerstone prior to being reused as a pounder. There are areas of flaking scars indicating more violent use of the stone initially.

Pounders were the commonest of the cobble tools at this particular site and they were found in the pits and postholes of Pit Group 7 as well as Roundhouse 1 and its palisade, Roundhouse 5 and Roundhouse 6 (Table 4.5). They were tools that could have been used for a variety of purposes such as cracking or crushing the kernels of seeds and grain on a quern before they were ground into flour, or opening the hard shells of

Artefct types	Dolerite	Quartz	Quartzite	Quartz/ quartzite	Quartzite/ schist	Mica Schist	Schist	Sandstone	Slate	Nr.
Roofing slate									2	2
Architectural pieces								2		2
Pounders	2	2	3	2						9
Pounders/ hammerstones			2							2
Hammerstones			1			3		1		5
Polishers							2	1		3
Whetstones							1	1		2
Anvils								2		2
Quern rubbers			2		1	9				12
Saddle querns			2		1	3		1		7
Rotary quern								1		1
Total	2	2	10	2	2	14	3	9	1	47

Table 4.4: Artefact lithology.

hazel nuts and roughening surfaces of querns and quern rubbers. It is equally possible that they were used to pound mineral or rock temper to a smaller size before it was added to the clay mix for pottery manufacture. Pounders could have been also used as mallets in woodworking.

Pounder/hammerstones

Three stones, two of quartz/quartzite and one of ferruginous sandstone, had dual functions of a pounder and a hammer but they have a slightly lower average weight than the pounders, at c. 282 g. SF 80 is most typical with one end use for pounding and the other was more intensely used through hammering. SF 81 and SF 243b are elongated cobbles with combined wear at either end: the former was pounded and flaked though hammering at one end with scarring from hammering at the other; the latter had only slight wear at either end and down one side.

Each of these stone was discarded into the fills of postholes either in Roundhouse 1 or its palisade or in Roundhouse 6.

Hammerstones

Three mica schist cobbles and one of quartzite were identified as hammerstones. Their individual weights were about 900 g suggesting that denser heavier stones were chosen for hammers, even if the cobble size was little different from the tools already described. They are identified through their flaking scars, usually at one end only, but SF 177 was slightly damaged at both ends. The removal of flakes was caused by severe percussion on another hard stone. SF 123 was a damaged stone but its surviving end suggested it had been used in two directions as a hammer. The mica schist cobbles present, are an unusual but probably expedient choice, easily used and then discarded.

SF 77 and SF 79 were located in postholes in Roundhouse 1, SF 123 in a posthole of Pit Group 6, but SF 177 was associated with the remains of a cist chamber in Pit Group 11. Although speculative, it could have been used in the chamber construction.

Polishers

Only two cobbles polishers, one of schist and one of schist/sandstone, were found (a further similar stone with polish is described under Anvils, below). The weight of the stones varies between 116 g and 604 g, suggesting these were generally lighter stones than the hand tools already described. These are flatter, rounded cobbles but with exceptionally smooth surfaces, normally marked by a darker patch of wear on one or more surfaces, as SF 182, or in the case of SF 64, towards one tip. The latter also has a discrete area of pecking around part of its circumference.

It is probable that they were used on soft organic materials such as leather or skins, possibly even wood, to smooth surfaces and make skins or leather more pliable. Both these tools were found in postholes associated with Pit Group 11 and Roundhouse 1.

Structure	Roofing slate	Architectural pieces	Pounders	Pounders/ hammer-stones	Hammer-stones	Polishers	Whet-stones	Anvils	Quern rubbers	Saddle querns	Rotary quern	Totals
Unstratified (u/s)	2	1	1							2		6
Evaluation		1							2			3
Culvert			1							1	1	3
PG 6					1			1	1			3
PG 7			1						1			2
PG 11					1	1			2	1		5
RH1/palisade/ external			2	2	2	1	1		1			9
RH2								1		1		2
RH4									2	1		3
RH5			2			1			2	1		6
RH6			2	1			1		1			5
Total	2	2	9	3	4	3	2	2	12	7	1	47

PG = Pit Group RH = Roundhouse

Table 4.5: Location of worked stone by structure.

Whetstones

From the excavation only two examples of whetstone were recovered, SF 73 in red sandstone and SF 210 in schist. Both were elongated cobbles although SF 75 had broken across its shaft. The latter was smoothed on one side and half of one surface, while SF 210 has one surface darkened with wear but it was little used. Both stones were probably used for the whetting or sharpening of metal blades.

Anvils

Two sandstone boulders and a large cobble of schist are considered to have been used as anvil stones. Both boulders are in excess of 7 kg in weight and the cobble weighs c. 2 kg. SF 190 is an elongated and flattened boulder with a slight pecked indentation on its upper surface. SF 130 is an irregularly shaped block from a boulder but with a significant round, pecked hollow in its flat upper surface. It is likely that the stone was used particularly and repeatedly in the one place to form the rough-surfaced hollow. SF 130 is the best example of an anvil from the excavated area.

Cobble SF 236 has the most wear from multiple uses but is the least convincing anvil of the three. The stone has recent damage but was flaked at one end, a large area of one surface has been flattened and smoothed by polishing or from its use as a whetstone, and a discrete area of pecked hollowing on one surface indicates it has also been used as an anvil.

Although the anvils from this site were probably not used for metal working, they may have been used for splitting cobbles or other stones, such as flints, to provide pieces with sharp-edges. SF 130 was significantly worn to indicate it was in regular use, and given its weight was probably in a fixed position in a building. However, it was found in a posthole in Pit Group 6 and the other two stones came from a pit in Roundhouse 2 and a posthole in Roundhouse 5 (Table 4.5).

Quern rubbers

The twelve quern rubbers discovered within the excavated area indicate the availability of raw material sources in the form of rounded and flattened boulders. The majority (9) were of mica schist, with the remainder (3) being of quartzite and quartzite/schist (Table 4.4).

The quern rubbers were mostly split boulders, and were in the region of 190 mm to 320 mm in length, 140 mm to 245 mm in width but no greater than 95 mm in depth. On average they weighed c. 4.76 kg. They were used on saddle querns as the upper stones to grind grain into flour. The dimensions of individual stones would have been tailored to fit specific saddle querns but with a length and width that could accommodate two hands placed on their (largely smooth) upper surface. This allowed one person to push the stone and then pull it back on the grain on the grinding surface of the quern when in use. Another important aspect of the quern rubber was their lateral ends and the sides of the stone were usually rounded and their working surfaces fitted with the profile of the worked surface of the quern. Most of the querns (see below) had a concave worked surface and this would be matched by the convex worked surface of the quern rubber. Only one stone, SF 202, has a slightly concave worked surface.

Both the working surfaces of the quern and its quern rubber were 'refreshed' or roughened, most likely by pecking the surface with a pounder. Many of the quern rubbers display evidence of use, for example, SF 15, SF 183 and SF 277 have very worn and smooth worked surfaces. Others, such as SF 248 had a smooth worked surface but areas of re-pecking also survived. This was also the case with SF 118, SF 127, SF 151 and SF 243a, which had very smooth edges to the worked surfaces but the middle part of them had been refreshed. SF 202 had a well-defined edge to the worn areas of its surface and SF 203 was similar but with a distinct facet on one edge of the worked area. The two stones were found in the same building, Roundhouse 4, and could have been possibly used on the same quern to create this distinct wear pattern. SF 245 appeared to have been roughened prior to being discarded and most of the quern rubbers were reused as stone packing in postholes in Pit Groups 6, 7 and 11 as well as in Roundhouse 1, Roundhouse 5 and Roundhouse 6. Two others were found in pits in Pit Group 11 and Roundhouse 6 (Table 4.5).

The use of mica schist for quern rubbers in the production of flour is intriguing as querns or mill stones of this material are commonly found on archaeological excavations from prehistory and into the Middle Ages or later periods (see Ballin

Smith 2023c). In general, mica schist attains a hardness of 4 to 6 on the Mohs scale, (sandstone is 6-7 and quartzite is harder at 7), but its structure can breakdown with flakes of mica dislodging or breaking away due to its schistose structure. Prehistoric preference for this material may have been due to the availability of the raw material in places where harder stones were more difficult to work. Varieties of it were relatively easy to shape, tool or split, and although a relatively hard stone, it may have worn well for a significant time. The problem of this material is the amount of flaked mica that was likely to have been ground with the grain into flour, and the problems this would have cause in eating and digesting it.

Saddle querns

A total of seven saddle querns were identified. Most of the examples that were recovered were fragments. These stones were predominantly of mica schist, with one stone of micaceous sandstone and another of micaceous quartzite. SF 200, a large block of quartzite weighing over 78 kg is also fragmentary as it split through its length. It was reused as packing in a posthole in Roundhouse 4.

SF 174 is a fine example of a complete saddle quern, although unstratified. It is a large boulder of quartzite/schist that weighs over 94 kg and measures 745 mm by 430 mm by 240 mm. The stone shows evidence of tooling down one side and at both (narrowed) ends and along both top side edges. Its base is domed and the worked surface is well-used and concave. Its wear through the use of a quern rubber is off-centre and is very pronounced, with evidence of refreshing by pounding in places. The quern also has a pronounced lip along the edge of one side on its worked surface (see SF 202 and 203 above in Quern Rubbers).

SF 179 is a heavily worn and concave fragment of mica schist that broke across the middle of the stone, where it had almost worn through because of extended use. It was discarded and reused as packing in a posthole (1115) in Pit Group 11. SF 189, also of mica schist, has a steep concave worked surface. The quern broke close to an inclusion in the stone and was also reused in a posthole (1095) in Roundhouse 2. Other quern fragments were found in deposits in Pit Group 5, Roundhouse 5 and in a modern culvert.

Later pieces

Architectural pieces

Two architectural pieces (SF 5 and SF 20) were found in a recent ditch and in a post-medieval culvert respectively. Both are of blonde sandstone and both have been tooled. SF 5 is probably part of a small column and SF 20 is most likely a large fragment of coping stone to a boundary wall. The latter is finely tooled all over. Both are post-medieval or later in date.

Rotary quern

SF 19B is the only evidence of a rotary quern from the excavated area, and it is probably late-medieval or early post-medieval in date. It is made from sandstone and was also found in the culvert. It is the upper stone from a rotary set that broke through its central eye and both ends of stone are damaged. Its edges are roughly tooled and the eye has also been formed by pecking. The piece has two surviving rectangular rind slots on the worked surface that measure 60-85 mm by 50 mm by 20 mm. They are positioned at slightly oblique angles and the bottoms of the slots are not smooth. The worked surface of the stone is tooled along one edge and end where there are clear refreshing tool marks. Otherwise the working surface is very smooth and slightly concave. The upper surface of the stone is slightly domed and has been tooled to shape it. In this surface is a 43 mm deep rectangular slot 30 by 35 mm, positioned within 40 mm of the eye. This is probably one slot of probably three that would have secured a grain hopper above the eye, and as the stone turned the vibration would shake the hopper to release grain into the eye and down to the bed stone.

Slate

Two fragments of a garnet schist roof slate were found in a modern ditch.

Unworked stone

Unusually, there was a significant number (95) of small and large stones that were collected from features on the site that were unworked. Half the pieces were found in pits and the other half as packing in postholes (Table 4.6). These were predominantly mica schist followed by sandstone and then quartzite. Many of these are boulders:

Table 4.6: Unworked stone location and type.

Structure	Pit/PH	Dolerite	Quartzite/ schist	Schist	Mica Schist	Sandstone	Sandstone/ quartzite	Slate	Quartzite	Quartz/ quartzite	Quartz	Granite	Unknown	Totals
Unstratified					2	3		1	1					7
Culvert					1									1
Other feature				1	7	1			1					10
PG1	Pit					2								2
PG4	Pit			1										1
PG5	Pit				2	1			1					4
PG5	PH				2		1							3
PG6	PIt								1					1
PG6	PH	1		1	3	4	1							10
PG7	Pit		1					1					1	3
PG8	PH								1					1
PG10	PH		1			1								2
PG11	Pit				1									1
PG11	PH				1									1
PG14	Pit					1						1		2
NW of RH1	Pit	1			2									3
NW of RH1	PH						1		1					2
RH1 palisade	PH	1							1			1		3
RH1	PH			1	1	2								4
RH2	PH		1			3			3					7
RH3	PH			1	2	1			1		1	1		7
RH4	Pit				1	1								2
RH4	PH			1	2	2			1					6
RH5	Pit					2					3			5
RH5	Deposit					1								1
RH6	Pit			1	1				1					3
RH6	PH				1				1					2
RH6	Deposit	1												1
Total		4	3	7	29	25	3	2	14	0	4	3	1	95

the heaviest at 54 kg and certainly all the larger stone would have been resourced from nearby beaches and transported to the site. All these were intentionally brought to the settlement, with a significant number used for construction purposes.

Discussion, distribution and dating

For a predominantly late Bronze Age site, a total of 47 stone artefacts can be considered a high number as stone tools from Bronze Age sites are generally sparse. The location of all the worked stone from Rosemarkie is displayed in Table 4.5. The majority of stones were found as reused pieces in postholes, the remainder were located in pits (6), deposits (2), a cist (1) and in unstratified or modern features (10). It can be argued that none of them were in-situ except perhaps the six that were found in pits, and even that is doubtful as there is uncertainty about the function of those features.

What is clear is that due to the sandy subsoil it was necessary to secure and support the roof-bearing posts of the roundhouses, and most of the worked stones that were found in postholes must have already been discarded as worn-out before they were reused as packing stones. Many of these stones were therefore either earlier in date or contemporary with the structures they were found in, such as those in Roundhouse 1 and its surroundings, Roundhouses 2, 4, 5 and 6 and Pit Group 11. Table 4.7 lists the worked stones from pits with radiocarbon dates – all Bronze Age, with the majority being late Bronze Age in date. It is clear that stone was an important resource and one where worn-out pieces could have been curated or stock-piled for later reuse. Apart from cobble tools, no personal objects such as spindle whorls or items of jewellery were found on the excavated area. The majority of cobble tools came from the pit groups and Roundhouse 1 with its palisade. Like pottery, worn out or damage small hand tools, pounders, hammer-stones, polishers and whetstones, were found close to the palisade where they were discarded. Saddle querns and quern rubbers (Table 4.5) were well distributed across the site, many more surviving than are seen at other contemporary settlement sites.

Comparison can be made with the stone assemblages from recently excavated sites with contemporary or slightly later occupation, such as the extensive settlement site at Guardbridge in Fife (Ballin Smith 2025c) with 40 worked stones, Northbar on the River Clyde by Erskine (Ballin Smith forthcoming b) with a total of 19 worked stones, and Carnoustie, Angus (Ballin Smith 2025a) with a total of 17. Guardbridge produced a number of spindle whorls and hammerstones, but some of them came from structures of late Bronze Age and early Iron Age date. A total of nine cobble tools, most polishers came from a workshop phase of Carnoustie roundhouse Structure 5, which was probably intimately linked to the burial of a late Bronze Age metalwork hoard behind the building (ibid). However, a workshop or workshop area associated with Roundhouse 1 at Rosemarkie has not been clearly defined, despite stone tools and other evidence, but it hints at similar activities to those at the roundhouses at Carnoustie, and during a similar time frame.

It would appear that the necessary use of stone for construction purposes at Rosemarkie has preserved hand tools and larger worked stones, such as quern rubbers, which would have been discarded at other sites and lost from the archaeological record. But due to the movement of worked stones to other areas out of necessity for construction purposes, has meant that the understanding of possible areas of activity, such as grinding grain, within roundhouses has been lost.

SF	Type	Context	Structure	Radiocarbon date at 2 sigma	Lab code	Period
118	Quern rubber	794 fill of pit 793	PG7	1598 – 1432 cal BC	UBA-56013	E-MBA
241	Pounder	1486 top fill in pit 1436	RH6	1190 – 931 cal BC	UBA-56034	M-LBA
189	Saddle quern	1085 fill of pit 1084	RH2	1047 – 906 cal BC	UBA-56022	LBA
200	Saddle quern	1282 top fill in pit 1281	RH4	1009 – 837 cal BC	UBA-56028	LBA
182	Polisher	1141 fill of pit 1140	PG11	1009 – 836 cal BC	UBA-56025	LBA
183	Quern rubber	1141 fill of pit 1140	PG11	1009 – 836 cal BC	UBA-56025	LBA

Table 4.7: Stone artefacts associated with radiocarbon dates.

The Prehistoric Pottery

By Beverley Ballin Smith

Introduction

From the excavations at Rosemarkie, near Fortrose on the Black Isle, an assemblage of hand-made coarse pottery was recovered. It is predominantly middle Neolithic and middle to later Bronze Age in terms of date, with one example each of an early Neolithic vessel and an early Bronze Age Food Vessel present. The vessels, predominantly domestic in function, were found in features of some of the pit groups and roundhouses, and in some cases, in areas to the west of the roundhouses.

The assemblage was cleaned before analysis and all sherds were examined according to the revised guidelines of the Prehistoric Ceramics Research Group (2010), the CIfA's *Standards and Guidance for the collection, documentation, conservation and research of archaeological materials* (2014, revised 2020).

Analysis of the pieces

The analysis of the sherds is discussed as a single collection, by period of manufacture, and then by its distribution. The total collection amounts to 853 sherds, excluding small fragments less than 10 by 10 mm. Most sherds were recovered and bagged during the excavation but a small number of sherds and fragments were retrieved from soil samples that were subsequently processed.

As expected, 84.9% of the sherds are body sherds, 11.4% are rims and only 2.7% are base sherds, with the evidence indicating the preponderance of round-bottomed (early) vessels, or the lack of survival of flat-based (later) vessels. Other diagnostic sherds, in addition to rims and base sherds include a small number (1%) of carinations, which are characteristic of some pottery types in both the Neolithic as well as the Bronze Age. In this assemblage carinations aide the identification of vessel types rather than the period. Table 4.8 displays the total number of sherds from each location and the range of sherds recovered.

The total weight of the assemblages is almost 8.5 kg (Table 4.9), with average sherd weights across the excavated area varying between 8.7 g to 14.1 g. In general, the number of pieces compared to the average sherd weight can give some idea of fragmentation, but in this assemblage the pattern is not clear because of the complex sherd distribution. Sherds from the Neolithic have been found in features of the later Bronze Age roundhouses in particular, and also sherds from Bronze Age periods were distributed across several of the pit groups suggesting that some of them are possibly surviving elements of earlier roundhouses. From the pottery analysis the excavated area appears to be a palimpsest of activities from the early Neolithic, the middle Neolithic and throughout the early to later Bronze Age.

Post-depositional changes

There was an accumulation of iron pan deposits especially on sherds from features in Pit Groups 3, 5 and 11, which all contain Bronze Age pottery, and also the Roundhouse1/palisade area which is mixed Bronze Age with middle Neolithic pottery. Whether this is a sign of wetter conditions during the Bronze Age or micro-geological conditions affecting the fills of postholes and pits in certain areas of the site is not known. Sherds from other features appear well-preserved, apart from the ablation and abrasion caused by a sandy subsoil and topsoil.

Manufacture of the pottery

Raw materials

Materials necessary for pottery production would have been found in the immediate or near vicinity to the settlements in the excavated area. Clay and sand are likely to have been found along waterways, such as the Rosemarkie Burn that is located north of the site and exits into Rosemarkie Bay, and clay also in the Devensian-Diamicton (boulder clay) till to the north-west of the site. The raised marine deltaic deposits beneath the present day Rosemarkie, also from the Devensian period, would have provided sand and gravel deposits that could have been used by the prehistoric potters (see BGS Geology Viewer 2025).

Location	Rims	Carinations	Bases	Bodies	Fragments	Total Nr
Evaluation and topsoil	4		2	18	*	24
PG1	1			7	*	8
PG3	39	9	2	170	*	220
PG5	1			10	*	11
PG7	6		6	48	*	60
PG9				15	*	15
PG11	1			60	*	60
PG12	2			2	*	2
PG13	2		2	20	*	24
PG14				29	*	29
NW of Palisade/ RH1/ SW of RH1	19		1	98	*	118
RH1	7			23	*	30
RH2	3			11	*	14
RH4	1			32	*	33
RH5	1			5		6
RH6	12		10	177	*	199
Totals	99	9	23	725		853
Percentages	11.4%	1.0%	2.7%	84.9%	100%	

** = present*

Table 4.8: Sherd form numbers by location.

Location	Total sherd nos	Total weight (g)	Average sherd weight (g)	Average wall thickness (mm)	Period
Evaluation and topsoil	24	900.4	37.5	11.9	EN/EBA
PG1	8	29.4	3.7	8.8	?
PG3	220	374.2	1.7	8.7	BA
PG5	11	115.3	10.5	12.1	? BA
PG7	60	1306.2	21.8	14.1	MN
PG9	15	45.3	3.0	n/m	n/m
PG11	60	659.1	11.0	13.9	?BA
PG12	2	39.5	19.8	11.9	?
PG13	24	419.49	17.5	10.6	MN/LBA
PG14	29	320.4	11.0	13.7	N
NW of Palisade/ RH1/ SW of RH1	118	1490.2	12.6	10.3	MN/ but mainly BA
RH1	30	276	9.2	9.1	MN/BA
RH2	14	154.2	11.0	13.2	EBA?
RH4	33	876	26.5	11.9	BA/LBA
RH5	6	54.3	9.1	12	BA
RH6	199	1416.9	7.1	10.9	LBA
Totals	853	8476.89			

n/m = not measured

Table 4.9: Sherd weights by location.

One of the first ingredients added to the clay to make it more pliable and more easily worked was that of organic materials such as finely chopped dried grasses or straw/hay, for which there is abundant evidence throughout the assemblage. However, there is an apparent distinction between the preparation of the clays between the two main periods. During the Neolithic considerably more organic material was added to the clay, than during the Bronze Age. When fired the organic material in the Neolithic pots would burn away to leave noticeable small cavities or vesicles on their surfaces, which are described as having a corky appearance (Figure 4.4). Bronze Age potters either reduced the amount of organic material needed or found better clay sources.

Figure 4.4: Middle Neolithic sherd SF 154. Its cory (vesicular) appearance is due to the burning away of organic temper added to the clay.

Analysis of the sherds indicates that stone and mineral temper was added to the clay and that these minerals reflect the complex geology of the local area. One of the main ingredients was predominantly fragments of crushed rock quartz, which were found in most but not all the pottery. Grey stones were also a popular addition, but it was not possible to identify what they were more precisely in most cases. However, they did include slate, schist and psammite and were found in over half the assemblage. Other minerals included mica flecks (most likely a natural component of the local clay), and rare fragments of sandstone and possibly dolerite. This eclectic mix of minerals was used generally throughout the assemblage, suggesting the same or similar gravel or rock sources were used in the Neolithic and also in the Bronze Age. Mineral additives were necessary for strengthening the clay, and to prevent it from shrinking and cracking prior to firing.

The size of the mineral fragments added to the clay varies from medium, coarse to very coarse across all periods. This is slightly unusual as earlier vessels have a tendency to have finer stone temper, with later (Bronze Age) vessels having much coarser fragments. This indication might be a reflection of the harder, metamorphic rock resources that may not have been easy to crush or grind down. Although in general, the size of the temper reflects the size and thickness of vessels: large heavy vessels will have coarser mineral temper and thinner better made vessels will have finer temper. It might also reflect the function of pots. Stone temper, especially quartz, was a useful additive to the clay of vessels which were intended to be used on the hearth or over the fire as they were better able to withstand thermal shock during heating and cooling (Kilikouglou *et al.* 1998).

Forming the vessels

Neolithic vessels were probably made using the thumb-pot method of opening up a ball of clay with the thumb to make a small open-mouthed and rounded form. In order to increase the size of the intended vessel, coils of clay were added around the perimeter of the opening to add height and to make the desired shape. An extra coil of clay could have been added on the outside of the form to make a carination, or carinations could be pinched out from an existing coil. From there, further coils would have been attached to make the neck of the vessel, and finally the rim. During vessel building, the potter would have needed to support the rounded bottom of the vessel in soft earth or sand. After, or even during construction the coils would have been made secure by smoothing the clay on the outer and inner surfaces in order to bond them together. However, the moulding lines of individual coils on vessel V39 can clearly be seen. Once the clay was dry, the finishing of the vessel required the final

smoothing of surfaces by polishing or burnishing, and if applicable it was decorated. The final process would be the firing of the vessel. In this assemblage the finishing of some vessels was poor as finger moulding marks were commonly not removed, and the exterior surface of V41 may have been left deliberately rough, to aid handling and lifting the vessel. Only sherds of one flat base (V45) were found in the assemblage in spite of the number of Bronze Age vessels present.

Most vessels and especially those from the early part of the Bronze Age were well-made and evenly fired at sufficiently high temperatures, with very few sherds suggesting otherwise. Changes noted in sherds are largely due to the post-deposition environment rather than firing mishaps. A catalogue of the identified vessels appears as Appendix 4.

The vessels

Early Neolithic vessels

The assemblage produced a thick-walled round-bottomed, plain vessel (V1), which is tentatively identified as early Neolithic in date. It was found in the fill of an isolated pit (1000/999) to the north-east of the excavated area and had been truncated by a haul road. Two large conjoined sherds that broke along a coil join are from the lower part of the vessel (Figure 4.5), with two additional smaller sherds. The sherds were badly cracked and spalled due to exposure to fire, some were also corky.

A sherd, V27, located on the very edge of the Roundhouse 1 palisade could be part of a second early Neolithic vessel, a modified carinated bowl c. 250 mm in diameter (Figure 4.5). It is a well-made piece, with a slightly flattened profile to its rounded rim that broke way above the carination. The pot has a good external finish produced by smoothing and carries an hour-glass perforation drilled from the vessel exterior to the interior, its size reducing from 11 mm to 2.5 mm. It is likely that this vessel is from later in the period.

Middle Neolithic vessels

A total of fourteen vessels V9-17, V19-V21, V29 and V30 are identified as Impressed Ware bowls from the Middle Neolithic with rounded or slightly flattened bases. The majority are associated with pits in Pit Group 7, but with other single examples from Pit Groups 13 and 14 and Roundhouse 1, and two were recovered from a pit north-west of the palisade associated with Roundhouse 1. In the first instance these vessels are recognised by their distinctive decorated and bevelled rims – the bevel is on the interior of V12, V13, V14, V17, V29 and V30, but on the exterior of V9 and V16 (Figure 4.5). Other characteristics include some with decorated exteriors, and where it survives, a carination below the neck of the vessel. Although some of these characteristics are shared with early Bronze Age pottery, notably Food Vessels, none of these middle Neolithic vessels are associated with burials.

These robust vessels were built with predominantly coarse mineral temper and in the case of V16 the mineral temper was extremely large. They all had liberal organic temper added to the clay and all are noted to have surfaces that are corky (see above). Although their wall thicknesses range from c. 8 mm, the majority fall between 11 mm and a maximum of 16 mm. The rims of V16, V17 and V19 were measured to be c. 210 mm to c. 240 mm in diameter. Vessel 10 was a much smaller pot and its estimated belly diameter was c. 120 mm.

Whereas most of these vessels are identified by their decorated rims, V17 also had conjoined body sherds which indicated the rounded but tapering shape of the pot (Figure 4.5). In spite of heavy abrasion this vessel is interesting from its all-over, almost random incised decoration. The rim bevel carries slightly oblique random rows of incised stab marks, possibly made by a sharpened stick. The decoration on the neck to the shallow carination is incised partly in an angular arrangement of marks and the same tool on the body has made inverted / \s. The extreme corky exterior surface has somewhat masked the design.

V15 is a broad bevelled rim to the exterior, where the linear incisions on it are elongated slashes 20-25 mm in length (Figure 4.5). The surviving body sherds suggest the exterior of the pot was plain. V9 rim has short parallel incisions arranged in an opposing open \ / design on its top (Figure 4.5). V12 and V14 both carry rim designs of two parallel rows of fingernail incisions, the former being a narrow rim bevel and the latter a broad

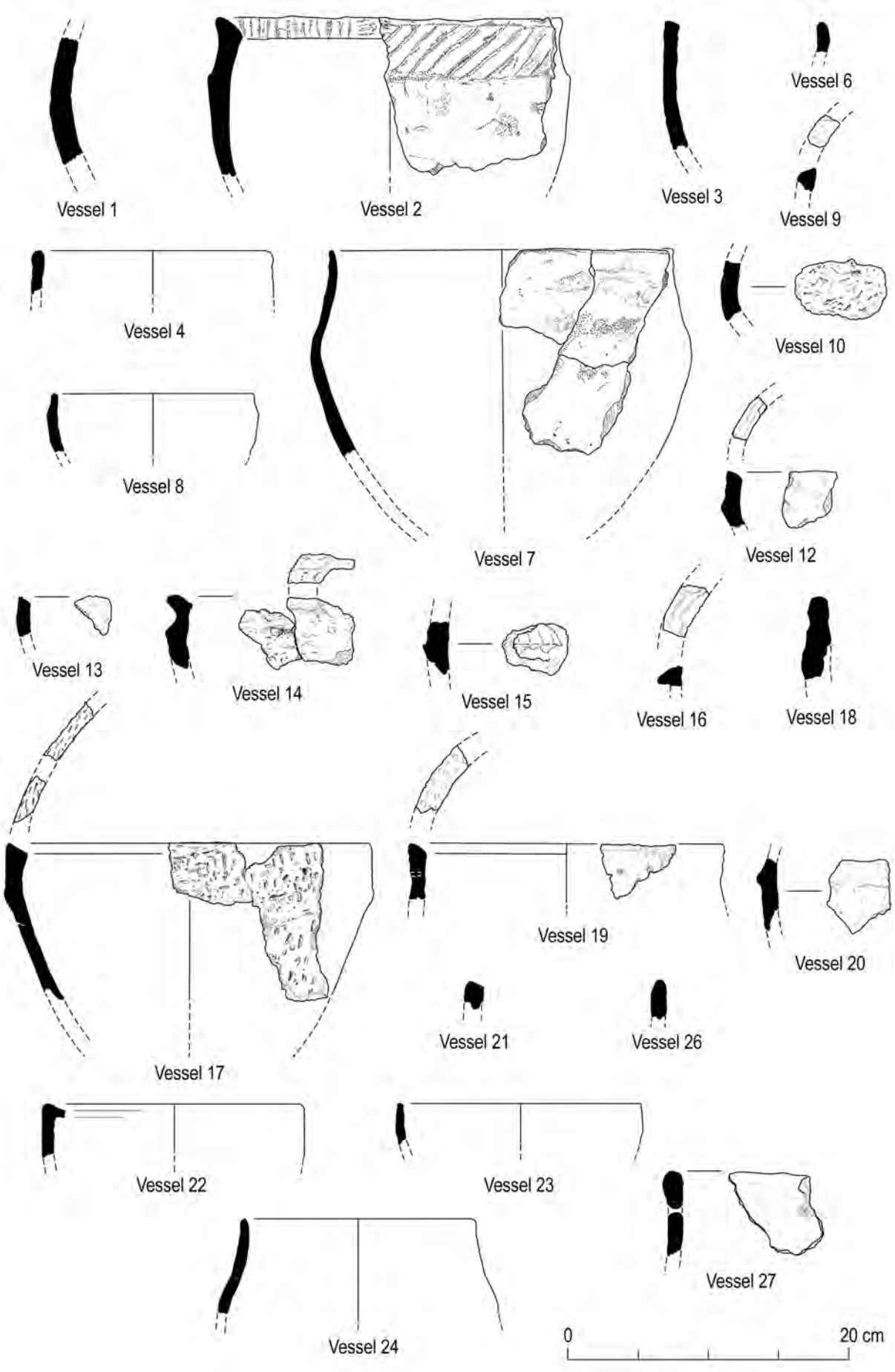

Figure 4.5: Neolithic and Bronze Age Vessels V1-V27 .

one. Both vessels have carinations and both appear to have undecorated exteriors (Figure 4.5). V14 has a highly abraded and pitted exterior surface, due to the excessive amounts of organic material in its clay body.

Other types of decoration can be seen on V29 where a fingertip has been pressed repeatedly in a line into the clay to form a closely positioned 'pie-crust' type of motif immediately below the rim. The rim top in this example has two lines of widely spaced small oval incised marks created by a fine bone or twig (Figure 4.7). Found with the latter is V30 a small sherd of another differently decorated pot. The rim bevel has two parallel lines of a rectangular incised motif, but that incised below the rim is a pointed oval motif. A 6 mm diameter perforation at the base of the horizontal line of incised ovals was made before the vessel was fired.

Another motif used was that of shallow ovals or circles, possibly made by a bird bone. V13 is a small body sherd with a roughly angular design made by the positioning of six small incised circles (Figure 4.5). V19 has two rows of fairly regular and closely positioned ovals on the rim bevel, with the remains of two similar sized but deeply impressed circles in a row approximately c. 20 mm below the rim top (Figure 4.5). This vessel also had thicker sherds surviving from near its base that indicated it was round-bottomed.

Two other sherds from V15 and V20 carry oblique linear incisions above the carination (Figure 4.5). The decoration on V15 of which only a small part survives, has a slight carination and the four surviving incisions are fine and c. 10 mm apart. Above the applied carination of V20 are two surviving longer incised lines c. 15 mm apart. This vessel is also corky and is therefore considered middle Neolithic in date.

V10 is a fragment of the belly of a small vessel without evidence of its rim or base. The piece is decorated with incised lines c. 10 mm long (Figure 4.5). Although very abraded the sherd seems to have three lines of surviving oblique incisions to one side of its exterior that changed through 90° on the other side.

V21 is added here even though it is a plain but comparably wide rim sherd to the others in this category. It is heavily burnt at a high temperature and is cracked and distorted. It was found in the occupation deposits in the centre of Roundhouse 1 and its location suggests it was a residual sherd, looking very much like a calcined piece of bone that has been repeatedly burnt in a fire-pit (Figure 4.6).

Figure 4.6: Heavily burnt rim sherd V21.

Early Bronze Age vessels

A single sherd V2 is identified as part of a bipartite Food Vessel from the early Bronze Age. It was found in a pit, possibly a disturbed burial, in one of the evaluation trenches towards the northern part of the site.

This large fragment of a rim, carination and part of the bowl is decorated on its neck and rim has a rim diameter of c. 280 mm (Figure 4.5). The slightly everted rim edge is rounded and slightly unevenly moulded and it has an interior bevel c. 23.5 mm wide, both are much abraded. It is partly decorated with deep vertical lines, probably incised with thick twisted cord followed by four to five lines of a deeply incised horizontal pattern with a single line of three separate oblique slashes/incisions with further horizontal lines following. The carination is positioned 42 mm below the rim edge and the neck is decorated by ten deeply incised oblique lines 2-3 mm wide from below the rim to just above the carination. Abrasion and adhering deposits on the neck and decoration prohibit more precise identification of the tool that made the lines. It could have been a rough thin stick or more likely a taut piece of cord that was pressed deeply into the clay.

Middle to later Bronze Age vessels

The 28 vessels that are considered to be Bronze Age V3-8, V18, V22-26, V28, V31 to V45, are all undecorated. There are differences between them but attempting to assign them to a specific time within the Bronze Age is very subjective as dating the contexts in which they were found was not always possible. Sherds considered later Bronze Age are more distinctive are described separately (see *Heavier vessels with irregular rims*, below).

Thin-rimmed vessels

Several different fine vessels with thin slightly everted or curved rims, with wall thicknesses of between 6.5 mm and 9.7 mm with one up to 11 mm were found within the burnt floor deposits of PG3, a possible roundhouse (V5 and V6 Figure 4.5), with V7 from a pit in the same structure. V23 to V25 (Figures 4.5 and 4.7) were associated with Roundhouse 1 and also its palisade, and V33 and V35 (Figure 4.7) were located north-west of Roundhouse 1. Measurements of rims suggest vessel diameters from c. 170 mm to c. 250 mm.

The best preserved example of these vessels is V7 (Figure 4.5) as it has several conjoining rim and body sherds, and it was also one of the largest with a rim diameter of c. 240 mm. Its profile is a weak S-shape with a slightly concave neck to a rounded belly and presumably a flat base, but no base sherds survived. Although some sherds of this vessel seem to have a recognisable carination, in the reconstructed sherds the carination was a rounded bulge. The rim is straight to slightly everted and finely rounded and the pot is thin and graceful in appearance although with some sooting and iron staining. It was probably little used before it parted along its coil joins, as the straight-ish edges of many of the sherds indicate. The sherds of V5 are very similar but they could not be reconstructed as several pots may have been represented in the floor deposits in which they were found. These pots were probably cooking or storage vessels.

Vessels V8 and V23 (Figure 4.5) are straight to slightly inturned versions of the thin rim, and both measured c. 170 mm in diameter and indicate smaller vessels than V7.

Rounded and everted rimmed vessels

There are four examples of thin rims that are everted, V4 is largely unstratified and V31 and V32 are from the north-west of the palisade and Roundhouse 1. V40 was found in Roundhouse 5 and its rim protrudes slightly to the interior of the vessel. V32 (Figure 4.7) is from a well-made vessel, while V4 (Figure 4.5), V31 and V40 (Figure 4.7) provide evidence of the poor finishing of vessels, especially where the rim coil was added to the vessel body, and in the distortion of the rim profiles. The coil joins of the rims to the necks of the vessels are noticeable where they have not been smoothed away, and the rim of V40 is flattened slightly on its rim top, indicating its protruding shape might be the result of drying the pot upside down.

Rounded topped rimmed vessels

Two rims, V26 from the Roundhouse 1/palisade and V34 from north-west of the palisade differ from those already described as they are from thicker-walled vessels with sherd widths of 11-13 mm, and they have rounded, slightly pointed rim tops (Figures 4.5 and 4.7). V26 seems to have been a straight-ish vessel where V34 suggests a more barrel-shaped pot. The moulding and finishing of both these vessels was poor.

Vessel with a rim with an internal overhang

V22 (Figure 4.5) is also from Roundhouse 1 but from a posthole. Although quite a fine sherd with a wall thickness of 8.4 mm and a rim diameter of c. 180 mm, its shape is uniquely different from the fine rims described previously. It is a straight rim with a plain bevel to the interior of the pot, but the bevel exhibits a protruding ledge, possibly to carry a lid or to stop contents of the vessel spilling out.

Heavier vessels with irregular rims

These coarsely tempered vessels, with wall thickness varying from c.9.5 mm to c. 17.5 mm, and up to 22 mm for the thicker base sherds of V36, are often poorly made and finished. They include V3, V18, V28, V36-V39, and V41- V45 that mostly represent cooking pots and all, except V3 from the evaluation, V18 from Pit Group 11 and V43 from Pit Group 13, are associated with the roundhouses.

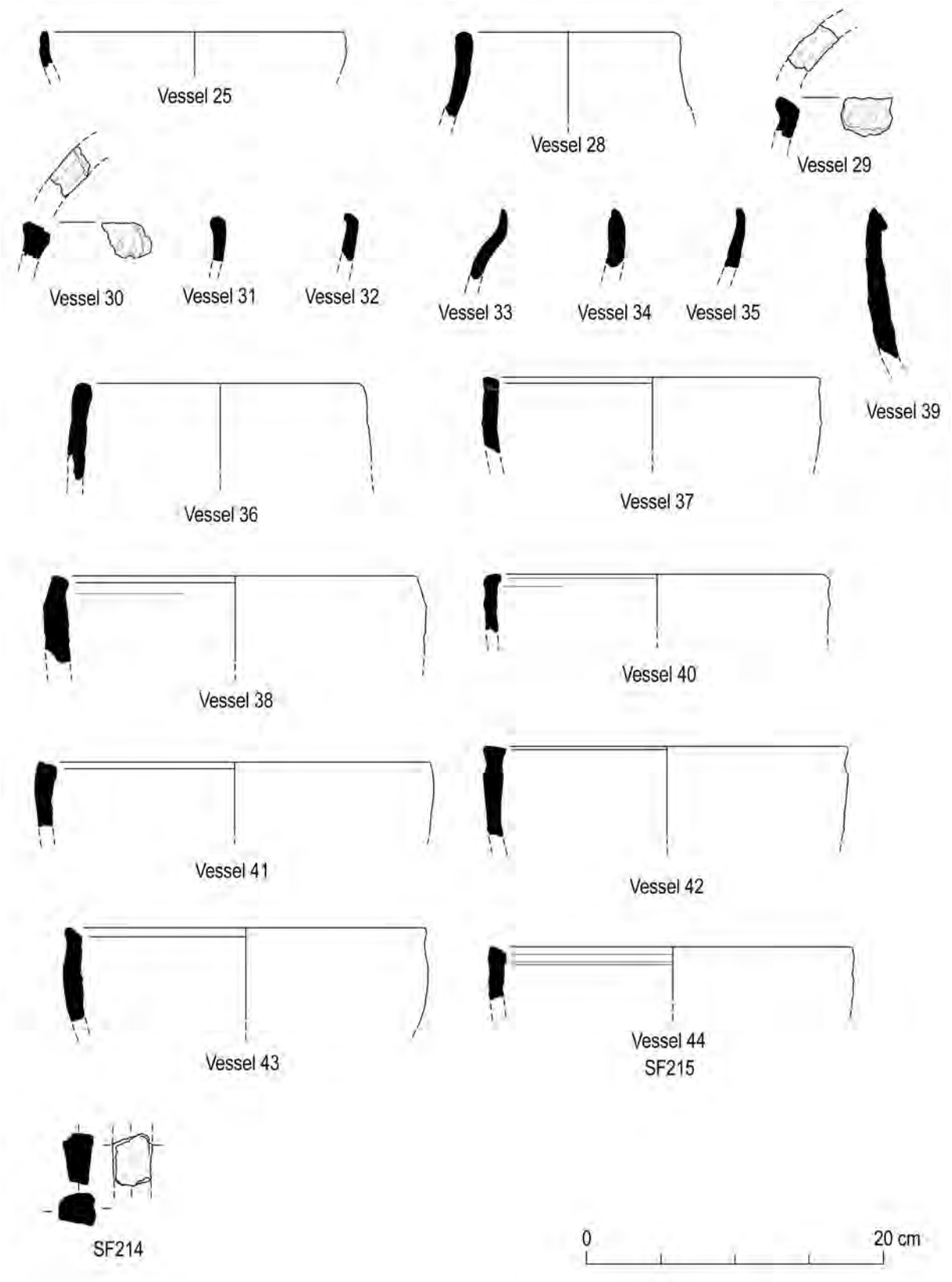

Figure 4.7: Neolithic and Bronze Age pottery vessels V28-V44, with artefact SF214.

V18 (Figure 4.5) is a very robust sherd with a wall thickness of 17.3 mm and a rounded top to its badly unmeasurable abraded rim. Finger moulding on the exterior of the sherd has created a corrugated surface with cracking around the larger grits that protrude through the vessel surface.

V28 (Figure 4.7) is a flattened rim that has a long curved neck to a possible carination. It is not unlike V7 in shape but it is from a smaller narrower diameter vessel measuring only 140 mm at its rim. It was found in a pit linked to the palisade of Roundhouse 1. V36 (Figure 4.7) found in a pit south-west of Roundhouse 1 is a predominantly straight-sided vessel with a flattened rim top that is slightly inverted. A moulding line where the rim and body coils join is noticeable. Its heavy base sherds indicate that its base may have been rounded.

V37 and V38 are both from postholes in Roundhouse 2. V37 (Figure 4.7) is a straight plain rim with a slight slope to the vessel interior that is not a bevel. Moulding lines are also visible where the rim has joined the body. V3 (Figure 4.5) is very similar to it. V38 (Figure 4.7) is a heavy vessel with a wall thickness of 14-17 mm. It comprises two conjoined rims that are slightly inturned forming a small bulge to the interior. The moulding of the rim has formed a slight concavity on the interior and cracking along the join on the exterior. The carbon deposits on the exterior surface of the sherds suggest this was a cooking pot.

V39 is a large rim sherd which does not conjoin with other body sherds of the same vessel from the burnt residues within a posthole in Roundhouse 4 (Figure 4.7 and 4.8). It is part of a 12.8 mm thick-walled vessel that tapers from its 220 mm straight rim and slightly barrel shaped body to its missing base. The rim has an internal bevel up to 16 mm wide that is steeply angled to the vessel interior but it is very poorly moulded, and was simply folded over from the rim top and not finished. It is reminiscent of late Bronze Age urns, such as V29 from Northbar, Erskine (Ballin Smith forthcoming a) with its rough surface, protruding grits, many moulding marks and accumulation of carbon deposits on its exterior surface.

Figure 4.8: Vessel 39 showing the interior surface and the poorly moulded and finished rim.

The remaining vessels are all from features within Roundhouse 6. The V41 rim (Figure 4.7) is a heavily gritted piece with walls 10.5 mm thick, and a diameter of c. 260 mm. It is from a straight-sided/slightly tapering vessel with a fairly sharp uneven rim edge and an uneven interior bevel c. 15.3 mm wide. The rim join is visible on the interior where moulding has not masked it. The vessel, a cooking pot, may have deliberately been made with a gritty surface, to aid its handling.

V42 (Figure 4.7) is similar robust pot to V41. The three non-joining rims are probably all from the same vessel but vary in profile because their moulding is irregular. The largest rim sherd has rounded edges and its top is flat to slightly bevelled, with the bevel varying between 12.8 mm to c. 16 mm wide on the other rim sherds. Moulding marks below the large rim sherd have produced a slight concavity, and are clearly visible on other sherds as the vessel was only roughly finished with grits showing through its surfaces. The c. 240 mm diameter V43 (Figure 4.7) is similar, as it has a slightly everted rim with many moulding marks visible below it, but most

of its interior bevel has been lost. V44 also has a rim diameter of c. 240 mm but its vessel walls attained a width of up to 10 mm (Figure 4.7). It was intended to be a straight rim to a barrel-shaped vessel with an internal bevel c. 12.3 mm wide, but poor moulding distorted its profile. The rim coil was turned over to the inside of the vessel where it was badly joined to the body.

The rim sherds to V45 (not illustrated) are small, non-joining and indicate a flat to slightly bevelled straight rim with rounded edges measuring c. 220 mm in diameter. The rim is irregularly moulded but suggests a gently tapering vessel to its c. 180 mm diameter base. Although distorted and very fragmented this is the only example of a flat base to a pot in this assemblage.

Pottery distribution and dating

The distribution of the various types of pottery identified from the site is displayed in Table 4.10 against its location. The two vessels dated to the early Neolithic indicate there was a domestic human presence on the excavated area but they give little insight into activities at that time. Early Neolithic radiocarbon dates are present but could be from isolated pits or from residual material in later pits.

The early Bronze Age Food Vessel provides a little more information as it is an isolated surviving sherd of a possible human burial, but also indicates that people during the early part of the Bronze Age were using this place in the landscape. Pottery was not found in all the pit groups and roundhouses but some observations can be made of those structures in which it was located.

Pit Group 7 is dominated by middle Neolithic Impressed ware vessels (nine in total) that strongly suggest that it was a semi-permanent structure or a place that was visited repeatedly during the middle Neolithic. A radiocarbon date of 3339 – 3024 cal BC (UBA-56018) from pit (1015/1016) agrees with the middle Neolithic dated V10 and V11. A second radiocarbon date

	EN	MN	EBA	Bronze Age Vessels				
Location	Carinated bowls	Impressed Ware	Food Vessel	Thin rims	Rounded and everted rims	Rounded topped rims	Rim with an internal overhang	Thick irregular rims
Evaluation and topsoil	V1		V2		V4			V3
PG3				V5, V6, V7				
PG5				V8				
PG7		V9, V10, V11, V12, V13, V14, V15, V16, V17						
PG11								V18
PG13		V19						V43
PG14		V20						
NW of Palisade/ RH1/ SW of RH1	V27	V29, V30		V24, V25, V33, V35	V31, V32	V26, V34		V28, V36
RH1		V21		V23			V22	
RH2								V37, V38
RH4								V39
RH5					V40			
RH6								V41, V42, V44, V45
Totals	2	14	1	9	4	2	1	12

Table 4.10: Distribution of vessels.

of 3344 – 3032 cal BC (UBA-56019) from pit (1027/1028) contained Neolithic vessel V13.

Pit Group 13 and Pit Group 14 are also dated to the middle Neolithic period by the occurrence of their single Impressed Ware vessels. Pit (1471/1472) contained V19 and was radiocarbon dated to the middle Neolithic 3322 – 2917 cal BC (UBA-56033), but pit (882/883) with V20 was not independently dated. However, it would appear that activities in these two pit groups were peripheral to what occurred in Pit Group 7. The remaining middle Neolithic vessels are associated with Roundhouse 1 its palisade and the areas in its vicinity. V21 is most probably middle Neolithic in date, but the radiocarbon date from the roundhouse floor deposits produced a late Bronze Age date of 1107 – 906 cal BC (UBA-56038), indicating the sherds were residual. North-west of the palisade, pit (408/409) was dug through or incorporated earlier deposits in its back fill as it produced an early Neolithic radiocarbon date of 3786 – 3648 cal BC (UBA-56009) and sherds of middle Neolithic vessels V29 and V30. The pottery and the radiocarbon dates indicate that earlier activities were reasonably wide-spread across the area only to be overlain by occupation in the Bronze Age.

Looking at the distribution of later pottery, four thin-rimmed Bronze Age vessels were found in a floor level and pits in Pit Group 3 and Pit Group 5, where V7 was buried as a whole or near complete vessel. It is suggested that these two groups of pits are either remnants of earlier Bronze Age roundhouses or some other contemporary structures related to them, as they contained no evidence of earlier types of pottery vessels. However, a middle Neolithic radiocarbon date of 3339 – 3029 cal BC (UBA-56006) disagrees with the Bronze Age V5 and V6 from the floor level (257) and possibly indicates the incorporation of earlier organic material in its composition. It is suggested that the thin-rimmed pots are early in the sequence of Bronze Age vessels on the excavated area.

The roundhouses produced only sparse evidence of domestic pots, with the majority of vessels of all types being retrieved from the area of the palisade associated with Roundhouse 1 and areas around it. This evidence might imply that domestic activities such as cooking took place outside the structures or that most of the thin-rimmed vessels were typologically earlier and were removed as broken pots in refuse to be dumped beyond the roundhouse. An early Neolithic radiocarbon date of 3796 – 3647 cal BC (UBA-56008) was returned from a pit to the south-west of Roundhouse 1, which also contained late Bronze Age pottery V36, indicating the widespread distribution of earlier occupation evidence.

Thick, heavier vessels with irregular rims are probably from later on in the Bronze Age, when activities seemed to be especially focused on Roundhouse 6 and with minor activities in Roundhouse 2 and Roundhouse 4. The occurrence of these vessels in the vicinity of the palisade reinforces the idea that domestic refuse was discarded there. Two late Bronze Age radiocarbon dates, one 1190 – 931 cal BC (UBA-56034) from pit (1436) of Roundhouse 6 is in agreement with V44 and V45 both considered to be late Bronze Age pots; and 1119 – 922 cal BC (UBA-56032) from the ditch of Roundhouse 5 (1391/1392) also produced Bronze Age V40.

The structures that contained the most vessels are Pit Group 7 for the middle Neolithic and Roundhouse 6 for the (later) Bronze Age, with Pit Group 3 and Pit Group 5 indicating occupation during the end of the early Bronze Age or during the middle Bronze Age period.

Discussion

Even with the guidance of radiocarbon dating, the sequence of the pottery and therefore some of the activities on the excavated area are largely typologically driven. The pottery sequence suggests there was a long association with the landscape, with the traditional early Neolithic carinated bowl (V1) indicating occupation possibly as early as the 39th/38th century BC. A date suggested by Sheridan for the early carinated bowls from Hillhouse Farm in East Ayrshire (2021, 14-20). The modified and perforated carinated bowl, V27, is not unlike the varied early Neolithic pottery assemblage found in association with timber halls at Carnoustie in

Angus. Modified vessels there were probably in use during the 38th and 37th centuries BC (Ballin Smith 2025b).

Middle Neolithic Impressed Ware sherds are usually one type of pottery that is easily recognised during excavations because of the decorative rims and body sherds. Some pots with decorated bevelled rims display common features found across the south-western Scotland to the north-east region, indicating social connections and the movement of ideas and beliefs. However, the pottery also displays variety in both the decoration of vessels and the shape of the pots, suggesting there was much experimentation and individual expression during their currency.

At Carnoustie, as at Rosemarkie, these vessels were clearly associated with a number of pit groups (Ballin Smith 2025b) where radiocarbon dates suggested a wide date range but which seemed to concentrate between the end of the 35th to the first half of the 31st century cal BC. One of the largest assemblages of Impressed Ware bowls came from groups of pits at Meadowend Farm, Clackmannanshire, where they were dated c. 3350 – 3000 cal BC (Sheridan 2018, 31, 34, 47). A Middle Neolithic Impressed Ware vessel associated with occupation on the side of a palaeochannel in Hamilton, South Lanarkshire, was recently dated to the beginning of the 35th to the middle of the 34th century BC (Ballin Smith 2023a, 58). From the radiocarbon dates (above), the Rosemarkie middle Neolithic Impressed wares are contemporary with some of these vessels from the other sites.

Surprisingly, there is no late Neolithic pottery recorded on the excavated area at Rosemarkie and no Beaker pottery was found. Apart from the evidence of V2 an early Bronze Age Food Vessel, roughly dated to the 23rd to the middle of the 20th century BC, there seems to have been a long hiatus or absence of use of the site from the end of the middle Neolithic and into the early Bronze Age.

The plain domestic pottery from the Bronze Age has been less well studied than the more recognisable funerary wares. This is because it has generally not survived well and it has not been immediately recognisable to type or period. At Rosemarkie there are evident differences in this pottery but those differences are not discriminated by the radiocarbon dates. Pottery from a middle Bronze Age roundhouse at Larkhall in South Lanarkshire produced a range of rim forms, rim sizes and evidence of thinner vessels, similar to those from Rosemarkie, which were dated between the sixteenth and fifteenth centuries BC to as late as the twelfth to tenth centuries BC (Ballin Smith 2023b, Figure 11 and Table 8). The later BC date ranges fit well with the later radiocarbon dates from Rosemarkie. A plain, flat-based bucket-shaped or tapering vessel with a poorly moulded rim, which broke along its coil joins was found at the Udal, North Uist. Unusually, this whole vessel was found with other grave goods in a Bronze Age cist and was dated between the sixteenth and fifteenth centuries BC similar to the vessels from Larkhall (Squair and Ballin Smith 2018, 197, Fig 2.15). It indicates the wide variety of vessel types found in the middle and later Bronze Age periods.

Recent interventions along the Aberdeen Western Peripheral Route produced small assemblages of Bronze Age pottery. At Gairnhill 4 and Gairnhill 5 rims of plain wares from middle to late Bronze Age structures were noted. A bucket-shaped vessel with a folded down bevel, similar to Rosemarkie V37, came from Gairnhill 4 roundhouse which was dated between 1100 – 840 cal BC, and large pots with straighter walls from Gairnhill 5 were similarly dated (Lochrie 2019a, Illus 3.53 to 3.56, 185, 193). Middle to late Bronze Age pottery was also found at Wester Hatton 4, where a bucket-shaped vessel c. 220 mm in diameter was dated to c. 1260 – 1020 cal BC (Lochrie 2019b, 290-91, 308, Illus 6.39, Table 6.13). However, the collation of data of well stratified and dated examples of pottery from the later Bronze Age periods is needed from across Scotland to guide our understanding of the typologies of the period and its relationship to contemporary settlement.

It is apparent on the availability of present evidence that by the end of the Bronze Age at Rosemarkie the settlement had come to an end. There are no sherds of later pottery to suggest, for example, that the occupation of the site continued into the Iron Age at its present location. Nevertheless, radiocarbon dating of features

has enabled a more thorough understanding of the periods of pottery use at the settlement, of periods of hiatus, and of its demise.

Raw clay

A sample of clay SF 108 was found in context (501) a pit or posthole in Pit Group 5. It is comprises shattered fragments of what may have been a lump of clay that has been partly burnt. It contains no additional organic or mineral temper and weighs 50.8 g. The fragments are all irregular in shape and grey light red in colour.

Pottery artefact

SF 214 is considered an artefact, a possible handle or tool, and was found in the fill of posthole (1387) in the Bronze Age Roundhouse 5 (Figure 4.7 and Figure 4.9). This object is a tapering wedge-shaped piece that has lost both its ends but is worn smooth on part of its shaft (the largest surface) and its adjoining sides. There are also fine scratches on one side and one surface. The piece is made from fine pottery with little noticeable temper apart from sand but it is slightly corky suggesting organic material was also added to the clay. It weighs 16.2 g and it measures 33 mm in length, 27.5 mm in width and averages c. 21.5 mm in thickness.

Figure 4.9: Pottery artefact SF 214.

Fired or burnt clay

By Beverley Ballin Smith

Introduction

Fragments of clay accidentally burnt were found during the processing of soil samples from a posthole. Fired clay can survive particularly well in its burial conditions, as it has been hardened by fire and therefore is more resistant to taphonomic processes and the post-excavation processing of samples than unfired clay. However, the presence of fragments of burnt clay is important for site interpretation, as it can support or enhance the understanding of an abandoned or demolished structure.

A total of 25 pieces, some large, of burnt clay weighing a total of 830 g came from the fill (940) of a posthole (939) in Roundhouse 2.

Results of the analysis

Raw clay was possibly dug from subsoil deposits or a stream side and brought back to the site to be made ready for different uses. The material described as prepared clay is raw clay which has been 'opened' with the addition of some organic material (filler or temper) that has been added to make the clay more plyable. When found on archaeological sites samples of the latter are often cached or stored ready to use in hand-sized or small ball-sized pieces, which have been 'wedged', that is moulded, flattened, twisted and pulled to eliminate air and to mix the clay well (Hodges 1989, 20). SF 139 (Figure 4.10) is an example of prepared clay where many of its fragments demonstrate the wedging process it had been subjected to. The fragments were clean and the clay of good quality when it was (accidentally) burnt and they retained evidence of this mixing and working process. SF 139 was found in the fill (940) of posthole (939) within Roundhouse 2. The largest two pieces measuring approximately 107 mm by 61.7 mm by 40 mm had split in half lengthways. It has been possible to reassemble them from the other pieces in the sample and this indicates that they were ready to be made into other objects, such as loom weights or to be mixed with stone temper for pottery making.

The sample contains one piece that resembles part of a loom weight perforation. The fragment of burnt clay retains an outline of the edge of a thumb pressed into the roughly shaped clay fragment (Figure 4.10). This partial perforation may have been simply made by someone sticking their thumb into clay rather than an actual loom weight piece.

Discussion

Fired clay pieces are generally not datable in themselves but the radiocarbon dates from the project area, and Roundhouse 2 in particular (Table 3.1 Radiocarbon dates) indicate occupation during the later Bronze Age. The material on this project area is limited to a single rare example as other fired clay samples from wattle and daub structures were not found. SF 139 was located where it had been discarded into a posthole, along with packing stones during the erection of a wooden post. The evidence suggests the clay was prepared for use and possibly stored in a building that caught fire. During clearance of that building the clay was deposited in a convenient posthole but not fired there.

The survival of this material is rare, especially as it is the only example of fired clay (including daub) from the features of the settlement. Prepared or raw clay, formed into loom weights, some slightly burnt, were found in pits and postholes related to middle to late Bronze Age roundhouses at Northbar, Erskine (Ballin Smith forthcoming a), and may be considered a comparative example in type and date. A sample of raw and prepared clay was found at Guardbridge in Fife, in a posthole of a late Bronze Age or early Iron Age structure to be use for loom weights, a fragmentary one was found at the site, or for pottery manufacture (Ballin Smith 2025d).

Figure 4.10: Fragments of prepared clay (SF 139). Piece to the lower right has part of a perforation caused by a thumb pressed into the clay.

Late Bronze Age Metalworking Debris

By Gemma Cruickshanks and Matthew G. Knight

Summary

A small assemblage of non-ferrous metalworking debris was recovered from Rosemarkie. Thirteen mould fragments indicate at least four different objects were cast: a filleted spearhead, a spearhead or ferrule, a bladed item and a curved object, though the exact form of some of these remains unclear. Five crucible sherds are from a minimum of three vessels and show signs of intensive use, adding to a sparse corpus of late Bronze Age crucibles in Scotland. All the mould and crucible fragments were recovered from contexts within Roundhouse 1 in Area 2, dating to the late Bronze Age. Differences in fabric, form and context suggest this debris relates to more than one casting episode involving differing craftworkers or craft traditions.

The assemblage

Eighteen ceramic fragments were identified as non-ferrous metal casting debris: thirteen moulds and five crucibles. Crucibles are small vessels, usually ceramic, which held non-ferrous metal alloys while they were melted over a hearth. The liquid metal was then poured into a shaped ceramic or stone mould to form a new object. The small fragments of crucibles and moulds discarded after use are the best evidence we have of this early craft and its craftworkers. Despite the large number of bronze objects deposited during the Bronze Age, metalworking refractories, particularly crucibles, are under represented in the archaeological record. For more detailed background information on non-ferrous metalworking technology see Webley, Adams and Brück (2020, 19-42).

Moulds

Bronze Age moulds were usually made from fine soft clay and were broken apart to extract the cast object. As such, surviving pieces are usually abraded, very fragmentary and a challenge to interpret. Only one mould here can be identified with any certainty. SF 62 comprises four pieces, refitting to form part of a mould valve for a spearhead. The spearhead had a lozenge-shaped section with midrib, defined by two longitudinal ridges on each side of the blade, known as 'fillets'. Not enough survives to determine exactly how large the spearhead was. Filleted spearheads are a late Bronze Age form, classed as Davis' (2015, 162-175) Group 13 and broadly dated to the Wilburton metalworking assemblage, c. 1150 – 1020 BC. Such spearheads are not common in Scotland, with only thirteen listed by Davis (2015), largely from hoards. Cladh Hallan, South Uist, is the only other site known to have moulds for this form (T. Cowie pers. comm.). SF 99A could also have been a spearhead or a ferrule but the casting surface is too abraded to be certain.

A very abraded fragment (SF 99B) preserves part of a slightly concave casting surface, tentatively suggesting it was for a bladed object, such as a sword, spearhead or sickle, but it could not be identified more closely. Two curved mould fragments (SF 98 and SF 99C) share enough features to be discussed together, though their function remains unclear. Both comprise a relatively thin, curved clay fragment with D-shaped section. The inner, vertical edge steps before breaking on SF 99C, and is bisected by a slightly diagonal, longitudinal ridge on SF 98. It is possible that SF 99C is broken at a similar ridge and was originally a similar form. If SF 98 and SF 99C were circular, their internal diameter would have been c.70-80 mm, slightly larger than, though broadly comparable to, the penannular bracelets found in the Late Bronze Age hoard at Rosemarkie (Part 5: *Bronze Ornament Hoard*). Moulds for such bracelets, like those from Birnie, Moray (F. Hunter pers. comm.), tend to be simple bivalve moulds and it is not clear how SF 98 and SF 99C functioned when no other parts of the mould assembly survived. Their link to penannular bracelets therefore remains speculative.

Other fragments can only be identified as pieces of inner valve (SF 5A, SF 5B, SF 6C and SF 6D) but remain undiagnostic.

Despite the fragmentary state of the mould assemblage, various technological details survive. Patches of a sandier ceramic fabric adhering to the exterior of the filleted spearhead mould (SF 62) indicate the two inner valves were wrapped in a coarser fabric to secure them during casting. A small fragment of similar sandy fabric (SF 6E) with one smoothed face is also probably wrapping but cannot be attributed to a specific

mould. The spearhead or ferrule mould (SF 99A) and a separate, small undiagnostic fragment of inner valve (SF 5B) both show sub-rectangular notches along the contact surface (where the two valves joined). Such notches would have held corresponding tenons or positive keys on the opposite valve, allowing the two halves to be securely registered. In addition to the keying, SF 99A also displays sandier wrapping fabric on the exterior, preserving three wide, lateral grooves where a craftworker's fingers pressed into the clay during its manufacture.

At least three fabrics are evident. The filleted spearhead mould (SF 62) was made from a notably finer clay with very few inclusions than the spearhead or ferrule mould (SF 99A) and blade mould (SF 99B). The outer wrapping was also a sandy clay fabric, but with a higher organic content, shown by frequent small voids.

Moulds catalogue

SF 5A Abraded fragment of fine, slightly sandy clay. Mainly orange, with a band of grey on one smooth, slightly convex face, suggestive of a mould contact surface or matrix. Exterior also convex. 31 mm by 20 mm by 10 mm, 4.7 g. Context (15002), fill of pit (15001) in the Roundhouse 1 area from the evaluation phase.

SF 5B Small pale brown fired clay fragment with one smoothed convex face (exterior) and a rougher concave face with has a possible positive key, suggesting it is a contact surface from a mould. 23 mm by 19.5 mm by 9 mm, 2.8 g. Context (15002), fill of pit (15001) in the Roundhouse 1 area from the evaluation phase.

SF 6C Two refitting fragments (recent break), forming part of a flat contact surface at the edge of a mould valve. Hints of wrapping around the edge. Grey contact surface, orange exterior, fine fabric. 41 mm by 12.5 mm by 15 mm, 5.4 g. Context (15002), fill of pit (15001) in the Roundhouse 1 area from the evaluation phase.

SF 6D Elongated, fractured fragment of fired clay with smoothed, flat orange face, transitioning to grey fractured surfaces on the other side. Could be part of a mould valve exterior. 29 mm by 16 mm by 1 mm, 4 g. Context (15002), fill of pit (15001) in the Roundhouse 1 area from the evaluation phase.

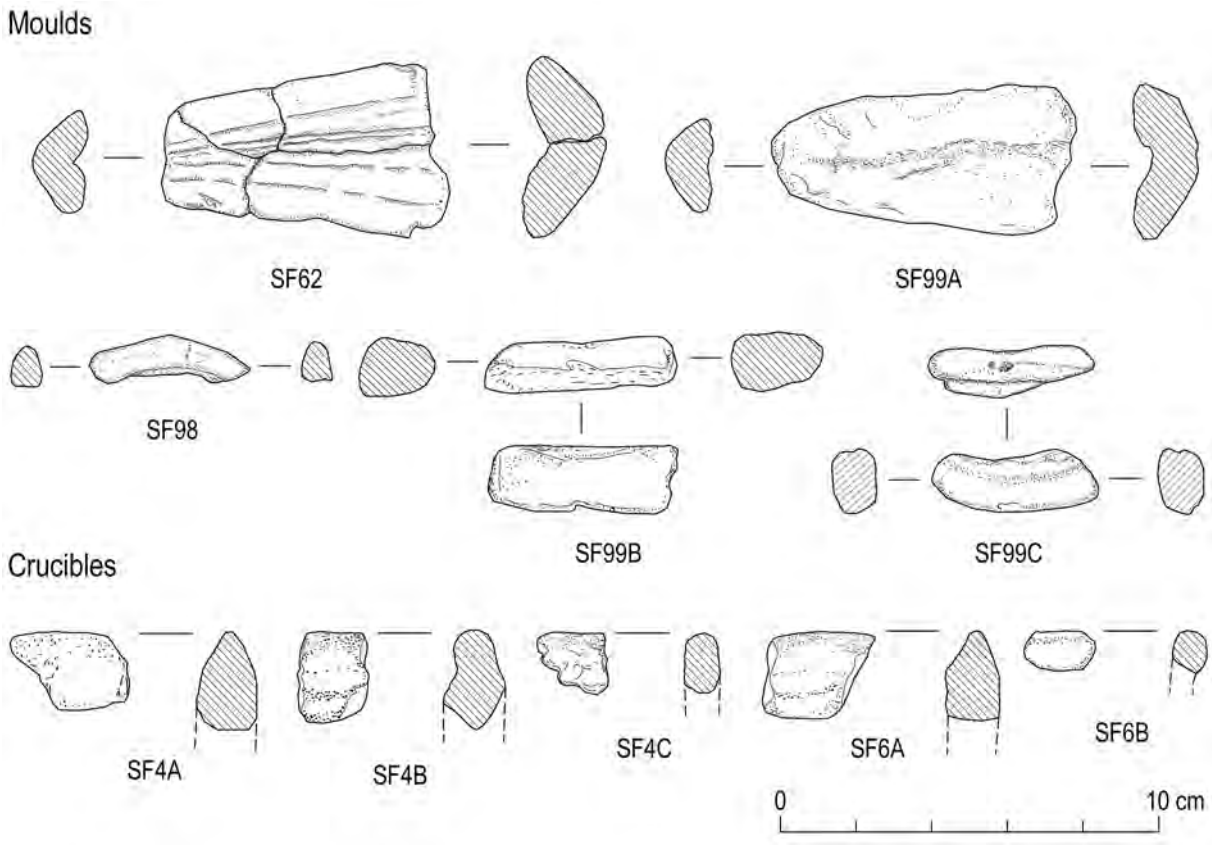

Figure 4.11: Clay moulds and crucibles

SF 6E Flat, pale brown fragment of sandy clay with one relatively smooth, slightly concave side, the other face and all edges are broken. Possibly part of mould wrapping, based on fabric alone. 33 mm by 23.5 mm by 9 mm, 6.8 g. Context (15002), fill of pit (15001) in the Roundhouse 1 area from the evaluation phase.

SF 62 Four refitting fragments (recent breaks) forming part of a valve from a ceramic middle-late Bronze Age filleted spearhead mould, broken at both ends. The object matrix or casting surface has straight edges converging almost to the tip before breaking. The contact surface (where the two valves would have met) comprises a flat rim either side of the matrix, 9-10 mm wide. The spearhead would have had a lozenge-section with fillet-defined midrib (longitudinal ridges on either side of the blade). The very fine clay fabric is grey from the matrix to around half-way through the mould, transitioning to a pale orange oxidised colour to the exterior. The exterior surface is convex, with patches of adhering wrapping in a sandier fabric. Matrix: maximum width 30 mm, 6.5 mm deep, length 77 mm. Whole fragment: 77 mm by 46.5 mm by 19.5 mm, 51.4 g. Context (322), fill of pit (321) in Roundhouse 1, Area 2.

SF 98 Curved fragment of fine grey fired clay with relatively smooth faces and outer edge, possibly for a bracelet. The inner edge is vertical but bisected by a longitudinal or slightly diagonal ridge. It is unclear for what object or how this component worked. Length 45 mm by 11 mm by 7.5 mm, 2.8 g. Context (515) occupation layer in centre of Roundhouse 1.

SF 99A Part of a ceramic mould valve, probably for a spearhead or ferrule tip, though the matrix surface is very eroded. The other end is missing. Mostly pale orange fine clay with a patch of grey clay at the broken end. The matrix or casting surface is broadly concave, linear and converges to a point. The contact surfaces down both edges show negative keying in the form of rectangular notches, which would have registered this valve to its partner during casting. There are three notches down the left side and traces of two visible on the right. The exterior is convex with traces of a sandier wrapping clay and an undulating surface, suggestive of finger impressions. 82.5 mm by 39 mm by 17 mm; matrix 68 mm by 12 mm by depth 5 mm; notches 5 mm by 5 mm and 5 mm by 7 mm, 40.8 g. Context (713), fill of pit (712) in Roundhouse 1.

SF 99B Abraded sub-rectangular fragment from the edge of a ceramic mould valve. Exterior is pale brown/orange and gently convex. The grey matrix surface is slightly concave, suggesting it was for casting some sort of bladed item, such as a sword, spearhead or sickle. Wedge section indicates the valve was thicker in the middle. Slightly sandy fine clay. Sandier than SF 62, similar to SF 99A. 49.5 mm by 21 mm by 13.5 mm, 14 g. Context (713), fill of pit (712) in Roundhouse 1.

SF 99C Curved fragment of clay, similar to SF 98 but thicker. The inside edge steps in before breaking. 44.5 mm by 14 mm by 11 mm, 6.8 g. Context (713), fill of pit (712) in Roundhouse 1.

Crucibles

Five crucible sherds were also recovered from Roundhouse 1. SF 4A and SF 6A are from the same or very similar vessels with thick-walls and a bevelled rim. Not enough survives to determine whether the bevel was internal or external. The bevel is an unusual feature for a crucible but common on late Bronze Age 'flat-rimmed ware' pottery (e.g. Cruickshanks and Sheridan 2020, illus 5.2-4). A second crucible form is evidenced by SF 4C and SF 6B, both fragments of crucible rim which refit to form part of a small, round vessel which was smaller and thinner-walled than the bevelled vessel (SF 4A/SF 6A). The fifth fragment (SF 4B) is heat-distorted but does not appear to be from either of the above vessels, suggesting the sherds are from a minimum of three different crucibles.

While the crucibles' forms differ, other details are shared, revealing a common technology. For example, the clay fabric on all the sherds shows intense vitrification (evidenced by bubbled, glassy structure) on the rim but very little fabric vitrification extending away from the rim and down the wall. This implies the crucibles were heated from above as the alloy was melted, rather than being surrounded by hot charcoal in the hearth. Surface X-ray fluorescence (XRF) analysis revealed traces of copper, tin and lead on all the sherds, indicating they were all used to melt leaded tin-bronze, which is consistent

with their late Bronze Age date. Both vessels SF 4A/6A and SF 4C/6B show red glassy vitrified residues extending over broken edges in places, suggesting they may have failed during use, or at least suffered serious cracking during use. This, along with the distorted state of SF 4B, presents an image of intensive use, probably to destruction.

Crucible catalogue

All the crucibles were recovered from the fill (15002) of pit (15001) in Roundhouse 1 area (during the evaluation phase).

SF 4A as SF 6A (below), but less red residues and vitrification. Does not refit but seems could be from the same or very similar vessel. Height 23 mm, Width 29 mm, Thickness 12 mm, 7.3 g. XRF: Cu (copper), Sn (tin), Pb (lead).

SF 4B Ceramic crucible rim sherd with red-black enamel residues over the slightly flattened rim. The form is unusual, with the vessel wall angled, then expanding before breaking. So little survives that its unusual form could be the result of heat-distortion. It is not clear which side is the exterior or interior. The fabric is mostly vitrified around the rim, less so away from the rim, where it is a fine, pale grey-clay with occasional tiny mixed rock inclusions. This pattern of vitrification suggests it was heated from above. Height 25.5 mm, Width 20 mm, Thickness 10-12.5 mm, 6.6 g.

SF 6A Robust, tapering ceramic rim, similar in form to a pottery vessel with bevelled rim. This fragment displays red enamel and vitrification over one side and part of the rim, suggesting it was a non-ferrous metalworking crucible. The red residues extend slightly over a broken edge, suggesting failure in use or at least cracking during use. If it is a rim, then it was heated from above, as seen on the fabric, which becomes less vitrified (and therefore less well preserved) away from the rim. Not enough survives to determine vessel form. Height 25.5 mm, Width 29.5 mm, Thickness 15 mm, 10.2 g. XRF: Cu, Sn, Pb.

SF 4C and SF 6B Two refitting vitrified ceramic crucible rim sherds with traces of red glassy residues on one of them (SF 4C). The fragments have rounded rims, refitting to show it was a small vessel, around 50 mm in diameter if circular. The fabric is fine clay, vitrified at the rim, suggesting it was heated from above. The red residues extend over one edge slightly, suggesting failure in use. Height 15 mm, combined Width 32 mm, Thickness 17 mm, 1.9 g and 2.6 g. XRF: SF 4C – Cu, Sn, Pb; SF 6C – Sn, Pb.

Discussion

All the crucibles and five of the moulds were retrieved from the fill (15002) of a pit (15001) identified during the evaluation phase in the area which became defined as Roundhouse 1 during its excavation. The other mould fragments were found in pit fills (322 and 713) and an occupation layer (515) also in Roundhouse 1 (Table 4.11). Pit fill (713) produced a radiocarbon date of 1125 – 929 cal BC (UBA-56011).

	Roundhouse 1				
Contexts	322	515	713	15002	Totals
Moulds					
Spearhead	4				4
Spearhead or ferrule			1		1
Blade			1		1
Curved		1	1		2
Inner valve, undiagnostic				4	4
Outer wrapping				4	1
Crucibles					
Bevelled rim				2	2
Small, rounded vessel				2	2
Other				1	1
Total	4	1	3	13	18

Table 4.11: Distribution of moulds and crucibles (number of fragments).

The presence of bronze-casting debris in four separate contexts within the same roundhouse implies this structure could have been a workshop, especially as none derive from the rest of the settlement. However, since no in situ metalworking features were identified, such as hearths, this remains speculative, particularly as the deliberate deposition of metalworking debris within settlements appears to have been a common tradition throughout later prehistory (Webley, Adams and Brück 2020, 85).

Variations in the mould fabrics, crucible forms and objects being cast at Rosemarkie indicate the debris is unlikely to be from a single event. Its deposition in different contexts reinforces this. For example, the filleted spearhead mould (SF 62) was made from a finer fabric than the spearhead/ferrule and blade moulds (SF 99A and SF 99B) and the two groups were found in separate pits. This suggests that the debris was not only produced during different events but deposited separately too. Apart from the filleted spearhead (SF 62) only a single fragment of each mould type is present, and no more than two fragments from an individual crucible, i.e. this is only a small selection of the debris which would have been produced during these castings. Purposefully placing these fragments in Roundhouse 1 held meaning to the community here and although a precise meaning remains elusive, the deposits mark the structure out as significant.

Rosemarkie is one of a growing number of Late Bronze Age metalworking sites in the area around the Moray and Cromarty Firths. Remains of a sword mould were recovered from Seafield West, Inverness (Cowie and Eremin 2011) and around 309 clay mould fragments from casting a objects, including socketed axeheads, spearheads, sickles, socketed knives and gouges, were recovered from two late Bronze Age or earliest Iron Age pits associated with a structure at Bellfield Farm, North Kessock, Highland (Cowie 2012; Murray 2012, 24; Clark et al. 2017, 60-61). A relatively large assemblage of late Bronze Age moulds was also recovered from Birnie, Moray, where spearheads, socketed axeheads, pins and penannular bracelets were being cast (Fraser Hunter pers. comm.). Crucibles are also known from this site.

Crucibles are scarcer than moulds in Bronze Age contexts in Britain and, as such, are poorly understood in relation to later periods. For Scotland, evidence for crucibles is only known from seven late Bronze Age sites (Adams et al. 2017) and the few which do survive tend to be very fragmentary, leaving their form unclear and making it challenging to contextualise the Rosemarkie forms. For example, only six crucible sherds were present alongside the mould fragments in the late Bronze Age metalworking assemblage from Bellfield Farm (Cowie 2012), around 11 miles to the south-west of Rosemarkie. There, Cowie noted the under-representation of crucibles and observed that the severely burnt condition of one sherd hinted 'at prolonged use to the point of disintegration' (ibid), mirroring the signs of failure on the Rosemarkie crucibles. This also aligns with the broader picture observed at other late Bronze Age sites in Britain, where crucibles show signs of relining and reworking to prolong their use life (Webley et al. 2020, 76) and may account for their disproportion representation when compared to moulds. A single crucible fragment was identified amongst around 200 mould fragments from late Bronze Age structures at Jarlshof, Shetland (Hamilton 1956, 29). The Jarlshof crucible was described as from a round-bottomed, 'boat-shaped' vessel. As they are infrequent fragmentary finds, the size and form of late Bronze Age crucibles is also poorly understood. The only Rosemarkie vessel for which diameter could be estimated (SF 4C/SF 6B) is very small (max. 50 mm) and is unlikely to have held enough metal for casting a sword or a spearhead. The only potential parallel found for the bevelled vessel (SF 4A/SF 6A) is amongst an assemblage of late Bronze Age metalworking debris from Galmisdale on Eigg, where several crucibles appear to have thick walls and a slight internal bevel (Cowie 2002, 10, fig.6).

The nature, organisation and development of the craft of bronze-casting in Bronze Age Scotland is poorly understood, making the Rosemarkie assemblage a valuable discovery. Further work into late Bronze Age refractories in Scotland would no doubt be beneficial.

Metalwork

By Gemma Cruickshanks

In addition to the late Bronze Age hoard (Part 5), three other items of metalwork were recovered. Two iron objects comprise a bar fragment (Sample 225) and a relatively modern machinery part (SF 34), the latter from topsoil and not discussed further. The bar (Sample 225) is missing both ends, making closer identification challenging but the slight taper along its length could suggest it was a nail shank, or tool tang, for example. It was recovered from the fill of a pit (1332/1331) in Roundhouse 4, implying it is probably ancient. Small bar fragments are common finds on sites where blacksmiths were working, where a range of stock and offcuts would have been circulating. Small quantities of blacksmithing debris recovered at Rosemarkie, including from Roundhouse 5 (Part 4: *Ironworking and Vitrified Material*) suggest this is a plausible explanation for Sample 225.

D-shaped copper alloy buckles like SF 26 have medieval and later parallels and could have served many functions, including fastening personal dress or straps on horse gear or other equipment (Egan and Pritchard 2002, 50-52). A slightly flattened facet on the rounded outer edge of SF 26's frame may have been caused by frequent rubbing against a strap or clothing, suggesting it was well-used. Buckles are commonly found in topsoil/plough soil contexts, as this one was, and the missing bar from SF 26 could have been the cause of its accidental loss.

Catalogue

Sample 225 Tapering iron bar with rectangular section, broken at narrow end, possibly bending at 90° before breaking at the other. Function unclear. Length 32 mm, Width 10 mm, Thickness 5 mm. Context (1332) fill of pit (1331) in Roundhouse 4.

SF 26 Small, intact copper alloy D-shaped buckle with oval-sectioned frame. Fine patina coating surface. Slight flattened facet on rounded end, possibly from use-wear. Height 26.5 mm, Width 21.5 mm, Thickness 3 mm. Topsoil.

SF 34 Fragment of modern iron machinery, comprising a pear-shaped dish, with expanded collar/washer at wider end, narrowing to a square-sectioned broken bar. Other end narrows then breaks. Function unclear. 118 mm by 60 mm by 26 mm. Topsoil.

Ironworking Debris and Other Vitrified Material

By Gemma Cruickshanks

Summary

A small assemblage of vitrified material weighing 2.4 kg was recovered during excavations at Rosemarkie. Vitrified material can be produced during a range of high-temperature processes from specialist crafts to daily domestic hearth activity. This assemblage includes material diagnostic of ironworking, including possible smelting slag, a smithing hearth base and small quantities of hammerscale and slag spheres diagnostic of blacksmithing. A small amount of undiagnostic vitrified material was also recovered. No in situ metalworking features were noted and the debris is dispersed across the site, leaving it uncertain exactly where and when the ironworking activity was taking place.

The Assemblage

The assemblage was visually examined and classified according to common terminologies (e.g. Crew and Rehren 2002; McDonnell and Milns 2015; McLaren and Dungworth 2021) based on features such as density, morphology, colour and magnetic attraction. Categorising in this way enables different stages of the iron production process to potentially be identified since different forms of slag are produced at each stage of this process. The assemblage is summarised in Table 4.12 and a full catalogue is in the archive.

Smelting slag

A single fragment of possible smelting slag (SF 6) was recovered from the fill (023) of a ditch (022) in Area 1. The fragment is orange-brown in colour with frequent voids created by bubbles

and burnt-out charcoal pieces. While one side is smoother than the other, suggesting it cooled against a dished surface such as a furnace or hearth base, it is a little too irregular in form to be certain of its origins. Its incomplete weight (1.4 kg) and frequent voids suggest a smelting origin is perhaps more likely. The ditch fill (023) also included post-medieval finds, suggesting SF 6 could also be relatively recent in date.

Smithing hearth base

A single plano-convex cake (PCC) of slag (SF 3) was recovered from the fill (014) of a ditch (009) in Area 1. PCCs can form during iron smelting, bloom refining and blacksmithing and are broadly differentiable by size and weight at extreme ends of the spectrum, but middle-range examples are challenging to identify more closely without compositional analysis. At 745 g and probably intact, this example is from smithing, but it is not possible to determine whether this was bloom smithing, refining or blacksmithing without further analysis.

Hammerscale and slag spheres

Hammerscale flakes and slag spheres are a type of micro-residue which form during blacksmithing as flakes and droplets fly from hot iron during hammering. In large quantities, this type of debris can indicate where a blacksmith's anvil was located, but small amounts, as here, frequently become dispersed across long-lived sites. Table 4.12 shows the distribution of hammerscale flakes and slag spheres here. Slight concentrations were recovered from Pit Group 1 in Area 1, and Roundhouse 1 in Area 2, but not in quantities large enough to suggest in situ blacksmithing activity.

Undiagnostic iron slag

One fragment of iron slag (SF 135) was found amongst spoil in the vicinity of Roundhouse 1. It's very abraded state suggests it has been moved around frequently, perhaps in plough soil, since its initial deposition, leaving its date and closer identification uncertain. Other tiny fragments (<0.4 g) of undiagnostic iron slag were retrieved from Roundhouses 2, 3, 4, 5 and 6. They are too small to identify which part of the ironworking process they derived from.

Other vitrified material

This group of material could have been produced during a range of high-temperature processes and is not necessarily related to metalworking. A fragment of cinder (Sample 244) from a pit fill (1412) in Roundhouse 5 is the vitrified remain of fuel, probably charcoal. Fragments of fuel ash slag (Sample 177 and SF 47) were retrieved from colluvium at the base of a cist pit (1126) in Area 3 and topsoil, respectively. Fuel ash slag forms during the high-temperature reaction between silicates like sand or clay and fuel ash and can therefore form during a range of activities.

		Area 1		Area 2		Area 3			Area 4						
Group	Type	PG1	Ditches	RH1	PG10	RH2	PG5	PG11	RH3	RH4	RH5	RH6	PG9	u/s	Total (g)
Iron working	Smelting slag, possible		1414.7												1414.7
	Smithing hearth base		745												745.0
	Hammerscale and slag spheres	0.5	0.1	0.8			0.1	0.3		0.4		0.1	0.1		2.4
	Undiagnostic iron slag			144.7			0.1		0.2	0.4	0.1	0.1			145.6
Undiagnostic vitrified material	Fuel ash slag													43.1	43.1
	Cinder										0.4				0.4
	Magnetic residue			6	0.1										6.1
	Total (g)	0.5	2159.8	151.5	0.1	0	0.2	0.3	0.2	0.8	0.5	0.2	0.1	43.1	2357.3

RH = Roundhouse, PG = Pit Group, Ditch (fills 014 and 023)

Table 4.12: Table showing distribution of ironworking debris and other vitrified material.

Small fragments of 'magnetic residues' were extracted during the processing of soil samples from contexts in Roundhouse 1 and Pit Group 10, both in Area 2. Magnetic residues are often too small to identify closely and can include naturally magnetised soil and stone particles as well as vitrified material.

Discussion

This small assemblage provides tentative evidence of iron production, though the fragments are sparsely scattered through a range secondary contexts, making it challenging to identify where and when this activity took place. The types of debris present do tell us that probable iron smelting and bloom refining or blacksmithing were taking place which, in addition to the Part 4: *Late Bronze Age metalworking evidence* demonstrates that this settlement had access to a range of skilled metalworkers, potentially over a considerable period of time.

Ironworking is a relatively common feature of Iron Age roundhouse settlements in the areas surrounding the Moray Firth, in comparison to other regions of Scotland (Cruickshanks 2017). Very large assemblages comprising hundreds of kilogrammes of ironworking debris are known from some roundhouse settlements, such as at Culduthel (Inverness), Grantown Road (Forres) and Birnie (Elgin) (McLaren and Dungworth 2021; McLaren and Dungworth 2016; Cruickshanks and Dungworth in prep). Many other settlements have produced smaller assemblages, hinting at a complex arrangement of varying scales and forms of ironworking taking place at different times, even on the same site. Notable examples within the more immediate locale of Rosemarkie span a range of dates, including middle Iron Age ironworking at North Kessock (McLaren 2012), early medieval iron smelting and smithing debris from three of the Learnie caves (Birch, Peteranna and Gunn 2019; Cruickshanks in prep) and evidence of ironworking within the medieval Burgh of Cromarty (Birch and Peteranna 2017; Cruickshanks in prep).

Medieval and Later Pottery

By Bob Will and Mollie Dogherty

Introduction

The assemblage of pottery recovered generally from the topsoil levels from the archaeological investigations at Rosemarkie consists of 127 sherds (1726.3 g) of pottery that dates from the medieval period through to the nineteenth and early twentieth centuries. Although there are medieval sherds within the assemblage the main post-medieval fabrics are missing. Many of the sherds were small and abraded. The occurrence of these pottery sherds across the excavated area is probably due to nearby buildings and the spreading of midden materials across the area as a fertiliser prior to crop cultivation.

All the sherds were examined, weighed and recorded according to guidelines and standards produced by the Medieval Pottery Research Group (MPRG 1998 and 2001). No scientific analysis of the fabrics or glazes was undertaken.

Pottery types

Scottish Medieval Redwares

A total of 21 sherds (330.7 g) were recovered in Scottish Medieval Redware fabrics, this type of pottery is found across most of Scotland and has been the subject of an extensive research programme funded by Historic Environment Scotland (Haggarty et al. 2011). The largest assemblages of Scottish Medieval Redwares have been recovered from excavations in Aberdeen and Perth. Two kiln sites are known: one at Rattray near Peterhead that produced wheel-thrown and hand-made vessels, and the other at Stenhouse near Falkirk. These fabrics are thought to date from the thirteenth to fifteenth century although the publication of the Perth High Street excavations has identified Scottish redware fabrics from the mid to late twelfth century (Hall et al. 2012, 3-11, 27-33). There was a wide variation in the fabric from quite crude and rough, to well-sorted thin-walled, with pronounced rilling or throwing marks. The firing conditions also varied from oxidised to reduced or partly reduced. These variations may reflect different kilns or manufacturing sites, or chronological differences.

Scottish White Gritty Ware

Only two sherds (37.2 g) in Scottish white gritty ware fabrics were recovered. This fabric is found throughout Scotland particularly from east coast towns and in the Central Belt where it has been recovered from excavations in large quantities but it is found throughout the rest of the country as well. So far, the only published kiln site is at Colstoun in East Lothian but it is likely that a number of kilns were in production throughout Scotland (Jones et al. 2003). White gritty wares first appear in the late twelfth century but the tradition lasted into the late fifteenth century. The sherds from Rosemarkie include an undecorated square rim that is probably from a storage jar or cooking pot and could date to the thirteenth or fourteenth century.

Raeren

One body sherd (10.1 g) of Raeren salt-glazed stoneware was recovered with a brown salt-glaze exterior and a light grey interior. In the late medieval period, Raeren was a centre of the stoneware potting industry (Gaimster et al. 1990, 224). Between 1475 and 1525 new vessel forms were developed, including the drinking mugs, with squat necks and loop handles, which were exported in huge quantities. They are found all over Britain and where they date to the first half of the sixteenth century (Hurst et al. 1986, 196).

Nineteenth and Twentieth Century Industrial Wares

Most of the assemblage consists of modern factory produced ceramics and includes white earthenware (54 sherds), red earthenware (34 sherds) and industrial stoneware (10 sherds). These fabrics would date from the nineteenth and early twentieth centuries. White earthenwares tend to be table wares while the red earthenwares and stonewares are usually more utilitarian consisting of large bowls and storage vessels. The different types of pottery and methods of decoration are found throughout the trenches and probably relate to the later occupation and abandonment of the buildings.

White Salt-glazed Stoneware

One rim sherd from a plate was recovered in this distinctive white salt-glazed stoneware with a moulded pattern known as 'dot, diaper and basket'. White salt-glazed stoneware was the first of the mass-produced white wares and was manufactures from the first quarter of the eighteenth century initially it was made in Staffordshire but it was also made in Scotland.

White Earthenware

The largest group of sherds in the assemblage is white earthenwares (54 sherds) and a variety of forms, including plates, bowls, teapots and teacups are represented. The vessels have been decorated by a number of methods including hand painting, sponge printing and transfer printing. Unfortunately, most of the decorated sherds are too small to be able to identify the pattern or manufacturer.

The use of sponge printing as a decorative technique is thought to have been introduced from the 1830s or 1840s and was popular with Scottish factories, although there was a tendency not to mark these wares (Cruickshank 1982). Sponge printed wares can be found just with the sponged design but are more commonly found combined with hand painted bands or decoration.

Fabric	Rims	Bases	Handles	Body sherd	Total	Weight (g)
Scottish Medieval Redwares	1	2	3	15	21	330.7
Scottish White Gritty Wares	1			1	2	37.2
Raeren Stoneware				1	1	10.1
Modern white earthenware	19	8	2	25	54	315.7
White salt-glaze stoneware	1			1	2	14.7
Modern red earthenware	8	7		19	34	598.4
Modern stoneware	1	4	1	4	10	258.2
Ceramic Building Materials				3	3	161.3
Total	31	21	6	69	127	1726.3

Table 4.13: Medieval and later pottery fabrics.

Several sherds had transfer printed designs, although transfer printing was developed in the late eighteenth century it was only in the middle of the nineteenth century that it really took off with mass produced factory designs and became the standard from of decoration. The sherds from Rosemarkie have blue, black, brown and grey designs but the sherds ae too small to identify the pattern.

Red Earthenwares

The red earthenwares (34 sherds) represent more utilitarian vessels than the white earthenwares, the vessels tend to be larger with thicker walls and are often made from coarser fabrics. The sherds from Rosemarkie include large slip-lined dairy bowls or storage vessels and a brown glazed teapot. The dairy bowls are large bowls with a white or cream coloured slip on the interior that has then been covered by a clear lead glaze while the exterior generally remained unglazed. On some examples there are also spots or swirls of brown or green glaze on the interior. These vessels tend to have a narrow base and then widen at the rim and were used to cool milk and for separating cream from milk, these vessels are found throughout Scotland and were made at a number of different factories including Cupar in Fife (Martin and Martin 1996). Brown glazed teapots were made in numerous potteries throughout Britain over a long period of time from around 1850, although the style and decoration changed, the sherd is too small to identify the pattern.

Industrial stoneware

Ten sherds of Industrial stoneware were recovered. Stoneware vessels were made in vast quantities at factories in Glasgow, Newcastle and Portobello, as well as many other locations from around 1860 until the early twentieth century.

Ceramic Building Materials (CBM)

Three fragments (161.3 g) of building materials consisting of handmade bricks, roofing tiles and ceramic drain pipes were recovered in a coarse orange/red fabric. Several of the brick/tile fragments are probably from chimney pots as they are curved with burning and soot on the surface. Other fragments are from roofing tiles or pan tiles. Most of the building materials presumably date to the post-medieval to modern period.

Discussion

The assemblage covers a long time period from the medieval through to the modern era. The medieval sherds include the main fabric types found from excavations in northern Scotland including possible thirteenth century cooking pots and storage jars along with later thirteenth or early fourteenth century decorated jugs. A number of imported wares from mainland Europe were recovered including Rhenish stonewares and Low Countries cooking vessels.

Most of the assemblage dates to the nineteenth and early twentieth centuries and is typical of assemblages recovered from similar rural excavations, and a number of similar sherds were recovered from Ben Lawers (Atkinson 2016) and Brotchie's Steading at Dunnett (Holden et al. 2009). Although there is a range of decorative techniques used, the sherds with the different techniques are often found together in the same layer or context, for example, sponge decorated sherds are found alongside transfer printed wares. It has been suggested that both the sponged wares and transfer printed designs were made at the same time in the same factories but the sponged wares are usually not marked and were cheaper than transfer printed wares (Cruickshank 1982). Sponge decoration is usually found on bowls rather than flat plates, as bowls were more versatile in a household with few vessels.

PART 5: The Bronze Age Hoard

By Rachel Buckley, Leanne Demay, Susanna Harris, Matthew G. Knight, Peter Northover, Brendan O'Connor and Susan Ramsay

Introduction

By Rachel Buckley

The hoard was revealed sealed below a deep colluvium layer on 27th May 2021 during the watching brief and excavation at Greenside Farm, Rosemarkie by AOC Archaeology Group. It was located adjacent to multi-period settlement evidence dominated by late Bronze Age activity. The feature was identified as being of significance immediately on being revealed due to the presence of the distinctive copper alloy objects with surviving organic materials. A block of subsoil containing the hoard was lifted for laboratory excavation and analysis. It measured c. 390 mm by 370 mm and it was 200 mm in depth and weighed between 20 kg and 30 kg (Figure 5.1).

The hoard was revealed within a pit (1534), part of a group of pits known as Pit Group 5 in the feature-dense, north-west portion of the proposed development site in Area 3. It was located in close proximity to a possible posthole or stakehole (1557), suggesting the latter as a marker for the hoard.

Given the rarity and significance of the objects, as well as the sensitivity of the observed organic material, and the potential for other similar material to survive within the pit, it was decided that excavation of these objects would be necessary under laboratory conditions. After collection of the hoard in its block of subsoil from AOC, it was secured and transported to the GUARD Archaeology Ltd premises in Glasgow. The material was stored within a secure and stable refrigerated environment while arrangements

Figure 5.1: The hoard, in situ.

were made for the appropriate investigative and excavation processes to be undertaken. Will Murray, archaeological conservator with the Scottish Conservation Studio became the advisor in the first instance to ensure that all necessary safekeeping measures were being taken ahead of a formal assessment.

The hoard, discovered by AOC, had undergone some initial investigations with soil having been removed from the fill surrounding the uppermost artefacts. Moreover, a c. 20 mm wide slot was also excavated in the field to determine the depth of the feature and to explore the possible presence of textiles in which the hoard may have been contained (Figure 5.2). On reviewing preliminary imagery of the hoard taken by AOC, and comparing that with the initial imagery undertaken by GUARD Archaeology, its contents and their positions within the hoard pit appear to be as found by AOC in 2021, except for the upper layer of sediment overlying the objects.

The Hoard Excavation in the Lab

A designated working space of GUARD Archaeology's premises was provided for the hoard and access to this area was restricted to minimise any inadvertent disturbance to the material. The necessary equipment for excavation and lifting were prepared, and the block was secured onto a fixed wooden platform to reduce the risk of any movement while the investigation of it was underway. This also enabled the accurate recording of the positions and orientation of artefacts, ecofacts and samples from within the hoard throughout the excavation. An area in the work space, adjacent to the hoard, was also prepared for the conservator to carry out any immediate conservation processes where necessary, to undertake any initial assessments, and to prepare packaging materials and appropriate storage for when items were removed. Overhead and peripheral lighting and equipment was installed to enable accurate photogrammetric recording throughout the process.

Figure 5.2: The hoard ready for block lifting.

Radiography and CT-scan Imaging

Prior to commencement of the excavation, the block was transported from the GUARD Archaeology premises to the Small Animal Hospital at Garscube, Glasgow to carry out X-ray imaging and a CT-scan. This was with the aim of establishing the full size and extent of the visible objects, as well as establishing the presence of any unknown objects. Images were produced of the block from above, as well as through the block in sections. The images were successful in identifying the extent and location of the metal objects, and were subsequently used both in consultation with the conservator and specialists prior to excavation. They were also a useful tool during the excavation process in identifying sensitive areas prior to objects being fully revealed (Figure 5.3). The same X-ray and CT images were also provided to the relevant specialists when needed.

Excavation and recording strategy

Prior to the commencement of the excavation, the block was photogrammetrically photographed extensively with fixed points. These were used throughout the excavation process for photographing the overall block at various stages of excavation. The initial fixed point was considered 'South' therefore creating an arbitrary 'North' which was used during recording. The block was then planned at a scale of 1:10. This plan also detailed the 0.1 m by 0.1 m grid which was utilised throughout excavation for the purposes of locating materials, objects and fragments, including environmental samples. The grid was used to allocate co-ordinates for all materials and samples recovered during the excavation (Figure 5.4).

The excavation was undertaken by the author with the advice and assistance of the conservator.

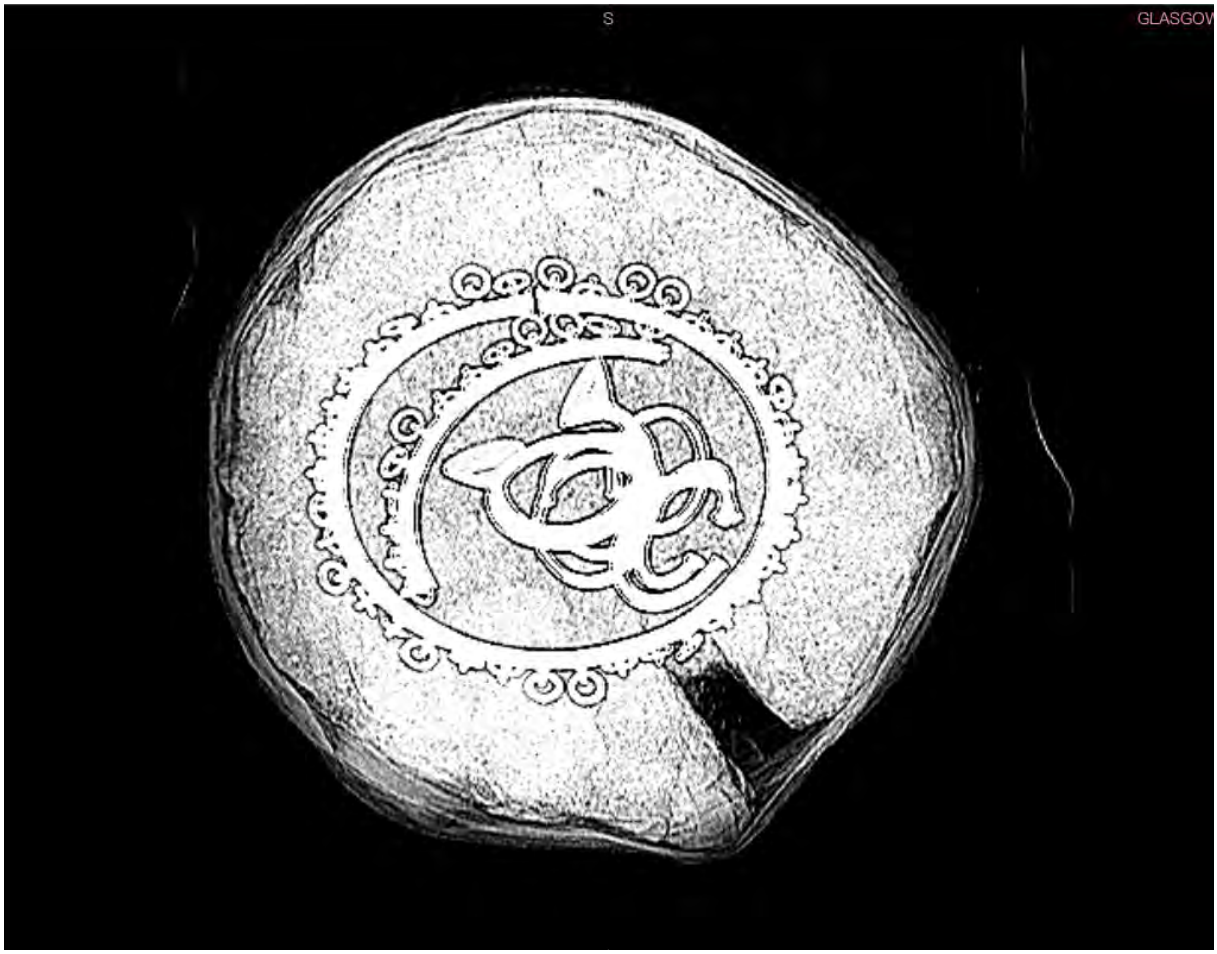

Figure 5.3: CT Scan result.

Throughout the process both detailed photographic recording and appropriately scaled drawings were undertaken. These techniques recorded the various stages of the excavation. All plans after the initial pre-excavation drawing were carried out at a scale of 1:2 in order that maximum detail could be recorded and that individual objects and fragments could be clearly annotated with relevant finds numbers and could be subsequently located within their specific context as necessary during specialists' analyses. Plans were undertaken on the completion of the removal of each spit of soil, and at appropriate intervals if newly revealed materials or fragments were to be removed. A photographic record, as well as photogrammetric images, was undertaken at these points during the excavation. They included both detailed images of aspects of the artefacts and material fragments as they were revealed, as well as general images of the block of subsoil as the excavation progressed.

The block was excavated in c. 20 mm deep spits, which was deemed appropriate based on the materials revealed. The excavation began initially with a general clean of the exterior layer of the block to remove any loose soil surrounding the hoard. Spit 1, levelled out the block by removing as little as 1 mm its north side and c. 25 mm from the higher south side to create a level surface, and to extract the uppermost complete penannular ringed ornament SF 001 (Figure 5.5). The pit into which the hoard was placed was identified on the initial surface cleaning, although it was partially obscured by SF 001. It was followed during the excavation where possible, other than where it was necessary to lower areas of surrounding subsoil to gain access to the objects. On removal of all objects and soil from the pit, the subsoil surface was metal detected to ensure there were no further metal fragments were present.

Figure 5.4: The hoard with its grid in position.

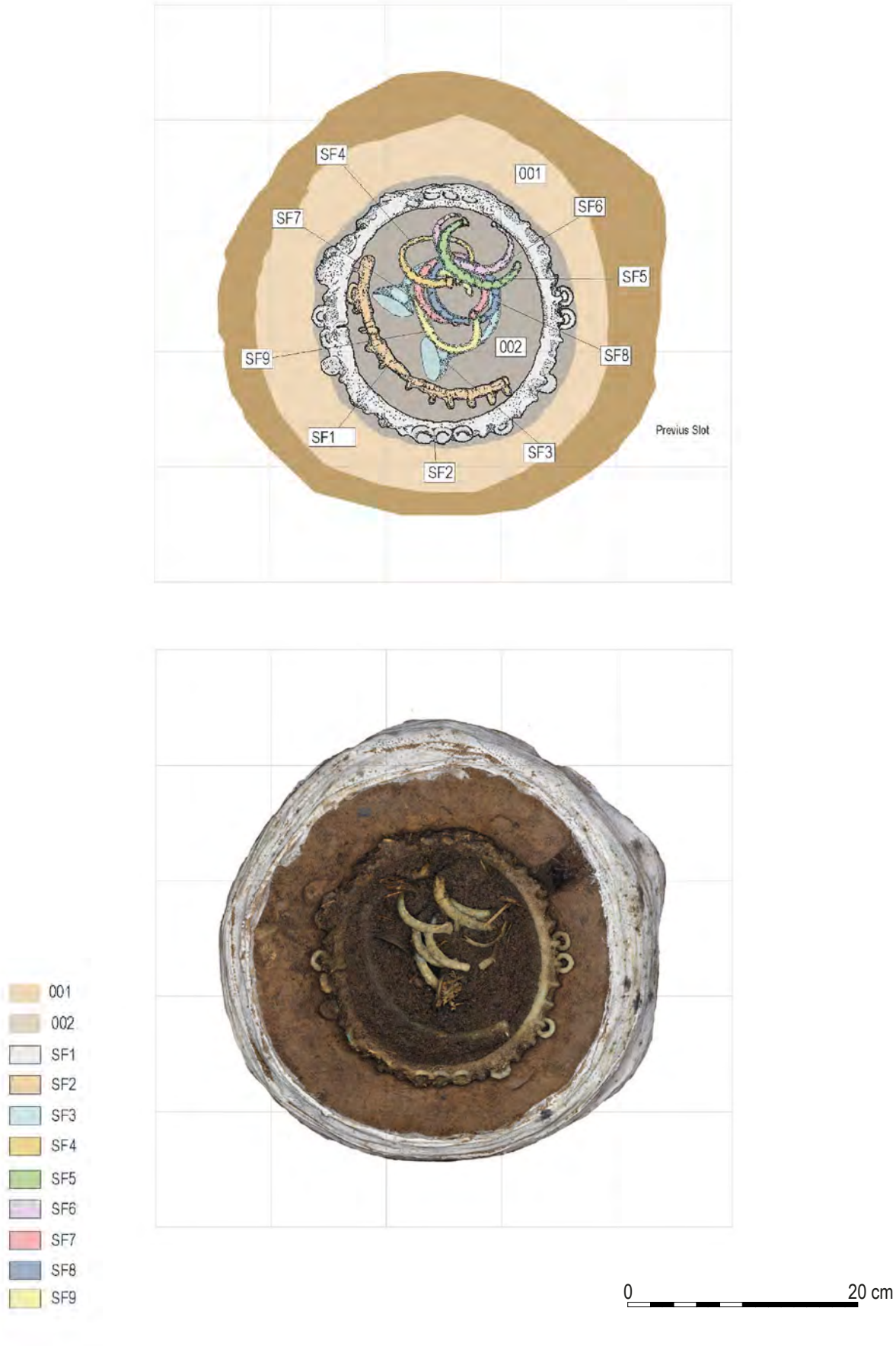

Figure 5.5: The excavation of the hoard.

Macroscopic fragments of materials were removed using tweezers as the excavation progressed, in order that these could be retained by spit and by grid square; these were retained into general Cu alloy, Organic and Botanic groupings (it was not possible to distinguish more specifically at this stage). Photographs of the recovered organic material were sent to Susan Ramsay, the project's Archaeobotanical specialist, to inform the approach of conserving any remains in the short term.

All drawings, photographs, finds, samples and contexts were recorded using pro-forma recording sheets. In addition to photographic recording, the lifting of artefacts during the excavation process was filmed in order to maintain a record of process and progress.

Condition and conservation

The condition of the metal objects and organic materials was monitored throughout the excavation process by the conservator and archaeologist; the in situ material was misted with deionised water as required throughout the course of each day to minimise drying and to aid conservation. The full block was re-covered and sealed each evening in order that it retained moisture and remained undisturbed overnight.

The objects were gradually revealed as the outer subsoil was lowered. They were left in situ until fully revealed and recorded, and deemed ready to be lifted with minimal strain on each item. Gloves were worn while lifting items, and directly touching or brushing of the objects during the excavation was avoided as much as possible, particularly in the case of the organic materials.

Appropriate packaging materials were prepared for the both the metal objects and organics in advance of their lifting. All artefactual material was handed as little as possible, with objects lifted with tweezers and placed directly in their prepared packaging. They were not moved or handled thereafter unless absolutely necessary. This approach was particularly important given the presence of fragile organic material on some of the objects identified early in the excavation process, and also due to the fragile state of the more delicate areas of metal work.

All necessary conservation measures during the excavation and subsequent packaging and temporary storage of the artefacts were directed by the conservator, and were carried out with the assistance of the archaeologist and the archaeological support staff. This included the use of suitable packing/storage materials and conditions for each object; a programme of continuous environmental monitoring and recording followed the excavation of the items.

Environmental Sampling

All material from within the hoard pit was recovered and recorded by grid square and spit to allow any necessary environmental analysis to take place, and for deposits to be accurately located.

Sampling also took place into the upper layer of surrounding subsoil across the entire block, with samples from this recovered and recorded by grid square and spit; this was to allow any necessary analysis of underlying residues or potential chemical signatures across the hoard pit. Sterile material below the pit was retained as a bulk sample for reference after undergoing a final metal detecting check (Figure 5.6).

Figure 5.6: Metal detecting the remaining subsoil after removal of the hoard.

Results of the Excavation

The excavation revealed nine copper alloy objects within the feature: one complete penannular ringed ornament with two loose annular rings, one fragment of a penannular ringed ornament, six penannular bar bracelets and one cup-ended ornament, as well as several different types of organic materials present. The latter were in situ with the metal artefacts and their survival was due to the anti-microbial properties of copper that they were surrounded by.

There were occasional lumps of carbonised material found throughout, which were identified as hazel, birch and alder, along with bracken stems and fronds concentrated in the centre of the hoard. Strips of tree bast that was most similar to ash was used as binding and was found to be knotted to the bar of the cup ended ornament (SF 003). There was also an unidentified organic layer adhering to some of the surfaces of the metal artefacts themselves which resembles degraded skin or leather (for further details, see below).

The feature

The pit was a sub-rounded shallow scoop (003), which initially measured 0.23 m by 0.22 m, with a depth of c. 0.1 m. Its full depth as found was unknown as the previous investigation had removed soil from the top of it. The feature was filled by a single fill of friable homogenous dark brown silty sand with occasional small gravel and organic inclusions (002). The subsoil (001) was orange brown silty sand with both small and large stone inclusions including a quartz pebble (SF 025).

The only other deposits which were noted as distinct were those concentrated immediately around the objects. These were essentially variations on the main fill (002) but with higher concentrations of organic fragments. These localised organic-rich areas were slightly darker and were allocated distinct spit numbers (spits two and four) and collected as samples so that artefactual and environmental material could be located in relation to the objects.

The conservator, present at the removal of some artefacts, was able to take a preliminary look at the items once removed, and noted that only soil and plant material on the items was present, no obvious textiles were observed on initial investigations.

The artefacts

The artefacts included nine copper alloy objects: one complete penannular ringed ornament with 37 evenly spaced integrated hoops and 34 attached annular rings, one fragment of penannular ringed ornament with 13 evenly spaced integrated hoops and 13 attached annular rings, six penannular bar bracelets and one cup-ended ornament with a tree bast overhand knot on its bar, together with five pieces of carbonised vegetation and twenty-four finds of organic material. All metal objects were removed from within the pit (003), as were the majority of the organic finds. Although some loose/disturbed material was removed from (001) during the levelling of Spit 1 (SFs 010-012) along with two carbonised vegetation finds, SF 018 and SF 027, and a quartz pebble SF 025. The Rosemarkie hoard is the first late Bronze Age ornament hoard from Scotland that we can be certain is composed of bronze ornaments only, and also the first to be discovered and excavated archaeologically in northern Britain.

Location of the metal artefacts

The location of the hoard is depicted in Figure 1.1.[1]

The complete penannular ringed ornament (SF 001) lay flat around the circumference of the pit (Figure 1.11) and it seemed to delimit its extent, with the rest of the artefacts located deeper within the pit. The fragment of penannular ringed ornament (SF 002) was positioned with the circumference of (SF 001) by its north-west arc, with the outer edge of both ends touching the inside of penannular ringed ornament (SF 001), and the inside touching one of the cup ended ornament's (SF 003) cups. The six penannular bar bracelets were located in the area delimitated by the ringed ornaments, concentrated in the south-

1. For purposes of illustration and clarity this figure comprises plans drawn at several stages of excavation in order to locate all the objects and was not indicative of direct object relationships. The original excavation plans depict separate stages of excavation with appropriate soil levels noted.

east inner quarter of (SF 001). The bracelets appeared stacked at an angle, each touching the one below, with their terminals facing towards the SSE and their outer arcs towards the NNW. There were strands of organic material around each of the objects with some of it holding objects together. Bracelet (SF 005), in the southern arc, lay on top of the other bracelets and directly on bracelet (SF 006). Bracelet (SF 004) extended out to the east, with one bracelet end below (SF 005 and SF 006) and its other end and its arced bar resting on bracelets (SF 007 and SF 008). These latter two lay almost on top of each other and in turn, lay on top of bracelet (SF 009) which lay furthest north. This bracelet sat with its arced bar resting on both cup ends of the cup-ended ornament (SF 003), which rested at the base of both the hoard and the pit (Figure 5.7 and Figure 5.8).

To simplify, the artefacts were in the following order; (SF 003) lay at the base of the feature and the hoard, bound with organic (SF 042) to the three stacked penannular bar bracelets sitting above, (SF 009) then (SF 008 with SF 007) on top. Bracelet (SF 004) sat above, though slightly askew to the rest of the bracelets. Next were bracelets (SF 006 then SF 005), removed together due to organic material (SF 029) surrounding them. Then, the fragment of penannular ringed ornament (SF 002), sat on the outer north edge of the feature and lastly, on top was the complete penannular ringed ornament (SF 001) that encircled the entire hoard.

Figure 5.7: Stacked bracelets.

Figure 5.8: Stacked bracelets, from a different angle.

Location of the organic and botanic artefacts

There were various types of organic materials amongst the metal items noted at the beginning of the excavation. Some had a grass-like structure, now identified as tree bast and others had serrated 'spiky' leaves, now identified as bracken (Figure 5.9). The organic materials were collected as small finds, their grid and spit position being noted, which artefact they were surrounding or entwined with and then assessed by the archaeobotanist.

Figure 5.9: Organic 'spiky' material from centre of hoard.

The bracken stems and fronds (SF's 010, 011 and 012) were collected during the first clean and levelling stage. Others (SF's 014, 015, 022, 035, 038 and 039) were removed from the central area as the spits progressed downwards and (SF's 022-024, 026 and 040) were associated with (SF 003) where many loose strands were removed from its cup ends (Figure 5.10), with (SF 047) being removed after the last artefacts in the hoard were lifted. This indicated their presence throughout the hoard from top to bottom and, as previously stated, concentrated in the centre of the deposit.

The plant material that the knot (SF 042) was created from was identified as tree bast, the inner bark of a tree, most closely resembling ash. Several loose strands of tree bast were found throughout the hoard and collected during the excavation. They were not attached to any artefacts but were in direct contact with them having detached from the main mass at some point and predominantly found in spit 5, which was cleared for the removal of bracelets (SF 004-006; Figure 5.13). Plant material (SF 019) was associated with (SF 004) and (SF 033) was associated with (SF 006 and SF 005). Bracelets (SF 007 and SF 008) shared clumped organic (SF 043) as well as loose strands (SF 031, SF 037 and

Figure 5.10: SF 026 in the cup ended ornament.

SF 044). Bracelet (SF 009) was associated with (SF 041). The knot (SF 042) was significant as it tied the lower bracelets (SF 007, SF 008, SF 009 and SF 003) together, creating complications during the lifting of these artefacts (Figure 5.11).

Other organic materials present in the hoard were noted as a dicotyledon stem (SF 021), positioned in between bracelets (SF 005 and SF 006) and several pieces of carbonised vegetation. A piece of carbonised alder (SF 029) was retrieved from under the southern end of (SF 005; Figure 5.12). Cup ended ornament (SF 003) had two lumps of carbonised vegetation (SF 028) alder and (SF 045) birch, recovered from under each cup end.

Figure 5.11: Hoard ready for the micro-excavation to begin.

Figure 5.12: SF 029 under southern arc of SF 005.

Figure 5.13: Ash bast, SF 019 removed from under SF 004.

Penannular ringed ornaments

The complete penannular ringed ornament (SF 001; Figure 5.14a) had annular rings that were attached to integrated loops protruding from the outer circumference of the main bar, which were uniformly spaced. The articulated annular rings lay at varying angles around the outside of the neck ring (SF 001); approximately half were tilted upwards. Two rings were separated from the main bar, but only one was noted to have detached during the excavation. One was noted as detached after specialist attention and a third was missing entirely. The rings noted as detached were complete with the integrated loop being the damaged part (Figure 5.15). The complete penannular ringed ornament had a small opening on its north-east edge. It was lifted first after spit 1 (1 mm and 25 mm in thickness) was removed (Figure 5.14b). Spit 2 (c. 10 mm in thickness) was associated with the soil left behind after the removal (Figure 5.14c).

The fragment of penannular ringed ornament (SF 002) was very similar in manufacture to (SF 001). It had thirteen integrated loops with similar spacing to (SF 001). All thirteen annular rings were attached and were predominantly tilted downwards with six rings turned upwards. Had it been intact, it would have had a slightly smaller diameter than (SF 001). It was the second artefact lifted after Spit 3 was removed (Figure 5.14d). Spit 4 (c. 10 mm in thickness) was associated with the soil left behind after the removal (Figure 5.14e).

Penannular bar bracelets

Bracelets (SF 005 and SF 006) were the next artefacts removed. They were loosely held together by organic material and so were removed together with the organic materials (SF 033) that encircled them, later identified as bracken stems and ash bast (Figure 5.16). This organic material appeared to follow the curve of the metal artefacts but with no obvious form or structure. The bracelets were similar in size with (SF 006) being the smaller of the two. They were lifted after Spit 5 was removed (Figure 5.14f).

Bracelet (SF 004), sat slightly apart from the main group had a small amount of ash bast (SF 019) and partly lay under (SF 006; Figure 5.14g).

Bracelets (SF 007, SF 008 and SF 009) were the last to be lifted with the cup ended ornament (SF 003) and organics (SF 042 and SF 043), as the surrounding organic material appeared to hold the items together (Figure 5.17). It was first suspected that the organic materials wrapped around the top two bracelets but after a stalled attempt at lifting due to them holding the items in place, a decision was made to take all four artefacts as one so the surviving organics would remain as intact as possible. A small copper sheet was crafted to create a mini block lift. It was slotted into sterile material below the cup ends of (SF 003) so no organics were disturbed as the bulk of the metal was gently lifted and tilted onto the sheet, holding all items in their positions effectively (Figure 5.18). The last artefacts were lifted after Spit 6 was removed. Spit 7 was associated with the soil left behind after their removal and measured c. 10 mm in thickness.

Figure 5.14: The complete penannular ringed ornament (SF 001) a, b and c.

Figure 5.15: Loose annular rings from SF 001.

Figure 5.16: SF 005 and SF 006 wrapped in SF 033.

Figure 5.17: Organics SF 042 and SF 043 clumped around the bracelets.

Figure 5.18: Mini-blocklift of last artefacts in the hoard.

The Bronze Ornament Hoard

By Matthew G. Knight, Leanne Demay and Brendan O'Connor

Catalogue

All artefacts are produced from cast copper alloy, with two being leaded bronze (SF 007 and SF 008) (Figures 5.19-5.22). For details of metallurgical compositions see Northover, below.

SF 001: Penannular ringed ornament, complete, slightly oval in plan (interior diameter 195 mm by 175 mm; external diameter 210 mm by 198 mm; internal circumference c. 560 mm). The solid bar, generally oval in section (thickness 10.5 mm by 9.5 mm opposite terminals), flares towards plain expanded flat oval buffer terminals (18.5 mm by 14.5 mm), slightly angled, main expansion side-to-side (gap 3.3 mm between terminals). Two small lenticular holes are cast on the interior of the terminals about 8 mm from the ends. Radiography revealed these relate to angled perforations leading to the terminal ends. Thirty-seven evenly spaced integrated loops (length 9-10 mm; thickness 4-5 mm; with 11.5 mm between each loop) hold cast rings (diameter 17.0-17.4 mm; thickness 4.5 mm); three are missing (two loose rings are present). Where accurately measurable, most of the rings are consistent in diameter (external diameter c. 16.5 mm); some may show areas of thinning/wear, but adhering organic material hinders visual analysis. Generally sound. Flaky mid-brown coarse organic deposits adhere to much of the surface, quite thickly in places, fixing approximately half of the rings in an upright position. Weight 494 g.

Figure 5.19: Complete penannular ringed ornament from Rosemarkie (SF 001). Taken by National Museums Scotland.

Figure 5.20: Incomplete penannular ringed ornament from Rosemarkie (SF 002). Taken by National Museums Scotland.

Figure 5.21: Copper-alloy cup-ended ornament from Rosemarkie (SF 003) with tree bast knot around the hoop. Taken by National Museums Scotland.

Figure 5.22: Six copper-alloy bracelets from Rosemarkie (SF 004-SF 009). Taken by National Museums Scotland.

SF 002: Fragment of penannular ringed ornament, broken at both ends in antiquity. The solid bar, oval/circular in section (diameter 9.5-10.5 mm), features 13 evenly spaced integrated loops (12 mm gap between each loop) each holding a cast annular ring (diameter 17 mm where accurately measurable; thickness 3.5-4 mm). A fracture line is visible approximately halfway along the bar. A mid-brown flaky organic deposit, thick in places (fixing 6 of the rings in an upright position), and thin darker patches of smooth organic matter are concentrated on one surface only; the other surface appears relatively clean. Where free of organics, surface corrosion is visible. Similar in form to SF 001, but the original interior diameter is smaller, estimated at c.170 mm. Approximately 40% remains; the angle of the curvature suggests it is a fragment from the side of the ornament. Weight 163.1 g.

SF 003: Cup-ended ornament, complete. Complete cast penannular bar ornament with concave circular terminals. The oval-sectioned bar/hoop (measures 14.5 mm by 12 mm opposite terminals) is thickest at apex of the curve and narrows and tapers smoothly towards the terminals where it becomes almost circular (8.5 mm by 9 mm). Slight step out to the cup on exterior but smooth join on interior. Cup terminals are regular circles, diameter 40.5–41 mm, thickness 1.5–2 mm. Cups slightly everted and not completely central on bar. Length of hoop end to end of cup terminal: 20.5–23 mm (expands towards outside). Thick plant fibres wound around the top of the hoop, off-centre, are tied in a knot. A thin layer of flaky light brown organic deposit adheres to much of the surface of the ornament, and a darker layer of thin seemingly organic material is concentrated around the exterior and interior of the cup ends. Generally sound, edge of one cup very slightly chipped. Hoop external diameter 82.5 mm by 64 mm; internal diameter 63 by 50 mm. Maximum width of ornament (terminal to terminal) 94.5 mm. Weight 193.58 g.

SF 004: Penannular bar bracelet, complete, hoop slightly distorted when viewed edge-on. Plain outwardly expanded flat oval terminals (9.5-10 mm by 7.5 mm). Broadly circular in plan. Some corrosion and lamination, particularly at terminals. Patches of original patina surviving. Light brown organic materials adhering at one terminal and on the hoop (opposite terminals, off centre). Thin layer of dark organic material, largely on interior of hoop. The organics appear to have been wound around the hoop. Hoop cross-section oval/D-shaped (8 mm by 6 mm). Hoop diameter 68 by 61.5 mm (external); diameter 53.5 by 49 mm (internal). Weight 57.95 g.

SF 005: Penannular bar bracelet, complete, hoop slightly distorted when viewed edge-on. Oval in plan. Plain outwardly expanded oval or D-shaped terminals (mis-matched; 7.5 mm by 9.5 mm and 9 by 9.5 mm). Generally sound, some patches of corrosion, largest terminal missing c. 1/3 surface through corrosion loss. Light brown organic materials adhering to much of the outer hoop and one terminal. Fibrous organics wrapped around much of one half. Hoop cross-section D-shaped (7.5 mm by 10 mm opposite terminals gently tapering to 8.5 mm by 6 mm). Hoop diameter 81 mm by 65.5 mm (external); diameter 62.5 mm by 49 mm (internal). Weight 87.51 g.

SF 006: Penannular bar bracelet, complete, hoop even when viewed side-on. Oval in plan. Plain outwardly expanded flat oval terminals (9 mm by 10.5-11.5 mm), main expansion side-to-side. Thin covering of light brown organic material across much of the surface, particularly concentrated at one terminal. Generally sound, small areas of corrosion or small corrosion blisters. Hoop cross-section flattened oval (8.5 mm by 7 mm opposite terminals gently tapering to 8 mm by 6 mm at terminals). Hoop diameter 72 mm by 58 mm (external); diameter 56 mm by 42 mm (internal). Weight 61.74 g.

SF 007: Penannular bar bracelet, complete, hoop very slightly distorted when viewed side-on. Oval in plan. The plain outwardly expanded terminals are D-shaped (10.0 x 9.5mm). Some flaking areas of original patina concentrated at terminals. Very thin layer of light brown organic materials across much of the surface and layer of thin dark organic material (plant matter) adhering around one terminal on the interior. Generally sound, areas of corrosion or small corrosion blisters. Hoop cross-section D-shaped (8.5 mm by 7.5 mm opposite terminals, gently tapering to 7.5 mm by 7 mm at terminals). Hoop diameter 75.5 mm by 61 mm (external); diameter 61.5 mm by 45mm (internal). Weight 68.8 g.

SF 008: Penannular bar bracelet, complete, hoop even when viewed side-on. Oval in plan. The oval-sectioned hoop (8.5 mm by 7.5 mm opposite terminals) tapers gently towards plain flattened oval terminals with very slight side-to-side expansion (7 mm by 5 mm). Some areas of original patina concentrated at the top of the hoop and internal surface at one terminal. Generally sound with patches of corrosion. Thin patches of light brown organic material adhering, some seemingly wrapped around the bracelet. Hoop diameter 75 mm by 65 mm (external); diameter 59 mm by 50.5 mm (internal). Weight 68.79 g.

SF 009: Penannular bar bracelet, complete, hoop even when viewed side-on. Oval in plan. The hoop is D-shaped in section (9 mm by 7.5 mm opposite terminals) gently tapers towards plain flattened D-shaped terminals (8.5 mm by 6 mm) which expand very subtly from inside-outside. Generally sound with patches of flaking original patina concentrated at the top of the hoop, some small areas of corrosion. Light brown organics adhering, and layer of thin dark organic material (plant matter) in patches, particularly around interior of hoop. Hoop diameter 77 mm by 64.5 mm (external); diameter 61.5 mm by 51 mm. Weight 77.35 g.

Typology

A note on typology

SF 001 and SF 002 were usually regarded as a form of torc or neck-ring or necklet (e.g. Coles 1960, 94-5; Cowie 1988, 33, illus.30). However, SF 001 shows no evidence to suggest it was used in such a way, such as wear or distortion, and its internal diameter is quite small for most adult human heads. These objects will be referred to here as 'penannular ringed ornaments', to avoid assumptions about their function.

Artefacts such as SF 004 to SF 009 are occasionally referred to as 'armlets' (e.g. Coles 1960) but, following Becker et al. (2020, 118) the term 'bracelet' is used here to reflect more accurately their size as an ornament to be worn on the lower arm or wrist; the term 'armlet' is better reserved for ornaments larger enough to be worn on the upper arm.

Finally, SF 003 is a cup-ended ornament, a descriptive term widely accepted over functional terms such as 'dress fastener' for which there is currently no evidence.

Penannular ringed ornaments *(SF 001, SF 002)*

The Rosemarkie hoard contained one complete and one incomplete penannular ringed ornament, both of a similar manufacture and density of rings around the exterior of the bar. The complete ornament is the most complicated example of this type currently known in Scotland with 37 integrated loops and rings, of which two loops are broken recently, one ring has a modern break and only one ring is missing. The incomplete example would have been similarly complex when complete. Three other hoards from Scotland contain penannular ringed ornaments (Table 5.1): three from Braes of Gight, Aberdeenshire; one from Dingwall, and two broken fragments from Wester Ord, both Highland (Easter Ross) (Muirhead 1891; Richardson 1925, 113-16; Cowie 1988, 33, illus.30). The Dingwall find spot is, however, assumed (Cowie 1988, 33, 47), while the Wester Ord find spot is uncertain (Clark et al. 2017, 33).

While the forms are consistent, there is some variety across these objects. One of the Braes of Gight ringed ornaments (NMS acc. no. X.DQ 275) comprises a bar with 18 integrated loops and rings evenly spaced around the exterior, as well as a larger integrated loop and ring at each terminal. The other two ornaments in the hoard (NMS X.DQ 276-7) consist of a plain bar with an integrated loop and ring at each terminal. All are smaller than the complete Rosemarkie example, with respective diameters of 171 mm, 180 mm and 158 mm. The example from Dingwall (Aberdeen University Marischal Museum: 14502) is larger, with a diameter of c. 234 mm (Clark et al. 2017, 43). Like the Rosemarkie ornament, the Dingwall ornament has flat, slightly everted buffer terminals and while only one ring now survives, the stump remains of c. 40 integrated loops survive around the outside. Were it complete, it would represent a similar complexity to the Rosemarkie ornament. Lastly, two non-refitting fragments of the bar of a penannular ringed ornament survive from the Wester Ord hoard (NMS X.DQ 271), including one terminal

with everted buffer end and one distorted bar fragment. Like the Dingwall ornament, only the stumps of the loops around the exterior of the bar survive; two additional rings, now lost, found with the hoard are thought to be part of this ornament (PSAS 1870, 309-10).

Hoard	Socketed axeheads	Penannular bracelet	Penannular ringed ornament	Cup-ended ornament	Pin	Other object types	Key references
(1) Rosemarkie, Highland (Ross and Cromarty)		x	x	X			This report
(2) Auchtertyre, Moray		x				x	Smith 1872, 435-43; Coles 1960
(3) Ballindalloch, Moray		x				x	Unpublished; Treasure Trove TT 30/24
(4) Balmashanner, Angus	x	x				x	Anderson 1892; Coles 1960, 98-9
(5) Braes of Gight, Aberdeenshire		x	x			x	Muirhead 1891; Coles 1960, 94-5
(6) Clockmaden Farm, Perth and Kinross	x	x				x	Cowie and Reid 1987
(7) Dingwall, Highland (Ross and Cromarty)	x		x		x		Cowie 1988, 33, illus.30; Clark et al. 2017, 32, 41, 43, 50
(8) Glentanar, Aberdeenshire	x	x				x	Pearce 1971; 1977
(9) Heights of Brae, Highland (Ross and Cromarty)		x (gold)		x (gold)		x	Clarke and Kemp 1984
(10) Hillhead, Highland (Caithness)		x (gold)				x	PSAS 1913, 433-5, fig.1; Coles 1960, 93; Eogan 1994, 150
(11) Monmore, Killin, Stirling	x	x				x	Stewart 1882
(12) Orrock, Fife		x			x	x	Piggott 1948; Coles 1960, 109-10
(13) Poolewe, Highland (Ross and Cromarty)	x			x		x	Jolly 1880; Knight et al. 2021
(14) Rehill (Ryehill), Aberdeenshire	x	x					Coles 1960, 97
(15) St Andrews, Fife	x	x			x	x	Cowie et al. 1991; 1998
(16) St Cyrus, Aberdeenshire	x	x (gold)					Unpublished; Treasure Trove TT 229/23
(17) Wester Ord, Highland (Ross and Cromarty)	x	x	x			x	PSAS 1870, 309-10; Coles 1960, 129-30; Richardson 1925, 113-6

Table 5.1: Late Bronze Age hoards containing ornaments in northern mainland Scotland. All object types are copper-alloy except where noted and other object types cover a range of objects and materials.

Both the surviving terminal fragment from Wester Ord and the Dingwall ornament have cast angled perforations through the terminal ends and out the interior of the bar. The Rosemarkie ringed ornament has the same cast angled perforations (see Figure 5.25, below). The function of these holes is currently unclear but suggests the ornaments may have been threaded or strung in some way and that these perforations were integral features.

To date, penannular ringed ornaments retain a distinctly north-east Scotland distribution with none known from elsewhere in Britain, though there has previously been speculation of Continental influence (e.g. Childe 1935, 163-5; Coles 1960, 42-3). Coles (1960, 42-3) suggested these ornaments may draw similar inspiration to Ziemitz-type necklets from northern Germany (cf. Sprockhoff 1956, 143-4, Abb.38, Taf.25); however, apart from being penannular bars with integrated rings around the exterior, these are quite different in form. They are not well dated and were excluded from a recent catalogue of Nordic Bronze Age necklets (Nørgaard 2011). One in particular - from Ziemitz on the Baltic island of Usedom - has a triangular lattice around its exterior onto which multiple rings are interlinked. Another superficially similar object type occurs in the French Alpine region. Two complex bronze torcs with multiple interlinked bronze wires looped with annular rings are known from a hoard from Les Truquets, Réallon, Haute-Alpes (Eluère and Gomez 1990, 125). Similar torcs with loose rings also occur in Slovenia (Teržan 1995, 62-3, n26, pl.97). Both the French and Slovenian finds belong to the early part of the late Bronze Age, before the proposed dating of Rosemarkie (see below). Additionally, geographical disparity, with no comparable objects in northern France or southern Britain, makes it more likely that these continental examples pose a coincidental resemblance rather than a typological connection. Further, these torcs are made from multiple interlinking elements, rather than being a cast ensemble as in the Scottish artefacts.

Closer to home, loose rings are found on the Irish flesh-hook from Dunaverney, Co. Antrim (Bowman and Needham 2007). These rings are attached by tangs which project through the ferrules of the flesh-hook from cast figures of birds and are coiled around the rings (ibid. 67, fig 11-12). While this technology differs from Rosemarkie, another Irish flesh-hook, from Doomore, Co. Sligo, and some horns, do have similarly cast-on rings (ibid. 93). Dunaverney is also broadly contemporary with the Rosemarkie hoard (ibid. 82, 97, fig 18, table 2). Given the limited concentration of Scottish finds around the Moray Firth, it seems most probable that these ringed ornaments represent an insular manufacturing tradition, which is supported by the composition that aligns with what is expected for Scottish late Bronze Age metalwork (Northover, below). The Dingwall, Wester Ord and Rosemarkie examples are sufficiently similar in character that one may speculate that they were made by the same craftsperson or workshop, or drew inspiration from the same ideology, perhaps related to Ireland.

Penannular bar bracelets *(SF 004-SF 009)*

The Rosemarkie hoard contained six complete, undecorated penannular bracelets, all apart from one with distinctive outwardly projecting terminals (Table 5.2; Figure 5.22). This type of bracelet, known as a 'Covesea type' (Coles 1960, 39-40), is largely confined to late Bronze Age hoards across north-eastern mainland Scotland, from Fife to Highland (Benton 1931, 182-4; Coles 1960, 41; Becker et al. 2020).

SF no.	Bar section	Terminal expansion	Bar width (mm)	Diameter (internal) (mm)	Diameter (external) (mm)	Mass (g)	Distorted
4	Oval/D	outwards	8.0 by 6.0	53.5 by 49.0	68.0 by 61.5	57.95	Y
5	D-shaped	outwards	10.0 by 7.5	62.5 by 49.0	81.0 by 65.5	87.51	Y
6	Oval	side-side	8.5 by 7.0	56.0 by 42.0	72.0 by 58.0	61.74	
7	D-shaped	outwards	8.5 by 7.5	61.5 by 45.0	75.5 by 61.0	68.8	Y
8	Oval	side-side	8.5 by 7.5	59.0 by 50.5	75.0 by 65.0	68.79	
9	D-shaped	slight	9.0 by 7.5	61.5 by 51.0	77.0 by 64.5	77.35	

Table 5.2: Rosemarkie penannular bracelets.

Table 5.2 details the penannular bar bracelets from Rosemarkie. Most hoops/bars are D-shaped in section (SF 004, SF 005, SF 007, SF 009), two are oval (SF 006 and SF 008), the width tapering towards the terminal. All show clearly expanded terminals, except SF 009 where the expansion is more subtle. All are oval in plan, except SF 004 which is almost circular. However, there are no obvious pairs or groups, or indications that any derive from the same pre-form or mould. When viewed side-on, three bracelets are slightly distorted (SF 004, SF 005 and SF 007) suggesting they were worn repeatedly; the distortion might arise from the action of moving the terminals away from one another in a side-ways motion to expand the gap to enable the wearer to insert their wrist. The lack of decoration conforms to a wider pattern of plain bronze bracelets in the Highland region.

The Rosemarkie penannular bar bracelets are notably chunky, weighing between 58-87 g (Table 5.2): these are among the heaviest bronze bracelets known from Scotland. A visual assessment of bracelets from comparable hoards in the National Museums Scotland collections revealed a striking diversity in form, particularly in the bar width and mass. A thicker penannular bar bracelet from Wester Ord (NMS X.DQ 272) and a broken bracelet from Auchtertyre, Moray (NMS X.DQ 115; Smith 1872, 435-43) provide the best parallels for the Rosemarkie examples, particularly SF 004 and SF 005. Other good parallels in form come from the hoards from Dingwall; Balmashanner, Angus (Anderson 1892); St Andrews, Fife; and Braes of Gight. Most are, however, smaller and lighter. The heaviest bracelet in the St Andrews hoard weighs 53.27 g (NMS X.DQA 43), while the complete Braes of Gight bracelets range from 27.93 g to 49.37 g. Two of the eleven bracelets from Balmashanner (NMS X.DQ 143-144) and one from Wester Ord (NMS X.DQ 272) provide good mass comparisons at 57.77 g, 67.58 g and 79.8 g respectively. These are significantly chunkier than those from other hoards, such Clockmaden Farm, Perth and Kinross where the slender bracelets weighed between 13 to 28 g (Cowie and Reid 1987, 82-4, Illus 15). This is undoubtedly significant, not only in terms of the overall appearance of the finished objects but also in relation to the control or acquisition of the raw materials necessary to create them, along with the power and status they imply. The heaviest Rosemarkie bracelet is nearly three times the mass of the lightest bracelet from Braes of Gight, for instance. The shape and expansion of terminals also vary, and there appears to be a clear correlation between D-shaped hoops/bars and outwardly expanded terminals in the Rosemarkie assemblage, also evident in those from Auchtertyre and Covesea. Further research into copper-alloy bracelets from northern Scotland would be fruitful.

Cup-ended ornament *(SF 003)*

While the other ornaments from Rosemarkie are familiar Scottish forms, SF 003 is more unusual. The only comparable example surviving is in the Poolewe hoard, Wester Ross, which differs in form with a more slender hoop and broad, shallow terminals (Knight et al. 2021, 6, 10, 21-2, fig. 4, 8). However, a 19th century illustration of a bracelet (Chambers 1864, 22, 37, fig 5) appears to show a related bronze form, whose slightly swollen hoop and concave-profile terminals are consistent with certain late Bronze Age bracelets from Ireland. The illustrated bracelet was among a number of ornaments found on Caerlee Hill, Innerleithen, Peeblesshire (Coles 1960, 90, 134; RCAHMS 1967, 19), and if this was indeed a hoard of bronze ornaments it would be among a very few from Scotland. Apart from Rosemarkie, there is an even earlier find in a cairn at Orrock in Fife composed of various ornaments, including three small bracelets (Piggott 1948).

Bronze ornaments like SF 003 are also very rare in England (Hawkes and Clarke 1963, 229, 242, fig 51) though one had been reused as the pommel of a sword in the Whittingham hoard, Northumberland (Colquhoun and Burgess 1988, 122, pl. 111, no.755). A few of these bronze bracelets occur in Ireland. There are two cup-ended examples in the Ashmolean Museum, Oxford, from Co. Cavan and Ballymoney, Co. Antrim (acc. nos 1927. 2903 and 2904); the former seems to be the closest comparison to Rosemarkie, though neither has quite such conical terminals. A bronze bracelet in the hoard from Mountrivers, Co. Cork has terminals of concave profile, resembling Caerlee (Eogan 1994, 152, pl. XVI, bottom; Cahill 2006, 247-53, pl. XVI). The hoards from Derryhale, Co. Antrim, and Brockhagh, Co. Westmeath, each contain a bronze bracelet that also differs in form and proportions from Rosemarkie (Eogan 1983, 57-8, no. 44, 5, fig. 22, 5 and 166 no. 147, 4, fig. 93A, 1).

The working assumption is that Rosemarkie SF 003 is a bronze version of gold cup-ended ornaments, possibly functioning as bracelets. This is supported by the presence of three gold examples in the hoard from Heights of Brae, only about 20 km west of Rosemarkie (Clarke and Kemp 1984, 192, 197, illus. 2-3; Eogan 1994, pl. XVIII, bottom), that resemble the bronze cup-ended ornament from Poolewe. Comparable gold bracelets from Ireland are illustrated by Armstrong in his catalogue of Irish gold ornaments (1933, pl. XVI) and belong to his 'Penannular rings of the third class' (ibid. 30-33, 71-4). But none of these gold bracelets seems to match exactly the proportions of the Rosemarkie bronze cup-ended ornament. Subsequent groupings are still based on Armstrong's catalogue (Eogan 1994, 85, 88 - Variety 12, listed as 'Thick penannular bracelets' on p.152-3 and mapped in fig. 39; Hook and Needham 1989, 21 - Class A; Cahill 2006, 285 – Type 3). Cahill identifies gold bracelets of Eogan's Variety 12 from the New Ross hoard, Co. Waterford (ibid. 285, Appendix B.2, 4, pl. XXX), and from Brahalish (ibid. 228-30, pl. V), Clonakilty and Kippach (ibid. 243-4, pl. XIII) in Co. Cork (ibid. Appendix A.2, 9, 14 and 35).

Gold bracelets with conical terminals occur in British hoards from Walderslade in Kent (Eogan 1994, fig. 35, 1), Morvah in Cornwall (Hook and Needham 1989, fig. 1, 1; Eogan 1994, pl. XVIII top, upper row), and Caister-on-Sea in Norfolk (ibid. pl. 13, 3), all located around the southern coast. As there seem to be no gold bracelets like these in northern Britain, an Irish inspiration would be plausible for the Rosemarkie ornament. This is supported by the metal compositional analysis (Northover, below), which revealed the Rosemarkie ornament was produced from a copper alloy consistent with the repertoire of late Bronze Age metalwork in Scotland and thus was probably manufactured locally.

Dating

On typological grounds, the Rosemarkie hoard comfortably fits within the Ewart Park/St Andrews phase of the late Bronze Age (c. 1020 – 800 BC). Bast fibres from around the cup-ended ornament (SF 003) were dated between 894 to 794 cal BC (UBA-56041), while hazel charcoal from the subsoil around the hoard (SF 018) produced an earlier date of 1012 – 838 cal BC (UBA-56040) (see Part 3: Radiocarbon dates, Table 3.1). This indicates the probable date of deposition.

Parallels for the objects in the hoard suggest a general currency of these artefacts in the Ewart Park phase. Some associations may suggest a slightly earlier date in this sequence. For instance, the association of ringed ornament fragments and a Covesea-type bracelet with socketed axeheads of types Meldreth and Highfield (cf. Schmidt and Burgess 1981, 181, 208) at Wester Ord is more likely to date to the tenth century BC (i.e. early Ewart Park).

Absolute dates associated with ornaments are few. The bracelets and other metalwork recovered at Sculptor's Cave, Covesea, Moray, lack directly associated dates but probably date to the late Bronze Age layers around 1050 – 975 cal BC. A bracelet and amber bead from Croig Cave, Mull fall within a radiocarbon dating sequence between 1130 – 790 cal BC and 1030 – 840 cal BC (Cowie and O'Connor 2012, 80; Mithen and Wicks 2012, 76; Becker et al. 2020, 118). Radiocarbon dates for the Rosemarkie hoard represent the first absolute dates directly associated with an ornament hoard in Scotland and are critical for our understanding of the wider typology of the associated objects.

Manufacture

All the bracelets were cast in bivalve moulds, as was typical for the late Bronze Age. Ornament moulds are very rarely found but two-piece clay moulds for producing bracelets were recovered from the ephemeral remains of a late Bronze Age metalworking area at Birnie, Moray (Hunter 2006, 22, Fig 12; 2007, 13). The Rosemarkie bracelets would have been cast in similar moulds and appear to have been carefully finished. Differences in their forms indicate they came from individual moulds and metal analysis revealed no correlation between the composition and the form (Northover, below). X-radiography shows that they were consistently well-cast with little evidence of porosity or casting flaws (Figures 5.23-5.25). It had been suggested that the expanded terminals of Covesea-type bracelets might have been hammered into form (Benton 1931, 182–4), but the cast grooves on the penannular bracelets (SF 728 and SF 729) from Sculptor's Cave prove that expanded terminals were also cast (Becker et al. 2020, 117–8), as seems to be the case for the Rosemarkie bracelets.

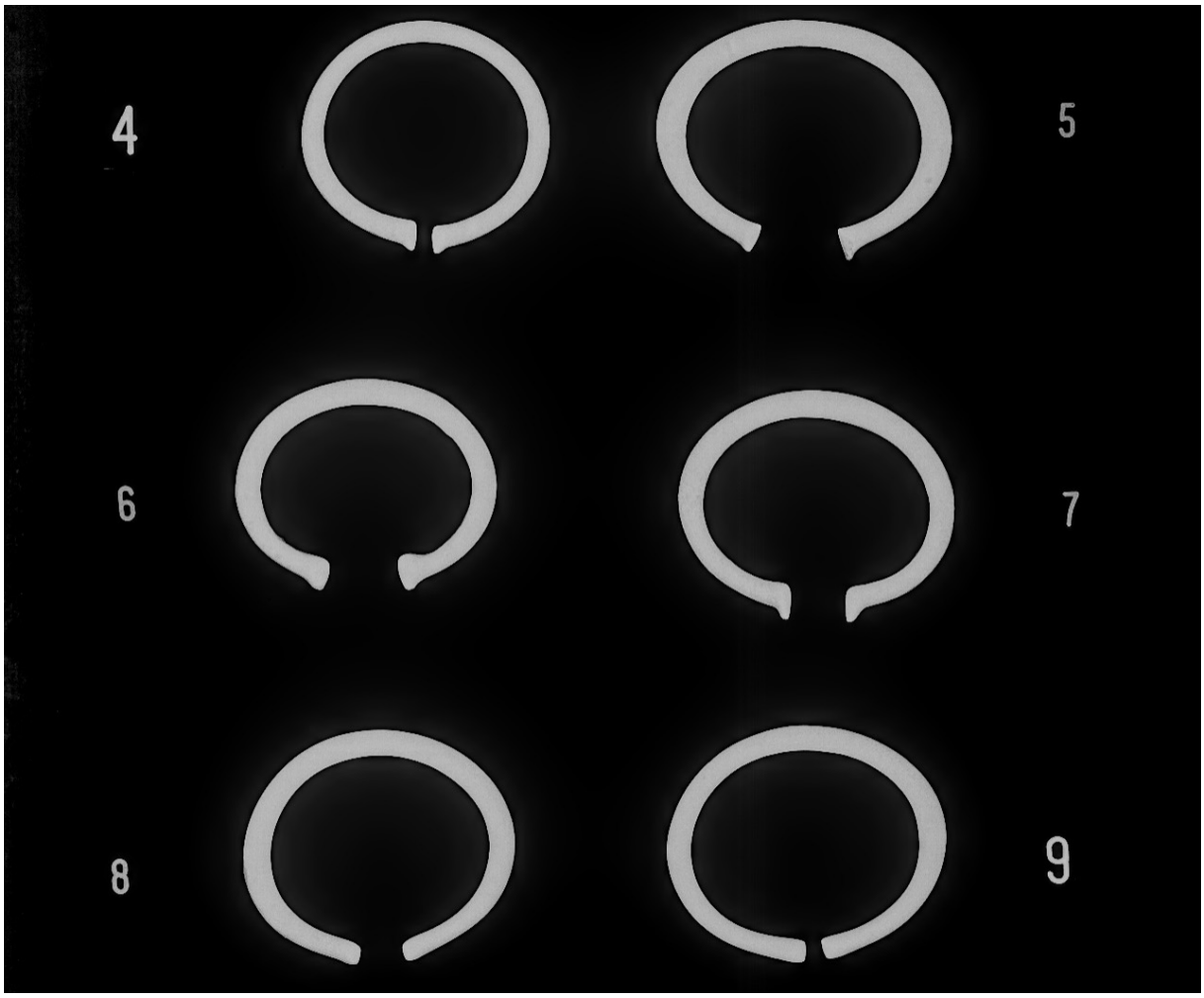

Figure 5.23: Computed radiography (CR) plate of bracelets SF 004-SF 009 from Rosemarkie. Taken by National Museums Scotland.

Figure 5.24: Computed radiography (CR) plate of cup-ended ornament SF 003 from Rosemarkie. Taken by National Museums Scotland.

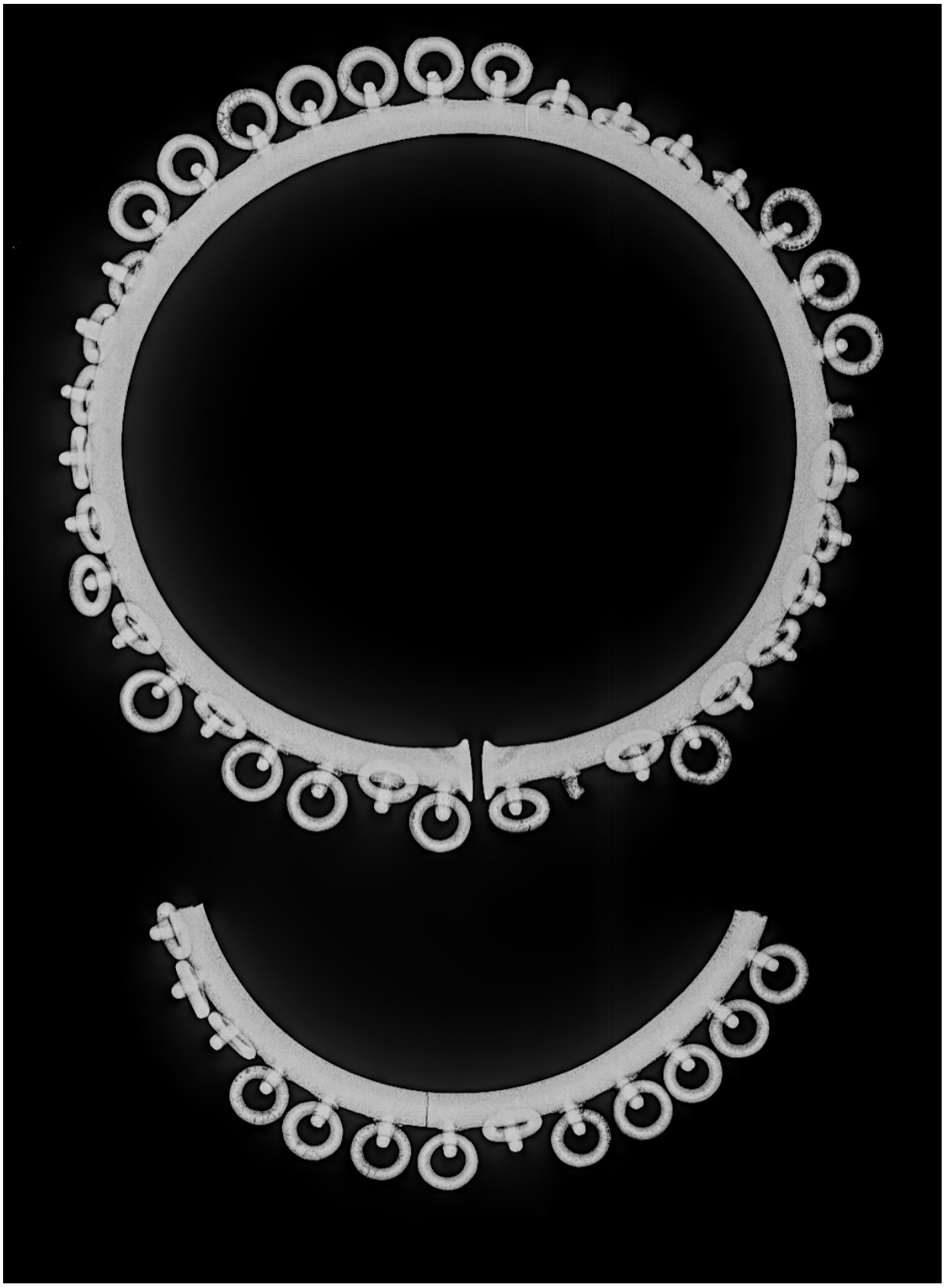

Figure 5.25: Computed radiography (CR) plate of SF 001 and SF 002 from Rosemarkie. Taken by National Museums Scotland.

The cup-ended ornament (SF 003) is also well-cast and finely finished. It was probably cast as one in a single bivalve mould. X-rays reveal no signs of seams or separation between the cup terminals and the main bar (Figure 5.24). In his discussion of the manufacture of gold cup-ended ornaments, Maryon (1938, 201-3) proposed that the objects may be cast as one or the terminals may be cast or burnished on. For the Poolewe example, it was suggested that the terminals may have been cast on (Knight et al. 2021, 10), due in part to a lip on the interior of the cup terminals that seems to represent the original bar. No such lip is visible on the Rosemarkie cup terminals and it is most likely this was produced as a single object.

By contrast, the penannular ringed ornaments SF 001 and SF 002 are much more complex, and there are two possibilities for their manufacture. These may represent an exceedingly rare example of lost-wax casting (Northover, below), a technique that was uncommon in the late Bronze Age in Britain, though may have been used for producing high-status objects, such as vessels (Northover 2010) or flesh-hooks (Bowman and Needham 2007). Alternatively these objects may have been made by complex casting using bivalve moulds, involving individually cast components comprising three main parts: the large penannular bar, attachment loops, and small annular rings. Fragments of a ringed ornament from Wester Ord offers some clues as to how these ornaments were constructed (Figure 5.26). The surviving bar fragments have a series of small 'cup-like' hollows with projecting 'lips' that Richardson (1925, 114, fig.1) speculated were the remains of small loops. The uniformity of these suggests that they were a specific part of the design of the penannular ring at the casting stage with the intention of creating a surface which would allow the flow of metal (perhaps through soldering or a complex cast-on) as a mechanism to strengthen the join between the main ring and the loops. For the Rosemarkie ornaments, an X-ray shows that 'lipped' cups are clearly visible at the base of some of the loops; this suggests the Wester Ord ornament fragments are unfinished. However, this latter technique would have required a highly intensive finishing process of all rings and hoops. Resolving the question of the exact manufacturing technique (lost-wax casting or complex bivalve casting) requires further investigation. For both SF 001 and SF 002, the casting quality of the penannular bar is very good with little porosity visible (Figure 5.25). By contrast the loops and small annular rings display high levels of porosity. The uniformity of the loops and rings suggests they were cast en masse before assembly and the similarity of the two complete and incomplete ringed ornaments suggests they were made by the same craftworker.

Figure 5.26: The two penannular ringed ornament fragments from the Wester Ord hoard, Highland (NMS acc.no X.DQ 271). © National Museums Scotland.

Wrapping and arranging the deposit

Micro-excavation of the block-lifted hoard recorded the structure and arrangement of the ornaments and associated organic remains (Buckley, above). The organic remains were analysed by Susan Ramsay (below) and the knotted plant fibres were reported on by Susanna Harris (below). The hoard was carefully arranged for deposition with various elements wrapped, bound, stacked and packed. The key features of the hoard arrangement relevant to the subsequent wider discussion are outlined here.

Wrapping

Patches of a thin dark organic layer were observed closely adhering to the surface of most of the ornaments as well as concentrated strands of plant fibres wrapped around them. These areas of plant fibres appear similar to the tree bast that bound the ornaments (see below), but are distinct from it and are finer, as will be discussed.

Small patches of the dark layer were observed on the bars of SF 001 and SF 002, but it appears inconsistent and quite ephemeral, perhaps a result of preservation near the edge of the pit. By comparison, this layer was extensively present on the bracelets (SF 004 - SF 009) and on the terminals of the cup-ended ornament (SF 003). It was speculated that this might be a corrosion product or a carbonised residue, but closer inspection and discussion revealed this was probably the remains of an organic layer adhering to the bronze objects, seemingly deliberately wrapped or applied. It does not appear to represent plant matter but resembles degraded skin or leather. The exact nature of this material requires future specialist work beyond the scope of the work commissioned, but some initial observations can be offered.

- The upper surface of the material has a cracked or crazed appearance where it has degraded, and in places it has delaminated (Figure 5.27). Where survival is good, the surface is darker, less cracked and slightly undulating, as in the cups of SF 003 and the interior of SF 008 (Figures 5.28 and 5.29). Where it can be viewed in section, this undulation is quite clear, as are multiple layers within the material (Figure 5.30). This is in keeping with what one might expect from surviving prehistoric leather.
- This material appears to be very thin and adheres to the surface of each object, as though representing individual wrapping. This is particularly noticeable where it adheres around the terminals of bracelet SF 004 (Figure 5.31), around the bars of bracelets SF 008 and SF 009, and around and inside the cups of cup-ended ornament SF 003.
- No clear technological features, such as stitching, seams or edges, could be conclusively identified, which makes it hard to understand how the material was applied to the objects.
- Where stratigraphic relationships can be observed with the other organic material, the possible leather was underneath the tree bast binding that tied groups of ornaments together (see below). Impressions of the binding can be seen in the upper surface of this layer in SF 004. However, in some areas there is fine plant matter also wrapped around the bracelet, which is clearly underneath the possible leather wrapping. This is observable, for instance, at the terminal of SF 004, as well as on the interior of SF 006 (Figure 5.32).
- Both the fibrous layer and the possible leather are inconsistently preserved across the bracelets. SF 005 has extensive survival of this fibrous wrapping around half of the hoop, but comparatively little survival of the possible leather except in patches. This suggests that both materials may have originally been much more extensive and we are almost certainly observing an incomplete survival of these materials and their relationships with each other and the objects.

Taken together it seems that the bracelets may have been individually wrapped in fibrous plant matter (currently unidentified) and then wrapped in possible skin or leather. This took place ahead of deposition and crucially before the ornaments were bound. This raises the possibility that the wrapping may have served a decorative or protective purpose, but the complexity of the wrapping would benefit from future investigation.

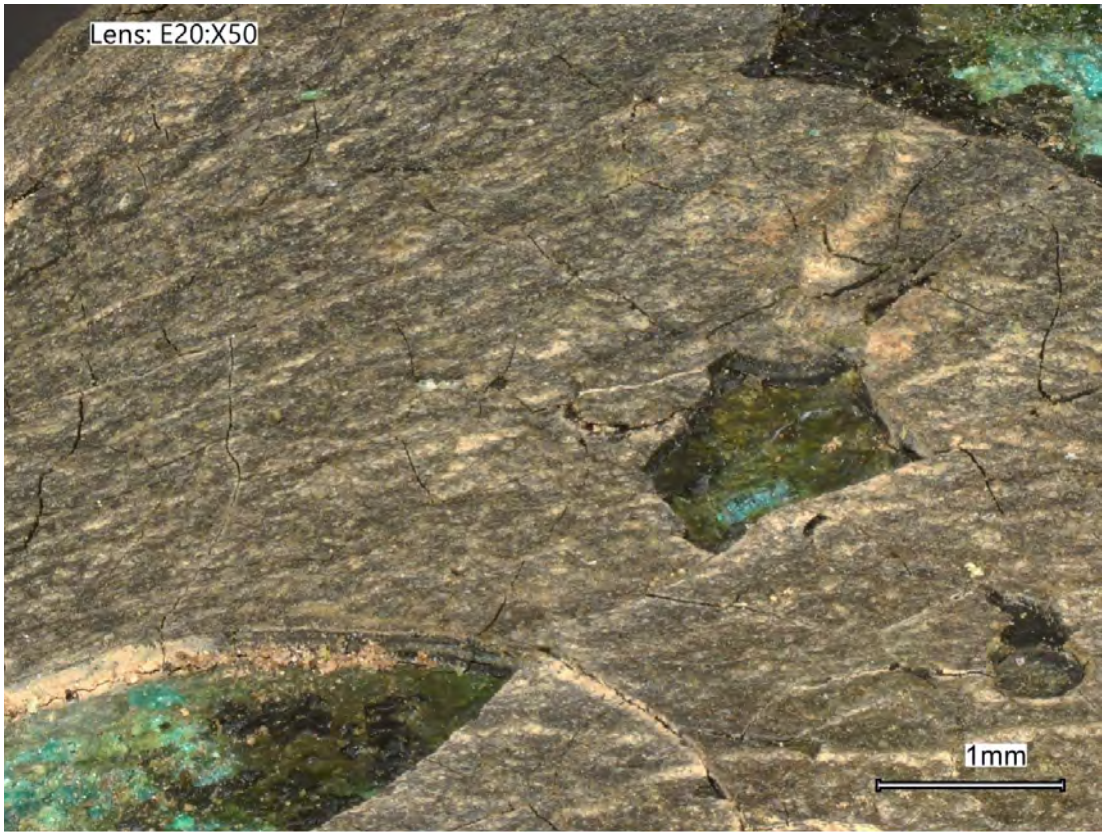

Figure 5.27: Cracked and crazed surface of dark organic layer on exterior of one terminal of cup-ended ornament SF 003. Taken by National Museums Scotland.

Figure 5.28: Undulating surface of dark organic layer on interior surface of one terminal of cup-ended ornament SF 003. Taken by National Museums Scotland.

Figure 5.29: Undulating surface of dark organic layer on interior surface of hoop of bracelet SF 008. Taken by National Museums Scotland.

Figure 5.30: Side view of multiple layers of dark organic layer adhering to bracelet SF 007. Taken by National Museums Scotland.

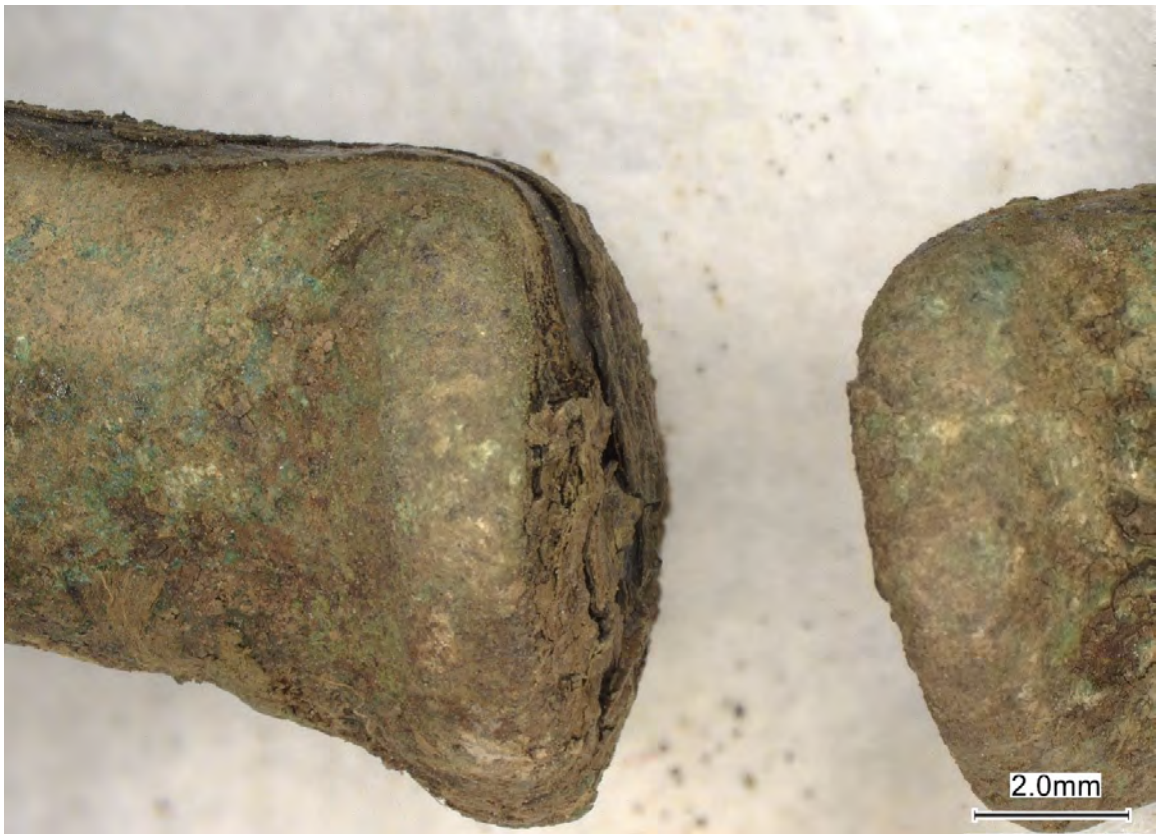

Figure 5.31: Dark organic layer adhering around the terminals of bracelet SF 004. Taken by National Museums Scotland.

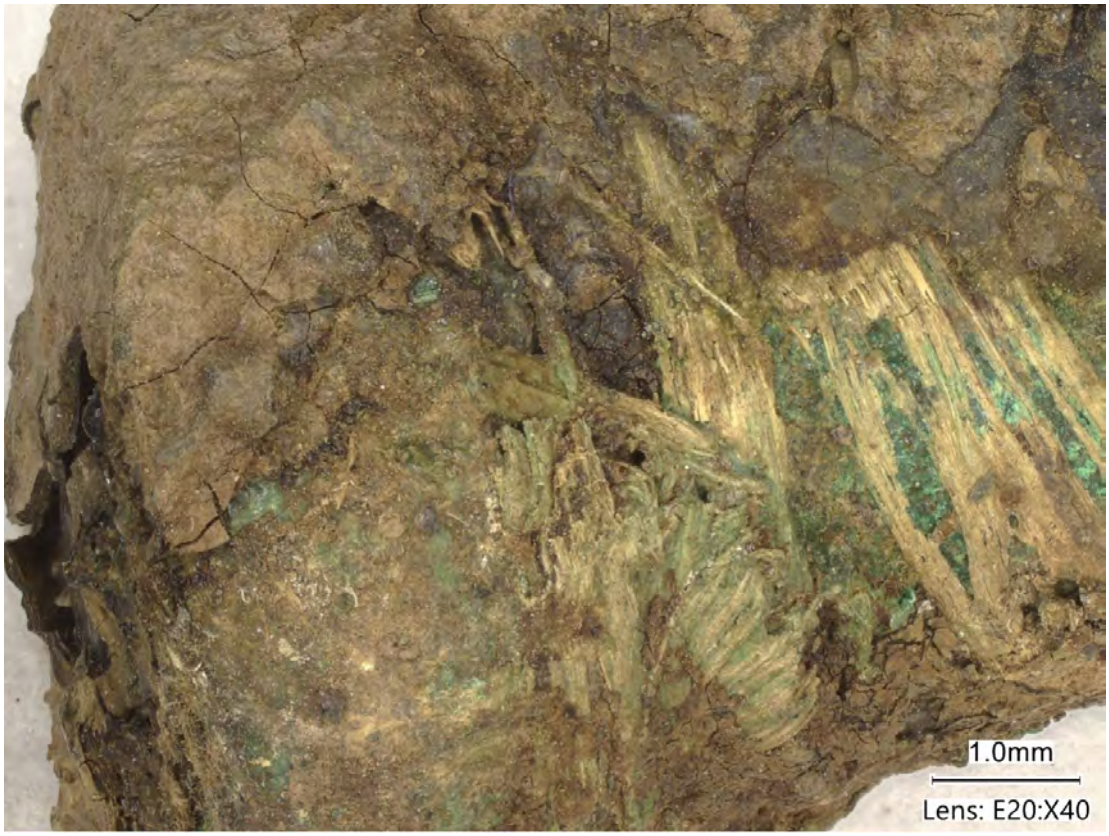

Figure 5.32: Fine plant matter adhering to surface of the terminal of bracelet SF 004 underneath the dark organic layer. Taken by National Museums Scotland.

Binding and stacking

At the base of the pit (003) four of the ornaments were bound by SF 042, strands of tree bast, a plant fibre that comes from the inner bark of trees (possibly ash, Fraxinus sp, Figure 5.13) (Ramsay, below and Table 3.9a in Appendices). The cup-ended ornament SF 003 lay at the base, connected to three stacked bracelets above (from bottom to top: SF 009, SF 008 and SF 007). The most coherent binding that survived was that of the loose twisted fibres on the bar of SF 003, identified as a simple 'overhand' knot (Harris, below, Figure 5.8). Above these four ornaments was bracelet SF 004 which was not clearly bound to any other object and located slightly apart from the others at an angle. However, tree bast binding was visible during excavation around the middle of the hoop, surviving now as a discoloration of the patina in a strip on one face; on the opposite face there is an impression of binding in the possible leather layer in the same area. This raises the prospect that SF 004 was once bound to other bracelets (possibly the stack below) but slipped from position over time while in the ground. Above SF 004, bracelets SF 005 and SF 006 were tied together by tree bast (SF 033) but separate from the stack of four ornaments below. The excellent survival of the tree bast, and indeed other organics, was probably due to its direct contact with the bronze ornaments and the antimicrobial properties of the copper (Figure 5.16 and see Ramsay, below).

The ornaments were thus placed or 'stacked' in the following order (from base to top): cup-ended ornament SF 003, followed by penannular bracelets SF 009, SF 008, SF 007, SF 004, SF 006, and SF 005 (Figure 5.10). SF 004 was positioned slightly apart from, but above, the main group. To the northern side was the incomplete penannular ringed ornament (SF 002) and enclosing them all in plan was the complete penannular ringed ornament (SF 001). This gives an indication of the order of placement within the pit, though it is unclear if SF 001 and SF 002 may have been placed before the bound and stacked bracelets. All were broadly on their side (i.e. lying flat), though SF 004 was slightly askew.

There was little consistency to the orientation of the ornaments. SF 001 and SF 003 were both aligned with their openings broadly to the north; SF 009 with its opening to the south west; the stacked bracelets SF 005 and SF 006 were aligned south; and SF 004, SF 007 and SF 008 were aligned west, which strengthens the possibility that SF 004 was once part of this stack. It is noteworthy that the stack comprising the cup-ended ornament and three (possibly four) bracelets were not all aligned similarly.

Packing

The most striking feature of pit (003) is its shallow depth of just 0.1 m but it was precisely wide enough to accommodate the diameter of the penannular ringed ornament (SF 001). It was obviously a snug fit as corrosion and adhering organics have fixed some rings in an upright position, and in all probability, fossilised the exact position in which they have lain since deposition. There was no evidence to suggest the ringed ornaments SF 001 and SF 002 were bound to one another, or to any other ornament, but significant amounts of bracken (Pteridium aquilinum) that appeared as 'clumped material' between objects (e.g. SF 014 between SF 001 and SF 002), were recorded from many of the microsamples (Figure 5.9), suggesting it was used as packing material to protect the ornaments (Ramsay, below and Table 3.9a in Appendices). This form of packing is known from other late Bronze Age hoards (ibid.). The half penannular ring ornament (SF 002) was carefully placed to align with SF 001. Both ends of SF 002 were touching SF 001; it was carefully positioned as closely as possible to the mirror the position of the intact ornament.

Arrangement in pit

From the nine individual objects, three or four distinct associations can be identified: the four connected ornaments (SF 003, SF 007-SF 009); two joined bracelets (SF 005 and SF 006); the two penannular ringed ornaments positioned in a way that they touch; and one bracelet (SF 004) that appears separate from the others (though it was probably dislodged). The careful arrangement of all the objects within the intact complex ring ornament (SF 001) is particularly significant (Figure 5.5). In this sense, it was not the shallow pit or scoop (003) that contained the hoard, but rather SF 001. Every aspect of the Rosemarkie hoard's deposition suggests care, as evidenced by the arrangement and placement of the ornaments, the wrapping of individual

objects, the tree bast binding, and the bracken packing. There must be an inherent symbolism to this process.

Discussion

The Rosemarkie hoard of nine copper-alloy ornaments and associated organics is a rare and important discovery. It is the only archaeological excavation of a late Bronze Age ornament hoard from northern Britain known to the authors. Previous such discoveries were found through agricultural work (e.g. Auchtertyre) or metal-detecting (e.g. Clockmaden), with little contextual information. Excavation of the Rosemarkie hoard has allowed us to have confidence that the entirety of the hoard has been recovered, and critical radiocarbon dates have confirmed the assumed chronology of the objects, as well as the probable date of deposition in the latter half of the eighth century BC. Further, we can understand the structure and arrangement of the objects; as well as better appreciating the intrinsic role of organic material in forming the deposit.

As an excavated dryland hoard, seemingly undisturbed by ploughing or animal burrowing, the Rosemarkie hoard is an exceedingly rare instance of a closed deposit, with all objects seemingly placed within a single pit and apparently deposited at the same time as there is no stratigraphic or structural evidence to the contrary. As such we can be confident no objects are absent or unreported, as is often the case for antiquarian discoveries.

The evidence for binding of different groups of objects, (SF 003 and SF 007-SF 009) and (SF 005 and SF 006) offers an insight into which groups of objects may have related to each other. As the objects are not visibly linked or paired except through the binding, this may reveal distinct groups that related to specific people or communities that contributed to the deposition. That the complete ringed ornament seems to frame and define the diameter of the pit, suggests this might have been the first or the last object into the deposit, or at least this was a defining factor in burying the hoard.

The Rosemarkie hoard fits within a broader tradition of hoarding ornaments in northern Scotland, concentrated in the north-east and particularly around the Moray Firth (Table 5.1, Figure 5.33). Including Rosemarkie, there are now seventeen hoards from northern mainland Scotland containing ornaments, of which twelve include penannular bracelets with expanded terminals. This includes hoards from Wester Ord, Highland (Ross and Cromarty); Braes of Gight, Glentanar, and Rehill, all Aberdeenshire; Auchtertyre, and Ballindalloch, both Moray; Balmashanner, Angus; and Clockmaden, Perth and Kinross. Four other bracelets were deposited at Sculptor's Cave, Moray (Becker et al. 2020, 117-8, Illus. 5.33). Two Late Bronze Age hoards containing penannular Covesea-type bracelets are known from Fife: St Andrews (Cowie et al. 1991) and Orrock (Coles 1960, 109-110). While the hoard from Orrock contained only ornaments of various materials, the St Andrew's hoard contained over two hundred objects, including at least twenty-two penannular bracelets, other personal ornaments, tools, and weaponry of various materials (Cowie et al. 1991). Penannular bracelets clearly form an important component of late Bronze Age ornament hoards. Whilst Becker et al. (2020, 118) recognises the territory from Fife to the inner Moray Firth as a 'core region for a distinctive series of hoards in which ornaments predominate or form a significant component'; the addition of another hoard with the combination of penannular bracelets and ringed ornaments suggests a more northerly, localised tradition focused on the Moray Firth and Aberdeenshire. Moreover, the Rosemarkie hoard represents the first such hoard to be composed solely of bronze ornaments, with no additional objects such as axeheads included.

The hoard from Braes of Gight deserves particular mention for its similar character to the Rosemarkie hoard. It contained six penannular bracelets, a razor, a penannular ringed ornament and two penannular ornaments with ringed terminals (Muirhead 1891; Coles 1960, 94-5, pl.ll). Unfortunately, little is known about its original find context except that it was found while removing some large rocks (Muirhead 1891). Geographically, it sits apart from the other hoards containing penannular ringed ornaments, which form a tight concentration in Easter Ross around the Moray Firth. To this grouping we can add include the Heights of Brae hoard of gold ornaments. The style of ringed ornament in these three hoards is remarkably consistent, while the

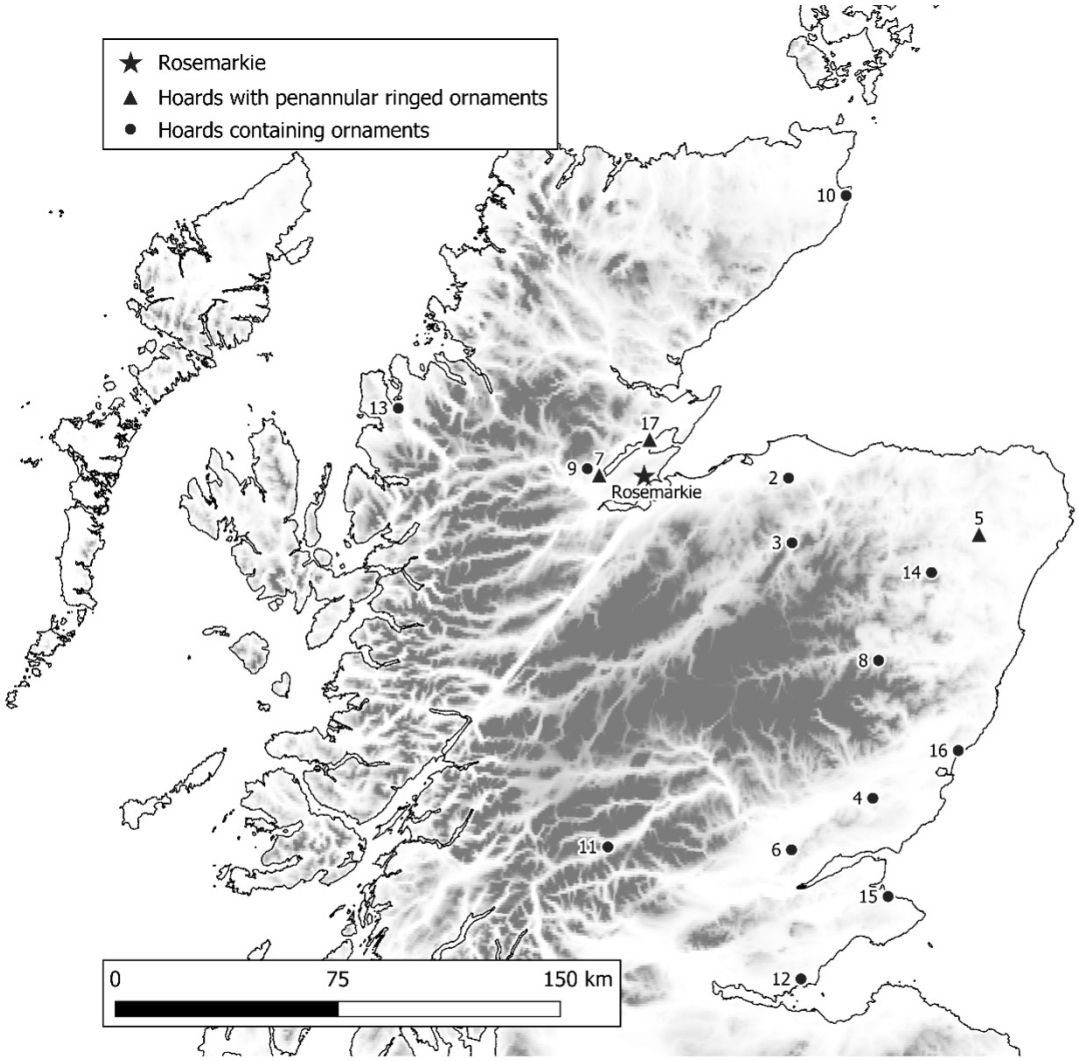

Figure 5.33: Map of northern Scotland showing distribution of hoards containing ornaments. Only those from mainland Scotland are plotted. Numbers correspond with Table 5.1. (Contains OS data © Crown copyright and database rights 2024)

Braes of Gight ornaments are slightly different with fewer, larger rings around the outside or appended to the terminals.

The radiocarbon dates obtained from the fill and bast fibre wrapping of the Rosemarkie are useful for indicating the possible dates of circulation for some of these objects, with the probable deposition date falling around 850 – 800 cal BC. Given the close similarities in the style and manufacture of the ringed ornaments at Wester Ord and Dingwall, it is possible that these hoards may have also been deposited around the same time. This requires further investigation.

The evidence for organic wrapping, binding and packing of objects contributes to a growing body of evidence that such practices were more common than previously recognised. In Scotland, it is recorded in late Bronze Age hoards from St Andrews, Fife (Cowie et al. 1991; Gabra-Sanders 1994); Carnoustie and Pyotdykes, both Angus (Coles et al. 1964; Bailie et al. 2025); and Peebles, Scottish Borders (Knight et al. 2025). At St Andrews, wool, animal hair, coarse grass and plant fibres were used to bind and wrap the objects. Plant fibres and textiles were used to wrap and bind tweezers, axeheads and linked multiple annular rings together. However, the hoard was heavily disturbed before archaeological investigation so the relationships are unclear (Cowie et al. 1991; Gabra-Sanders 1994). At Pyotdykes, a plug of plant textile was recovered from the socket of a spearhead found with two swords, one of which was in a wood and leather scabbard (Coles et al. 1964); and at Carnoustie a sword in an organic scabbard was wrapped in a woven textile and secured with a pin, and a spearhead was wrapped in sheepskin and a woollen cloth,

and buried in a pit (Bailie et al. 2025). These survivals support historic accounts of wrapped or bundled hoards (Knight 2022). The hoard at Wester Ord, which contained the fragments of a ringed ornament, was reportedly found wrapped in cloth under a boulder (PSAS 1870, 309-310). At Peebles, there was little evidence for deliberate wrapping or binding, but remarkable conditions preserved organic components as well as plant packing material (Knight et al. 2025). Plant packing material is increasingly noticed in hoards from Britain, such as the Havering Hoard, London (Adams and O'Connor 2022, 218, 227), and the St Levan hoard, Cornwall (Ramsay, below). What we can observe in the Rosemarkie hoard fits within a wider established practice of hoarding but where organic materials were often integral to the act of deposition. The multiple layers of wrapping and binding at Rosemarkie provide an intriguing glimpse of just how complex this might be and warrants further investigation of the materials and processes involved.

The care expressed through the Rosemarkie hoard, coupled with the complex ringed ornaments and wrapped and bound bracelets, suggests we are dealing with a deposit that had inherent meaning and symbolism to those that buried the objects. All but SF 002 were complete, with some showing signs of wear, which suggests these were objects that were still functional at the point of deposition. All were probably made locally, though not necessarily from the same metal source (Northover, below) and the objects may have been treasured ornaments, perhaps contributing to individual or communal identities. The rare skill involved in producing SF 001 and SF 002, probably the work of a local craftworker, suggests that when SF 002 broke it was significant. The removal of usable ornaments from circulation must have represented an important sacrifice of material, especially given the heavy weight of the bracelets. It is impossible to say how many people or communities were involved in the deposition, or who may have worn the bracelets, but the number of ornaments and their varied compositions suggests this collection was accumulated from multiple sources, i.e. these are not the possessions of a single individual. The organisation and distinctly bound groups of bracelets supports this idea.

The Fibres Tying the Bracelets

By Susanna Harris

Introduction

The fibrous material tied around the cup-ended penannular bracelet or ornament (SF 003 and SF 42/43) was examined. The fibrous material was part of a larger quantity of fibre strips that bound together various items in the hoard. The hoard was block lifted and excavated in the laboratory. According to the micro-excavation lead, Rachel Buckley, the bottom four bracelets (three penannular, one cup-ended penannular) were all connected in one place by the ties (Figure 5.34). The two at the top were tangled together with fibrous material, the middle penannular bracelet was placed at a different angle, and the lower cup-ended penannular bracelet was bound with plant fibre (pers. comm. R. Buckley). The most substantial binding is the knot on the cup-ended penannular bracelet which is reported on here.

The bast fibre from the hoard (SF 42/43) is radiocarbon dated 894 – 794 cal BC (UBA-56041), placing it in the late Bronze Age.

The state of preservation is excellent. The fibrous material retains its original brown colour with small areas of verdigris. These green areas indicate the presence of copper corrosion products and areas of mineralisation. The fibrous material is organic and preserved due to wet conditions and the biocidal action of copper corrosion products from the hoard. This environment is one of ways by which organic materials are preserved in Scotland (Davis and Harris 2023, Janaway 1983).

Methodology

The fibrous knot was examined by eye and with a digital microscope Dino-lite edge AM4115ZTI at magnifications of 20-150x. The account of the micro excavation was taken into consideration to understand the relationship of the knot to the other objects and extent of the tie and binding of the objects in the hoard.

Results

A mass of fibre strips were used for binding material, which was aligned and tied around

the cup-ended penannular bracelet and other bracelets in the hoard (Figure 5.35). Individually the strips are flat ribbons. Where the fibre strips pass around the cup-ended penannular bracelet they form a rudimentary single S-twisted 'cord' with a maximum diameter of 8-10 mm. This loose twist appears to have provided an element of structure to the mass of strips when forming the knot. This fibrous material is fastened around the arm of the bracelet with an overhand knot (Ashley 1947, 84, knot 515) (Figure 5.36). The ends of the fibre strips facing upwards splay out and have broken ends (Figure 5.36, position E). This is presumably where they originally connected the cup-ended penannular bracelet to the other bracelets, which were separated during laboratory excavation.

Figure 5.34: In situ stack of penanular bracelets bound with fibrous material. The cup-ended penannular bracelet is at the bottom. Taken by GUARD Archaeology Ltd.

Figure 5.35: Cup-ended penannular bracelet tied with treebast fibres in an overland knot. Taken by Susanna Harris.

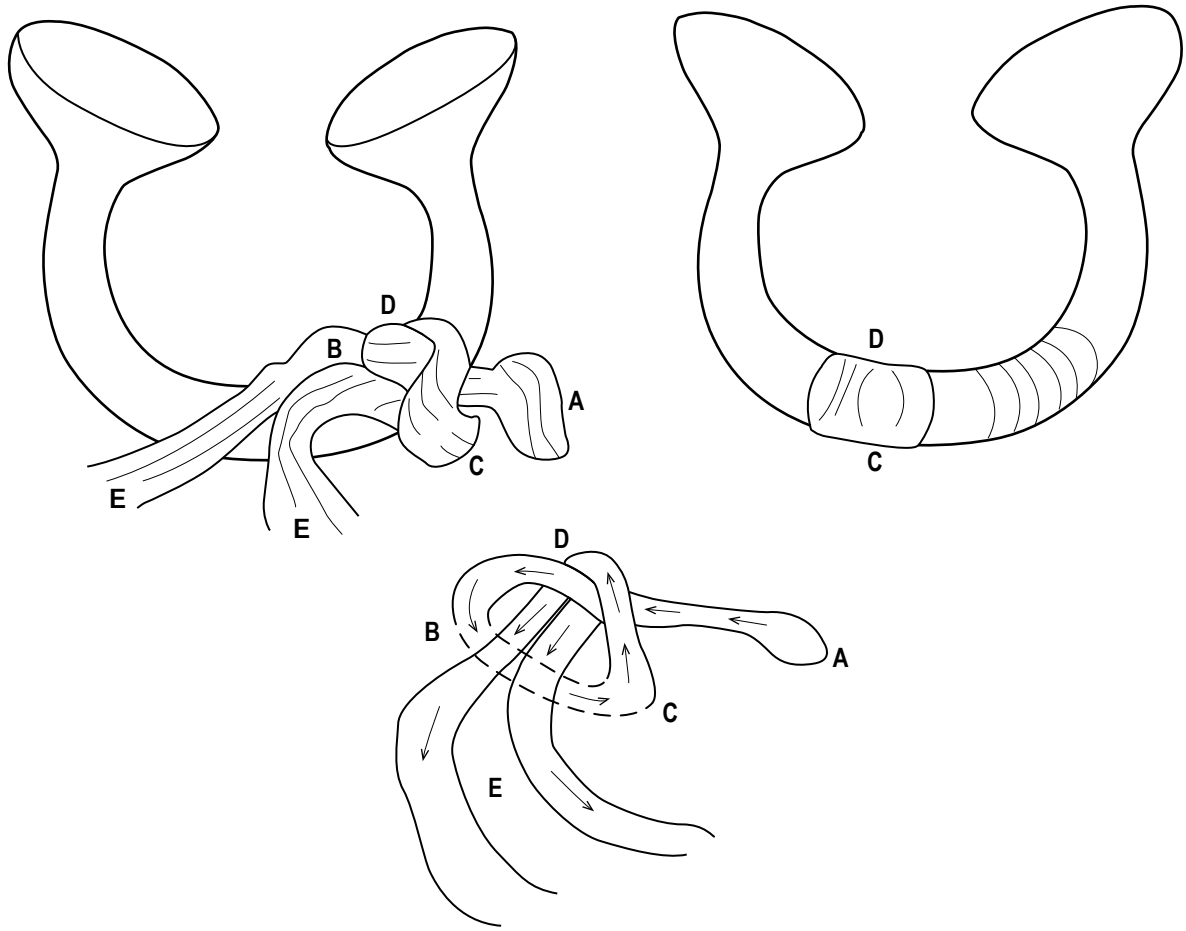

Figure 5.36: Top: Diagram of the overhand knot position on the front and back of cup-ended penannular bracelet. Bottom: Knot structure and tying sequence from A to E. By Susanna Harris and GUARD Archaeology Ltd.

The fibrous plant material is identified as tree bast by Susan Ramsay (below). Its organic colour ranges from yellow, dark yellowish brown to dark brown in the 10YR Munsell soil colour chart. The fibres do not show significant evidence of wear and suggest that they were in a reasonably pristine state when tied onto the bracelet (Figure 5.37).

Comparanda

The preservation of organic material in a late Bronze Age hoard of this extent and quality is rare in Scotland and the UK more generally.

Tree bast is one of the fibrous materials used during the Bronze Age; it comes from the inner bark of trees. Once extracted from a branch or trunk and processed, tree bast strips can be several metres long (Harris and Gleba 2024, 487). Evidence for tree bast strips, like at Rosemarkie, as well as string and fabrics from lime bast, is preserved in the charred and waterlogged deposits of Must Farm pile dwelling, Cambridgeshire, dated 850 BC (ibid. 466, 487).

There are instances in Scotland and England where items within hoards are known to have been tied together (see also Knight et al, above). In the St Andrew's hoard, Fife dated 920 – 800 BC, several bronze rings were found tied together with S-ply cord of plant fibre (Gabra-Sanders 1994, 40, fig.6). Other items in the St Andrew's hoard were bound with plant fibre strips, identified as possible grass or other plant material, including around the mouth of a socketed axe and closing the jaw of a pair of tweezers (ibid. 38). In the late nineteenth century while digging at Monemore, Killin, Stirling, a hoard was found including axes, a spearhead, penannular bracelets and multiple bronze rings; it was reported they were tied together with a fastening material like twine (Stewart 1882, 28; Knight 2022, 289). In Norfolk, England, traces of lime bast S-twist cord were found passing through and around the loops of socketed axes and the peg holes of a spearhead in the Beeston Regis II hoard (Lawson 1980, 218, Lawson et al. undated). The cord almost certainly bound together the items in the Beeston Regis hoard. Its metalwork is typologically dated to the late Bronze Age, 1000 – 700 BC. It may be reasonable to consider that the practice of tying objects in hoards, notably rings or looped metalwork, with fibrous strips or cord was common in the late Bronze Age. It is only seen in fortuitously cases with organic preservation such as the tied bracelets of Rosemarkie.

Figure 5.37: Organic preserved fibrous tree bast strips knotted around the cup-ended penannular bracelet. 100x magnification. Taken by Susanna Harris.

Archaeobotany of the Hoard

By Susan Ramsay

Introduction

The Bronze Age hoard was located in pit (1534) and consisted of nine bronze artefacts, including one complete neck ring, one partial neck ring, six penannular bracelets and one cup-ended penannular bracelet. It was clear during excavation that plant material was also present within this pit and it appeared that some kind of fibrous material had been tied or knotted around some of the bronze objects. There was speculation that some of this plant material might be the remains of a woven basket or bag. The pit fill was lifted as a single block and then subjected to micro-excavation. In total, 54 micro samples of organic/plant material were taken during this phase of the excavation and presented for analysis. The plant material was generally not carbonised although a few fragments of alder, birch and hazel charcoal were recorded (Appendix: Table 3.12). Hazel charcoal from the outer fill of the hoard was radiocarbon dated to 1012 – 838 cal BC (UBA-56040). The uncarbonised plant material appeared to have survived as a result of its close proximity to the bronze objects, with the copper in the bronze prohibiting microbial decay. The identifiable plant material was almost all fragments of bracken (Pteridium aquilinum), with stems and pinnae (individual 'leaflets' on a fern frond) present. The other main category of plant material recovered was what appeared to be tree bast, which is a type of plant fibre that comes from the inner bark of trees. Specific identification of this material was problematical but a few fragments had a morphology that was most similar to ash (Fraxinus sp). The tree bast seemed to form the fibrous material that had been used to tie the bronze objects together. No evidence of a bag or basket was noted. No other identifiable plant material was recorded and no seeds were recovered from this pit fill.

Discussion

The Bronze Age hoard in Pit (1534) had tree bast, possibly from ash, used as a fibre to bind several of the items together. It probably survived due to its direct contact with the bronze objects and the antimicrobial properties of the copper within the bronze. Tree bast, possibly from lime (Tilia sp) was found binding together a Bronze Age hoard of axes from Beeston Regis, Norfolk (Lawson 1980). No other evidence for ash e.g. in the form of charcoal, was located on this site, although the Botanical Society of Britain and Ireland distribution maps (BSBI 2024) show that ash grows presently in the Rosemarkie area, but it is close to its northern limit.

In addition, significant amounts of bracken (Pteridium aquilinum), in the form of stems and pinnae from degraded bracken fronds, were identified from many of the microsamples taken from the hoard. It is likely that, as with the tree bast, the bracken that survived was in contact with the bronze objects. There was no evidence for the bracken having been woven into a bag or basket and it seemed more likely that it had been used as packing material to protect the bronze objects. A late Bronze Age hoard of fifty-three cast copper alloy fragments from St. Levan in Cornwall also produced bracken and grass/straw as packing material but this site also produced some evidence for leather fragments. It has been suggested that the bronze objects, bracken and straw had once been contained within a leather bag (Tyacke 2016). There was no evidence for leather fragments in the Rosemarkie hoard but there is a possibility that this might not have been preserved if it was not in direct contact with the bronze objects.

Metallurgy Isotope Analysis

By Peter Northover

The primary purposes of this metallurgical study were to place the Rosemarkie find in its context in Scottish Late Bronze Age as a whole, and among Scottish Late Bronze Age ornaments in particular. There were also more particular questions of correlations between ornament types and the metal used in their manufacture, especially with the ringed circular ornaments, a more specialised product than most. Ideally the samples taken should be suitable for optical metallography to allow both quality control of the analysis in relation to corrosion, and to determine the manufacturing methods for each ornament type. However, it was decided that such sampling was too intrusive and drilled samples were used instead; the samples were mounted in the same way as for a metallographic sample and so allowed for an assessment of how much each had been affected by corrosion.

Sampling and analysis

A single sample was drilled from each of the ornaments using a handheld model maker's electric drill with a 0.9 mm diameter bit. The samples, labelled RMK 1-9, were each divided into two halves, one destined for electron probe microanalysis with wavelength dispersive X-ray spectrometry (EPMA-WDS) and the second for lead isotope analysis (LIA). Sample RMK 2, from the fragmentary circular ringed ornament, was not so divided because of its corroded state. The details of the methods used are recorded in Appendix 1. For EPMA-WDS five areas, each 10 µm in diameter were analysed on each sample, except for six on RMK 9. For LIA, where there was sufficient sample material duplicate analyses were made. The individual elemental compositions and their means are given in Table 5.3 and the lead isotope data in Table 5.4.

As noted above, the use of drilled samples precluded any metallographic study, save to determine that the particles analysed were free from corrosion, and for the possible identification of non-metallic inclusions.

Bronze in the Rosemarkie hoard

With only nine objects the Rosemarkie find is too small a population for the use of, initially, statistical methods to search for patterns and simple inspection must suffice. The first approach to the compositions is to sort them by alloy type but in the Scottish late Bronze Age there are difficulties of nomenclature. Since the work of Brown and Blin-Stoyle the late Bronze Age in England and Wales has been associated with the use of leaded bronze (Brown and Blin-Stoyle 1959), sometimes heavily leaded, as the principal alloy for all purposes. Since then, further research has shown how the use of leaded bronze developed in the Wilburton period (Northover 1982), how unleaded bronze was kept for specific products such as cauldron sheets (Northover 2010), and what the place of leaded bronze in late Bronze Age Scotland might be (Cowie et al. 1998).

To continue we now need a working definition of leaded bronze. The addition of 2% lead to a tin bronze will begin to have effects on the behaviour of the alloy that are observable in the workshop (Staniaszek and Northover 1983), although modern commercial use of the term leaded tin bronze covers alloys with down to 1% lead. Within the 430 Scottish Late Bronze Age analyses currently available 58% have < 2% lead. Dividing the objects into four categories, tools, weapons, ornaments and other (e.g. vessel fittings and sheets) this percentage can be seen to vary widely, from 73% for tools to 48% for ornaments: histograms for lead for the four categories are given in Figure 5.38 and the differences are clear.

Whether any of the alloys with >2% lead were created deliberately for the objects analysed or just represent part of a chain of recycling is difficult to judge, but it might well be that for some specialised products such as ornaments or cast vessel fittings creating an alloy could have been done for the occasion. Here the definition of a leaded bronze containing >2% lead is simply a description of an alloy and, by implication, its properties. At the other end of the scale, identifying objects with no residue of added lead is equally difficult: a lead concentration of

<0.10% is almost certainly free of added lead and even objects with <0.5% may also be truly unleaded. In total, 30% of the analysed bronzes contain <0.5% lead, with 48% of tools and 33% of weapons on the one hand having <0.5% lead, but only 18% of ornaments on the other. Compared with the other groups this graph illustrates how ornaments tend to have a significantly larger proportion of lead contents in the range 2-8% and tools have a very much larger proportion below 2%. Nonetheless, there can still be significant variations within each category and this is where, in a later section, the lead isotope data find a place.

Analysis	Object	Part	Fe	Co	Ni	Cu	Zn	As	Sb	Sn	Ag	Bi
RMK 1/ Mean	Penannular ringed ornament	Drilled, body	0.01	0.01	0.12	90.19	0.00	0.12	0.16	8.05	0.03	0.02
RMK 2/ Mean	Penannular ringed ornament, fragment	Drilled, body	0.03	0.00	0.13	92.65	0.00	0.08	0.15	6.34	0.03	0.01
RMK 3/ Mean	Cup-ended ornament	Drilled, body	0.03	0.01	0.18	89.88	0.00	0.16	0.30	8.34	0.09	0.02
RMK 4/ Mean	Penannular bar bracelet	Drilled, body	0.03	0.01	0.17	93.92	0.00	0.10	0.13	4.12	0.03	0.00
RMK 5/ Mean	Penannular bar bracelet	Drilled, body	0.01	0.00	0.17	89.34	0.00	0.26	0.27	8.60	0.08	0.02
RMK 6/ Mean	Penannular bar bracelet	Drilled, body	0.02	0.02	0.14	88.52	0.00	0.11	0.14	9.40	0.02	0.04
RMK 7/ Mean	Penannular bar bracelet	Drilled, body	0.02	0.00	0.14	78.66	0.00	0.17	0.46	13.76	0.21	0.01
RMK 8/ Mean	Penannular bar bracelet	Drilled, body	0.03	0.02	0.19	86.61	0.00	0.25	0.43	9.49	0.15	0.00
RMK 9/ Mean	Penannular bar bracelet	Drilled, body	0.04	0.01	0.18	89.91	0.00	0.18	0.33	8.69	0.08	0.03
RMK 1/ Mean	Penannular ringed ornament	Drilled, body	0.01	0.01	0.12	90.19	0.00	0.12	0.16	8.05	0.03	0.02
RMK 2/ Mean	Penannular ringed ornament, fragment	Drilled, body	0.03	0.00	0.13	92.65	0.00	0.08	0.15	6.34	0.03	0.01
RMK 4/ Mean	Penannular bar bracelet	Drilled, body	0.03	0.01	0.17	93.92	0.00	0.10	0.13	4.12	0.03	0.00
RMK 6/ Mean	Penannular bar bracelet	Drilled, body	0.02	0.02	0.14	88.52	0.00	0.11	0.14	9.40	0.02	0.04
RMK 3/ Mean	Cup-ended ornament	Drilled, body	0.03	0.01	0.18	89.88	0.00	0.16	0.30	8.34	0.09	0.02
RMK 5/ Mean	Penannular bar bracelet	Drilled, body	0.01	0.00	0.17	89.34	0.00	0.26	0.27	8.60	0.08	0.02
RMK 9/ Mean	Penannular bar bracelet	Drilled, body	0.04	0.01	0.18	89.91	0.00	0.18	0.33	8.69	0.08	0.03
RMK 7/ Mean	Penannular bar bracelet	Drilled, body	0.02	0.00	0.14	78.66	0.00	0.17	0.46	13.76	0.21	0.01
RMK 8/ Mean	Penannular bar bracelet	Drilled, body	0.03	0.02	0.19	86.61	0.00	0.25	0.43	9.49	0.15	0.00

Table 5.3: Analysis of the Rosemarkie assemblage.

Analysis	Object	Part	Pb	Au	Cd	S	Al	Si	Mn	P	Sb/As	Sb/Ni
RMK 1/ Mean	Penannular ringed ornament	Drilled, body	1.20	0.01	0.01	0.02	0.00	0.04	0.00	0.01	1.26	1.33
RMK 2/ Mean	Penannular ringed ornament, fragment	Drilled, body	0.53	0.00	0.01	0.01	0.00	0.01	0.01	0.01	1.80	1.16
RMK 3/ Mean	Cup-ended ornament	Drilled, body	0.95	0.01	0.00	0.00	0.00	0.01	0.01	0.01	1.88	1.67
RMK 4/ Mean	Penannular bar bracelet	Drilled, body	1.09	0.00	0.01	0.37	0.00	0.01	0.01	0.01	1.33	0.76
RMK 5/ Mean	Penannular bar bracelet	Drilled, body	1.16	0.03	0.00	0.02	0.00	0.01	0.01	0.01	1.07	1.62
RMK 6/ Mean	Penannular bar bracelet	Drilled, body	1.54	0.02	0.00	0.00	0.00	0.01	0.01	0.01	1.32	1.05
RMK 7/ Mean	Penannular bar bracelet	Drilled, body	6.46	0.01	0.00	0.08	0.00	0.01	0.00	0.01	2.67	3.20
RMK 8/ Mean	Penannular bar bracelet	Drilled, body	2.77	0.02	0.00	0.00	0.00	0.00	0.01	0.01	1.70	2.32
RMK 9/ Mean	Penannular bar bracelet	Drilled, body	0.45	0.03	0.01	0.01	0.00	0.05	0.01	0.01	1.83	1.87
RMK 1/ Mean	Penannular ringed ornament	Drilled, body	1.20	0.01	0.01	0.02	0.00	0.04	0.00	0.01	1.26	1.33
RMK 2/ Mean	Penannular ringed ornament, fragment	Drilled, body	0.53	0.00	0.01	0.01	0.00	0.01	0.01	0.01	1.80	1.16
RMK 4/ Mean	Penannular bar bracelet	Drilled, body	1.09	0.00	0.01	0.37	0.00	0.01	0.01	0.01	1.33	0.76
RMK 6/ Mean	Penannular bar bracelet	Drilled, body	1.54	0.02	0.00	0.00	0.00	0.01	0.01	0.01	1.32	1.05
RMK 3/ Mean	Cup-ended ornament	Drilled, body	0.95	0.01	0.00	0.00	0.00	0.01	0.01	0.01	1.88	1.67
RMK 5/ Mean	Penannular bar bracelet	Drilled, body	1.16	0.03	0.00	0.02	0.00	0.01	0.01	0.01	1.07	1.62
RMK 9/ Mean	Penannular bar bracelet	Drilled, body	0.45	0.03	0.01	0.01	0.00	0.05	0.01	0.01	1.83	1.87
RMK 7/ Mean	Penannular bar bracelet	Drilled, body	6.46	0.01	0.00	0.08	0.00	0.01	0.00	0.01	2.67	3.20
RMK 8/ Mean	Penannular bar bracelet	Drilled, body	2.77	0.02	0.00	0.00	0.00	0.00	0.01	0.01	1.70	2.32

Table 5.3 (continued): Analysis of the Rosemarkie assemblage.

Sample	206Pb/204Pb	207Pb/206Pb	208Pb/206Pb	wt% Pb
RMK1	18.432	0.849	2.085	1.20
RMK1	18.432	0.849	2.085	1.20
RMK3	18.427	0.849	2.086	0.95
RMK4	18.410	0.850	2.087	1.09
RMK4	18.410	0.850	2.087	1.09
RMK5	18.421	0.849	2.086	1.16
RMK6	18.431	0.849	2.086	1.54
RMK6	18.430	0.849	2.085	1.54
RMK7	18.415	0.849	2.087	6.46
RMK8	18.416	0.849	2.086	2.77
RMK9	18.417	0.849	2.087	0.45
RMK9	18.416	0.849	2.087	0.45

Table 5.4: Lead isotope analysis of the Rosemarkie assemblage.

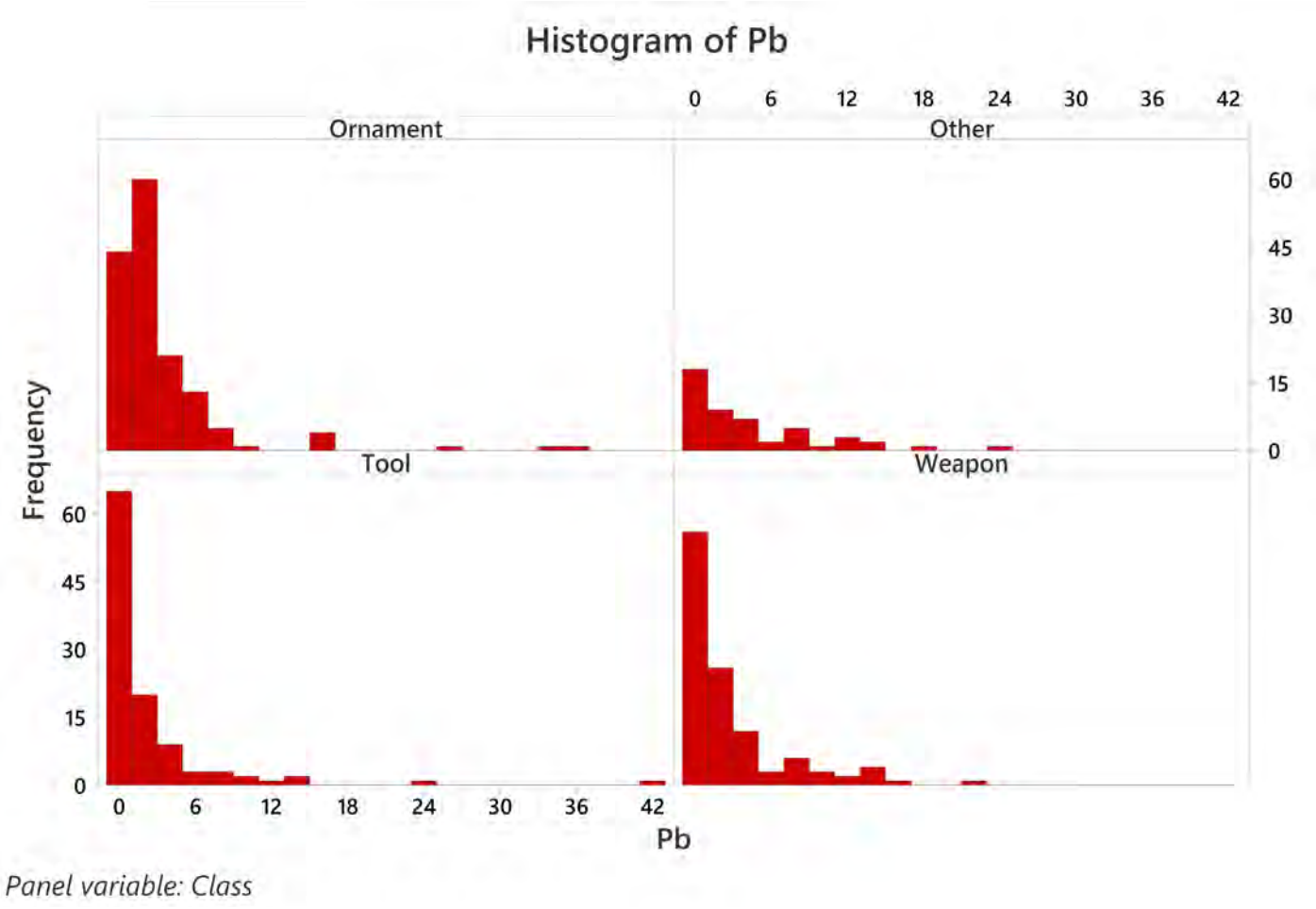

Figure 5.38: Histograms of lead contents for Scottish Late Bronze Age bronze tools, weapons, ornaments, and other types.

Similar histograms of tin concentrations for the four classes of object are presented in Figure 5.39 Overall, tin contents are spread between approximately 4% and 13%. Trends are not very clear but it can be said that the distributions for ornaments and tools tend towards lower tin contents compared with weapons. Combining lead and tin data in a contour plot (Figure 5.40) indicates that there is a bimodal distribution for tin with peaks between 6% and 9% and between 9% and 12%; the plot also demonstrates the large number of compositions with <1% lead and shows that the bronze smiths of late Bronze Age Scotland would be very familiar with this type of alloy and its behaviour. Now the alloy content and impurities of the Rosemarkie ornaments can be examined against this background.

The nine Rosemarkie bronzes (Table 5.3) can be placed in three groups based on both alloy and impurity contents. Just two objects, both penannular bar bracelets (RMK 7, 8), can be described as leaded bronzes on the basis of the definition given above, and they also both have the highest tin contents. This may, however be simply a consequence of segregation in some of the castings, with six having very similar tin contents in the range 8.0-9.5%. The measured 4.1% tin in RMK 4 almost certainly represents a low tin bronze while the measured 6.3% tin in RMK 2, the fragmentary penannular ringed ornament may be the result of corrosion. The lead content of the seven bronzes with <2% lead varies between 0.45 and 1.54% and, since the impurity patterns of the bronzes are very similar, it may well be that the great majority of the lead is residual from recycling. In all cases, provided due care was taken the alloys are entirely suitable for creating the products we see.

The key impurities in exploring the origins and history of the copper in the bronze are nickel, arsenic, antimony, and silver. Two other impurities, iron and sulphur, offer clues to copper

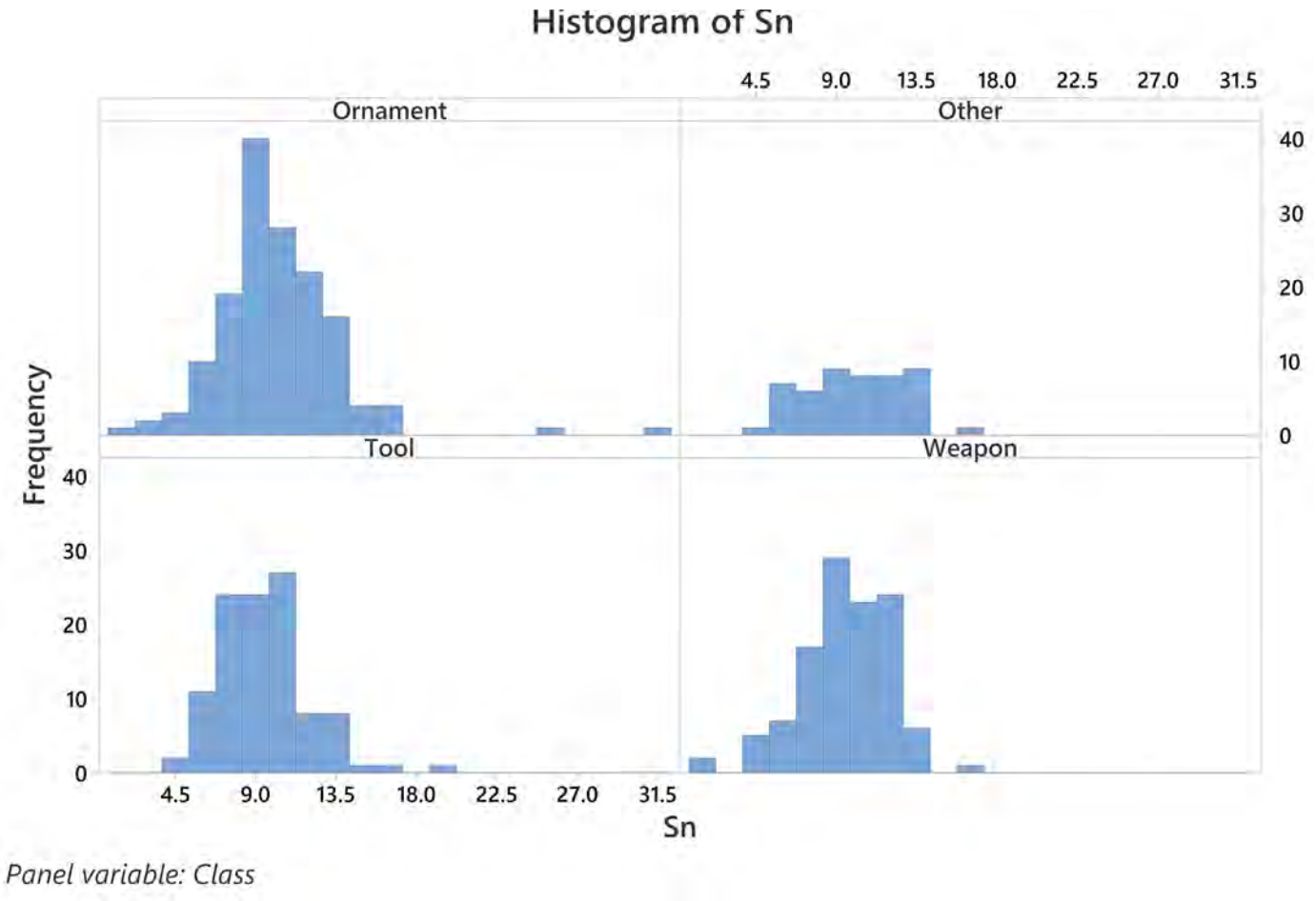

Figure 5.39: Histograms of tin contents for Scottish Late Bronze Age bronze tools, weapons, ornaments, and other types.

production and to recycling (Northover 2014); copper ingots in Britain tend to have low values for most impurities but often have high sulphur content. All the bronzes from Rosemarkie have very low iron, as do almost all the late Bronze Age bronzes analysed from Scotland but a number, like RMK 4 contains a relatively high concentration of sulphur at 0.37%: combined with a low tin content of 4.1% we may be seeing a mixing of bronze scrap and ingot copper. Ingot copper has not been identified in late Bronze Age Scotland so the mixing might have happened further south.

Table 5.3 also sets out the ratios Sb:As and Sb:Ni and, using these ratios, the bronzes can be seen to fall neatly into three groups. The first, with the lowest antimony contents and the lowest ratios, contains both penannular ringed ornaments allowing us to suggest that the two were made together. The second group, RMK 3, 5, 9, is intermediate and, compared with the first grouping, has increased silver and nickel contents. Besides two penannular bar bracelets this group includes the cup-ended ornament which is compositionally indistinguishable from the other two objects. The third group, also penannular bar-bracelets (RMK 7, 8) has, as noted above, higher alloy contents, and also higher antimony and silver concentrations; a reasonable conclusion is that the bronze has undergone less recycling than the two previous groups.

The absence of a metallographic study means that there is only a limited amount that can be said about how the ornaments were made, for example the extent to which the penannular bar-bracelets were cold worked and annealed after casting. One thing that can be said is that there seem to be no correlations between the composition groups and the details of the form of the bar-bracelets. On the other hand, it is clear from their form and finish that the penannular ringed ornaments were made using lost wax casting. This was an uncommon process in the British late Bronze Age and is associated with the highest class of bronze products, for example cauldrons and buckets where the handle fittings were cast using lost wax (Northover 2010).

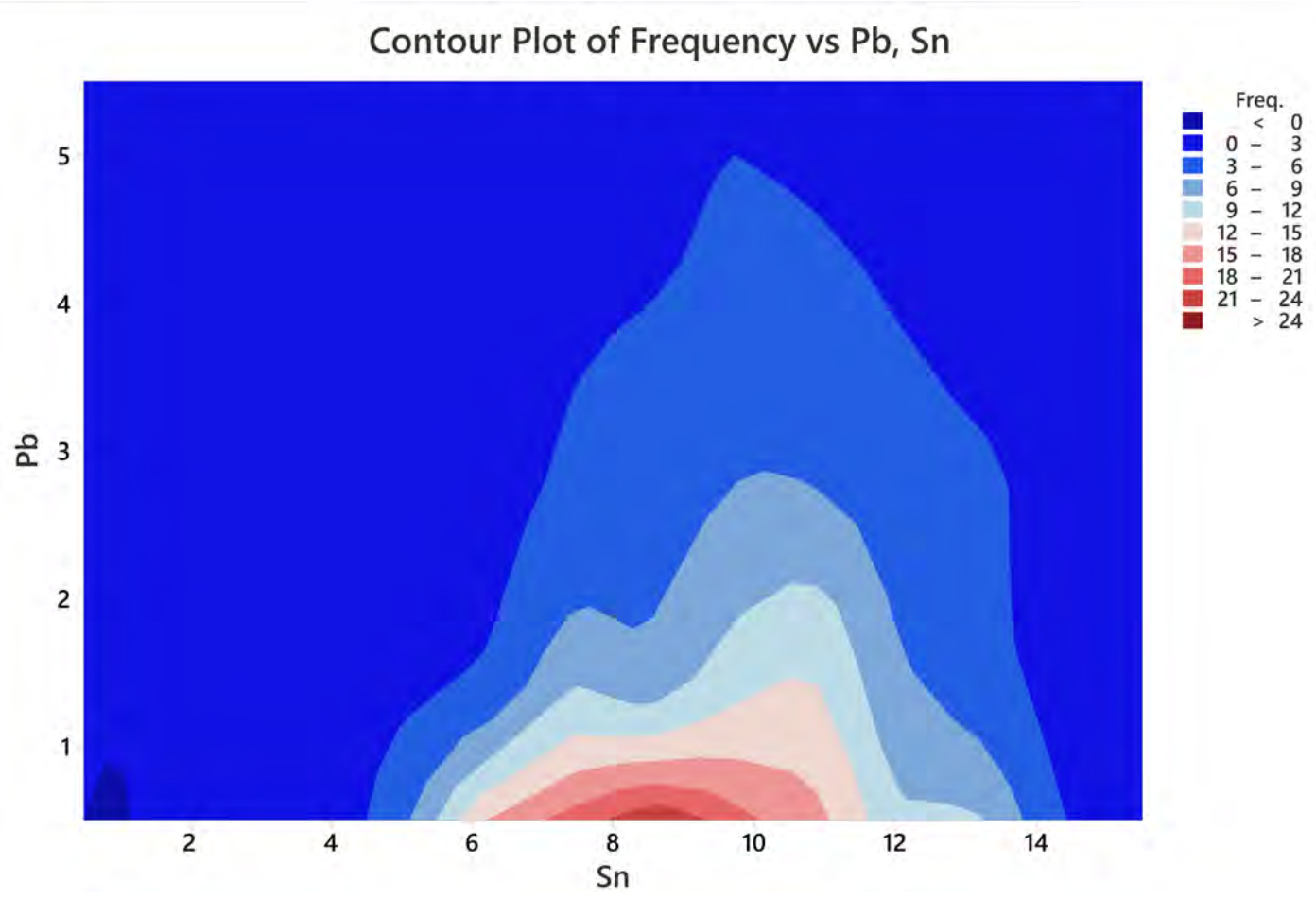

Figure 5.40: Contour plot of lead and tin contents of Scottish Late Bronze Age bronzes.

Comparisons

There is not the space here for a comprehensive comparison of the compositions from Rosemarkie with the Scottish late Bronze Age as a whole, confining the exercise to the two other analysed Scottish hoards with ringed ornaments, Braes of Gight, Aberdeenshire, and Wester Ord, Ross and Cromarty (Coles 1960). The compositions are represented by scatterplots of Pb vs Sn (Figure 5.41) and Ni vs Sb (Figure 5.42). The distributions for the three hoards overlap in Figure 5.41, but that for Wester Ord is skewed relative to the other two by the number of tools in the hoard; the two objects with the highest and lowest tin contents from Rosemarkie appear as outliers. Using the scatterplot of Ni vs Sb in Figure 42 as a representation of the impurities in the nine ornaments, the three sub-groups within Rosemarkie stand out very clearly, and overlap with most of the objects analysed from Braes of Gight and Wester Ord. Both the latter two, however, have a number of objects with low nickel and/or antimony concentrations and these correlate with higher arsenic contents, an impurity pattern widespread further south in England and Wales, an illustrated by a scatterplot of Sb vs As (Figure 5.43).

Lead isotope analysis

Presenting the lead isotope analyses of the Rosemarkie assemblage presents two challenges. The first is simply the lack of comparative data: Rosemarkie raises the number of lead isotope analyses of Scottish late Bronze Age bronzes from three to eleven. The second, as will be seen below in more detail, is that the data are so tightly clustered that displaying them graphically in any meaningful way is problematic: Figures 5.44a-b show the data plotted on the same scales as typically used in the publication of lead isotope ratios from bronzes for Bronze Age England and Wales (e.g. Rohl and Needham 1998, 139-73). The tight grouping strongly suggests that the lead in these bronzes could have a common history, if not a common origin. However, there is a possible division into two groups which might

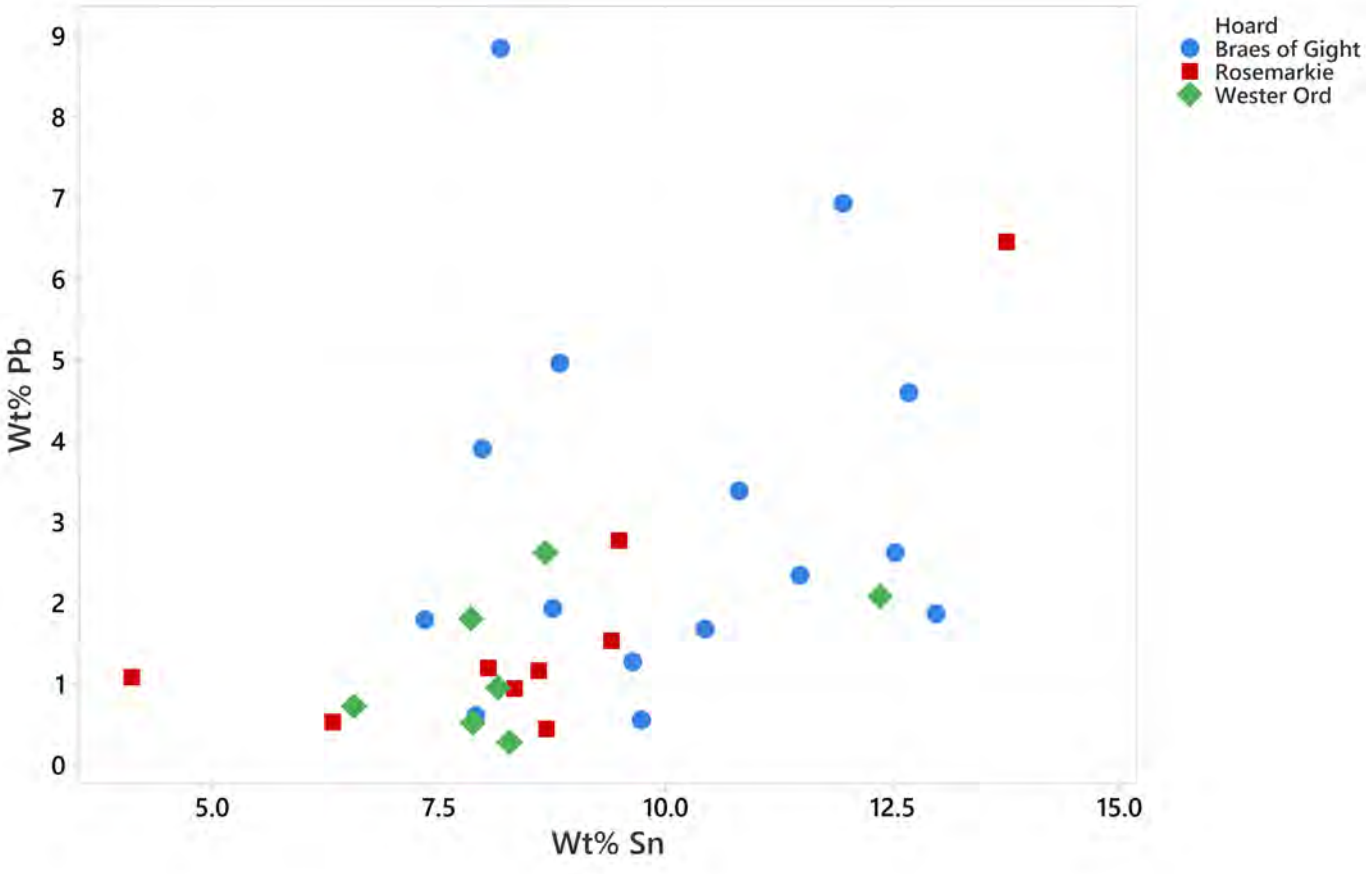

Figure 5.41: Scatterplot of Pb vs Sn for the contents of hoards with penannular ringed ornaments.

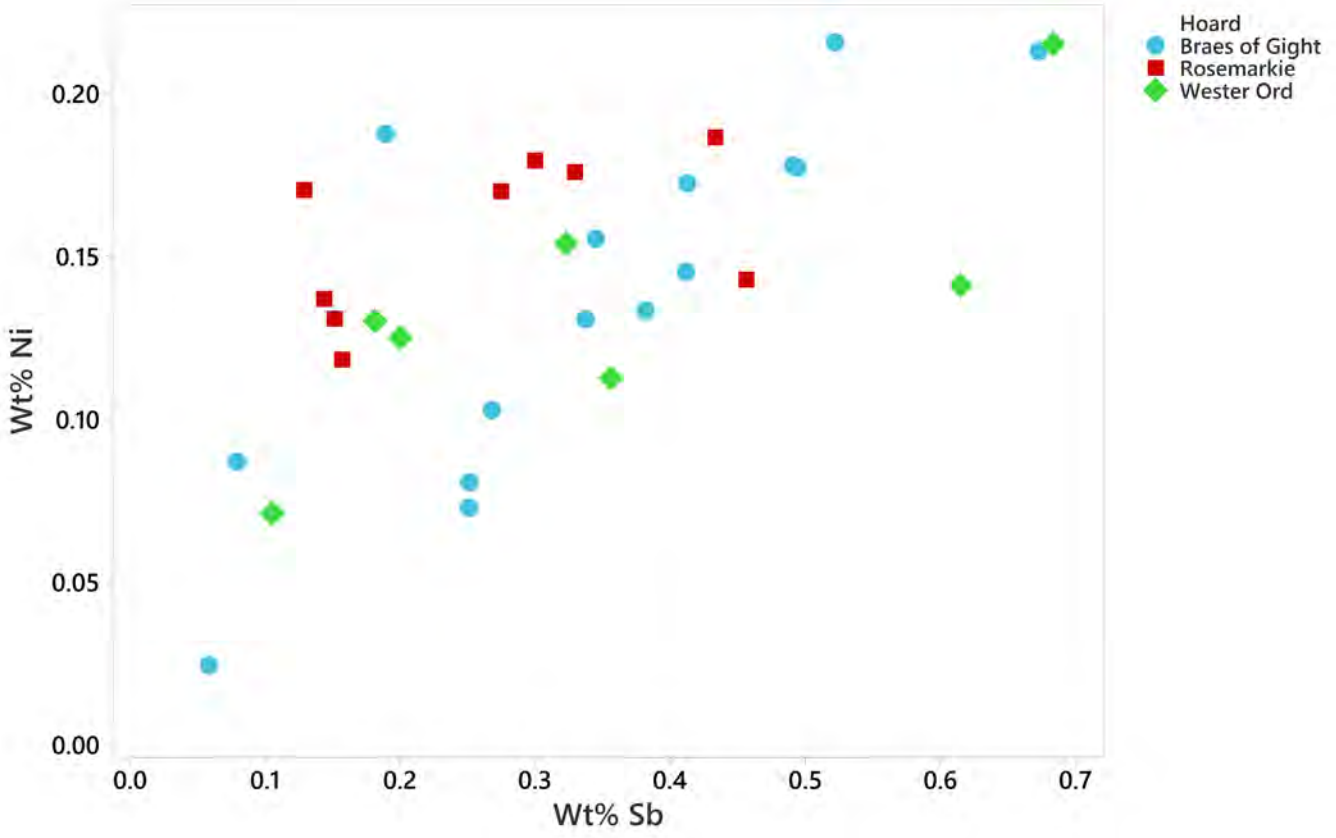

Figure 5.42: Scatterplot of Ni vs Sb for the contents of hoards with penannular ringed ornaments.

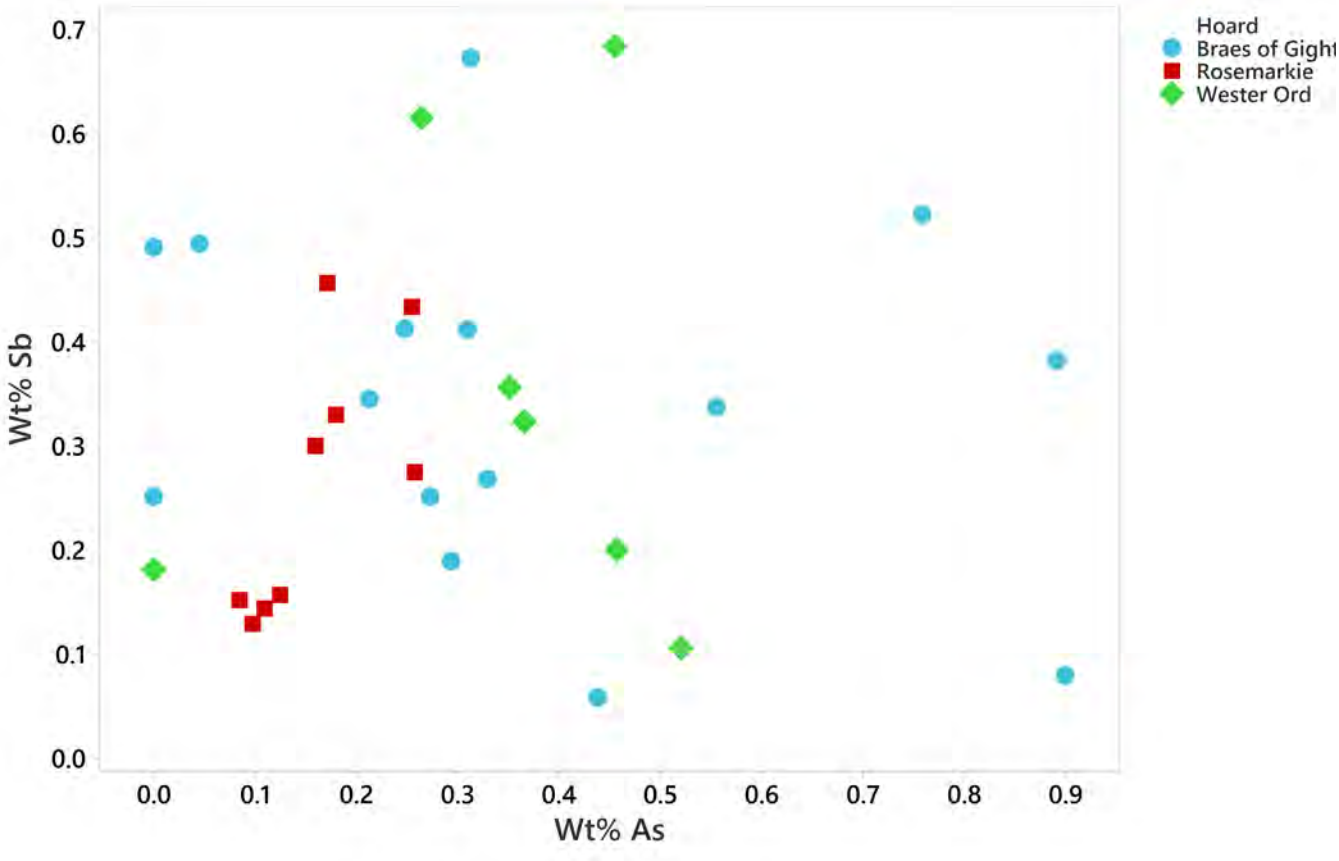

Figure 5.43: Scatterplot of Sb vs As for the contents of hoards with penannular ringed ornaments.

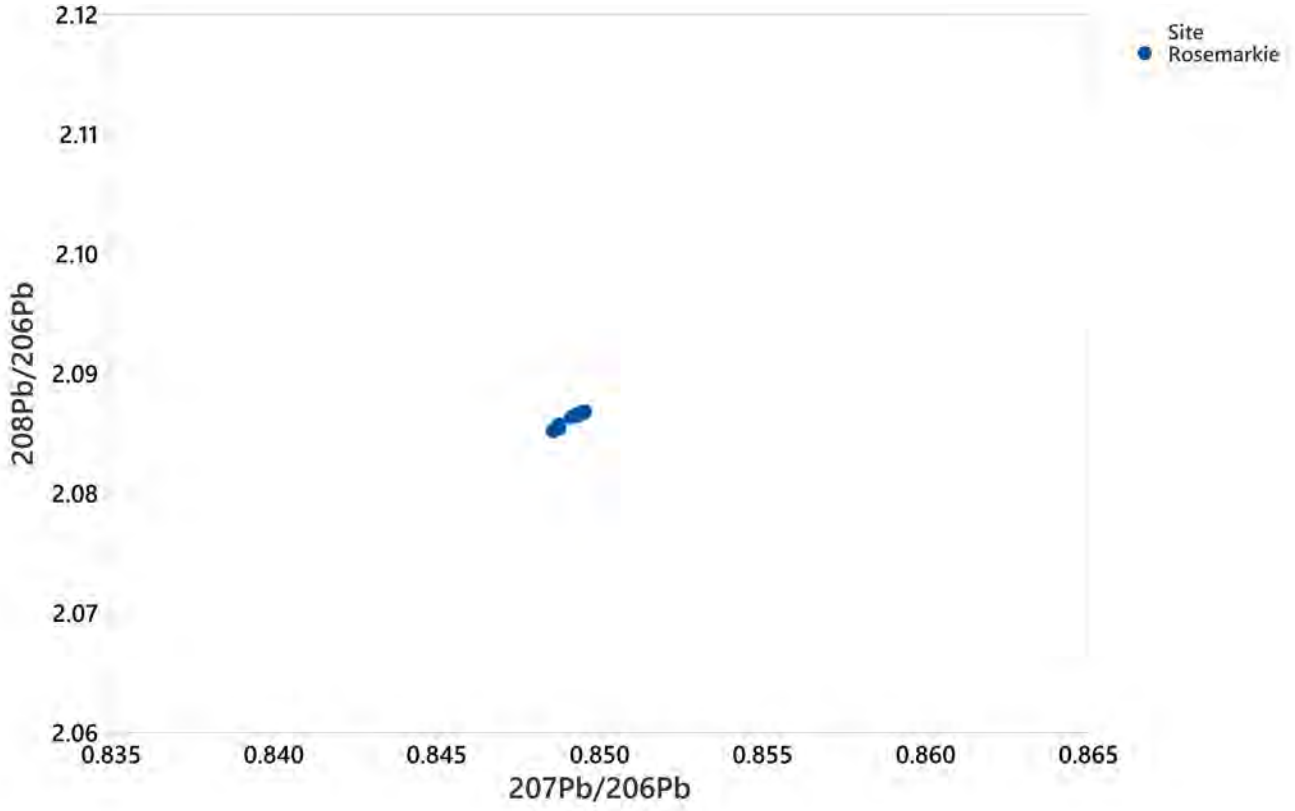

Figure 5.44a: Scatterplot of $^{208}Pb/^{206}Pb$ vs $^{207}Pb/^{206}Pb$ for the Rosemarkie bronzes.

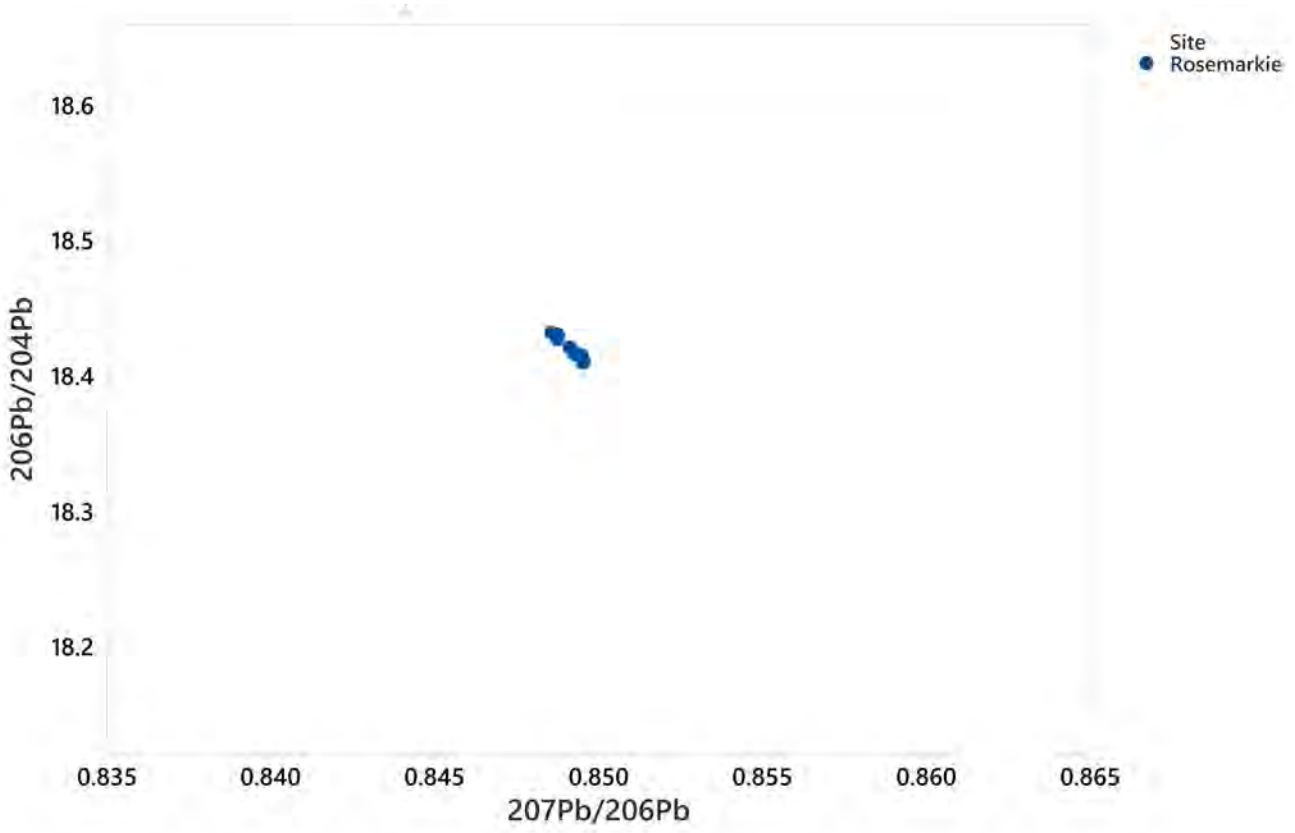

Figure 5.44b: Scatterplot of $^{206}Pb/^{204}Pb$ vs $^{207}Pb/^{206}Pb$ for the Rosemarkie bronzes.

indicate some variation in the supply chain, and it is worth noting that the two leaded bronzes are close together in one of the subdivisions and, as also noted, they have the highest antimony and silver contents. The two subdivisions, if real, might then be the result of different recycling pathways.

Having identified this close grouping, the next step was to find bronzes with closely similar lead isotope ratios. The first match is found in the only other Scottish late Bronze Age metalwork so far subject to lead isotope analysis, the Carnoustie hoard (Northover 2025): the bronze and gold from the spearhead are exact matches and the sword is close by, although it must be remembered that discussion of the gold suggested that it might be middle Bronze Age in origin. The discussion of the Carnoustie bronze compositions suggested that the path by which they reached Scotland involved import of bronze across the North Sea from the Continent, alloying with lead in England or, perhaps, Wales, and then, via successive stages of recycling, reaching Scotland, perhaps with some mixing with unleaded copper or bronze. Comparison with English bronzes show that the lead isotope ratios seen at Rosemarkie can be found from the Wilburton period onwards through the Ewart Park period; it is to be regretted that Parc-y-meirch in Denbighshire is the only hoard that can be assigned to the earliest, Blackmoor, phase of Ewart ParK that has any lead isotope data given that Knight, Demay, and O'Connor (this volume) have suggested that Rosemarkie could have connections that early. Importantly, though, Parc-y-meirch, which has a Wilburton type 'S' metal composition and is heavily leaded, coincides exactly with the lead isotope data for Rosemarkie. Further, other Wilburton hoards for which lead isotope data of sufficient quality are available also coincide exactly with Rosemarkie (Figures 5.45a-b). In their discussion of the lead isotope ratios of Wilburton period metalwork Rohl and Needham (1998) argue that such a tight single cluster could well point to a single source for the lead used in the Wilburton period and, to judge by Parc-y-meirch, possibly also in the Blackmoor phase. It is not possible to say for certain where in England and Wales this source was but the Mendips form one possibility, and there are others in the Pennines; one region that can be ruled out is Scotland (Rohl and Needham 1998, Plot 16).

Discussion

First and foremost, we can say that the bronze in the Rosemarkie assemblage is absolutely typical of the great bulk of Scottish late Bronze Age metalwork in terms of alloy type with the caveat that the proportion of lead bronzes is lower than that for ornaments in Scotland as a whole. The observation that the very tight grouping of the lead isotope ratios of the Rosemarkie objects matches exactly those of the lead in Wilburton bronzes in England and Wales and cannot be matched with any analysed Scottish lead sources. points to the direction from which Scotland was being supplied with metal. One clue that this supply could have been maintained into the Blackmoor phase of the Ewart Park period is shown by the discovery in 2020 of the Peebles Hoard (Knight 2024) which contains objects which are exactly paralleled by the Parc-y-meirch hoard from north Wales: the lead isotope ratios of the two analysed objects from Parc-y-meirch plot exactly with the Rosemarkie results.

From the condition of the objects in the Peebles hoard for which illustrations are available it would appear that they were intact but possibly used with an absence of pieces of scrap or ingots. It may then be that bronze was traded in the form of used objects and not broken up until being placed in a crucible. Although there was always a proportion of higher lead contents, the generally modest lead contents of most of the bronze used in the Scottish late Bronze Age provided a stock of metal with which all craftsmen could be familiar, and the majority of them would have the skills to make the simpler ornaments such as the penannular bracelets. A cup-ended ornament would be more familiar to a gold smith and it is not impossible that bronze examples were also made by a goldsmith. Finally, as already discussed, the penannular ringed ornaments are the product of a very different skill set which almost certainly included the use of lost wax casting, for which there might have been only two or three workshops in the whole of Scotland. The most important conclusion of this study, though, has been to highlight how the combination of compositional and lead isotope analysis can increase our understanding of the organisation of late Bronze Age metalworking in Scotland.

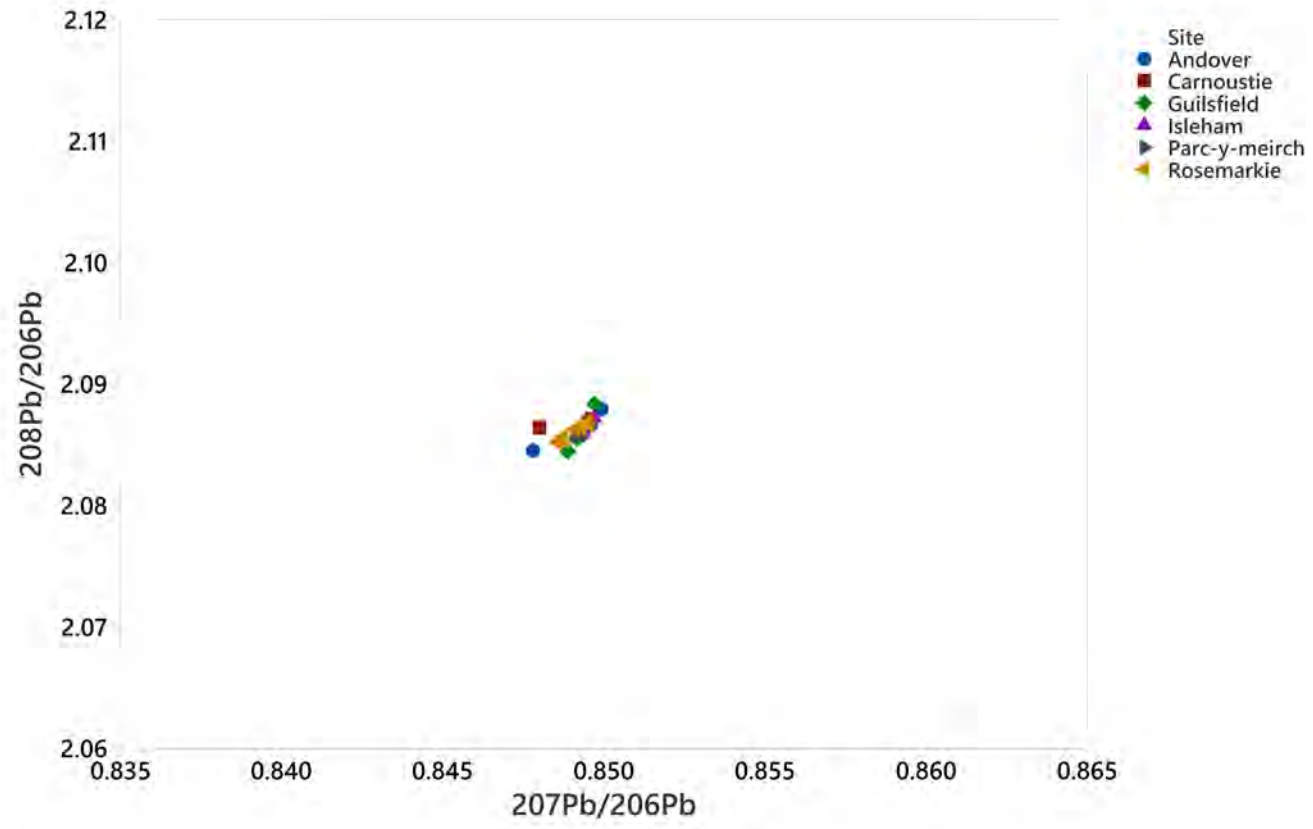

Figure 5.45a: Scatterplot of $^{208}Pb/^{206}Pb$ vs $^{207}Pb/^{206}Pb$ for Wilburton hoards and for Parc-y-meirch and Rosemarkie bronzes.

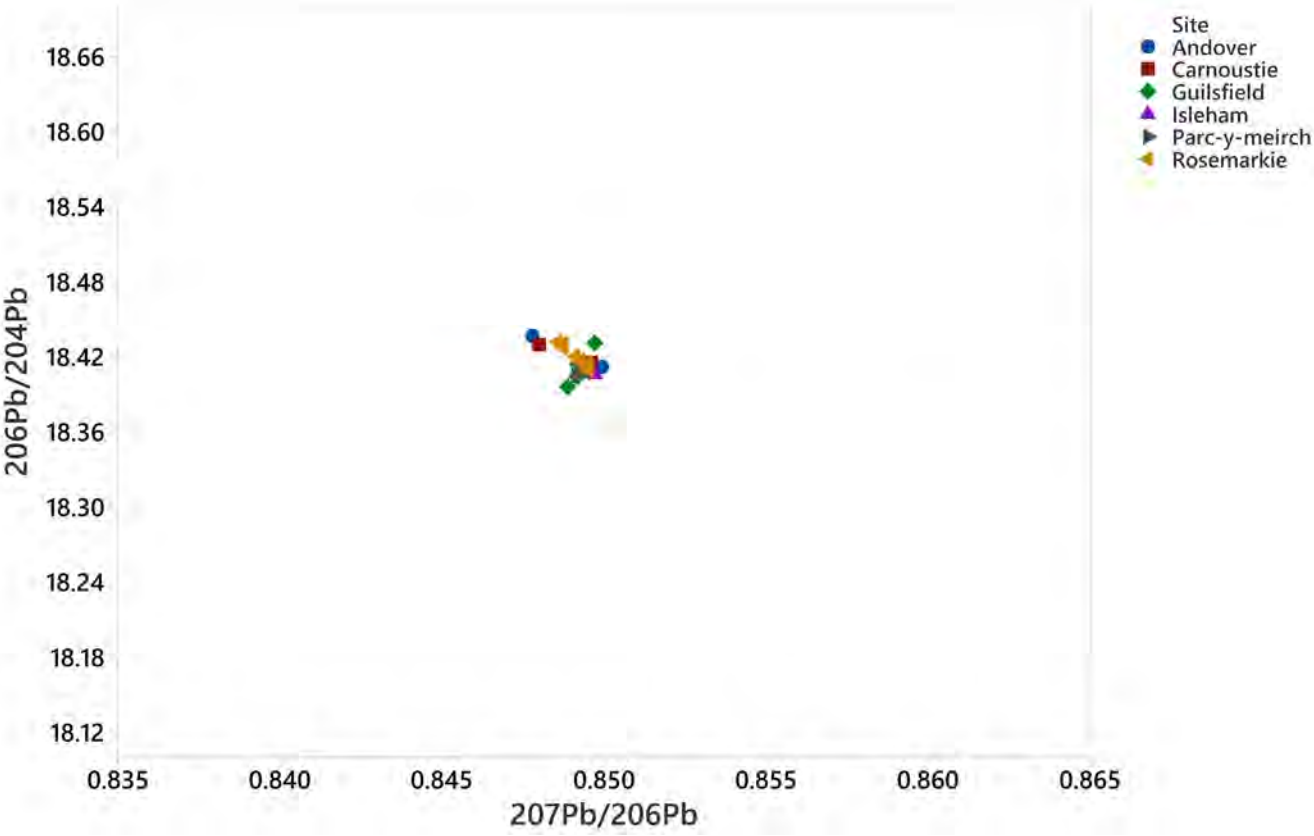

Figure 5.45b: Scatterplot of $^{206}Pb/^{204}Pb$ vs $^{207}Pb/^{206}Pb$ for for Wilburton hoards and for Parc-y-meirch and Rosemarkie bronzes.

General Discussion of the Hoard

By Rachel Buckley

It was quickly established once the hoard was revealed during the excavation (Figure 5.1) that the objects, together with the survival of associated organic remains, were of national significance and unique within Scotland and the UK. Although there are direct comparable examples for the metal objects locally and nationally, finds such as these are still rare. Various specialist analyses and interpretative processes have been required to fully understand the objects of the hoard and place them within a wider contextual setting, drawing on the results of the post excavation analysis as well as comparative examples both nationally and internationally.

Detailed specialist analysis to consider the composition of the hoard, craftsmanship and sources of the materials, was necessary. This work was to ensure that a full body of information existed for this rare assemblage that could contribute to our understanding of the actual burial of the hoard, its meaning in the later Bronze Age in Scotland and further afield, and its contribution to our wider understanding of earlier unearthed hoards. It is also hoped that the process detailed here will in some way benefit other archaeologists in dealing with similar rare and significant objects in the future.

Location of the hoard

This area surrounding Rosemarkie on the Moray Firth has many sites of Bronze Age or earlier interest (Part 6: Discussion), some not unlike the palimpsest revealed at Greenside Farm. The hoard was located towards the west edge of the settlement in Pit Group 5, situated to the north of Roundhouse 1 (Figure 2.40). The features closest to where the hoard was located were a possible row of stakeholes, a hearth, and a group of postholes forming a rough D-shaped or arc. Three pits in this group were dated, two were middle to late Bronze Age and one further south was late Bronze Age.

The pit into which the hoard was buried closely fitted the artefacts. It was a small circular scoop dug to the required dimensions and depth to accommodate the hoard and no more. Furthermore, there was evidently more preparation involved than simply dumping the items into a small pit, as the organisation of the artefacts and the surviving organic evidence demonstrate.

Survival of the hoard

The survival of the organics was due to being deposited alongside the copper items. Barbour (2025) in his discussion of the survival of both metals and organics in the Carnoustie hoard indicated that, "Copper and copper-alloys are generally seen to preserve extraordinarily well in most soil environments……often form(ing) a so-called passivating layer of stable corrosion products''. In addition to this, copper is well known as a biocide and fungicide and is toxic towards microorganisms (Borkow and Gabbay 2005), meaning that copper preserves itself but due to it close proximity with organic materials impeded their decomposition by excluding microorganisms. Amongst other instances there is an early Bronze Age example from Seafield West in Inverness where the survival of a bronze dagger with surviving pieces of scabbard wrapped in cattle skin that survived total decomposition due to the presence of copper in the dagger (Cressey and Sheridan 2003).

With regards to the lumps of carbonised vegetation found within the feature, these were from secure contexts within the hoard, sitting under metal objects (SF 003 and SF 005), which suggests that they were not likely a result of later intrusion. The question is why only a few lumps were present and where did they come from? There was a hearth or fire-pit to the north-west of the hoard's location, and if it had been windy the pieces might have blown in when the hoard was being deposited. It would seem unlikely that they were deliberately included with the metal objects.

A dark organic layer resembling degraded skin or leather was present on all objects of the hoard, though not consistently, with some items having better preservation than others, notably the best conservation was on the lower items within the hoard (see above). This demonstrates that the items had been wrapped possibly individually or in small groups as opposed to being within an organic container as traces of the organic layer were present on the inner edges of the items,

where a bag or outer wrapping of the entire hoard, typically would not touch.

It can be assumed the wrapped items were then packed, using the bracken stems and fronds concentrated in the centre but found from the bottom to the top of the hoard. As Ramsay (above) noted, it resembled a hoard found in St Levan in Cornwall where bracken as well as grass and straw were used as packing material. The presence of packing material raises questions about how the individual ornaments were wrapped and bound, especially as the bracelets were together. Either the bracken was placed in between the groups of bound bracelets as they were placed into the ground or the bracelets were wrapped in a style like bandages where thin strands were wound around the bracelets, allowing space in the centre of the stack to be packed with bracken.

Tree bast knotted fibres (SF 003 and SFs 007-009) were tied together and others may also have been tied (SF 005 and SF 006). What is uncertain is whether they were all bound together when they were first deposited, the fibres degraded over time, or whether they were bound in small groups and then deposited together (Figure 5.7). Part of this tree bast knot (SF 042 and SF 043) provided the late Bronze Age date of 894 – 794 cal BC for the hoard (Table 3.1).

Knight et al. (above) indicated that the ornaments may have come from different sources. No two items were identical and there were differences in how they were wrapped, suggesting that individuals or groups had come together to bury this hoard. It may account for the differing ways the organics presented themselves on the objects, with the stratigraphic relationship of bronze, organic layer and plant material being diverse throughout the hoard.

There was little evidence to support the ringed ornaments being bound to the bracelets. The clumped bracken frond (SF 014) was the only significant material associated with the complete penannular ringed ornament (SF 001), which was removed from underneath it. It was considered that the complete penannular ringed ornament could have been a container opening with the small rings having material bound to them to create a vessel to hold the hoard. However, no evidence was found during the excavation to support this, or the possibility that the hoard was contained in textile or skin before being deposited.

Comparison of the hoard

The nine bronze artefacts can usefully be compared in Scotland and further afield. Penannular bar bracelets are a well-known type, but what makes the Rosemarkie bracelets unusual and different from other penannular bracelets found in Scotland is their chunkiness and mass. Of particular note was the heaviest of the bracelets (SF 005), the heaviest example known in Scotland. This gives rise to the idea that the craftspeople had access to, or control over resources to create something that was heavier (and more expensive) than normal, and which displayed the wealth and status of its owner.

The complete penannular ringed ornament is the most complex and best-preserved example in Scotland and indeed the rest of Britain. It would have looked quite different to its current condition when first constructed (Figure 5.19). Bronze resembles gold in its sheen and lustre and its craftmanship is exceptional. This item was undoubtedly a high-value object for its owner. How exactly it was worn or used is still unclear. Earlier found examples were called neck-rings. The Rosemarkie example, however, with a gap between the terminals of just 3.3 mm, shows no signs of stress or distortion to have been open wide enough to fit over an average human head in order to sit around a neck.

The closest comparison was found in Dingwall but which has a much larger opening between its terminals and it appears to be sub-circular in shape due to distortion. The other options for how it was worn would be on top of the head like a crown but this doesn't seem as likely due to the penannular design. Some of the rings attached to the integrated loops were still able to freely move up and down. The idea that something would have been attached to these small rings is definitely feasible, but again, knowing what or why is only speculation. The tree bast fibres used in the hoard brings the possibility that strands of something similar could have been attached to the rings, to create a 'garment' for ritualistic behaviour. However, there was nothing

attached to the penannular ringed ornament when deposited. There was no conclusive evidence either to say whether the fragment of penannular ringed ornament (SF 002) was broken on purpose or by accident. A fracture of the metal was noted during conservation so the piece may have been stressed or fractured when the object was broken. Knight et al. (above) also suggested the similarities between the complete and partial penannular ringed ornaments were such that they could have been made by the same craftworker (Figures 5.19 and 5.20).

Several comparative examples to the penannular ringed ornaments are located in the Black Isle area. As already noted, the closest comparison is a complete penannular ringed ornament from Dingwall, found c. 1851 (Cowie 1988, 33, 47). It was missing all but one of its annular rings, the integrated loops although broken were still clearly visible and in the same style as the ones from Rosemarkie. Knight et al. (above) had noted two small holes on the interior of the terminals leading to the terminal ends, but their purpose is unclear. One of the penannular neck-rings from the Braes of Gight (Muirhead 1891) has two annular rings inserted through the terminals ends to create a clasp or closing loops; this could possibly be what the lenticular holes were designed for on the complete version from Rosemarkie (Figure 5.46). The terminal of a curved piece, part of the fragments of penannular ringed ornaments from Wester Ord, Cromarty Forth also has a lenticular hole (Richardson 1925). It is a possibility that these lenticular holes were part of the crafting process and served no design function.

The cup ended ornament (SF 003) has fewer comparisons and where there are similarities, they are mostly crafted of gold as opposed to bronze – with the exception of the bronze cup ended ornament found at Poolewe (Jolly 1880) which is not as 'chunky' as the Rosemarkie example (Figure 5.21). It has been posited that

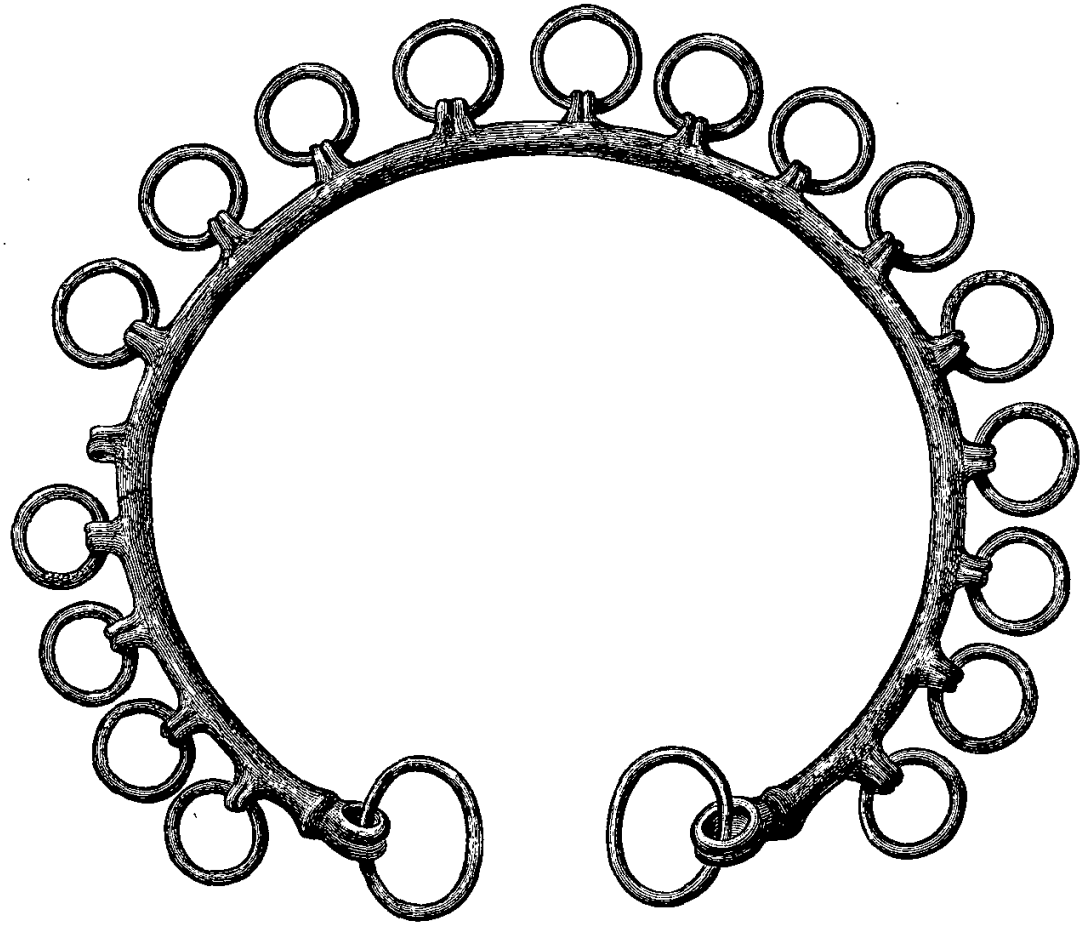

Figure 5.46: Necklet of bronze found at Braes of Gight (half size). From George Muirhead, 1891, Notice of Bronze Ornaments and a thin Bifid Blade of Bronze from the Braes of Gight, Aberdeenshire, 136, Figure 2, Proceedings of the Society of Antiquaries of Scotland 25 (1891), 135-138.

these ornaments could be dress fasteners, but their function is still ambiguous. These ornaments can be more easily identified from the influence of Irish craftspeople. While there are few examples in mainland Britain, they are more plentiful in Ireland (Eogan 1983; 1994). The penannular bracelets also have Irish examples in gold, but in the Highlands of Scotland, inspired examples were made from other resources as well as gold.

Why the burial of the hoard?

Regarding why these items were buried, there may be several possibilities. There are founders' hoards or metal-workers stashes – these include old weapons and broken metal pieces, ingots and other resources too valuable to waste that could be recycled as was common practice in the Bronze Age. There are votive hoards, rarely found on dryland however, often composed of deliberately broken or damaged objects deposited in watery places – bogs, rivers, lochs - thrown in with no chance or desire of recovery. The Rosemarkie hoard, buried with care, shows us another story. The hoard here was tightly packed into a pit with a single homogenous fill suggesting a feature specially created for the hoard, likely the temporary storage of the objects with an intention of their recovery at some stage. Furthermore, the stakehole found in close proximity to the hoard during fieldwork may have acted as a marker to enable the hoard to be recovered at a later point in time.

Perhaps the objects were deposited for pragmatic purposes of safe keeping either generally or because of a potential threat. The fact that they were placed on the edge of the settlement meant that the hoard's owner(s) could have kept an eye on them and additionally, due to them not being buried too deeply, meant they would have been easily retrievable when the time came. Why the time never came to retrieve these valuable goods is a question that unfortunately, can never be truly answered. It is exceptionally rare to find metalwork hoards on dryland and in domestic settlements of this time period but over the last ten years, this picture is changing with a bronze hoard found in association with a contemporary settlement at Carnoustie (Ballin Smith et al. 2025) and another bronze hoard recovered from the entranceway of a roundhouse near Peebles (Knight 2024, 139).

This was a long-lived settlement at Rosemarkie and the hoard was deposited near the end of the settlement's lifespan. Somewhere in the area were talented and experienced craftspeople capable of creating artefacts of an exceptionally high calibre such as the penannular ringed ornaments and penannular bar bracelets that literally outweighed the usual style. The settlement was part of a wider network, with exchange routes established for the movement of raw materials into Scotland - shown by the remarkable similarities in the (non-native) metals in Carnoustie and Rosemarkie hoards, along with routes that the finished artefacts made to their new owners – such as the remarkably similar pieces that have been found in places like Dingwall. The Rosemarkie Bronze Age settlement's inhabitants had access to wealth and status, demonstrated by the fact they owned these pieces in the first instance and then were able to bury the items, as opposed to needing to trade them for resources and survival. The analyses indicate that the hoard was a gathering of personal objects from probably different people or groups and represents a significant individual, as well as community, deposition. In addition to the gathering of the items, the care and attention to wrapping, binding and packing of the objects gives sway to the idea that this was an organised, premeditated and purposeful deposition.

PART 6: Discussion

By Iraia Arabaolaza with contributions by Beverley Ballin Smith and Alun Woodward

Landscape and Environmental Background

By Beverley Ballin Smith

Today the landscape of the Black Isle is dominated by agriculture with a spine of predominantly coniferous trees running through the higher ground in middle of the peninsula. Ten millennia ago, c. 7700 cal BC, the landscape was quite different, with its acidic soils supporting largely forests of coniferous (Scots pine) trees with pioneering birch, and the calcareous sandy soils, such as those around Rosemarkie, sustaining deciduous (oak and birch) tree species with hazel along woodland margins.

The earliest dated human evidence from Rosemarkie is from the Mesolithic where birch, oak and hazel were probably used as firewood by Mesolithic explorers and hunters (see below) who camped there with views across the Moray Firth to the coastline of Moray to the south. This scenario was followed by a roughly four thousand year gap to about 3900 cal BC, the early Neolithic, when sparse human occupation again appears in the archaeological record. Oak, birch and hazel wood was used as fuel for camp fires with evidence of hazel nutshells gathered for food. Some two centuries later willow wood, possibly from locations along water courses, was added to the mixed woodland resources used. The occurrence of this species in the archaeological record may indicate that changes to the extent of the native forests and its composition were already taking place.

During the middle Neolithic from about 3500 cal BC the exploitation of deciduous woodland species remained more or less the same as in the early Neolithic but with the addition of alder. The evidence of copious hazel nutshells, an important autumn food resource, suggests that hazel shrubs may have been encouraged to proliferate by the removal of larger tree species. Another factor that may have had a significant effect on the native forest was its opening for subsistence agriculture by people using slash and burn techniques. The creation of clearings in the forest may have occurred earlier in the period, but there is no evidence from Rosemarkie that they existed until the middle of the Neolithic. The presence of naked barley and emmer wheat grains indicated that cereal crops were being grown in the vicinity of the excavated area and that a permanent dwelling was erected, such as the oval building in Pit Group 7 (see below).

Evidence for occupation and agriculture during the later Neolithic, early Bronze Age and the early part of the middle Bronze Age was either limited or absent. However, environmental changes to the landscape in this area that had begun earlier became more profound and irreversible during the course of the Bronze Age. One of the main changes was the movement of soil from the steeply sloped hill to the north-west of Rosemarkie that accumulated across the excavated area. The humic, iron-rich red soil that developed over the middle Old Red Sandstone bedrock (Scotland's Soils 2025) accumulated eventually to a depth of c. 1.75 m across the western part of the site. The question is when did soil creep that formed colluvium start to move downhill and what caused it to do so?

During the middle Neolithic, pits and postholes of Pit Groups 3 and 12 were dug into, or were covered by, colluvium deposits suggesting soil movement may have begun prior to that period i.e. before 3500 BC during the early Neolithic period. Removal of the natural nature tree cover from the hill combined with the lack of tree generation, exposure of the soil to primitive agricultural practices, the sloping topography of the landscape and water run-off, are probably the main causes of colluvium development in this area. The early Bronze Age cist was built into colluvium and enclosed by it, and many of the middle to later Bronze Age roundhouses, from about 1373 cal BC were also built into it and subsequently covered by it, indicating the processes of soil movement continued throughout the Bronze Age.

The partial or total removal of the native woodland affected the local availability of suitable timber for the construction of wooden roundhouses for settlement in the area. Whereas oak was still important and birch, hazel and willow timber was still used, alder, cherry type wood and Scots pine were also utilised along with some elm. This number of different species, with the reduced dominance of oak, except for the main structural timbers of the buildings, has been noted in the construction of other contemporary roundhouses, such as at Carnoustie in Angus; Guardbridge in Fife; and at the Curragh in South Ayrshire (Ramsay 2025a; 2025b and Alldritt 2025). The frequent occurrence of hazel with that of alder and willow (all probably coppiced) suggests their use in the construction of wattle and daub wall panels and for partitions in the roundhouses (see Part 3: *Archaeobotany*). However, the palisade around Roundhouse 1 used a significant amount of Scots pine in its construction – a timber that had its uses but was not as apparently valuable for house construction as the hardwoods.

Heather species were also gathered and brought back to be used in the roundhouses, and indicates that heathland vegetation was established in the later Bronze Age and within a reasonable distance of the settlement. Heather was used for purposes such as roofing the structures, bedding and possibly for firewood. Bracken was found with the ninth century BC hoard and gorse/broom was identified in Pit Group 5, the location of the hoard. Bracken is a common component of heather moorland and was traditionally cut and dried in the autumn for animal (and possibly human) bedding. It has also been used as a packaging material (Mabey 1977, 102-103), a role it seems to have played in the hoard. Gorse and broom are also found on heathland, but the former has also been traditionally used for hedging, animal fodder and firewood. Bast fibres from ash (see Part 3: Archaeobotany) suggest that ash trees may have grown in the vicinity of the roundhouse settlement during the late Bronze Age.

All the roundhouses produced evidence of cereal grain, with naked barley being the main crop cultivated. Some wheat was also noted as well as possible wild oats (see Part 3: Archaeobotany) but these may have been weeds grown amongst the barley crop. The removal of trees in the vicinity of the settlement allowed for cereal cultivation and the use of an ard plough. Evidence of the latter was found across the demolished structures of Roundhouse 1 and Pit Group 4, and although undated, indicates that some cultivation took place close to existing buildings. The presence of browsing domestic species such as cattle and sheep/goats is also an indicator that in general tree generation except around field margins, would have been difficult and possibly discouraged. However, hazel nutshells were still commonly collected as a food source during this period.

The archaeological evidence for the site ends in the early Medieval period, when birch wood was burnt. However, in general terms, the appearance of the countryside around Rosemarkie today has probably little altered from that of the late Bronze Age, with the dominance of agriculture and the marginalisation of trees around farmed areas.

The Mesolithic

By Alun Woodward

The earliest human use of the excavated area was from the Mesolithic but only an awareness of activity rather than evidence of specific occupation or exploitation - a thin vapour trail not a firm footprint. A radiocarbon date from a residual fragment of birch charcoal from the disturbed cist burial (1121) within Pit Group 11 returned a Mesolithic date of 7734 – 7579 cal BC (UBA-56024) (Figure 2.34). The lithic assemblage (see Part 4: *Lithic Assemblage*) did not produced any diagnostic Mesolithic pieces as its evidence is later, with the caveat that some serrated pieces, such as CAT 28, can be found on Mesolithic sites, but only on rare occasions.

The site of Fortrose and Rosemarkie Waste Water Works (Fraser 2014) is located about 400 m to the south-west of the present site and within the same landscape setting. It too confirmed a Mesolithic presence with birch charcoal providing a later date of 7034 – 6700 cal BC together with some possible Mesolithic lithics. Recent archaeological work to the south-west by Muir of Ord, close to the Beauly Firth, included the excavation of Mesolithic shell middens that were dated 6500 to 6100 BC. That site also

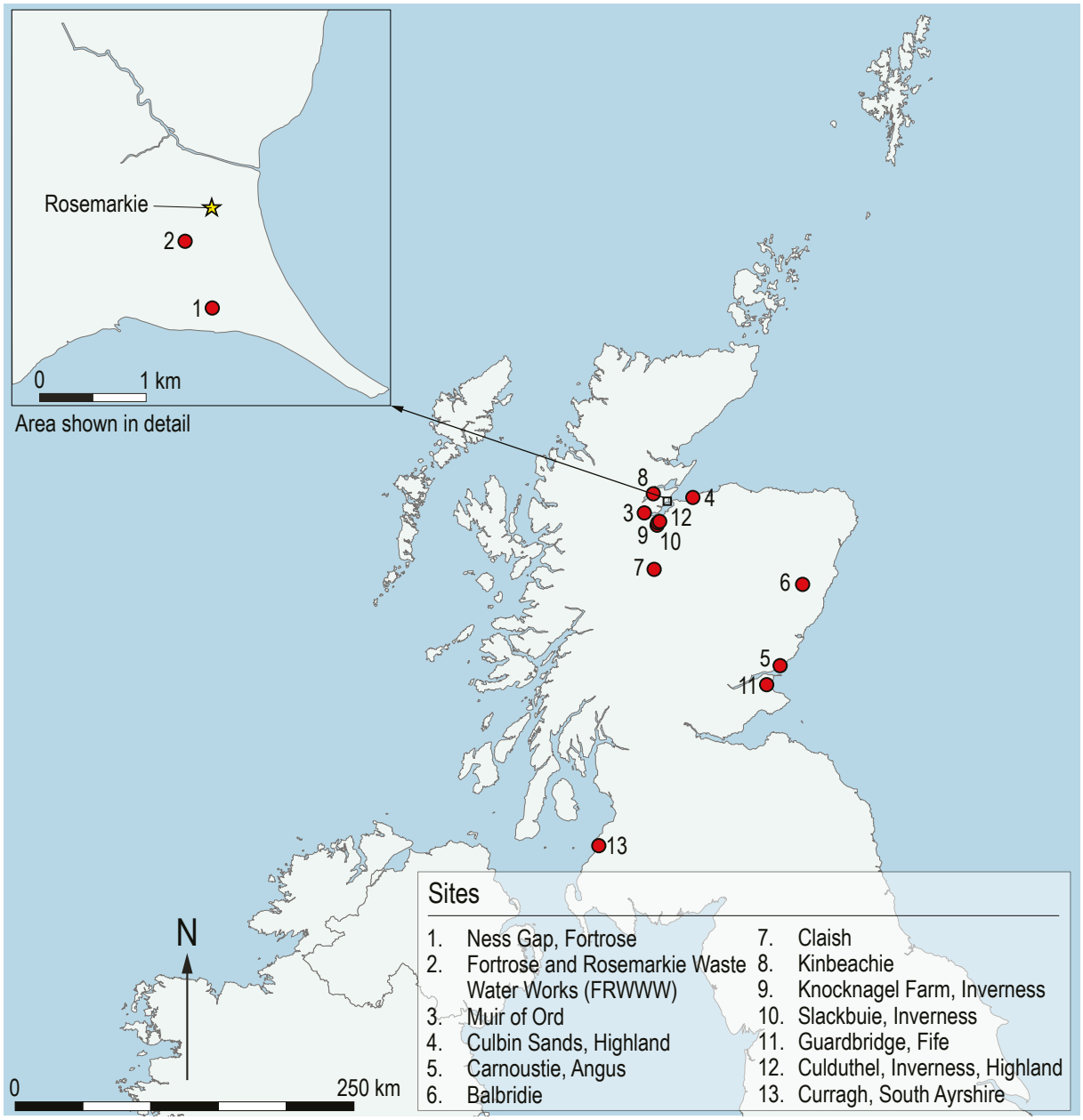

Figure 6.1: Map of Neolithic sites mentioned in the text.

produced worked antler and flakes, scrapers and cores mainly in flint, thereby indicating a wider and more concrete Mesolithic presence in the area (Taradale Through Time 2024).

The well-known site of Culbin Sands on the south side of the Moray Firth from Rosemarkie, produced evidence of a flint microlithic industry during the Mesolithic (Lacaille 1944), and is another example of coastal exploration with possible temporary campsites during this period (Figure 6.1).

Although evidence of a human presence in this geographic area is minimal, what it does indicate is that people moved through the landscape most likely following the coast and exploring inlets and rivers. The forested landscape and easily accessible coastal areas were exploited by people looking for suitable camp sites with resources for survival, hence the sparse birch charcoal evidence of possible camp fires. The Black Isle peninsula provided a rich and varied habitat throughout prehistory but its earliest occupants are mere shadows.

The Early Neolithic

By Alun Woodward

The evidence of human use of the area during the early part of the Neolithic also remains sparse. The earliest cultural remains on the site are of pottery Vessel 1 and Vessel 27 (see Part 4: *Prehistoric Pottery*) and indicate pottery production and usage during the early Neolithic. Whilst Vessel 1 was found in an isolated pit (999) towards the north-east part of the excavation (Figure 6.2), Vessel 27 was recovered from a pit (509) some distance to the south-west within the palisade of a much later Bronze Age roundhouse, indicating possibly two separate visits and activities during the early Neolithic time frame.

The radiocarbon dates from the early Neolithic of 3796 – 3647 cal BC (UBA- 56008) and 3786 – 3648 cal BC (UBA- 56009) came from locations in close proximity to the pit containing Vessel 27 but an earlier date of 3969 – 3798 cal BC (UBA-56026) came from within Pit Group 12 to the immediate north (Table 6.1). They indicate the use of the site, but the accompanying material cultural evidence is slight.

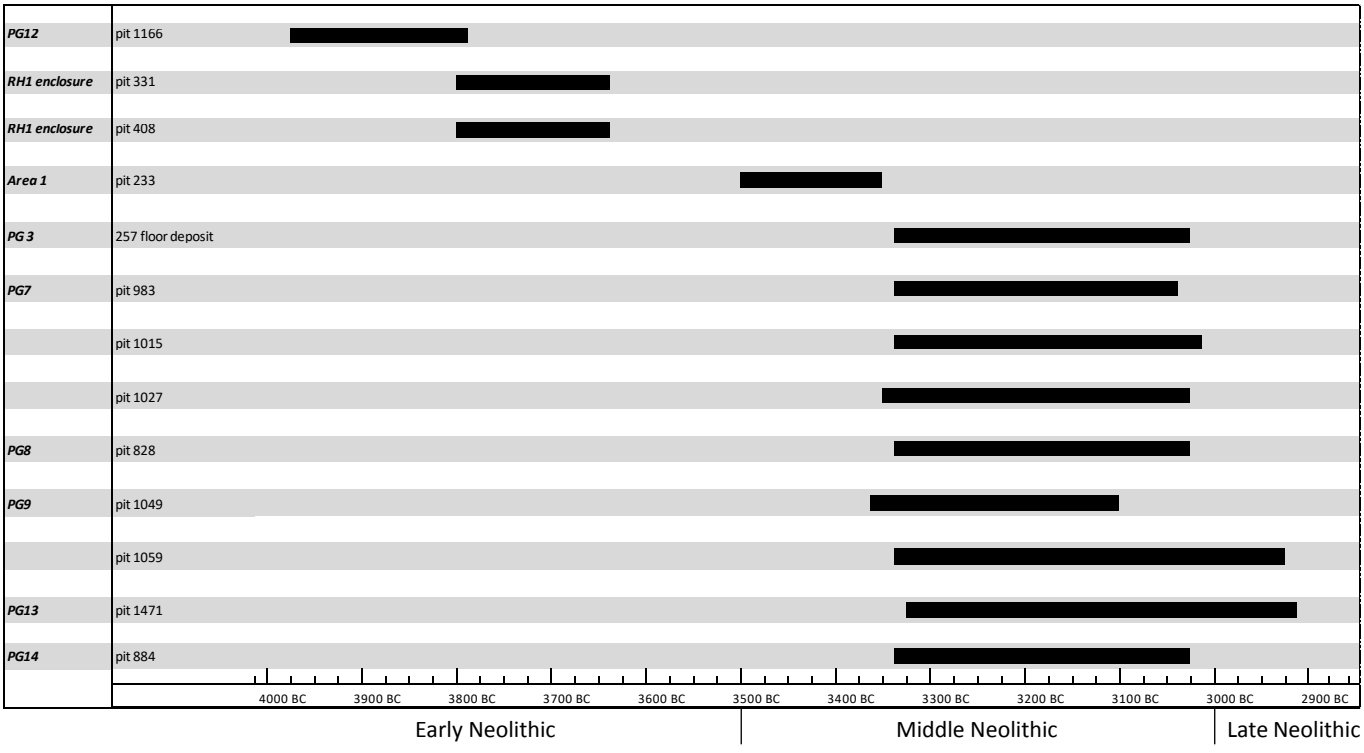

Table 6.1: Diagramatic representation of the radiocarbon dates from early and middle Neolithic features.

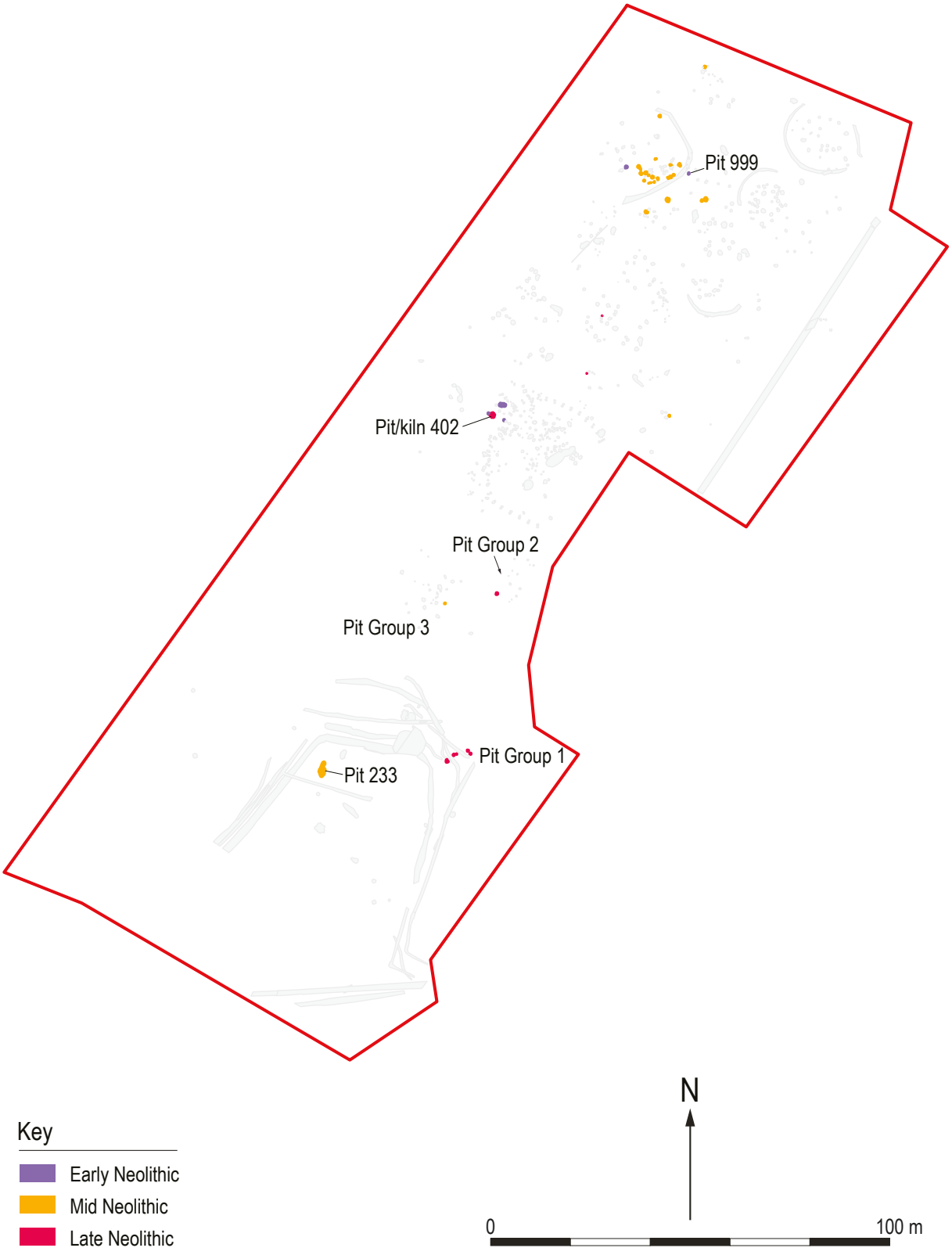

Figure 6.2: Location of Neolithic features across the site.

The nearby site of Fortrose and Rosemarkie Waste Water Works (Fraser 2014) recorded early Neolithic activity with pits containing modified carinated bowls pottery and radiocarbon dates spanning the end of the early Neolithic and into the middle Neolithic. A grain of carbonised bread wheat provided a contemporary date of 3641 – 3384 cal BC (SUERC-51489) and suggested that agriculture was being practiced in the area.

Although there was nothing at Rosemarkie to compare with the magnitude of early Neolithic timber halls such as Carnoustie, Balbridie and Claish (Ballin Smith et al. 2025; Fairweather and Ralston 1993; Barclay et al. 2003), there was limited evidence for activity. The pattern of human activity may represent seasonal camps or a more settled occupation with increased human interaction with the landscape that was subsequently overwritten by later prehistoric activities.

The Middle Neolithic

By Alun Woodward

The first demonstrable habitation within the excavated area was during the middle Neolithic period, from the 34th to 30th centuries BC (Table 6.1). A pit (233) within Area 1 to the south of the site predates a more substantial focus of clustered activity further north (Figures 2.4 and 6.2). It produced a middle Neolithic radiocarbon date of between 3513 – 3347 cal BC (UBA-56005) and it also contained a scale-flake knife (CAT 179, Figure 4.3) or sickle – a possible deliberate deposition. Nearby pits (231 and 235) indicated domestic hearth waste, but the former also had large amounts of hazel charcoal suggesting a wattle panel had been burnt there. The question to be answered is - was this evidence the beginnings of longer-lived settlement on the excavated area, or does it reinforce the annual cycle of visits to the area, most likely in the early autumn when grain was harvested and hazel nuts gathered?

Pit Group 3 to the north had a deposit (257) interpreted by the excavators as a sunken floor with a flint flake with edge retouch (CAT 13, Figure 4.3), which produced a radiocarbon date of 3339 – 3029 cal BC (UBA-56006). A pit of Pit Group 13 to the north-east contained a decorated middle Neolithic Impressed ware vessel (Vessel 19) and a radiocarbon date of 3322 – 2917 cal BC (UBA-56033), which corresponded with the currency of the pot.

Pit Group 7 and a possible structure

The group of pits including (983, 1015 and 1027) in the southern portion Pit Group 7 in the north-west of the site and apparently enclosed within the remains of ephemeral enclosure (1150) (Figure 6.2), returned radiocarbon dates (Table 6.1) from the middle Neolithic: 3342 – 3031 cal BC (UBA-56017), 3339 – 3012 cal BC (UBA-56018) and 3344 – 3032 cal BC (UBA-56019). These same pits produced middle Neolithic Impressed Ware bowls, Vessels 9 to 17, with Vessels 10 and 13 considered as being Neolithic or middle to late Neolithic in date. This evidence supports the impression that a permanent dwelling was erected in this location. The elongated distribution of pits, and the occurrence of three stone-lined pits or postholes could suggest that there was a structure and that it was more likely to be oval in shape rather than round (see Ballin Smith et al. 2025, Structure 13n). The undated curvilinear feature that formed a southern boundary to the pits has been interpreted as a turfed embankment or enclosure but its exact relationship to the possible structure was not clearly established.

The archaeobotany of the pits in Pit Group 7 indicated the occurrence of a large number of carbonised hazel nutshells - an important autumn food resource that had to be gathered, processed and presumably stored. The presence of naked barley grain (see Part 3: *Archaeobotany*) demonstrated not only that it was the main cereal crop but that cultivation of it had taken place reasonably close to the settlement. There was also significant willow and hazel charcoal that indicated the burning of a possible wattle structure or panels. The presence of a stone pounder (SF 161) adds further weight to the evidence that there was a domestic building represented by the southern pits. Further evidence of farming is indicated by indeterminate calcined bone of large ungulates (possibly cattle) (see Part 3: *Animal Bone*), suggesting that there was permanent settlement on the site consistent with the middle to late Neolithic time frame.

The botanical evidence recovered from the southern features of Pit Group 7 is comparable to that from the nearby sites of Kinbeachie (Barclay et al. 2001) and Fortrose and Rosemarkie Waste Water Works (Fraser 2014) on the Black Isle and Knocknagel Farm by Inverness (Kilpatrick 2016). At these sites cereals of naked barley, emmer wheat and charcoal from birch, hazel, pine, oak and elm were present.

A number of other middle Neolithic dated features in the immediate vicinity of Pit Group 7 add to evidence of occupation at this time. Pits from Pit Group 9 seem to have been roughly contemporary with those dated from Pit Group 7, and their carbonised assemblages were very similar including the high number of hazel nutshells. Pit Group 14 had a middle Neolithic dated vessel (Vessel 20), a large quantity of hazel nutshells and returned another roughly contemporary radiocarbon date of 3337 – 3024 cal BC (UBA-56015). Pit Group 8 to the north-east of Pit Group 7 provided another very similar middle Neolithic radiocarbon date range of 3340 – 3032 cal BC (UBA-56014), giving further weight to a concentration of activities during this period in the north-western part of the excavated area.

Compared to the sparse evidence of the early Neolithic, the middle Neolithic occupation at Greenside Farm is more prominent. Although the palimpsest nature of the site has affected the survival of structures, the radiocarbon dates and material culture evidence indicates that the site was permanently inhabited during an approximately 300-year period from about 3300 to 3000 BC.

The 1997 excavation of a Neolithic settlement at Kinbeachie, located towards the Cromarty Firth, returned middle Neolithic radiocarbon dates with the observation that they were from a single period of habitation (Barclay et al. 2001), a scenario that might apply to Greenside Farm. Middle Neolithic Impressed Ware bowls are typically found on contemporary sites in the Highlands and are noted at Kinbeachie (Barclay et al. 2001), Slackbuie, Inverness (Anderson 2012) Knocknagael Farm, Inverness (Ballin Smith 2016, 15) and Wester Hatton near Aberdeen (Lochrie 2019, 285-290), and emphasise the widespread distribution of not only decorated bowls, but also of occupation during this period. The nearby site of Fortrose and Rosemarkie Waste Water Works produced one possible sherd of late Neolithic Grooved Ware suggesting occupation did not end in the immediate area with the middle Neolithic but continued.

The Late Neolithic to the Early Bronze Age

At the Greenside Rosemarkie site, there was little activity evident in the first half of the third millennium BC, with only two late Neolithic dates contemporary to each other, one from a pit in Pit Group 1 of 2897 – 2675 cal BC (UBA-56004) and 2906 – 2678 cal BC (UBA 56007) from Pit Group 2 (Figure 6.2). Late Neolithic material cultural evidence is sparse and restricted to a flint flake (CAT 10) and a retouched piece of exotic black flint (CAT 13), from a pit and a floor deposit in Pit Group 3. The flint was a valuable raw material that was transported up the east coast of Britain along established routeways (see Part 4: *The Lithic Assemblage).*

A special deposit

A pit situated just to the north-west of the palisade of Roundhouse 1 was identified as a possible fire-pit or kiln (402; Figure 6.2) with large stones and silt in its base (512), a black charcoal lens (511) above and a deposit (403) that infilled the rest of the pit along with a small amount of burnt bone and a burnt flint flake (CAT 20) (Figure 6.3). The middle fill (511) of the pit was radiocarbon dated using naked barley grain, which produced a late Bronze Age date range of 905 – 809 cal BC (UBA-56039). However, it is the base of the pit that is of interest, as within it was a small unburnt flake struck off a polished flint axehead (CAT 19, Figure 4.3) and burnt bone (sample 062). After analysis, one of the 21 small fragments of bone from this sample was identified as a calcined second phalanx from a probable brown bear (*Ursus arctos*; Figure 3.10). It was not possible to identify the remaining fragments except as indeterminate mammal (see Part 3: *Animal bone*).

This was a most unusual and rare discovery. The polished flint was also a rare find, especially in this context with the animal bone. The questions can be asked of how reliable this information is,

how do we interpret the feature, and what date did the deposition of the flint and the bear bone take place?

In the immediate environment of pit (402) there was both Neolithic and Bronze Age activity. Situated on the edge of pit (402) was a smaller pit (509), which contained a rim sherd of Neolithic pottery, and a Bronze Age sherd. Within a few metres to the north-east was another larger pit (408) that had an early Neolithic radiocarbon date of 3786 – 3648 cal BC (UBA-50069) but produced middle Neolithic pottery (Vessels 29 and 30) and also had a number of large stones in its fill. Another small pit (406) beside it contained sherds of Bronze Age pottery (Vessel 32). The distribution of pits was not clearly zoned as reuse and mixing of deposits had evidently taken place. There was therefore an element of doubt about what the evidence from individual pits tells us.

The interpretation of pit (402) is complicated. There is a strong probability that the unburnt flake of a high status polished stone axehead was deposited at the base of the pit, together with the 21 fragments of burnt bone as a deliberate ritual act, and then it was filled in. At a later time a new pit was dug over the top of the earlier and used as a fire-pit or kiln, on at least two occasions (511 and 403), with the final firing and filling in containing a piece of burnt flint (CAT 20), and c. 2% calcined bone. There is no record of burnt bone being found in the middle fill (511).

An attempt can be made to date the main event – the deposition of the flake of polished axehead and that of the bear bone. The axehead fragment, is by comparison with the currency of polished stone axes, likely to be later in date, probably from the end of the Neolithic (c. 3000 – 2500 BC and into the earliest part of the early Bronze Age to c. 1950 BC (ScARF 2012 Neolithic and Bronze Age dates). It would seem highly likely that the burnt bone fragments, including that of the bear phalanx, are contemporary with the flint fragment.

Research by O'Regan suggests that bears in Britain became extinct between 3000 – 1500 BC, between the late Neolithic and the end of the early Bronze Age and that their scarce remains (usually phalanges) were associated with human cremations during that period. She indicated that bear remains are 'evidence of long-distance trade in high status Bronze Age…..cremations' (O'Regan 2023, 188 and Abstract) and that the bones may have had a protective function in the deceased's travel to the afterlife.

Figure 6.3: Pit (402), facing SSE.

The bear phalange and the fragment of a polished axehead, most likely were *pars pro toto* items, where a bone represented the whole bear or a fragment the whole axehead, and the pieces had the same significance and meaning as the bear and an intact axehead. These rare and prestigious items with the inclusion of fragments of burnt bone – may indicate the remains of a high status cremation burial. If this was the case, the burial would date between the end of the Neolithic and into the early Bronze Age. A thousand years later, pit digging in the late Bronze Age to create a fire-pit or kiln, disturbed the grave and intruded on what was one of the most interesting cremation burials in the region.

Early Bronze Age - funerary activity

Although a Mesolithic radiocarbon date was obtained from the partial and dismantled cobble-built cist burial (1121) located in the centre of the excavated area (Figure 6.4), this date was a consequence of contamination. Signs of ploughing were apparent during excavation and it is probable that the cist had been damaged by agricultural activity. This observation was further supported by the radiocarbon date from the basal fill that gave a date of 7734 – 7579 cal BC (UBA-56024). Unfortunately, the prehistoric pottery found within its fill was not diagnostic so it was not possible to determine if it was part of any grave goods accompanying the burial or what period it was from. The black flint core also retrieved from within the cist is generally associated with the late Neolithic in Scotland, and was a traded artefact either from Yorkshire or East Anglia (see Part 4: *Lithic Assemblage*). Although this is an interesting item of trading networks it provided no information regarding the burial practice, as it was uncertain whether it was a grave good or the result of truncation or contamination.

What is certain is there was a cist with the cremated remains of at least one possible adult individual. The presence of an early Bronze bipartite Food Vessel (Vessel 2) found during the earlier evaluation around the location of the cist, supports an early Bronze Age date (see Part 4: *Prehistoric Pottery*). The small quantity and fragmentary nature of the cremation remains made radiocarbon dating of them impossible. The lack of vessels that could be identified as cremation urns, the scarcity of the remains as well as their disperse nature across the whole site could indicate that they were not from urned cremations. Moreover, it is likely that any other burial features, if they existed, have been truncated by ploughing or other taphonomic events as evidenced in the cist. It is also possible that the presence of possible human remains scattered across the entirety of the site, might not be the result of later truncation but a secondary ritualistic deposition of the remains in postholes or pits instead (see Part 3: *Human Remains*).

The inclusions of grave goods in a cist together with the cremation burial seems to have been a common practice around the Black Isle area in the early Bronze Age as indicated by other sites such as Ness gap, Fortrose (Woodley et al. 2020, 30). At this site the pottery was dated between 1755 cal BC and 1450 cal BC, placing it within the early Bronze Age and into the middle Bronze Age. The cordoned urn cemetery discovered near Rosemarkie at the Waste Water Works site also produced an early Bronze Age date range of 1870 – 1620 cal BC (Sheridan in Fraser 2014, 34). It is possible that the Rosemarkie cist with the occurrence of the Food Vessel is either slightly earlier in date than these two sites, or that the burial activities at Rosemarkie, Fortrose and Rosemarkie Waste Water Works may indicate that a range of burial practices were being carried out about the same time, but with different vessels as grave goods. There is a further record of a Bronze Age cist with human remains and a Food Vessel that was found at the beginning of the twentieth century at Rosemarkie Manse (HHER no. MHG8852) but it adds little to the understanding of the cist burial on the excavated area. With limited evidence and a lack of a contemporary radiocarbon date from the Rosemarkie cist, the picture of burial activities is unclear, but it was most likely part of a larger funerary landscape.

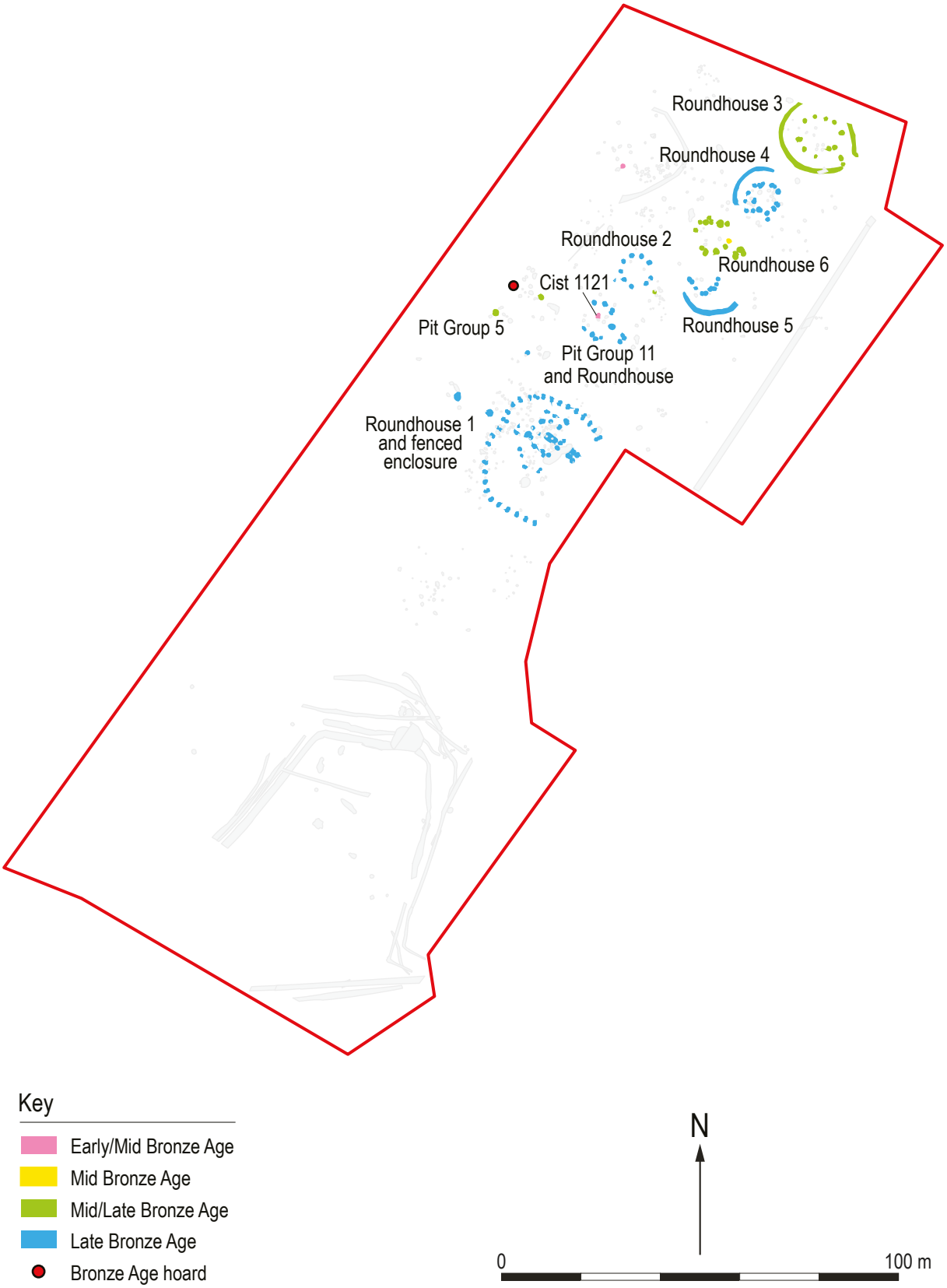

Figure 6.4: Distribution of Bronze Age structures and features across the excavated area.

Middle to Late Bronze Age Settlement Activity

The settlement

Following the funerary activity, domestic settlement became the dominant nature of activity at the Rosemarkie site. Sherds of undiagnostic Bronze Age pottery were found within pits and postholes often mixed into earlier features and radiocarbon dates highlighted domestic activities from the beginning of seventeenth century BC to the end of the Bronze Age. However, it is from the middle Bronze Age, from the mid-fifteenth century BC onwards especially that clear evidence of occupation appears, in the form of roundhouses.

The settlement was a long lived one, lasting more than six centuries to the turn of the eighth-century BC (Table 6.2). A total of seven roundhouses, three defined by small ditches or enclosures and another with a substantial double-post (fenced) palisade were identified along with five pit groups. These buildings were situated towards the north-east corner of the excavated area and slightly east of the Neolithic activities (Figure 6.4).

From the radiocarbon dates, it seems that the roundhouses represented different phases of habitation, with some being contemporary with each other, some showing possible reuse/ repair through time, and others reusing the same building footprint after a period of disuse. It is likely that the earlier phases represented

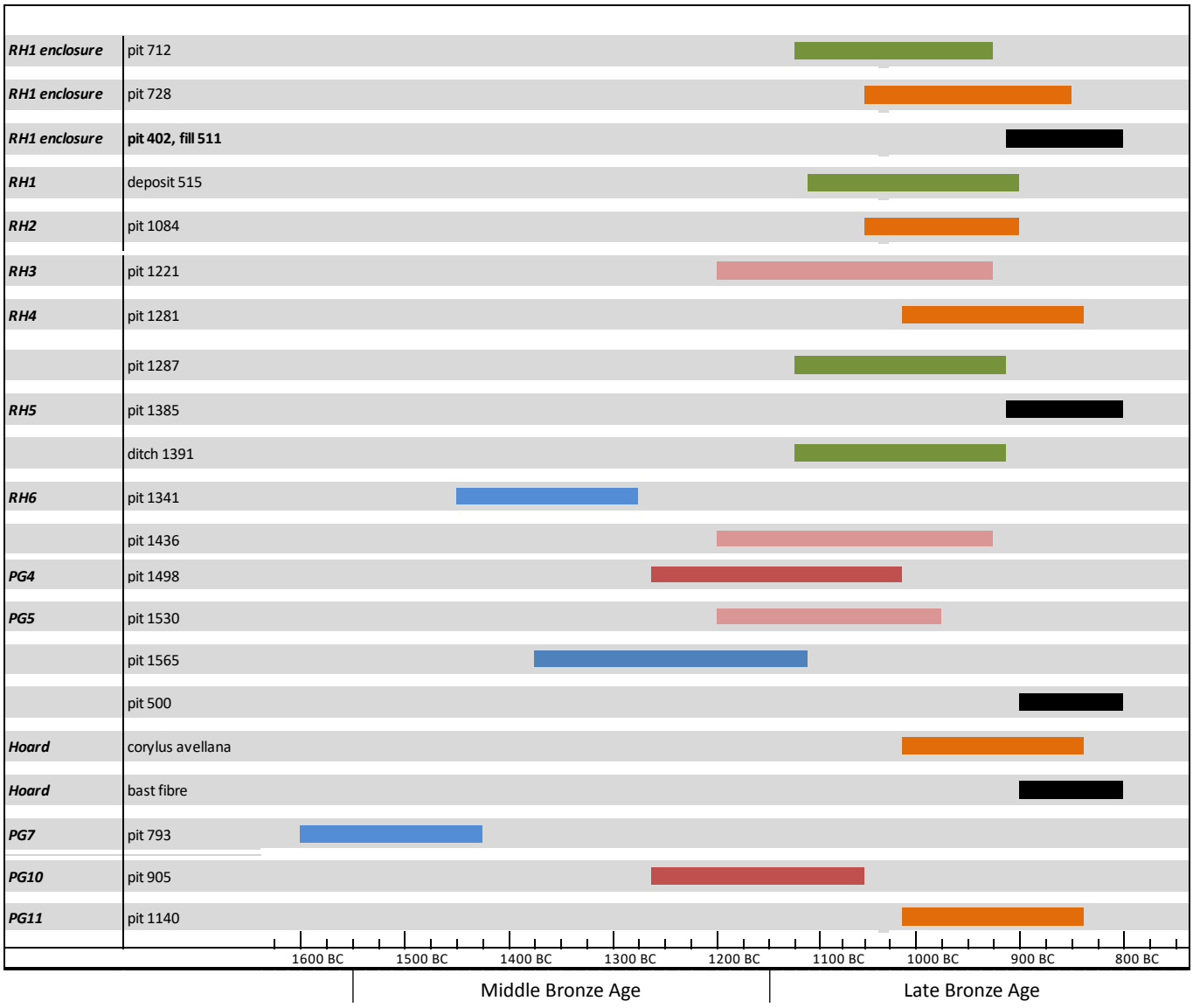

Table 6.2: Diagrammatic representation of the radiocarbon dates from Bronze Age structures.

a single farmhouse with ancillary buildings which was then rebuilt and expanded from the twelfth century BC onwards to include other farmhouses of a possible extended family. It has been suggested that the rebuilding of some of these structures could suggest episodic use of a site instead of a permanent occupation (Halliday 2007, 53-54). The life-span of a roundhouse in Scotland and consequently its occupation has been noted to be a short one, often no more than a generation (Barber and Crone 2001). Excavations at Leuchars in Fife suggested that the different structures identified on site were representations of the same family lineage moving around the excavated site and occupying different spaces in different periods (Cook et al. 2007). A similar scenario existed at Carnoustie (Ballin Smith et al. 2025) and probably at Rosemarkie too. It appears from Pope's research that late Bronze Age settlements were more coastal than in previous periods, suggesting that the Rosemarkie roundhouses in their location were typical of other settlements of that period (Pope 2015, 178; Figure 6.5).

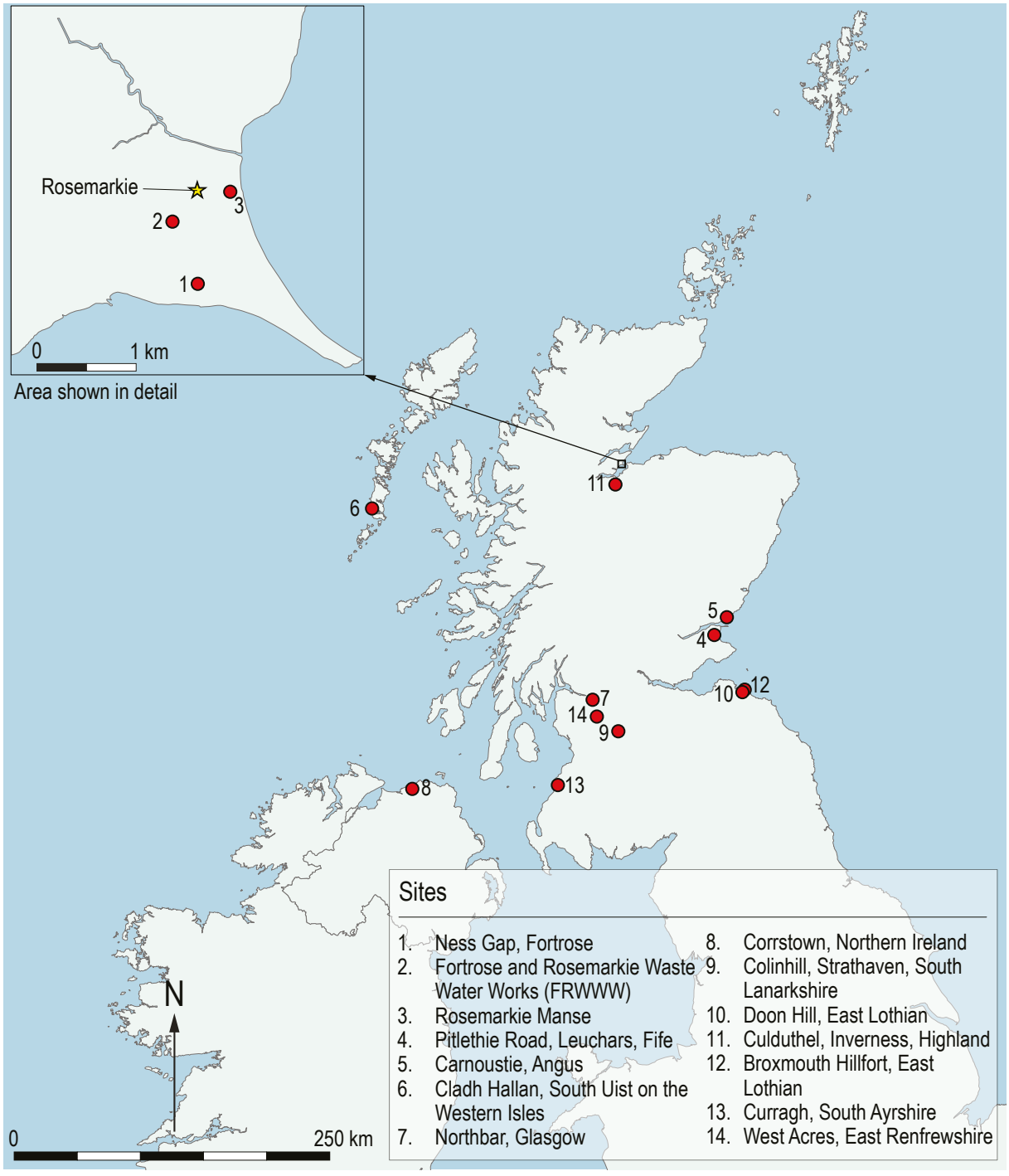

Figure 6.5: Map of Bronze Age sites mentioned in the text.

Roundhouse architecture

There are similarities and differences between the roundhouses in construction, which correlate with the radiocarbon dates obtained from them. All the roundhouses were circular in plan and they each comprised a ring of postholes often packed with stones that defined the central part of the structure. None of the buildings seemed to have a central fire-pit, even though hearth waste material was commonly noted within the fills of the postholes (see Part 3: *Archaeobotany*). This, however, is noted as not an unusual trait in prehistoric houses from the Highland region (Downes 2012). The internal spaces defined by the ring of postholes were similar with measurements of between 7 m to 10 m in diameter. These dimensions were comparable to other prehistoric houses from the same period such as those from the late Bronze Age settlement at Carnoustie in Angus (Ballin Smith et al. 2025) and elsewhere. Three main types of structures were discernible based on their type of surviving evidence: roundhouses with a ring of interior postholes without an external ring groove (Roundhouses 2, 6 and the Pit Group 11 roundhouse); those with a ring of interior postholes but with an outer perimeter defined by a ring groove (Roundhouses 3-5), and Roundhouse 1 with a palisade enclosure defined by a double post-built fence.

Structures with an inner ring of postholes but without an outer ring groove

The inner rings of postholes in the structures, including the roundhouse in Pit Group 11, varied from eight postholes in Roundhouse 6, to ten for both Roundhouse 2 and the roundhouse in Pit Group 11. Most of these postholes were packed with stones for stability (See Part 5: *Worked and Unworked stone*). An entrance was clearly visible in Roundhouse 2 that was oriented to the south-east, and a similar group of features was also present to the south-east in Pit Group 11 and also Roundhouse 6.

Roundhouse 6

The earliest structure, with a diameter of c. 9 m was Roundhouse 6. Although it had a clear entrance to the south-east, it was not discernible during the excavation. Two pits identified to the south-east and sealed with a deposit similar to the colluvium infilling the building from which Bronze Age pottery was retrieved, indicated the entrance. The radiocarbon dates obtained from pits within this structure suggested there were two distinctive phases of occupation. The earliest radiocarbon date was from 1441 – 1281 cal BC (UBA-56030), the middle of the fifteenth century cal BC to the first half of the thirteenth century cal BC from pit (1341) in the interior circle of posts, while the second radiocarbon date of 1190 – 931 cal BC (UBA-56034) provided a slightly later date from the early twelfth century cal BC to the middle tenth century cal BC, was from one of the entrance postholes (Table 6.2). A number of smaller postholes could indicate supports to the load-bearing posts in the centre of this building, and also partitions.

Although most of the material cultural evidence recovered does not infer differences between the structures that could assist with their dating, the quantity of artefacts encountered from within features of this roundhouse suggests a deliberate deposition of some items. These included stone tools, pottery sherds and animal bone. The cattle bone of a possible young animal, together with sheep/goat and horse bones placed within the centre of a posthole (1341) packed with stones and located at the inner end of the entrance, suggest a ritual deposition. Other finds, such as a whale vertebra and discarded stone tools could have been re-purposed and reused as packing materials or the former as a post-pad (see Part 3: *Animal Bone* and Part 4: *Worked and Unworked Stone*). However, the deliberate deposition of the cattle and other animal bones indicate another purpose apart from a simple practical one. Ritualistic depositions have been noted at other sites such as the late Bronze Age settlement at Cladh Hallan, on the Western Isles (Parker Pearson et al. 2021, 62, 82-85) where the human and animal burials were identified as pre-house construction foundation deposits. The animal deposit in the posthole in Roundhouse 6 could have been of similar ritual intention during its construction or a subsequent alteration.

The stone-packed postholes of this and other buildings on the excavated area, was necessary because of the soft subsoil deposits. Unworked stones were brought to the site to be used as

packing around the load-bearing posts of the building. However, not all the packing stones were unworked in Roundhouse 6, and eight worked stones were present: a whetstone and hammerstone were added to the packing of one posthole, two pounders were used in another two postholes, an anvil, a quern rubber and a broken hammerstone and a damaged quern rubber were added to other postholes. This may be the result of an opportunistic removal of worn or damaged tools, but six of them were slightly used and still serviceable. It could be argued that the undamaged tools may have also been part of ritualistic deposits in key features of the construction of the building.

Although evidence of pottery sherds was recovered from both Roundhouses 6, 2 and from the roundhouse within Pit Group 11 they are contemporary with the use of the buildings and found as often in pits as well as postholes where the post may have been replaced. In these instances, the broken vessel parts are considered discarded waste.

Structures with an inner ring of postholes and an outer ring groove

Three late Bronze Age buildings, Roundhouses 3, 4 and 5 had evidence of an outer ring groove, the narrow foundation trench for the outer wall of the roundhouses. These roundhouses were located in a row, starting with the earliest structure in the north-east corner of the site and moving towards the centre of the excavated area (Figure 6.4). Their internal outlines were clearly defined by a ring of postholes measuring, c. 7–10 m in diameter, but with evidence of an entrance facing south-east only present in Roundhouse 3. It is possible that one isolated posthole located in the south-east area of Roundhouse 4 could be the remains of an entrance, with traces of other features associated with an entrance porch being removed by the extensive truncation of the area. Although none of the outer ring grooves were complete due to later truncation, the best preserved was that of Roundhouse 3. These structures were comparable to those found in Northbar in Erskine (Atkinson and McNicol forthcoming) and Carnoustie (Ballin Smith et al. 2025).

Roundhouse 3

Part of the ring groove, which once enclosed the interior of this building, was unexplored to the north due to the edge of the excavated area. The feature formed a shallow penannular foundation trench for the outer wall of the roundhouse that may have had a diameter of c. 17 m, thus more than doubling the internal plan of the building. The north-eastern part of the ring groove by the entrance had a slight kink in it, indicating it had a porch.

There are signs that one of the posts in the postholes forming the entrance at Roundhouse 3 was burnt in situ. However, none of the other features or the floor showed signs of being scorched and the quantities of oak are not significant. It is possible that it might have been accidental, or the end of the post could have been charred deliberately to preserve its longevity in soil. A single radiocarbon date of 1190 – 931 cal BC (UBA- 5602) was obtained for the house from one of the internal postholes by the entrance. Roundhouse 3 provided evidence of a variety of tree species used either in its construction or on the hearth. They included alder, birch, hazel, oak and willow – their charcoal was recovered from all postholes, with traces of barley and hazel nutshells present around those postholes located at the south arc of the interior of the structure (See Part 3: *Archaeobotany*). Smaller postholes in the interior of the structure could possibly indicate the ends of partitions.

Roundhouse 4

The ring groove for this structure survived as an arc from the west to the north of the building. The internal arrangement of the roundhouse, with more than 25 pits and postholes, appears to suggest it had a supplementary ring of posts as well as the inner ring and also interior partitions. However, the two radiocarbon dated postholes from the larger posts on the south-western arc of the interior provided slightly different dates of 1118 – 919 cal BC (UBA-56029) and 1009 – 837 cal BC (UBA-56028). The differences in the dates may indicate that a number of these features were the result of alterations or repairs to the building (Table 6.2). Other evidence was found during excavation of this structure that there

were two phases. One of the postholes located in the southern arc of the structure was noted to have been placed on a bed of stones which sealed a previous posthole, thus suggesting a repair. The archaeobotanical evidence produced a similar mix of tree species as Roundhouse 3 with alder, hazel, Scots pine type and cherry type all represented, together with traces of hazel nutshell. However, in contrast to Roundhouse 3, no oak was recovered from any of the postholes. The lack of oak could probably indicate the wood was not available and other tree species had to be used. It may also indicate a later date for the building, which could correspond with the radiocarbon dating results.

Roundhouse 5

In comparison to the other roundhouses, Roundhouse 5 was not well preserved, with only the remains of a southern arc of the ring groove remaining of the structure. Two radiocarbon dates were obtained: one from a pit in the building's interior and the second from the fill of ring groove which indicated two possible distinct phases of this structure, including a possible late alteration. The earliest date from 1119 – 922 cal BC (UBA-50632) was obtained from the ring groove, while the second date of 910 – 810 cal BC (UBA-50610) came from the pit fill. The earliest date is almost identical to the date obtained for the second phase of Roundhouse 4, which suggests that both structures could have been contemporary. Both of these structures are positioned close together, but with earlier Roundhouse 6 located between them. It is possible that Roundhouses 4 and 5 could have co-existed, or they were built one after the other, with the footprint of the earlier Roundhouse 6 remaining untouched. The gradual movement of later Bronze Age buildings across an area of land when they were replaced, seems to have been common, and has been noted for example at Corestown in Northern Ireland (Ginn and Rathbone 2012, 220), where the predominant pattern of replacement structures was to build close to the original.

Roundhouse 1, the palisade, craftworking and the hoard

Located roughly in the centre of the excavated area, this roundhouse was the most southerly of the buildings (Figure 6.4). It comprised a ring of load-bearing postholes as well as a complex of smaller postholes that formed a smaller ring in the centre of the building. Many of these smaller postholes defined internal partitions, but some appeared to relate to the larger postholes that may have been replaced or reinforced with timber supports. The building's entrance faced south-east and it had the best-preserved porch of all the roundhouses. Its orientation and length was marked by three pairs of large postholes. Two of the building's inner postholes (580 and 688), seemed to have been burnt in situ (see Part 3: *Archaeobotany*). Unlike the possible burnt post identified in Roundhouse 3, these two postholes were part of the structure's load-bearing posts and were located at the north and east points of the circle of posts. Their burning could have been part of a closure rite prior to the abandonment of the structure.

Other rites included the deliberate deposition of a side-scraper in porphyritic pitchstone (CAT 23) and a chip of quartz (CAT 67) in a posthole (513) for a load-bearing timber on the south-western arc of the circle of postholes within the building. The deposition of pitchstone in significant postholes of buildings is not uncommon, as the deposition of pitchstone in an entrance posthole of a middle Bronze Age roundhouse at Strathaven in South Lanarkshire, and in a posthole of the early Neolithic timber hall at Doon Hill in East Lothian attests (Ballin 2019, 25; Ballin forthcoming c). A deposit close to the centre of the building provided a late Bronze Age date of 1107 – 909 cal BC (UBA-56038) and a nearby posthole gave an almost contemporary date range of 1125 – 929 cal BC (UBA-56011). Another radiocarbon date from the fill of a smaller posthole in the centre of the structure was slightly later in the later Bronze Age of 1046 – 856 cal BC (UBA-56012; Table 6.2).

An erosion feature or large pit was present in the south-east quadrant of this roundhouse and lying just south-west of the postholes forming its entrance. Its fill contained small amounts of birch and hazel charcoal, probably from scattered domestic hearth waste. Recent research has suggested that these gullies or ditches could be the result of the stalling of animals with the formation of the feature being the result of mucking-out. Similar features have been

identified in the north or the north-east areas of buildings as the preferred area for stalling animals (Lochrie 2019, 200). Even though, the location of the gully in Roundhouse 1 does not correspond with that preferred in those studied sites, its size and appearance and its placement next to the entrance, another preferred location, supports its use as byre at some time during its life span. Evidence of possible later uses of Oval house 1 and Roundhouse 5 at Carnoustie for the stalling of animals was identified though organic materials and multi-element analysis (Ballin Smith et al. 2025, 295-96). This suggests that buildings could have been use for both human and animal habitation, or that buildings were used solely as byres towards the end of their life span.

The palisade

The roundhouse was seemingly enclosed by a clearly demarcated palisade or fence of double posts approximately 30 m in diameter. Although the loss of its south-eastern side made it incomplete, it seemed to have formed a sub-circular structure that respected the location of the roundhouse that was positioned close to its northern extent. The gate through the palisade was probably located to the south-east near the roundhouse entrance, in the lost portion. The postholes of the palisade were sealed by deposits of colluvium, which contained not only remains of scattered hearth waste but also pottery fragments, of probably middle to late Bronze Age date. The question is whether the palisade and roundhouse can be considered a contemporary unit, or were they two separate structures? Unfortunately, this question cannot be answered by radiocarbon dating, as the palisade provided no dating material.

Problems of dating palisades have been noted at the Iron Age site of Culduthel near Inverness (Hatherley and Murray 2021, 17) where it appeared to be the earliest structure on the site prior to the Iron Age occupation. The much larger palisade at Broxmouth Hillfort was also problematic, due to the time frames indicated by its radiocarbon dates. The authors suggested it was the earliest substantial feature of the hillfort and predated the Iron Age activity (Armit and McKenzie 2013, 27-28). A palisade or oval enclosure predated the early Iron Age roundhouse at Curragh (Barbour and McNicol 2005) and seemingly had no structure directly associated with it, but the phase 1 palisade with a roundhouse at West Acres in the Clyde Valley was dated to the end of the early Bronze Age and into the middle Bronze Age (Toolis 2005).

Palisades were used over a long time frame in direct or implied association with mainly one timber roundhouses. They created a barrier, often with a gate, that surrounded or partially enclosed the immediate environs of the roundhouse, affecting movement of people and livestock. Their construction varied with stone supports and substantial posts, to the less substantial double fence arrangement at Greenside Farm. Here it is assumed, that the roundhouse made use of the enclosure, if the palisade was slightly earlier in date, which may have been the case, and that they functioned as a single unit.

The palisade may have acted as a deterrent to livestock such as cattle from grazing the roof of the roundhouse and to unwanted intruders, but it also may have given some status to the occupier of the roundhouse by creating a formal approach to the building. As well as being a repository of domestic waste and broken pottery dumped along the fence line, probably originating from the roundhouse, the enclosed area may have defined space for specific functions. The palisade allowed outdoor activities to take place close to the house in relative shelter and safety, and it might have given protection to a grain store. A 2 m by 2m square structure outlined by four postholes between the roundhouse and the palisade fence in the north-west was identified as a possible grain store. Contemporary grain stores, of similar size were identified with two of the roundhouses at the Curragh (Barbour and McNicol 2005, Figures 5 and 8).

Metal working and the hoard

Roundhouse 1 did not always remain a domestic dwelling because at some stage during its life-span it seems to have been turned into a workshop for craft working. In this case, the palisade, if it still existed, enclosed activities that may have been shielded or protected from nearby buildings and other people.

Roundhouse 1 was the only building at Greenside Farm that produced evidence of metalworking debris. Within the structure an occupation layer (515) provided a date of 1107 – 909 cal BC (UBA-56038), and a nearby pit (712) a similar date of 1125 – 929 cal BC (UBA-56011) (highlighted on Figure 2.12). Both these features and pit 15001 (from the trial trenching), also from within the building, produced clay moulds for metalworking (see Part 4: *Late Bronze Age Metalworking Debris).* Identifiable mould fragments indicated that a possible sword, spearhead or sickle was manufactured along with possible bracelets. In addition, fragments of several crucibles and moulds came from this pit (15001). Fragments of SF 62, a clay mould for a filleted spearhead were also found in a pit just outside the southern wall of the roundhouse.

The metallurgical and isotope analysis of the hoard ornaments and in particular their composition suggests that the artefacts were crafted using recycled metals sourced from various pathways or networks emanating from England and Wales. These recycling networks are a common trait of other Scottish Late Bronze Age hoards with the Carnoustie Hoard providing a close match (see part 5: *Metallurgy Isotope Analysis*; Northover 2025, 242-249). The manufacturing techniques used on the hoard elements also indicate a variety of specialist skills were required. It is clear that Rosemarkie was part of a metalworking network, a network that included not only the material, ideas/fashions but also the skills and knowledge that were transferred from person to person.

The distribution of mould fragments and crucibles indicates that manufacture of bronze objects took place either inside or outside the building, between the late twelfth to late tenth century BC. This activity largely pre-dates the burial of the hoard of bronze ornaments. It cannot be assumed that items of the hoard were made on the site, or that they were destined to be melted down for the metal to be reused. However, the metal/metalwork was important, expensive and had to be safeguarded. Its burial c. 35 m from the roundhouse towards the north, might have given it some protection, if this was an expedient temporary removal of metalwork from sight (see Part 5: *General Discussion of the Hoard*). The Carnoustie hoard was buried near a contemporary roundhouse too (Ballin Smith et al. 2025, 297) probably with the same intention of retrieval. The story of the Peeblesshire Hoard, dug into the entranceway of a roundhouse, has still to be told (Knight 2024, 139; NMS 2025).

There seems to be clear associations between the metalworking activities of Roundhouse 1, the hoard and its burial, and presumably its ownership. The finding of the hoard (Part 5: *Metalwork Hoard*) and the metalworking within Roundhouse 1 provides a unique and exceptional story to bring the late Bronze Age settlement on the excavated area to a close.

Later Uses of the Site

Following the deposition of the hoard and the abandonment of late Bronze Age roundhouses at the beginning of the early eighth century BC, settlement activities appeared to cease entirely within the Rosemarkie site. Abandonment was also noted at the late Bronze Age settlement at Carnoustie, close in time to the burial of its hoard (Ballin Smith et al. 2025, 300). However, it is not clear if the deposition of the hoard and the demise of the settlement were related events or not. It could be speculated that the burial of the hoard was part of a closing ritual or offering due to difficulties or problems experienced in the settlement. Or that the abandonment of the settlement provides a reason for the failure to retrieve the hoard. What is certain is that there was diminished activity on the site after this period. The build-up of colluvium, noted throughout the duration of settlement use, continued to accumulate to considerable depths. It can be considered that the continuing movement of soil may have been due to the lack of grass and tree cover or damage to fields and poor weather conditions that could for a time have made the settlement unviable. Later ploughing across Roundhouse 1 and Pit Group 4 after their structures had disappeared and their locations forgotten, took place while colluvium build up was taking place. This suggests that although this site was abandoned, people may not have moved far away.

Most of the later activity on the site was either seasonal or scattered across the whole site, which hinders its interpretation. A single radiocarbon date obtained from a midden pit in Pit Group 11 revealed a late Iron Age /early Medieval date (see Table 3.1). The different species of marine shell recovered from this pit, as well as their disposal in separate lenses suggests that the site was used seasonally with people exploiting natural food resources when available. In addition to this limited exploitation of the site, there was an indication that the site was used for iron metal working. However, due to the widely scattered nature of the remains, there was no evidence of where and when this activity occurred. As discussed previously by Cruickshanks (Part 4: *Iron working and Vitrified Material*) there are several iron working sites around the Moray Firth, indicating a regional knowledge and practice of the craft. Consequently, and although the iron working debris was not as substantial as in other local sites, Rosemarkie was part of a network of iron working communities. It reflected a continuation of the previous bronze metalworking traditions, which in turn suggests that metal working on or near this site, was carried out over a long-time span.

Several ditches located to the south of the excavated area suggest that later agricultural activities took place across the site. Medieval pottery recovered from the plough soil and from an agricultural ditch is evidence of manuring during this period with glimpses of trade goods arriving at Rosemarkie from mainland Europe, demonstrated by some of the wares. Most of the material culture recovered however represents early modern finds dated to the nineteenth and early twentieth centuries, reflecting the rural character of the site, with the post-medieval stone culvert encountered in the south-eastern corner of the excavated area, demarcating land and reinforcing its agricultural productivity.

PART 7: Conclusions

By Iraia Arabaolaza

Excavations at Greenside farm Rosemarkie have revealed a landscape that evolved for over 9,000 years, starting early in the Mesolithic until the post-medieval period. Like many other palimpsest sites some of the periods are only represented by either a single artefact or an isolated radiocarbon date.

But particularly significant evidence of prehistoric activity dating from the middle Neolithic until the late Bronze Age was unearthed, revealing that Rosemarkie was part of a broader community that shared funerary and belief systems with nearby prehistoric communities. The presence of the cist and the deposition of high status finds such as the bear bone and polished flint axehead, indicate that the Rosemarkie community had access to wide social and economic networks.

It is the late Bronze Age hoard, alongside a contemporary settlement with evidence for metalworking, that elevates Rosemarkie to national significance. The careful and deliberate burial of this hoard at the tail end of the Bronze Age and only a short distance from a contemporary roundhouse provides a rare glimpse into the community that made this deposition. The artefacts themselves demonstrate that Rosemarkie was a community open and influenced by local/regional fashions and ideas as well as the wider international world.

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Bibliography

(All links were active at the time of publication)

Adams, S, Brück, J and Webley, L 2017 *The Social Context of Technology: non-ferrous metalworking in later prehistoric Britain and Ireland*. York: Archaeology Data Service. Available from: https://doi.org/10.5284/1046749

Adams, S and O'Connor, B 2022 The Havering Hoard, Greater London, England: a multiple hoard in the context of the carp's tongue complex, 211-232, *in* Ard, V, Boulestin, B, Boulud-Gazo, S, Kerouanton, I, Maitay, C, Mélin, M and Nordez, M (eds.) *À l'ouest sans perdre le nord: liber amicorum José Gomez de Soto*. Chauvigny: Associations des Publications chauvinoises.

Alldritt, D 2025 Carbonised plant macrofossils and charcoal, 25-28, *in Barbour, J A Neolithic Monument, Iron Age Homesteads and Early Medieval Kilns: excavations at the Curragh, Girvan, Archaeology Reports Online* 59. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO59.html

Allen, M J 2017 *Molluscs in Archaeology: Methods, Approaches and Applications. Oxford: Oxbow Books Ltd.*

Anderson, J 1892 Notice of the discovery of a hoard of the Bronze Age, consisting chiefly of personal ornaments of bronze, amber and gold, at Balmashanner, near Forfar, *Proceedings of the Society of Antiquaries of Scotland* 26 (1891-92), 182-8.

Anderson, S, 2012 Slackbuie, Inverness (SL09) Finds Reports and Assessment Report No. 2116, CFA Archaeology Ltd

Armstrong, E 1933 *Catalogue of Irish gold ornaments in the collection of the Royal Irish Academy*. Dublin: The Stationary Office.

Armit, I and MacKenzie, J 2013 *An Inherited Place: Broxmouth Hillfort and the South-east Scottish Iron Age*. Edinburgh: Society of Antiquaries of Scotland.

Ashmore, P 2001 Settlement in Scotland During the Second Millennium BC, 1-8, *in Bruck, J (ed.) Bronze Age Landscapes Tradition and Transformation. Oxford: Oxbow Books.*

Ashley, C W 1947 *The Ashley Book of Knots*. London, Faber.

Atkinson, J-J and McNicol, D forthcoming *Bronze Age ritual monuments and domestic occupation at Northbar, Erskine*, Archaeology Reports Online.

Bailie, W, Hunter Blair, A, Barbour, J, Cameron, E, Cowie, T, Evans, J, Harris, S, Hermann, R, Murray, W, Northover, P, O'Connor, B, Pashley, V, Pernicka, E, Ramsay, S, Sheridan, A, Spence, B and Troalen, L 2025 The late Bronze Age metal hoard, 224-253, *in* Ballin Smith, B, Hunter-Blair, A and Bailie, W *Neolithic timber halls and a Bronze Age settlement with hoard at Carnoustie, Angus*, *Archaeology Reports Online* 60. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO60.html

Ballin, T B 2008 Quartz Technology in Scottish Prehistory. *Scottish Archaeological Internet Reports (SAIR)* 26. Available from: http://www.sair.org.uk/sair26.

Ballin, T B 2009 *Archaeological Pitchstone in Northern Britain. Characterization and interpretation of an important prehistoric source*. British Archaeological Reports British Series 476. Oxford: Archaeopress.

Ballin, T B 2011a The Levallois-like approach of Late Neolithic Britain: a discussion based on finds from the Stoneyhill Project, Aberdeenshire,

37-61, *in* Saville, A. (ed.) *Flint and Stone in the Neolithic Period.* Neolithic Studies Group Seminar Papers 11. Oxford: Oxbow Books.

Ballin, T B 2011b *Overhowden and Airhouse, Scottish Borders. Characterization and interpretation of two spectacular lithic assemblages from sites near the Overhowden Henge*. British Archaeological Reports British Series 539. Oxford: Archaeopress.

Ballin, T B 2012 'State of the Art' of British Gunflint Research, with special focus on the early gunflint workshop from Dun Eistean, Lewis, *Post Medieval Archaeology* 46 (1), 116-142.

Ballin, T B 2013a Felsite axehead reduction – the flow from quarry pit to discard/deposition, 73-91, *In* Mahler, D L (ed.) *The Border of Farming – Shetland and Scandinavia,*. Copenhagen: National Museum of Denmark. Available from: http://nordligeverdener.natmus.dk/fileadmin/user_upload/temasites/nordlige_verdener/Nord_Verd_Shetlandsprojekt_3_web.pdf

Ballin, T B 2013b The Late Neolithic pitchstone artefacts from Barnhouse, Orkney – an unusual assemblage from an unusual site, A*rchaeology Reports Online* 4. Available from: http://www.archaeologyreportsonline.com/PDF/ARO4_Barnhouse_pitchstone.pdf

Ballin, T B 2018 The quartz assemblage, 129-164, *in* Ballin Smith, B (ed.): *Life on the Edge: Iain Crawford's Udal, North Uist. The Neolithic and Bronze Age of RUX6*. Oxford: Archaeopress Publishing Ltd.

Ballin, T B 2019 Lithic artefacts, 21-17, *in* Spence, B Neolithic pits and Bronze Age settlement at Colinhill, Strathaven, *Archaeology Reports Online* 35. Available from: Available from: https://www.archaeologyreportsonline.com/reports/20219/ARO35.html

Ballin, T B 2021 *Classification of Lithic Artefacts from the British Late Glacial and Holocene Periods*. Oxford: Archaeopress Publishing Ltd.

Ballin, T B 2025 The lithic assemblage, 116-140, *in* Kilpatrick, M, Barbour, J, Muir, T and Hunter, C Guardbridge, Fife: A multi-period settlement with a multi-vallate fort. *Archaeology Reports Online* 61. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO61.html

Ballin, T B forthcoming a: The lithic assemblage, *in* Grant, E *The kitchen midden at Tarradale, Black Isle, Highland*.

Ballin, T B forthcoming b: The lithic assemblage, *in* Murray. H and C *Midmill, Aberdeenshire.*

Ballin, T B forthcoming c: The lithic assemblage, *in* Ralston, I *The Early Neolithic timber hall at Doon Hill, East Lothian*.

Ballin, T B forthcoming d: The lithic assemblage, *in* Rees, A *Guardbridge, Fife*.

Ballin, T B and Faithfull, J 2009 Gazetteer of Arran Pitchstone Sources. Presentation of exposed pitchstone dykes and sills across the Isle of Arran, and discussion of the possible archaeological relevance of these outcrops. *Scottish Archaeological Internet Reports (SAIR)* 38. Available from: http://www.sair.org.uk/sair38.

Ballin, T B, Barrowman, C and Faithfull, J 2008 The unusual pitchstone-bearing assemblage from Blackpark Plantation East, Bute, *Transactions of the Buteshire Natural History Society* XXVII, 23-51.

Ballin Smith, B 2016 Pottery, 13-15, *in Kilpatrick, M C 2016 Relieving Floods, Revealing History: Early Prehistoric Activity at Knocknagael Farm, Inverness, Scottish Archaeological Internet Reports 64. Available from:* http://dx.doi.org/10.9750/issn.2056-7421.2016.64

Ballin Smith, B 2023a Prehistoric pottery, 54-66, *in* Atkinson J-J The long history of a palaeochannel at Fernigair, Hamilton. *Archaeology Reports Online* 52. Available from: https://www.archaeologyreportsonline.com/reports/2023/ARO52.html

Ballin Smith B 2023b Prehistoric Pottery, 28-33, Fig 11, *in* Mooney K A Mesolithic camp, Bronze Age roundhouse and an Iron Age building at Nairn Street, Larkhall, South Lanarkshire. *Archaeology Reports Online 53*. Available from: https://www.archaeologyreportsonline.com/reports/2023/ARO53.html

Ballin Smith, B 2023c The worked stone from Chapeldonan. Unpublished Guard Archaeology specialist report.

Ballin Smith, B 2025a Stone Artefacts, 181-190, *in* Ballin Smith B, Hunter Blair, A and Bailie, W Neolithic timber halls and a Bronze Age settlement with hoard at Carnoustie, Angus. *Archaeology Reports Online* 60. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO60.html

Ballin Smith, B, 2025b The pottery, 191-220, *in* Ballin Smith B, Hunter Blair, A and Bailie, W Neolithic timber halls and a Bronze Age settlement with hoard at Carnoustie, Angus. *Archaeology Reports Online* 60. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO60.html

Ballin Smith, B 2025c Stone artefacts, 141-148, *in* Kilpatrick, M, Barbour, J, Muir, T and Hunter, C Guardbridge, Fife: A multi-period settlement with a multi-vallate fort. *Archaeology Reports Online* 61. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO61.html

Ballin Smith, B 2025d Clay and daub, 176-180, *in* Kilpatrick, M, Barbour, J, Muir, T and Hunter, C Guardbridge, Fife: A multi-period settlement with a multi-vallate fort. *Archaeology Reports Online* 61. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO61.html

Ballin Smith, B forthcoming a The Pottery and Fired Clay, *in* Atkinson J-J and McNicol, D Bronze Age ritual monuments and domestic occupation at Northbar, Erskine. *Archaeology Reports Online.*

Ballin Smith, B forthcoming b Coarse stone, *in* Atkinson J-J and McNicol, D Bronze Age ritual monuments and domestic occupation at Northbar, Erskine. *Archaeology Reports Online.*

Ballin Smith, B, Hunter Blair, A and Bailie, W 2025 Neolithic timber halls and a Bronze Age settlement with hoard at Carnoustie, Angus, Archaeology Reports Online 60. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO60.html

Barber, J W and Crone, B A 2001 The duration of structures, settlements and sites: some evidence from Scotland, 69-86, *in* Raftery, B and Hickey, J (eds.) *Recent Developments in Wetland Research.* Seandálaíocht: Monograph 2, UCD and WARP Occasional Paper 14. Dublin: University College, Dublin.

Barbour, J 2025 Post-depositional processes affecting the hoard, 254-259, *in Ballin Smith, B, Hunter Blair, A and Bailie, W 2025 Neolithic timber halls and a Bronze Age settlement with hoard at Carnoustie, Angus, Archaeology Reports Online* 60. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO60.html

Barbour, J and McNicol, D 2025 A Neolithic Monument, Iron Age Homesteads and Early Medieval Kilns: excavations at the Curragh, Girvan, *Archaeology Reports Online* 59. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO59.html

Barclay, G, Brophy, K and MacGregor, G 2003 Claish, Stirling: an early Neolithic structure in its context, *Proceedings of the Society of Antiquaries of Scotland* 132, 65-137.

Barclay, J, Carter, S P, Dalland, M M, Hastie, M, Holden, T G, MacSween, A and Wickham-Jones, C R 2001 A possible Neolithic settlement at Kinbeachie, Black Isle, Highland, *Proceedings of the Society of Antiquaries of Scotland 131, 57-85.*

Bass, W M 1971 Human Osteology: A Laboratory and Field Manual of the Human Skeleton. Missouri: Missouri Archaeological Society.

Becker, K, Cowie, T, Troalen, L and Tate, J 2020 Late Bronze Age Objects, 117-130, *in* Armit, I and Büster, L *Darkness Visible: The Sculptor's Cave, Covesea, from the Bronze Age to the Picts*. Edinburgh: Society of Antiquaries of Scotland.

Benton, S 1931 The Excavation of the Sculptor's Cave, Covesea, Morayshire, *Proceedings of the Society of Antiquaries of Scotland* 65, 177-216.

Birch, S and Peteranna, M 2017 Reeds Park, Cromarty, Excavation, *Discovery and Excavation in Scotland* 17 (2016), 97-99.

Birch, S, Peteranna, M and Gunn, S 2019 Rosemarkie Caves Project (Learnie Caves 1A and 1B), Excavation and post-excavation analysis, *Discovery and Excavation in Scotland*, 19 (2018), 124-127.

Bishop, R R, Church, M J and Rowley-Conwy, P A 2010 Cereals, fruits and nuts in the Scottish Neolithic, *Proceedings of the Society of Antiquaries of Scotland 139, 47-103.*

BSBI 2024 = Botanical Society of Britain and Ireland. Scottish Newsletter. Spring 2024.

Borkow, G and Gabbay, J 2005 Copper as a Biocidal Tool, Current Medicinal Chemistry 12 (18), 2163-2175.

Bowlder, S 2014 Mollusks and other shells, 316-337, in Balme, J and Paterson, A (eds.) Archaeology in practice: a student guide to archaeological analyses. London: Blackwell Publishing.

Bowman, S and Needham, S 2005 Flesh-hooks, technological complexity and the Atlantic Bronze Age feasting complex, *European Journal of Archaeology 8(2), 93-136.*

Bowman, S and Needham, S P 2007 The Dunaverney and Little Thetford flesh-hooks, *Antiquaries Journal* 87, 53-108.

Brickley, M and McKinley, J I (eds.) 2004 *Guidelines to the Standards for Recording Human Remains. CIfA and BABAO.*

BGS = British Geological Survey 2025 Online viewer. Available from: https://geologyviewer.bgs.ac.uk/

Brooks, S and Suchey, J M 1990 Skeletal age determination based on the os pubis, *Human Evolution 5, 227-238.*

Brown, M A and Blin-Stoyle, A E 1959 A sample analysis of British Middle and Late Bronze Age material, using optical spectrometry, *Proceedings of the Prehistoric Society* 25, 188-208.

Brück, J 2006 Fragmentation, Personhood and the Social Construction of Technology in Middle and Late Bronze Age Britain, *Cambridge Archaeological Journal 16, 297-315.*

Buikstra, J E and Ubelaker, D H 1994 Standards for Data Collection from Human Skeletal Remains. Fayetteville: Arkansas Archaeological Survey.

Cahill, M 2006 John Windele's golden legacy-prehistoric gold ornaments from Co. Cork and Co. Waterford, *Proceedings of the Royal Irish Academy* 106C, 219-337.

Cameron, I B and Stephenson, D 1985 *The Midland Valley of Scotland*. British Regional Geology. 5. London: British Geological Survey, Natural Environment Research Council / Her Majesty's Stationery Office.

Cappers, R T J, Bekker, R M and Jans, J E A 2006 Digital Seed Atlas of the Netherlands, Groningen Archaeological Studies 4. Eelde, The Netherlands: Barkhuis Publishing.

Chartered Institute for Archaeologists (CIfA) 2014, revised 2020, *Standard and guidance for the collection, documentation, conservation and research of archaeological materials*. Reading: CIfA. Available from: http://www.archaeologists.net/sites/default/files/CIfAS&GFinds_1.pdf

Childe, V G 1935 *The Prehistory of Scotland*. London: Kegan Paul, Trench, Trubner & Co. Ltd.

Clark, G, Cowie, T and Kruse, S 2017 *Feats of Clay. Bronze Age Metalworking around the Moray Firth*. Inverness: North Kessock and District Local History Society.

Clarke, D V and Kemp, M M B 1984 A Hoard of Late Bronze Age Gold Objects from Heights of Brae, Ross and Cromarty District, Highland Region, *Proceedings of the Society of Antiquaries of Scotland* 114, 189-198.

Coles, J M 1960 Scottish Late Bronze Age metalwork: typology, distributions and chronology, *Proceedings of the Society of Antiquaries of Scotland* 93, 16-134 and plates.

Coles, J M, Coutts, H and Ryder, M L 1964 A Late Bronze Age Find from Pyotdykes, Angus, Scotland, with associated gold, cloth, leather and wood remains, *Proceedings of the Prehistoric Society* 30, 186-198.

Colquhoun, I and Burgess, C 1988 *The Swords of Britain*. Prähistorische Bronzefunde 4.5. Munich: C H Beck.

Cook, M 2007 Early Neolithic ritual activity, Bronze Age occupation and medieval activity at Pitlethie Road, Leuchars, Fife, *Tayside and Fife Archaeological Journal* 13, 1-23,

Cowie, T 1988 *Magic Metal: Early Metalworkers in the North-East*. Aberdeen: University of Aberdeen.

Cowie, T 2002 A Preliminary Report on the Discovery of Late Bronze Age Metalworking Debris at Galmisdale, Isle of Eigg. Unpublished Interim Report, National Museums Scotland.

Cowie, T 2012 Ceramics Associated with Metalworking from North Kessock, Inverness. National Museums Scotland. Unpublished Specialist Report for Headland Archaeology.

Cowie, T and Eremin, K 2011 Fragments of Bronze Age Sword Moulds, 24-27, *in* Cressey, M and Anderson, S A Later Prehistoric Settlement and Metalworking Site at Seafield West, near Inverness, Highland, *Scottish Archaeology Internet Reports* 47.

Cowie, T, Northover, P and O'Connor, B 1998 The St Andrews, Fife hoard: context and chronology in the Scottish Late Bronze Age, 141-154, *in* Mordant, C, Pernot, C and Rychners, V (eds.), *L'Atelier du bronzier en Europe du XXe au VIIIe siècle avant Notre Ère* III (Session de Dijon). Paris: Èditions du CTHS.

Cowie, T, O'Connor, B and Proudfoot, E 1991 A Late Bronze Age hoard from St Andrews, Fife, Scotland: a preliminary report, in Chevillot, C and Coffyn, A (eds) *L'age du bronze atlantique: ses faciés, de l'Écosse à l'Andalousie et leurs relations avec le bronze continental at la méditerranée: Actes du 1er Colloque du Parc Archéologique de Beynac*, 49-58. Beynac-et-Cazenac: Publication de l'Association des Musées du Sarladais.

Cowie, T and O'Connor, B 2012 Artefacts, 80-84, *in* Mithen, S and Wicks, K 2012 Croig Cave: a Late Bronze Age ornament deposit and three millennia of fishing and foraging on the north-west coast of Mull, Scotland, *Proceedings of the Society of Antiquaries of Scotland* 142, 63-132.

Cowie, T and Reid, A 1987 Some recent finds of Bronze-Age metalwork from Perthshire, *Proceedings of the Society of Antiquaries of Scotland* 116, 69-88.

Cressey, M and Sheridan, A 2003 The excavations of a Bronze Age cemetery at Seafield West, near Inverness, Highland, *Proceedings of the Society of Antiquaries of Scotland 133, 47-84.*

Crew, P and Rehren, T 2002 High temperature workshop residues from Tara: iron, bronze and glass, 83-102, *in* Roche, H (ed.) *Excavations at Ráith na Ríg, Tara, Co Meath, 1997*. Dublin: Royal Irish Academy, Discovery Programme Reports 6.

Cruickshanks, G 2017 *Iron in Iron Age Scotland: a long term case study of production and use c. 800 BC to AD 800*. Unpublished PhD Thesis, University of Edinburgh.

Davis, M and Harris, S 2023 Textiles in a Viking Age hoard: Identifying ephemeral traces of textiles in metal corrosion products, *Journal of Archaeological Science*: Reports, 103796.

Davis, R 2015 *The Late Bronze Age Spearheads of Britain.* Stuttgart: Prähistorische Bronzefunde 5.7.

Downes, J (ed.) 2012 *ScARF Bronze Age Panel,* 3. Lifeways and life style 3.3. Settlement, Landuse and Resources. Available from: https://tinyurl.com/v8yd423

Egan, G and Pritchard, F 2002 *Dress Accessories 1150-1450: Medieval Finds from Excavations in London*. London: Museum of London

Eluère, C and Gomez, J 1990 *Typologie des objets de l'Âge du Bronze en France. Fascicule VII bracelets, colliers, boucles*. Paris: Société Préhistorique Française.

Eogan, G 1983 *Hoards of the Irish Bronze Age*. Dublin: University College.

Eogan, G 1994 *The Accomplished Art*. Oxford: Oxbow Books Ltd.

Fairweather, A D and Ralston, I B M 1993 The Neolithic timber hall at Balbridie, Grampian Region, Scotland: the building, the dates, the macrofossils, *Antiquity* 67 (255), 313-23.

Fish, J D and Fish, S 2011 *A Student's Guide to the Seashore. 3rd edition. Cambridge: Cambridge University Press.*

Fraser, L 2014 Fortrose and Rosemarkie Waste Water Works, Rosemarkie Road, Rosemarkie - Archaeological Excavation, Final Report. Unpublished Ross and Cromarty Archaeological Services report.

Gabra-Sanders, T 1994 Textiles and fibres from the Late Bronze Age hoard from St. Andrews, Fife, Scotland - a preliminary report, 34-42, *in* Jaacks, G and Tidow, K (eds.) *Archäologische Textilfunde - Archaeological Textiles, Textilsymposium, Neumünster 1993*. NESAT 5, Neüminster.

Gale, R and Cutler, D 2000 *Plants in Archaeology. Otley: Westbury Publishing.*

Ginn, V and Rathbone, S 2012 *Corrstown a Coastal Community: excavations of a Bronze Age village in Northern Ireland.* Oxford: Oxbow Books.

Halliday, S P 2007 Unenclosed round-houses in Scotland: occupation, abandonment and the character of settlement', *in* Burgess, C, Topping, P and Lynch, F (eds.) *Beyond Stonehenge: Essays on the Bronze Age in Honour of Colin Burgess*. Oxford: Oxbow Books, 49-56.

Hamilton, J R C 1956 *Excavations at Jarlshof, Shetland*. Edinburgh: HMSO.

Harris, S and Gleba, M 2024 Fibres and fabrics, Chapter 12, *in* Knight, M, Ballantyne, R, Brudenell, M, Cooper, A, Gibson, D and Robinson Zeki, I (eds.) *The Must Farm Pile-dwelling Settlement. Volume 2: Specialist Reports*. Cambridge: McDonald Institute for Archaeological Research.

Hatherley, C and Murray R 2021 *Culduthel: an Iron Age Craftworking Centre in North-East Scotland.* Edinburgh: Society of Antiquaries of Scotland.

Hawkes, C F C and Clarke, R R 1963 Gahlstorf and Caister-on-Sea. Two Finds of Late Bronze Age Irish Gold, 193-250, *in* Foster, I L L and Alcock, L (eds.) *Culture and Environment. Essays in Honour of Sir Cyril Fox*. London: Routledge and Kegan Paul.

Henriksen, M B 1998 'Pars pro toto'-begravelser i romersk jernalder – et aspekt af jernalderens begravelsesritualer, 99-112, *in* Sommer A L and Ballegaard, A L (eds.) *Dødens Rum*. Odense: Odense Universitetsforlag.

HHER = Highland Region Historic Environment Record, Inverness.

Historic Environment Scotland 1997 *The Treatment of Human Remains in Archaeology. Available from:* https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=02e7320f-4fb2-4c4a-8aba-a58e00e3f22c

Hodges, H 1989 *Artefacts: an introduction to early materials and technology.* London: Gerald Duckworth & Co. Ltd.

Hook, D and Needham, S P 1989 A comparison of recent analyses of British Late Bronze Age goldwork with Irish parallels, *Jewellery Studies* 3, 15-24.

Hunter, F 2006 Excavations at Birnie, Moray, 2005. Unpublished data structure report, National Museums Scotland.

Hunter, F 2007 Excavations at Birnie, Moray, 2006. Unpublished data structure report, National Museums Scotland.

Janaway, R 1983 Textile fibre characteristics preserved by metal corrosion: the potential of SEM studies, *The Conservator* 7, 48-52.

Jolly, W 1880 Notes on Bronze Weapons and Other Remains Found near Poolewe, Ross-Shire, *Proceedings of the Society of Antiquaries of Scotland* 14 (1879-80), 45-49.

Kennedy, K and Peteranna, M 2018 Housing development of 50 dwellings and associated works at land 90m NW of Greenside Farmhouse, Courthill Road, Rosemarkie. Unpublished Data Structure Report, AOC Archaeology.

Kilikouglou,V; Vekinis, G; Maniatis, Y and Day, P M 1998 Mechanical performance of quartz-tempered ceramics: part 1, strength and toughness, *Archaeometry* 40.2, 261-279.

Kilpatrick, M 2016 Relieving Floods, Revealing History: early Prehistoric Activity at Knocknagael Farm, Inverness, *Scottish Archaeological Internet Reports 64. Available from:* https://doi.org/10.9750/issn.2056-7421.2016.64

Kitchener, A and Britton, K 2024 The bears of Scotland, 387-414, *in Annales Zoologici Fennici 61, Finnish Zoological and Botanical Publishing Board.*

Knight, M G 2022 Practices of metalwork deposition in Late Bronze Age Scotland, 289-292, *in* Doyen, J-M, Cattelain, P, Delvaux, L and de Mulder, G (eds.) *De L'escaut au nil. Bric-à-brac en hommage à Eugène Warmenbol à l'occasion de son 65e anniversaire*. Treignes: Éditions du Cedarc.

Knight, M G 2024 The Peebles Hoard, *Discovery and Excavation in Scotland 25, 139-140.*

Knight, M G, Boughton, D and Northover, J P 2021 Poolewe: The last Bronze Age hoard in Scotland? *Archaeological Journal* 178 (1), 1-31.

Knight, M G, Freeman, E A, Davis, M and Hunter, F 2025 Unearthing the Peebles Hoard, *Current Archaeology* 418 (January 2025), 34-39.

Lacaille, A D 1944 Unrecorded microliths from Tentsmuir, Deeside and Culbin, *Proceedings of the Society of Antiquaries of Scotland 78, 5-16.*

Lawson, A J 1980 A Late Bronze Age hoard from Beeston Regis, Norfolk, *Antiquity* 54, 212, 217-219.

Lawson, A, Craddock, P, Hook, D and Buck, C undated Three Late Bronze Age Hoards from North East Norfolk. Unpublished Report. Norfolk Heritage Explorer. Available from: https://www.heritage.norfolk.gov.uk/record?tnf2342

Lochrie J 2019 Materials synthesis, 182-187, 192-203, 281-291 and 306-309, *in* Ginnever, M and von Wessel, J Between the Dee and the Don: settlement, life and death in the Bronze Age, *in* Dingwall K *et al*. 2019 *The land was forever: 15,000 years in north-east Scotland: Excavations on the Aberdeen Western Peripheral Route / Balmedie-Tipperty*. Oxford: Oxbow Books.

Mabey, R 1977 *Plants with a Purpose. Glasgow: Fontana/Collins.*

Maryon, H 1938 The Technical Methods of the Irish Smiths in the Bronze and Early Iron Ages, *Proceedings of the Royal Irish Academy Section C: Archaeology, Culture, History, Literature* 44, 181-228.

McDonnell, J G and Milns, J 2015 Ferrous and non-ferrous metalworking, 392-428, *in* Dockrill, S, Bond, J, Turner, V, Brown, L, Bashford, D, Cussans, J and Nicholson, R *Excavations at Old Scatness, Shetland Volume 2: The Broch and Iron Age Village*. Lerwick: Shetland Heritage.

McKinley, J I 2013 Cremation: excavation, analysis and interpretation of material from cremation-related contexts, 147-172, *in Tarlow, S and Nilsson Stutz, L (eds.) The Oxford Handbook of the Archaeology of Death and Burial. Oxford: Oxford University Press.*

McLaren, D 2012 Ironworking debris from Bellafield Farm, North Kessock. National Museums Scotland Unpublished Report for Headland Archaeology.

McLaren, D and Dungworth, D 2016 The Ferrous Metalworking, 45-61, in Cook, M Prehistoric Settlement Patterns in the North-East of Scotland; excavations at Grantown Road, Forres 2002-2013. *Scottish Archaeological Internet Reports* 61. Available from: https://journals.socantscot.org/index.php/sair/issue/view/90

McLaren, D and Dungworth, D 2021 The manufacture of iron at Culduthel: ferrous metalworking debris and iron metallurgy, 142-67, *in* Hatherley, C and Murray, R 2021 *Culduthel: An Iron Age Craft Centre*. Edinburgh: Society of Antiquaries of Scotland.

Meindl, R S, Lovejoy, C O, Mensforth, R P and Walker, R A 1985 A revised method of age determination using the os pubis, with a review and tests of accuracy of other current methods of pubic symphyseal aging, *American Journal of Physical Anthropology 68 (1), 57-66.*

Mithen, S and Wicks, K 2012 Croig Cave: a Late Bronze Age ornament deposit and three millennia of fishing and foraging on the north-west coast of Mull, Scotland, *Proceedings of the Society of Antiquaries of Scotland* 142, 63-132. Available from: https://doi.org/10.9750/PSAS.142.63.132

Muirhead, G 1891 Notice of Bronze Ornaments and a thin bifid blade of bronze from the braes of Gight, Aberdeenshire, *Proceedings of the Society of Antiquaries of Scotland* 25 (1890-91), 135-8.

Murray, R 2012 Bellfield Farm, North Kessock, Area 2 and 3 archaeological excavation for Tulloch Homes Ltd. Unpublished Headland Archaeology report. Available from: https://her.highland.gov.uk/api/LibraryLink5WebServiceProxy/FetchResourceFromStub/1-1-9-9-0-1_fc7660d442aa7f6-119901_83f32fc373a1e99.pdf.

NMS = National Museums Scotland 2025 *What is the Peebles Hoard? Available from:* https://www.nms.ac.uk/discover-catalogue/what-is-the-peebles-hoard

Northover J P 1982 The metallurgy of the Wilburton hoards, *Oxford Journal of Archaeology* 1(1), 69-109.

Northover, J P 2010 Metallurgy of Atlantic cauldrons and buckets, 35-41, 54-55, 61-63, 79-80, 102, 183-184, 189, 251-252, 277-78, 352-365, *in* Gerloff, S. *Atlantic cauldrons and buckets of the Late Bronze Age and Early Iron Ages in Western Europe.* Stuttgart: Franz Steiner Verlag, Prähistorische Bronzefunde II (18).

Northover, J P 2014 Analysis and metallography of ingots and metalworking waste, 182-87, *in* McKInley, J I, Leivers, M, Schuster, J, Marshall, P, Barclay A J and Stoodley, N *Cliffs End Farm, Isle of Thanet, Kent. A mortuary and ritual site of the Bronze Age, Iron Age, and Anglo-Saxon Period.* Old Sarum: Wessex Archaeology, Wessex Archaeology Report 31.

Northover, J P 2025 Metallurgical analysis, 242-250, *in* Ballin Smith, B, Hunter Blair, A and Bailie, W, Neolithic timber halls and a Bronze Age settlement with hoard at Carnoustie, Angus, *Archaeology Reports Online* 60. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO60.html

Nørgaard, H W 2011 *Die Halskragen der Bronzezeit in nördlichen Mitteleuropa und Südskaninavien*. Bonn: Verlag Dr. Rudolf Habelt GmbH.

Oestigaard, T 2013 Cremations in culture and cosmology, 497-509, *in Tarlow, S and Nilsson Stutz, L (eds.) The Oxford Handbook of the Archaeology of Death and Burial. Oxford: Oxford University Press.*

O'Regan, H J 2023 Brown bears in burials and entertainment in later prehistoric to modern Britain (c. 2400 BC – AD 1900s), 187–208, i*n* Grimm, O (ed.) *Bear and Human: Facets of a Multi-Layered Relationship from Past to Recent Times, with Emphasis on Northern Europe*. Turnhout: Brepols.

OSA = *Old Statistical Account of Scotland* 1794 Wood, Rev Mr A *Rosemarkie*, *County of Ross and Cromarty*, Vol 11, 333-351.

Parker Pearson, M, Mulville, J, Smith, H and Marshall, P 2021 *Cladh Hallan: Roundhouses and the dead in the Hebridean Age and Iron Age*. Oxford: Oxbow Books.

Piggott, C M 1948 Late Bronze Age burial from Orrock, near Burntisland, *Proceedings of the Society of Antiquaries of Scotland* 82, 306-8.

Pope, R 2015 Bronze Age architectural traditions: landscapes and dates, 159-184, *in* Hunter, F and Ralston I, *Scotland in Later Prehistoric Europe*. Edinburgh: Society of Antiquaries of Scotland.

Prehistoric Ceramics Research Group 2010 *The Study of Prehistoric Pottery. General Policies and Guidelines for Analysis and Publication*, PCRG Occasional Papers 1 and 2 (3rd edition), Salisbury: Wessex Archaeology.

PSAS 1870 Proceedings of the Society, February 14, 1870, *Proceedings of the Society of Antiquaries of Scotland* 8 (1868-70), 302-312.

Ramsay, S 2025a Archaeobotany, 108-137, *in Ballin Smith, B et al. Neolithic timber halls and a Bronze Age settlement with hoard at Carnoustie, Angus, Archaeology Reports Online* 60. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO60.html

Ramsay, S 2025b Archaeobotany, 97-111, *in Kilpatrick, M et al. Guardbridge, Fife: A multi-period settlement with a multi-vallate fort, Archaeology Reports Online* 61. Available from: https://www.archaeologyreportsonline.com/reports/2025/ARO61.html

RCAHMS 1967 *Peeblesshire, An Inventory of the Ancient Monuments*, Volume 1. Edinburgh: Her Majesty's Stationery Office.

Richardson, J S 1925 A Hoard of Bronze Objects from Wester Ord, Ross-shire, and an Early Iron Age Burial at Blackness Castle, Linlithgowshire, *Proceedings of the Society of Antiquaries of Scotland* 59 (1924-25), 113-119.

Rohl, B and Needham, S 1998 *The circulation of metal in the British Bronze Age: the application of lead isotope analysis*. London: The British Museum, Occasional Paper Number 102.

Saville, A 1981 *Grimes Graves, Norfolk. Excavations 1971/72: Volume II. The Flint Assemblage*. Department of the Environment Archaeological Reports 11. London: Her Majesty's Stationery Office.

Scheuer, L and Black, S 2016 *Developmental Juvenile Osteology. London: Elsevier Science, Academic Press.*

Schmidt, P K and Burgess, C 1981 *The Axes of Scotland and Northern England*. Prähistoriche Bronzefunde 9.7. Munich: C H Beck.

Schweingruber, F H 1990 *Anatomy of European Woods. Berne and Stuttgart. Haupt.*

Scotland's Soils 2025. Available from: https://soils.environment.gov.scot/maps/capability-maps/national-scale-land-capability-for-agriculture/ and https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/

Shepherd, I A G 1985 Jet and amber, 204-216, *in* Clarke, D V, Cowie, T G and Foxon, A 1985 *Symbols of Power at the Time of Stonehenge*. Edinburgh: National Museum of Antiquities of Scotland.

Shepherd, W 1972 *Flint: Its Origin, Properties and Uses*. London: Faber and Faber.

Sheridan, A 2018 The Middle Neolithic Impressed Ware assemblage, in Jones, E, Sheridan, A and Franklin, J Neolithic and Bronze Age occupation at Meadowend Farm, Clackmannanshire: Pots, pits and roundhouses, *Scottish Archaeological Internet Reports* 77, 31-40. Available from: https://doi.org/10.9750/issn.2056-7421.2018.77

Sheridan, A 2021 The early Neolithic pottery, 14-20, *in* Green, K, Aldritt, D, Ballin, T B and Sheridan A Exceptional pots: the early Neolithic of Hillhouse Farm, Kilmarnock, East Ayrshire, *Archaeology Reports Online* 44. Available from: https://www.archaeologyreportsonline.com/reports/2021/ARO44.html

Smith, C 2000 The animal bone, 194-279, *in Perry, D R Castle Park, Dunbar. Two thousand years on a fortified headland. Edinburgh: Society of Antiquaries of Scotland Monograph Series 16.*

Spence, T F 1968 The anatomical study of cremated fragments from archaeological sites, Proceedings of the Prehistoric Society 33, 70-83.

Sprockhoff, E 1956 *Jungbronzezeitliche Hortfunde. Der Südzone des Nordischen Kreises (Periode V) Band II*. Mainz: Verlag des Römisch-Germanischen Zentralmuseums.

Squair, R and Ballin Smith B 2018 The prehistoric pottery, 183-197, in Ballin Smith, B (ed.) *Life on the Edge: Iain Crawford's Udal, North Uist: The Neolithic and Bronze Age of RUX6.* Oxford: Archaeopress Publishing Ltd.

Stace, C 1997 *New Flora of the British Isles. 2nd Ed. Cambridge: Cambridge University Press.*

Staniaszek, B E P and Northover, J P 1983 The properties of leaded bronze alloys, 262-272, *in* Aspinall, A and Warren, S E (eds.) *The proceedings of the 22nd International Symposium on Archaeometry, Bradford* 1982. Bradford: University of Bradford.

Stewart, C 1882 Notice of a hoard of bronze weapons and other articles found at Monadh-Mor, Killin, *Proceedings of the Society of Antiquaries of Scotland* 16 (1881-82), 27-31.

Taradale Through Time 2024 Available from: https://www.tarradalethroughtime.co.uk/shellmiddens

Teržan, B (ed.) 1995 *Hoards and Individual Metal Finds from the Eneolithic and Bronze Ages in Slovenia*. Ljubljana: Narodni muzej Slovenije.

Toolis, R 2005 Bronze Age pastoral practices in the Clyde Valley: excavations at West Acres, Newton Mearns, *Proceedings of the Society of Antiquaries of Scotland* 135, 471-504.

Tyacke, A 2016 CORN-E8DF11: A Bronze Age Hoard. Available from: https://finds.org.uk/database/artefacts/record/id/760674

von den Driesch, A 1976 *A Guide to the Measurement of Animal Bones from Archaeological Sites. Peabody Museum Bulletin 1. Harvard University, USA: Peabody Museum of Archaeology and Ethnology.*

Watts, S and Pollard, A M 1998 Identifying archaeological jet and jet-like artifacts using FTIR, 37-52, *in* Pretzel. B. (ed.) *Postprints: IRUG2 at the V&A.* London: Victoria & Albert Museum.

Webley, L, Adams, S and Brück, J 2020 *The Social Context of Technology: non-ferrous metalworking in later prehistoric Britain and Ireland. Prehistoric Society Research Paper No.11. Oxford: Oxbow Books Ltd.*

White, T D and Folkens, P A 2005 The Human Bone Manual. London: Elsevier Inc.

Williamson, S 2021 Greenside Farm, Courthill Road, Rosemarkie Archaeological Watching Brief and Excavation. Unpublished Data Structure Report. AOC Archaeology Group.

Wood, J W, Milner, G R, Harpending, H C, Weiss, K M, Cohen, M N, Eisenberg, L E, Hutchinson, D L, Jankauskas, R, Česnys, G, Katzenberg, M A, Lukacs, J R, Mcgrath, J W, Roth, A, Ubelaker, D H, Wilkinson, R G, Wood, J W, Milner, G R, Harpending, H C and Weiss, K M 1992 The Osteological Paradox: Problems of Inferring Prehistoric Health from Skeletal Samples, *Current Anthropology 33, 343-370.*

Woodley, N C, Lochrie, J, Sheridan, A, Cowie, T and Christie, C 2020 The excavation of Neolithic pits and a Bronze Age burial site at Ness Gap, Fortrose, Scottish Archaeological Internet Reports 91. Available from: https://doi.org/10.9750/issn.2056-7421.2020.91

Yalden, D 1999 *The History of British Mammals. London: T and A D Poyser Ltd.*

Appendices

Appendix 1: Archaeobotanical Tables 3.3-3.22

Table 3.3: Area 1, Pit Group 1 additional pits and burning.

	Area	Area 1 - ditch			Area 1 - Pit Group 1			Area 1 - additional pits							Area 1 - burning
	Context	14	17	19	27	31	33	42	46	55	232	234	236	272	47
	Sample	1	2	3	5	6	7	8	9	11	21	22	23	29	10
	Description	Fill of ditch (009)	Fill of ditch (016)	Fill of ditch (018)	Fill of pit (026)	Fill of pit (030)	Fill of pit (032)	Lower fill of pit (040)	Fill of pit (045)	Fill of pit (054)	Fill of pit (231)	Fill of pit (233)	Fill of pit (235)	Fill of possible hearth (271)	Patch of in situ burning
Volume of charcoal >4 mm		5ml	2ml	2ml	35ml	50ml	10ml	6ml	1ml	500ml	40ml	1ml	5ml	30ml	15ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	20%	100%	100%	100%	100%	100%
Charcoal															
Alnus cf glutinosa	alder	-	-	6 (0.21g)	-	-	-	-	-	-	-	-	6 (0.38g)	-	-
Betula spp	birch	-	1 (0.20g)	-	-	-	-	-	-	-	-	-	-	-	-
Corylus cf avellana	hazel	-	-	-	25 (3.93g)	26 (7.59g)	15 (2.12g)	-	-	-	141 (7.37g)	1 (0.05g)	3 (0.31g)	73 (5.95g)	2 (0.34g)
Cytisus/Ulex	broom/gorse	1 (0.04g)	-	-	-	-	-	-	-	-	-	-	-	-	-
Ericales	heather type	19 (0.15g)	-	-		-	-	-	-	-	-	-	-	-	-
Pinus sylvestris type	Scots pine type	1 (0.05g)	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunoideae	cherry type	5 (0.10g)	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus spp	oak	-	-	-	-	-	-	29 (3.18g)	-	-	-	-	2 (0.10g)	-	47 (4.86g)
Rosaceae	rose family	-	-	-	-	-	-	-	-	-	-	-	2 (0.05g)	-	-
Salix spp	willow	-	1 (0.06g)	-	7 (1.63g)	-	-	-	-	51 (18.70g)	-	-	-	-	-
Indet charcoal	indet charcoal	-	-	-	66 (15.53g)	136 (26.38g)	5 (2.53g)	-	4 (0.28g)	1 (2.09g)	-	-	-	-	-
Seeds (carbonised)															
Corylus avellana nutshell	hazel nutshell	-	-	-	1 (<0.01g)	22 (2.27g)	1 (<0.01g)	-	-	-	-	-	-	-	5 (0.19g)
Misc															
cf Peat	cf peat	7 (0.24g)	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3.4: Roundhouse 1: post-ring, porch, ditch and interior.

	Area	Roundhouse 1 - post ring						Roundhouse 1 - porch				RH1 - ditch	Roundhouse 1 - interior					
	Context	545	546	550	650	587	613	621	717	723	727	567	597	713	515	704	705	729
	Sample	65	66	67	78	69	71	73	84	86	87	68	70	83	63	81	82	88
	Description	Fill of posthole (514)	Fill of posthole (513)	Fill of posthole (549)	Post pipe within post-hole (580)	Fill of pothole (586)	Fill of posthole (612)	Packing fill of post-hole (620)	Fill of posthole (715)	Packing fill of post-hole (722)	Post pipe within post-hole (725)	Fill of ditch (566)	Fill of posthole / pit (596)	Fill of pit (712)	Occupation deposit in centre of roundhouse	Spread of deposit (515)	Spread of deposit (515)	Fill of pit (728)
Vol of charcoal >4 mm		10ml	5ml	1ml	15ml	1ml	1ml	2ml	6ml	5ml	1ml	2ml	2ml	8ml	20ml	2ml	2ml	4ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal																		
Alnus cf glutinosa	alder	-	-	-	-	-	-	-	-	6 (0.33g)	-	-	-	-	15 (0.46g)	-	-	-
Betula spp	birch	-	1 (0.08g)	-	-	3 (0.09g)	1 (0.04g)	-	1 (0.04g)	-	-	1 (0.01g)	4 (0.08g)	-	-	-	-	-
Corylus cf avellana	hazel	-	-	2 (0.04g)	-	3 (0.21g)	1 (0.01g)	1 (0.07g)	10 (0.28g)	3 (0.10g)	-	6 (0.16g)	5 (0.08g)	1 (0.14g)	17 (0.71g)	-	1 (0.05g)	5 (0.27g)
Ericales	heather type	-	1 (0.03g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pinus sylvestris type	Scots pine type	-	-	-	-	-	-	-	-	-	-	-	-	35 (1.22g)	2 (0.07g)	-	-	1 (0.05g)
Prunoideae	cherry type	-	-	-	-	-	-	-	11 (0.37g)	-	-	-	-	-	-	-	-	-
Quercus spp	oak	45 (0.82g)	16 (0.74g)	1 (0.11g)	81 (3.77g)	1 (0.01g)	1 (0.02g)	4 (0.06g)	9 (0.26g)	15 (0.39g)	3 (0.07g)	-	4 (0.14g)	-	71 (3.40g)	6 (0.24g)	5 (0.18g)	6 (0.22g)
Indet charcoal	indet charcoal	-	-	-	-	-	-	-	-	-	-	-	-	-	22 (0.70g)	-	3 (0.07g)	1 (0.06g)
Cereals (carbonised)																		
Hordeum vulgare sl	barley	-	1	-	-	2	-	-	-	-	-	-	-	-	3	-	-	-
Indet cereal	indet cereal	-	-	-	-	-	-	-	-	1	-	-	-	-	6	-	-	3
Seeds (carbonised)																		
Corylus avellana nutshell	hazel nutshell	1 (0.02g)	-	1 (<0.01g)	1 (<0.01g)	-	-	-	-	2 (0.01g)	-	-	1 (0.03g)	-	3 (0.01g)	-	1 (<0.01g)	-

Table 3.5: Roundhouse 1: palisade.

	Area	Roundhouse 1 palisade															
	Context	122	140	142	154	240	304	306	308	310	457	625	629	637	645	681	690
	Sample	12	14	15	16	24	31	32	33	34	SF96	74	75	76	77	79	80
	Description	Fill of posthole (121)	Fill of posthole (139)	Fill of posthole (141)	Fill of posthole (153)	Fill of posthole (239)	Fill of posthole (303)	Fill of posthole (305)	Fill of posthole (307)	Fill of posthole (309)	Fill of posthole (456)	Fill of posthole (624)	Fill of posthole (628)	Fill of posthole (636)	Fill of posthole (644)	Basal remains of prehistoric soil horizon	Post pipe of post-hole (688)
Vol charcoal >4 mm		<1ml	4ml	5ml	-	-	20ml	3ml	<1ml	3ml	8ml	1ml	<1ml	6ml	<1ml	4ml	30ml
% charcoal >4mm ID		100%	100%	100%	-	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal																	
Alnus cf glutinosa	alder	-	-	-	-	-	-	-	-	6 (0.23g)	-	-	-	-	-	-	-
Betula spp	birch	-	-	-	-	-	-	-	-	1 (0.06g)	-	-	-	-	-	-	-
Corylus cf avellana	hazel	-	-	6 (1.22g)	-	-	23 (1.03g)	12 (0.38g)	-	1 (0.03g)	-	-	-	-	-	-	-
Pinus sylvestris type	Scots pine type	-	-	-	-	-	-	-	-	-	10 (1.75g)	-	-	-	-	1 (0.13g)	-
Quercus spp	oak	-	7 (0.82g)	3 (0.68g)	-	-	-	-	3 (0.10g)	2 (0.08g)	-	2 (0.04g)	-	22 (0.95g)	-	4 (0.33g)	318 (8.31g)
Salix spp	willow	-	-	5 (0.69g)	-	-	-	4 (0.33g)	-	1 (0.02g)	-	1 (0.11g)	1 (0.01g)	-	1 (<0.01g)	-	-
Indet charcoal	indet charcoal	2 (0.03g)	-	7 (0.84g)	-	-	-	-	-	-	-	-	-	3 (0.55g)	-	2 (0.09g)	-
Cereals (carbonised)																	
Indet cereal	indet cereal	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
Seeds (carbonised)																	
Corylus avellana nutshell	hazel nutshell	2 (<0.01g)	-	-	-	-	293 (4.64g)	26 (0.34g)	-	31 (0.51g)	-	-	-	4 (0.01g)	-	3 (0.01g)	-

Table 3.6: Features SW of Roundhouse 1.

	Area	Features SW of Roundhouse 1									SW palisade
	Feature type	Postholes				Pits					
	Context	326	334	340	342	322	332	400	348	399	128
	Sample	38	40	41	42	36	39	48	43	47	13
	Description	Fill of posthole (325)	Fill of posthole (333)	Fill of posthole (339)	Fill of posthole (341)	Fill of pit (321)	Fill of pit (331)	Lower fill of pit (323)	Fill of pit (347)	Fill of pit (398)	Fill of pit (127)
Volume of charcoal >4 mm		2ml	3ml	2ml	<1ml	2ml	2ml	2ml	1ml	2ml	2ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal											
Alnus cf glutinosa	alder	-	-	4 (0.11g)	-	-	-	-	-	-	-
Betula spp	birch	2 (0.18g)	1 (0.03g)	-	1 (0.03g)	-	-	-	-	-	-
Corylus cf avellana	hazel	-	11 (0.28g)	-	-	-	-	-	1 (0.05g)	3 (0.05g)	4 (0.18g)
Quercus spp	oak	-	1 (0.02g)	-	-	1 (0.01g)	10 (0.36g)	6 (0.14g)	-	-	-
Salix spp	willow	1 (0.07g)	-	-	-	-	3 (0.12g)	-	1 (0.01g)	1 (0.15g)	-
Indet charcoal	indet charcoal	-	-	-	-	-	-	-	-	3 (0.07g)	10 (0.29g)
Cereals (carbonised)											
Indet cereal	indet cereal	-	-	-	-	-	-	-	-	-	3
Seeds (carbonised)											
Corylus avellana nutshell	hazel nutshell	-	2 (0.03g)	-	-	-	8 (0.11g)	-	-	-	4 (0.01g)

Table 3.7: Roundhouse 1: NW interior and NW exterior.

	Area	Roundhouse 1 NW interior				Roundhouse 1 NW exterior					
	Context	320	413	421	541	401	405	407	409	437	507
	Sample	35	54	55	64	49	51	52	53	56	59
	Description	Fill of pit (319)	Fill of pit (412)	Fill of pit (420)	Fill of posthole (540)	Prehistoric soil layer	Fill of pit (404)	Fill of posthole (406)	Secondary fill of pit (408)	Fill of pit (436)	Fill of pit (508)
Volume of charcoal >4 mm		2ml	8ml	2ml	2ml	7ml	1ml	10ml	15ml	2ml	2ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal											
Alnus cf glutinosa	alder	-	-	1 (0.09g)	-	1 (0.07g)	-	-	-	-	-
Betula spp	birch	1 (0.04g)	-	-	-	7 (0.69g)	-	-	-	-	-
Corylus cf avellana	hazel	1 (0.04g)	6 (0.39g)	-	10 (0.38g)	2 (0.08g)	4 (0.13g)	20 (0.83g)	27 (1.03g)	1 (0.07g)	
Pinus sylvestris type	Scots pine type	-	-	-	-	1 (0.06g)	-	1 (0.02g)	-	-	-
Quercus spp	oak	5 (0.14g)	21 (0.91g)	1 (0.05g)	-	4 (0.04g)	1 (0.07g)	29 (1.62g)	69 (3.87g)	13 (0.28g)	-
Salix spp	willow	-	4 (0.34g)	-	-	-	-	4 (0.29g)	5 (0.39g)	-	4 (0.18g)
Ulmus spp	elm	-	-	-	-	2 (0.07g)	-	-	-	-	-
Indet charcoal	indet charcoal	-	-	2 (0.09g)	-	1 (0.09g)	-	-	-	-	-
Cereals (carbonised)											
Hordeum vulgare var nudum	naked barley	16	-	6	3	-	-	-	-	-	-
Hordeum vulgare sl	barley	26	-	6	3	-	-	-	-	-	-
Indet cereal	indet cereal	16	-	-	-	-	-	-	-	-	-
Seeds (carbonised)											
Corylus avellana nutshell	hazel nutshell	2 (0.03g)	31 (0.41g)	-	1 (<0.01g)	-	14 (0.11g)	-	10 (0.29g)	-	-
Misc											
Bone		-	-	5 (0.18g)	-	-	-	-	-	-	-

Table 3.8: Kilns and Pit Group 2.

	Area	Kilns							Pit Group 2		
	Context	510	511	512	734	736	738	739	274	284	358
	Sample	60	61	62	90	92	93	95	30	107	44
	Description	Fill of pit (509)	Middle fill of grain drying kiln (402). Burnt tray?	Possible kiln architecture to support a tray?	Accrual of overburden within pit (676)	Fill of pit/kiln (676)	Possible built grain drying rack in pit (676)	Basal layer of pit (676)	Basal fill of pit (273)	Fill of pit (283)	Remains of prob wooden post in posthole (291)
Volume of charcoal >4 mm		5ml	2ml	2ml	30ml	1ml	2ml	2ml	250ml	<1ml	-
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	20%	100%	-
Charcoal											
Alnus cf glutinosa	alder	-	-	-	-	-	-	-	54 (9.65g)	-	-
Betula spp	birch	-	-	3 (0.04g)	-	-	-	-	-	1 (0.02g)	-
Corylus cf avellana	hazel	-	1 (0.05g)	3 (0.08g)	-	-	-	-	-	-	-
Ericales	heather type	-	2 (0.06g)	-	-	-	-	-			
Quercus spp	oak	22 (1.06g)	-	4 (0.12g)	210 (10.39g)	10 (0.51g)	17 (0.45g)	-	-	-	-
Salix spp	willow	-	-	1 (0.02g)	-	-	-	-	8 (3.56g)	-	-
Indet charcoal	indet charcoal	-	-	1 (0.02g)	-	-	-	-	1 (0.84g)	-	-
Cereals (carbonised)											
Hordeum vulgare var nudum	naked barley	-	288	99	-	-	-	-	-	-	-
Hordeum vulgare sl	barley	-	83	77	1	-	-	-	-	-	-
Triticum dicoccum	emmer wheat	-	19	-	-	-	-	-	-	-	-
Indet cereal	indet cereal	-	195	34	2	-	-	-	-	-	-
Seeds (carbonised)											
Corylus avellana nutshell	hazel nutshell	4 (0.01g)	1 (0.03g)	4 (0.01g)	-	1 (<0.01g)	-	-	-	-	-
Misc											
Burnt soil/charcoal	Burnt soil/charcoal	-	-	-	-	-	-	-	-	-	15ml (10.84g)
Cramp	Cramp	-	2ml (0.67g)	-	-	-	-	-	-	-	-

Table 3.9: Pit Groups 3 and 4 and vegetation remnants.

	Area	Pit Group 3										Pit Group 4		Veg remnants
	Context	190	218	222	224	257	259	263	265	361	373	1499	1507	1494
	Sample	17	18	19	20	25	26	27	28	45	46	265	266	263
	Description	Fill of pit (189)	Fill of pit (217)	Fill of pit (221)	Fill of pit (223)	Hardened floor with evidence of burning	Fill of pit (258)	Fill of pit (262)	Fill of pit (264)	Fill of posthole (360)	Fill of posthole (372)	Fill of pit (1498)	Fill of pit (1506)	Remnants of a prehistoric tree root system
Volume of charcoal >4 mm		2ml	4ml	15ml	70ml	150ml	1ml	70ml	25ml	-	40ml	14ml	1ml	10ml
% charcoal >4mm ID		100%	100%	100%	50%	100%	100%	100%	100%	-	100%	100%	100%	100%
Charcoal														
Alnus cf glutinosa	alder	-	-	-	-	-	-	-	-	-	-	29 (1.10g)	2 (0.15g)	-
Betula spp	birch	-	6 (0.23g)	-	-	-	-	-	-	-	-	-	-	-
Corylus cf avellana	hazel	1 (0.07g)	-	-	-	-	-	-	-	-	-	8 (0.25g)	4 (0.10g)	-
Pinus sylvestris type	Scots pine type	-	-	-	-	-	-	203 (32.63g)	70 (12.47g)	-	67 (18.91g)	-	-	-
Prunoideae	cherry type			-	-	-	-	-	-	-		8 (0.42g)	-	-
Quercus spp	oak	5 (0.20g)	6 (0.47g)	34 (6.30g)	-	307 (65.25g)	3 (0.11g)	-	-	-	-	2 (0.07g)	-	25 (3.49g)
Salix spp	willow	-	-	-	48 (11.13g)	13 (5.52g)	-	-	-	-	-	-	-	-
Indet charcoal	indet charcoal	1 (0.09g)	9 (0.75g)	-	48 (9.32g)	21 (5.89g)	-	18 (5.10g)	-	-	-	7 (0.49g)	-	-
Cereals (carbonised)														
Indet cereal	indet cereal	-	-	-	-	-	3	-	-	-	-	4	-	-
Seeds (carbonised)														
Corylus avellana nutshell	hazel nutshell	-	-	40 (1.03g)	-	-	-	-	-	-	-	-	1 (<0.01g)	-
Misc														
Burnt soil/charcoal		-	-	-	-	-	-	-	-	-	30ml (23.36g)	-	-	-

Table 3.10: Roundhouse 2.

	Area	Roundhouse 2					
	Context	1083	1085	1089	1091	1093	1099
	Sample	165	166	167	168	169	170
	Description	Fill of pit (1082)	Fill of posthole (1084)	Fill of pit (1088)	Fill of posthole (1090)	Fill of posthole (1092)	Fill of posthole (1098)
Volume of charcoal >4 mm		2ml	3ml	1ml	3ml	1ml	1ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%
Charcoal							
Betula spp	birch	1 (0.03g)	-	-	-	-	-
Corylus cf avellana	hazel	5 (0.12g)	11 (0.37g)	1 (0.05g)	8 (0.55g)	6 (0.09g)	3 (0.07g)
Pinus sylvestris type	Scots pine type	2 (0.04g)	-	-	-	-	-
Quercus spp	oak	2 (0.07g)	-	-	-	-	-
Salix spp	willow	-	-	1 (0.01g)	-	-	1 (0.02g)
Cereals (carbonised)							
Indet cereal	indet cereal	-	-	-	4	-	-
Seeds (carbonised)							
Corylus avellana nutshell	hazel nutshell	-	1 (0.02g)	-	1 (0.02g)	-	-

Table 3.11: Pit Group 5, NW, East and South & SW features.

	Area	Pit Group 5														
	Feature group	Northwest features							East & South features						Southwest features	
	Context	1527	1529	1531	1533	1539	1551	1553	501	765	767	811	957	1562	1517	1566
	Sample	268	269	270	271	272	273	274	57	97	98	106	134	275	267	276
	Description	Fill of posthole (1526)	Fill of posthole (1528)	Fill of posthole (1530)	Fill of posthole (1532)	Fill of stakehole (1538)	Fill of posthole (1550)	Fill of pit (1552)	Fill of pit (500)	Fill of posthole (764)	Fill of slot (766)	Fill of pit (811)	Fill of pit (956)	Fill of posthole (1561)	Fill of pit (1516)	Fill of pit (1565)
Volume of charcoal >4 mm		1ml	6ml	10ml	6ml	2ml	12ml	15ml	15ml	10ml	2ml	2ml	4ml	1ml	6ml	40ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%
Charcoal																
Alnus cf glutinosa	alder	3 (0.07g)	-	22 (0.93g)	7 (0.37g)	-	4 (0.19g)	-	-	-	-	-	-	6 (0.17g)	14 (0.47g)	22 (1.40g)
Betula spp	birch	1 (0.06g)	-	2 (0.07g)	1 (0.05g)	-	-	-	33 (1.42g)	-	-	-	-	-	-	-
Corylus cf avellana	hazel	1 (0.02g)	20 (1.62g)	7 (0.18g)	8 (0.39g)	1 (0.03g)	27 (0.96g)	31 (1.34g)	15 (0.63g)	-	-	-	-	-	1 (0.07g)	44 (3.28g)
Cytisus/Ulex	broom/gorse	-	2 (0.26g)	-	-	1 (0.37g)	-	-	-	-	-	-	-	-	-	-
Pinus sylvestris type	Scots pine type	-	-	1 (0.02g)	-	-	-	-	-	15 (0.78g)	9 (0.26g)	-	-	-	-	-
Prunoideae	cherry type	-	-	-	-	-	1 (0.06g)	-	1 (0.05g)	-	-	-	-	-	-	-
Quercus spp	oak	3 (0.08g)	-	11 (0.34g)	3 (0.14g)	-	6 (0.21g)	-	1 (0.08g)	-	1 (0.06g)	19 (0.35g)	11 (0.61g)	-	-	-
Salix spp	willow	-	-	-	-	-	1 (0.04g)	-	-	-	-	-	1 (0.03g)	-	-	-
Indet charcoal	indet charcoal	-	-	-	-	-	-	-	-	-	-	-	-	-	7 (0.63g)	-
Cereals (carbonised)																
Hordeum vulgare var nudum	naked barley	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54
Hordeum vulgare sl	barley	-	-	1	-	-	-	-	2	-	-	-	-	-	-	39
Triticum aestivum	bread wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40
Triticum dicoccum	emmer wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50
Triticum spp	wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48
Indet cereal	indet cereal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
Seeds (carbonised)																
Corylus avellana nutshell	hazel nutshell	-	-	1 (<0.01g)	-	-	2 (0.02g)	-	10 (0.19g)	41 (1.27g)	-	-	-	-	-	6 (0.23g)

Table 3.12: Botanical Remains from the hoard.

Sample identifier	Identified taxa
SF1 neck ring wash water soil & organic residue	Pteridium aqulinum pinnae & indet organics
SF1 left half organic	Pteridium aquilinum stems & pinnae (abundant)
SF1 right half organic	Pteridium aquilinum stems & pinnae (abundant)
SF2 organics and soil removed	cf Pteridium aquilinum stems
SF2 rinse water residue	Pteridium aquilinum pinnae
SF2 organics upper surface	Pteridium aquilinum pinnae
SF2 organics lower left clump	Pteridium aquilinum stems & pinnae
SF3 soil from 'other cup'	cf Pteridium aquilinum stems & pinnae
SF3 soil removed	cf Pteridium aquilinum stems & pinnae, indet stems
SF3 wash water residue	indeterminate trace organics & stems
SF4 detached material	indeterminate trace organics
SF4 organic material removed	cf bast
SF5 organics	cf bast
SF5 cleaning residue	indeterminate trace organics
SF6 cleaning residue	indeterminate trace organics
SF7 wash residue soil & organics	indeterminate trace organics
SF7 organics	indeterminate trace organics
SF8 organics	indeterminate trace organics
SF8 cleaning & washing residue	indeterminate trace organics
SF9 wash water residue	indeterminate trace organics
SF010 (001) C5 SPIT 1	Pteridium aquilinum stem & pinnae
SF011 (001) E9 SPIT 1	Pteridium aquilinum pinnae
SF012 (001) G8 SPIT 1	cf Pteridium stem
SF013 (002) E3 SPIT 1	Indeterminate stems
SF014 (002) G7 SPIT 2	Pteridium aquilinum pinnae
SF015 (002) F6	Pteridium aquilinum stem & pinnae
SF017 (002) E4	cf bast
SF018 (001) D3 SPIT 3	Corylus cf avellana charcoal (0.18g)
SF019 (002) E5 SPIT 3	cf Fraxinus bast
SF020 (002) G7 SPIT 3	indeterminate stem
SF021 (002) F4 SPIT 3	cf Pteridium aquilinum stem & dicot twig
SF022 (002) E6 SPIT 3	Pteridium aquilinum stem & pinnae
SF023 (002) D6 SPIT 4	Pteridium aquilinum stem & pinnae
SF024 (002) E7 SPIT 4	Pteridium pinnae
SF026 (002) E7 SPIT 5	Pteridium aquilinum stem & pinnae
SF027 (001) C6 SPIT 5	Betula sp charcoal (0.06g)
SF028 (002) E5 SPIT 5	Alnus cf glutinosa charcoal (0.22g)
SF029 (002) G5 SPIT 5	Alnus cf glutinosa charcoal (0.17g)
SF030 (002) E7 SPIT 5	indeterminate stem
SF031 (002) F6 SPIT 5	cf Fraxinus bast
SF032 (002) G5 SPIT 5	cf Pteridium aquilinum stems
SF033 (002) G5 SPIT 5	cf Pteridium aquilinum stems & cf Fraxinus bast
SF034 (002) F4 SPIT 5	indeterminate stem
SF035 (002) F6 SPIT 5	Pteridium aquilinum stem & pinnae
SF036 (002) E6 SPIT 5	cf bast
SF037 (002) F5 SPIT 5	cf bast
SF038 (002) F6 SPIT 5	Pteridium aquilinum stem
SF039 (002) E6 SPIT 5	Pteridium aquilinum pinnae
SF040 (002) F7 SPIT 5	Pteridium aquilinum stem & pinnae
SF041 (002) E6 SPIT 5 loose on SF9	cf bast
SF042/043 (002) detached fibres from SF3	cf Fraxinus bast
SF044 (002) F5 SPIT 6	cf Fraxinus bast
SF045 (002) F6 SPIT 6	Betula sp charcoal (0.18g)
SF047 (002) SPIT 6	cf Pteridium aquilinum stem & pinnae

Table 3.13: Pit Group 6.

	Area	Pit Group 6						
	Context	769	776	778	782	855	867	952
	Sample	224	99	100	121	112	114	132
	Description	Fill of pit (768)	Fill of post-hole (775)	Fill of post-hole (777)	Fill of pit (779)	Fill of posthole (854)	Fill of pit (866)	Fill of pit (952)
Volume of charcoal >4 mm		3ml	1ml	1ml	<1ml	<1ml	1ml	3ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%
Charcoal								
Betula spp	birch	-	-	-	-	-	-	1 (0.01g)
Corylus cf avellana	hazel	3 (0.09g)	2 (0.05g)	-	-	1 (0.03g)	-	4 (0.19g)
Ericales	heather type	-	2 (0.06g)	4 (0.10g)	-	-	-	-
Quercus spp	oak	-	3 (0.08g)	3 (0.15g)	-	-	3 (0.09g)	3 (0.07g)
Salix spp	willow	3 (0.06g)	-	-	-	-	-	-
Indet charcoal	indet charcoal	5 (0.18g)	-	-	-	-	-	-
Seeds (carbonised)								
Corylus avellana nutshell	hazel nutshell	12 (0.17g)	4 (0.02g)	1 (<0.01g)	1 (0.01g)	-	-	-

Table 3.14: Pit Group 7.

	Area	Pit Group 7																		
	Context	794	796	798	810	968	970	978	982	984	992	1002	1004	1008	1016	1024	1026	1028	1032	1036	1044
	Sample	101	102	103	105	136	137	138	139	140	141	143, SF022	144	145	148	149	150	151	152	153	155
	Description	Fill of pit (793)	Fill of pit (795)	Fill of pit (797)	Fill of pit (809)	Fill of pit (967)	Fill of pit (969)	Fill of pit (977)	Fill of pit (981)	Fill of pit (983)	Fill of pit (991)	Fill of pit (1001)	Fill of pit (1003)	Fill of pit (1007)	Fill of pit (1015)	Fill of pit (1023)	Fill of pit (1025)	Fill of pit (1027)	Fill of pit (1031)	Fill of pit (1035)	Fill of pit (1043)
Volume of charcoal >4 mm		2ml	2ml	4ml	2ml	5ml	<1ml	10ml	12ml	10ml	1ml	2ml	20ml	8ml	15ml	20ml	4ml	14ml	4ml	4ml	4ml
% charcoal >4mm ID		100%	1005	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal																					
Betula spp	birch	-	1 (0.04g)	-	-	-	1 (0.04g)	3 (0.18g)	-	-	-	-	-	-	-	-	-	4 (0.12g)	-	-	-
Corylus cf avellana	hazel	3 (0.06g)	4 (0.11g)	7 (0.25g)	-	13 (0.44g)	-	10 (0.35g)	24 (1.46g)	13 (0.47g)	-	6 (0.19g)	12 (0.35g)	15 (0.53g)	39 (2.20g)	16 (0.53g)	10 (0.37g)	33 (1.50g)	5 (0.12g)	1 (0.02g)	1 (0.01g)
Pinus sylvestris type	Scots pine type	1 (0.01g)	-	-	9 (0.19g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus spp	oak	1 (0.01g)	-	-	-	-	-	-	-	-	1 (0.02g)	-	1 (0.02g)	-	-	8 (0.47g)	-	1 (0.02g)	-	-	1 (0.04g)
Salix spp	willow	1 (0.02g)	5 (0.28g)	8 (0.40g)	-	6 (0.19g)	-	1 (0.17g)	2 (0.06g)	3 (0.10g)	-	2 (0.10g)	6 (0.16g)	5 (0.25g)	5 (0.15g)	5 (0.24g)	7 (0.23g)	2 (0.16g)	-	1 (0.02g)	-
Ulmus spp	elm	1 (0.01g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indet charcoal	indet charcoal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4 (0.12g)
Cereals (carbonised)																					
Hordeum vulgare var nudum	naked barley	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2	-
Hordeum vulgare sl	barley	-	-	-	-	-	-	-	-	4	-	-	-	-	-	1	-	2	-	-	-
Triticum dicoccum	emmer wheat	-	-	-	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-
Triticum spp	wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-
Indet cereal	indet cereal	-	-	-	-	1	-	-	-	16	-	-	-	-	-	2	-	-	-	-	-
Seeds (carbonised)																					
Corylus avellana nutshell	hazel nutshell	2 (0.05g)	-	-	4 (0.02g)	43 (0.59g)	-	168 (1.46g)	65 (1.04g)	537 (13.85g)	-	13 (0.16g)	556 (6.30g)	76 (1.10g)	18 (0.35g)	478 (4.94g)	22 (0.26g)	63 (0.90g)	43 (0.53g)	22 (0.25g)	27 (0.30g)
Misc																					
Frothy' cinder		-	-	-	-	-	-	-	-	-	-	-	55 (1.94g)	-	-	-	-	-	-	-	-
Coal/cinder		-	-	-	-	-	-	-	-	-	-	6 (8.69g)	-	-	-	-	-	-	-	-	-

Table 3.15: Pit Groups 8, 9 and 10.

	Area	Pit Group 8						Pit Group 9								Pit Group 10				
	Context	825	829	845	847	859	861	1050	1054	1060	1062	1068	1070	1072	1074	900	902	906	910	961
	Sample	108	109	110	111	264	113	156	157	159	160	161	162	163	164	122	123	125	126	135
	Description	Fill of possible pit (824)	Fill of posthole (828)	Fill of posthole (844)	Fill of post-hole (846)	Fill of posthole (858)	Fill of pit (860)	Fill of pit (1049)	Fill of pit (1053)	Fill of pit (1059)	Fill of pit (1061)	Fill of pit (1067)	Fill of pit (1069)	Fill of pit (1071)	Upper fill of pit (1073)	Fill of pit (899)	Fill of post-hole (901)	Fill of posthole (905)	Fill of post-hole (909)	Fill of stakehole (960)
Volume of charcoal >4 mm		2ml	1ml	2ml	6ml	10ml	5ml	8ml	2ml	20ml	7ml	4ml	6ml	3ml	3ml	2ml	2ml	<1ml	1ml	1ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal																				
Alnus cf glutinosa	alder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 (0.15g)	-
Betula spp	birch	14 (0.33g)	-	-	1 (0.01g)	-	-	-	-	-	-	-	-	-	-	-	1 (0.02g)	-	-	-
Corylus cf avellana	hazel	-	3 (0.06g)	9 (0.18g)	15 (0.85g)	39 (1.31g)	21 (0.91g)	20 (0.71g)	-	4 (0.15g)	7 (0.21g)	4 (0.12g)	-	2 (0.08g)	-	7 (0.19g)	4 (0.08g)	1 (0.01g)	-	1 (0.04g)
Pinus sylvestris type	Scots pine type	-	-	-	-	1 (0.04g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus spp	oak	-	1 (0.02g)	3 (0.10g)	4 (0.10g)	5 (0.14g)	-	-	-	2 (0.18g)	-	-	-	-	-	3 (0.10g)	-	-	-	1 (0.03g)
Salix spp	willow	-	1 (0.02g)	-	-	-	-	8 (0.59g)	-	2 (0.08g)	-	-	2 (0.07g)	-	4 (0.30g)	-	-	-	-	-
Cereals (carbonised)																				
Hordeum vulgare var nudum	naked barley	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-
Hordeum vulgare sl	barley	-	-	-	-	-	-	-	-	9	3	-	-	-	-	-	-	1	-	-
Triticum dicoccum	emmer wheat	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Indet cereal	indet cereal	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-
Seeds (carbonised)																				
Corylus avellana nutshell	hazel nutshell	-	-	-	7 (0.05g)	1 (<0.01g)	-	39 (0.92g)	23 (0.30g)	438 (9.72g)	128 (1.72g)	66 (0.85g)	149 (2.22g)	29 (0.20g)	24 (0.20g)	1 (0.01g)	1 (<0.01g)	-	1 (0.01g)	-

Table 3.16: Pit Group 11 and cist.

	Area	Pit Group 11														Pit Group 11 Cist			
	Context	936	938	946	947	1104	1115	1123	1131	1135	1141	1159	1161	1163	1165	1119	1126	1126	1157
	Sample	127	128	129	130	171	172	175	178	179	180	182	183	184	185	173	176	177	181
	Description	Fill of pit (935)	Fill of pit (937)	Fill of possible pit (945)	Fill of possible structural slot (966)	Fill of pit (1103)	Fill of posthole (1114)	Fill of post-hole (1122)	Fill of posthole (1130)	Fill of pit (1134)	Fill of posthole (1140)	Fill of post-hole (1158)	Fill of pit (1160)	Fill of post-hole (1162)	Fill of pit (1164)	Upper fill of cist chamber (1121)	Fill of base of cist (1121)	Fill of base of cist (1121)	Possible displaced cremation material
Volume of charcoal >4 mm		40ml	10ml	12ml	10ml	10ml	5ml	-	4ml	10ml	12ml	6ml	4ml	1ml	2ml	7ml	2ml	4ml	-
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-
Charcoal																			
Alnus cf glutinosa	alder	2 (0.31g)	-	-	-	-	1 (0.06g)	-	-	-	-	-	-	-	-	-	-	1 (0.05g)	-
Betula spp	birch	-	-	-	-	11 (0.43g)	2 (0.11g)	-	1 (0.07g)	4 (0.10g)	-	-	1 (0.08g)	1 (0.03g)	-	2 (0.06g)	1 (0.07g)	-	-
Corylus cf avellana	hazel	19 (2.68g)	17 (2.06g)	-	-	2 (0.07g)	4 (0.12g)	-	7 (0.33g)	30 (1.01g)	40 (1.49g)	1 (0.06g)	8 (0.30g)	1 (0.03g)	1 (0.04g)	25 (0.96g)	5 (0.11g)	9 (0.16g)	-
Ericales	heather type	-	-	-	-	-	-	-	-	12 (0.17g)	-	-	-	-	-	-	-	-	-
Pinus sylvestris type	Scots pine type	-	-	45 (2.74g)	53 (2.67g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunoideae	cherry type	-	-	-	-	-	-	-	-	-	-	1 (0.21g)	-	-	-	-	-	-	-
Quercus spp	oak	-	-	-	-	3 (0.21g)	12 (0.36g)	-	4 (0.23g)	-	5 (0.17g)	13 (0.47g)	6 (0.22g)	5 (0.09g)	3 (0.21g)	7 (0.07g)	1 (0.02g)	7 (0.26g)	-
Salix spp	willow	15 (1.55g)	4 (0.42g)	-	-	12 (0.48g)	1 (0.06g)	-	-	-	-	-	-	-	-	-	-	-	-
Ulmus spp	elm	-	-	-	-	-	-	-	-	-	1 (0.05g)	-	-	-	-	-	-	-	-
Indet charcoal	indet charcoal	44 (11.75g)	-	-	-	-	3 (0.12g)	-	-	-	-	-	-	-	-	-	1 (0.04g)	-	-
Cereals (carbonised)																			
Hordeum vulgare var nudum	naked barley	-	-	-	-	-	-	-	-	39	3	-	-	-	-	1	-	3	-
Hordeum vulgare sl	barley	-	-	-	-	1	-	-	2	54	-	-	-	-	-	7	-	-	-
Triticum dicoccum	emmer wheat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Indet cereal	indet cereal	3	-	-	-	-	4	-	-	80	3	-	-	2	-	4	2	11	-
Seeds (carbonised)																			
Corylus avellana nutshell	hazel nutshell	2 (0.15g)	24 (0.47g)	-	5 (0.08g)	12 (0.19g)	23 (0.24g)	-	-	2 (0.01g)	-	-	-	1 (<0.01g)	-	4 (0.03g)	2 (0.01g)	-	-
Persicaria maculosa	redshank	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Vicia spp	vetch	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Misc																			
Shell 'fluff'	shell 'fluff'	-	-	-	-	+++++	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3.17: Pit Group 12 and isolated pits.

	Area	Pit Group 12						Isolated pits		
	Context	949	955	1167	1169	1173	1177	505	877	1000
	Sample	131	133	186	187	188	190	58	116	142
	Description	Fill of posthole (948)	Fill of possible slot (954)	Fill of pit (1166)	Fill of posthole (1168)	Fill of pit (1172)	Fill of pit (1176)	Fill of pit (504)	Fill of pit (876)	Fill of pit (999)
Volume of charcoal >4 mm		1ml	150ml	3ml	4ml	2ml	8ml	1ml	7ml	12ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal										
Betula spp	birch	-	-	3 (0.09g)	-	-	7 (0.34g)	-	-	-
Corylus cf avellana	hazel	4 (0.09g)	-	3 (0.08g)	9 (0.42g)	-	20 (0.72g)	2 (0.11g)	16 (0.70g)	13 (0.48g)
Pinus sylvestris type	Scots pine type	-	305 (40.91g)	-	-	-	-	1 (0.01g)	-	-
Quercus spp	oak	-	-	8 (0.21g)	10 (0.35g)	5 (0.45g)	11 (0.31g)	-	-	2 (0.08g)
Salix spp	willow	-	-		0.19g)	-	-	-	5 (0.42g)	20 (1.37g)
Cereals (carbonised)										
Hordeum vulgare sl	barley	3	-	-	-	-	-	-	-	-
Indet cereal	indet cereal	7	-	1	-	-	-	-	-	-
Seeds (carbonised)										
Coniferous cone fragment	pine cone fragment	-	29 (3.56g)	-	-	-	-	-	-	-
Corylus avellana nutshell	hazel nutshell	-	10 (0.23g)	2 (0.01g)	-	-	8 (0.23g)	-	3 (0.05g)	19 (0.23g)

Table 3.18: Roundhouse 3: postholes, pits, ditch and other.

	Area	Roundhouse 3														
	Features	Postholes										Pits		Ditch		Other
	Context	1200	1204	1206	1212	1214	1216	1218	1222	1222	1230	1198	1228	1183	1183	1184
	Sample	197	198	199	200	201	202	203	204	SF257	206	196	205	192	194	195
	Description	Fill of posthole (1199)	Fill of post-hole (1203)	Fill of posthole (1205)	Fill of posthole (1211)	Fill of posthole (1213)	Fill of posthole (1215)	Fill of posthole (1217)	Fill of posthole (1221)	Fill of posthole (1221)	Fill of posthole (1229)	Fill of pit (1197)	Fill of pit (1227)	Fill of ditch (1182)	Fill of ditch (1182)	Natural feature, burnt tree/similar
Volume of charcoal >4 mm		6ml	3ml	50ml	8ml	12ml	5ml	5ml	15ml	25ml	6ml	2ml	1ml	4ml	4ml	3ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal																
Alnus cf glutinosa	alder	-	6 (0.18g)	-	-	-	-	-	10 (0.32g)	-	-	2 (0.07g)	-	-	-	-
Betula spp	birch	-	-	46 (12.07g)	-	1 (0.11g)	1 (0.02g)	1 (0.03g)	3 (0.06g)	-	-	2 (0.08g)	-	-	-	7 (0.24g)
Corylus cf avellana	hazel	3 (0.10g)	4 (0.14g)	11 (0.79g)	20 (0.77g)	14 (0.44g)	11 (0.56g)	12 (0.42g)	5 (0.15g)	-	-	3 (0.12g)	-	13 (0.51g)	6 (0.20g)	-
Prunoideae	cherry type	-	-	-	-	-	-	-	-	-	-	-	1 (0.06g)	-	-	-
Quercus spp	oak	24 (1.17g)	-	-	5 (0.27g)	33 (1.88g)	3 (0.09g)	3 (0.08g)	-	-	24 (1.11g)	-	-	6 (0.27g)	6 (0.32g)	5 (0.09g)
Salix spp	willow	-	-	-	-	-	1 (0.03g)	-	-	-	-	-	1 (0.02g)	-	-	-
Indet charcoal	indet charcoal	-	-	-	-	-	-	-	55 (3.08g)	15 (5.24g)	-	-	3 (0.11g)	-	2 (0.11g)	2 (0.24g)
Cereals (carbonised)																
Hordeum vulgare sl	barley	-	1	-	-	-	-	-	-	-	-	-	2	-	-	-
cf Hordeum vulgare sl	cf barley	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Seeds (carbonised)																
Corylus avellana nutshell	hazel nutshell	-	-	-	-	-	4 (0.05g)	1 (0.01g)	1 (<0.01g)	-	-	-	-	-	-	-

Table 3.19: Roundhouse 4: ditch, postholes and pits.

	Area	Roundhouse 4																	
	Feature	Ditch	Postholes									Pits							
	Context	1250	1254	1256	1262	1268	1272	1282	1288	1481	1483	1270	1274	1276	1298	1332	1429	1445	1453
	Sample	207	208	209	210	211	213	216	217	259	260	212	214	215	218	225	248	251	252
	Description	Fill of ring ditch (1249)	Fill of posthole (1253)	Fill of post-hole (1255)	Fill of posthole (1261)	Fill of probable post-hole (1267)	Fill of pit (1271)	Upper fill of post-hole (1281)	Fill of pit (1287)	Burnt post residue of posthole (1480)	Burnt post residue of posthole (1482)	Fill of pit (1269)	Fill of pit (1273)	Fill of pit (1275)	Fill of pit (1297)	Fill of pit (1331)	Fill of pit (1428)	Fill of pit (1444)	Fill of pit (1452)
Volume of charcoal >4 mm		2ml	50ml	2ml	7ml	10ml	40ml	2ml	8ml	4ml	<1ml	1ml	3ml	2ml	2ml	2ml	5ml	2ml	<1ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal																			
Alnus cf glutinosa	alder	-	-	-	1 (0.02g)	15 (0.36g)	41 (1.73g)	-	-	6 (0.31g)	-	-	9 (0.30g)	-	1 (0.08g)	-	5 (0.17g)	-	-
cf Alnus spp	cf alder	-	148 (10.51g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Betula spp	birch	1 (0.04g)	-	-	-	-	-	-	-	-	-	1 (0.03g)	-	1 (0.02g)	-	6 (0.14g)	3 (0.22g)	-	-
Corylus cf avellana	hazel	6 (0.35g)	-	10 (0.22g)	2 (0.04g)	5 (0.25g)	34 (1.54g)	4 (0.06g)	16 (1.33g)	-	1 (0.04g)	1 (0.03g)	3 (0.04g)	6 (0.12g)	5 (0.26g)	1 (0.02g)	4 (0.16g)	7 (0.19g)	-
Ericales	heather type	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 (0.03g)	-	-	-
Pinus sylvestris type	Scots pine type	-	-	-	1 (0.01g)	-	13 (0.56g)	1 (0.02g)	-	-	-	-	-	-	-	-	1 (0.04g)	-	-
Prunoideae	cherry type	-	-	-	-	-	20 (1.97g)	-	1 (0.06g)	-	-	-	-	-	-	-	-	-	-
Quercus spp	oak	-	-	-	-	-	-	-	-	-	-	-	-	1 (0.03g)	1 (0.02g)	-	1 (0.02g)	3 (0.13g)	-
Indet charcoal	indet charcoal	-	-	-	32 (0.96g)	15 (0.34g)	16 (0.81g)	1 (0.05g)	-	-	-	-	-	2 (0.08g)	-	-	-	3 (0.09g)	-
Indet cinder	indet cinder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 (0.12g)
Cereals (carbonised)																			
Hordeum vulgare var nudum	naked barley	-	-	-	-	-	-	-	67	-	-	-	32	-	-	-	-	-	-
Hordeum vulgare sl	barley	-	-	-	-	-	-	6	59	3	5	-	32	-	-	1	-	-	-
cf Hordeum vulgare sl	cf barley	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-
Triticum spp	wheat	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Indet cereal	indet cereal	-	-	-	-	-	-	-	22	6	9	-	-	-	-	-	-	-	-
Rachis fragments	rachis fragment	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Seeds (carbonised)																			
Corylus avellana nutshell	hazel nutshell	-	3 (0.02g)	4 (0.03g)	4 (0.02g)	-	-	-	2 (0.02g)	1 (<0.01g)	-	-	-	-	1 (<0.01g)	1 (<0.01g)	1 (<0.01g)	-	-
cf Lathyrus / Pisum	cf pea	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cf Leymus arenarius	lyme grass	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-

Table 3.20: Roundhouse 5: ring ditch, postholes and pits.

	Area	Roundhouse 5								
	Feature	Ring Ditch			Postholes				Pits	
	Context	1392	1392	1392	1388	1390	1400	1404	1386	1396
	Sample	239	240A	240B	237	238	242	243	236	241
	Description	Fill of ring ditch (1391)	Fill of ring ditch (1391)	Fill of ring ditch (1391)	Fill of posthole (1387)	Fill of posthole (1389)	Fill of posthole (1399)	Fill of posthole (1403)	Fill of pit (1385)	Fill of pit (1395)
Volume of charcoal >4 mm		4ml	1ml	8ml	2ml	<1ml	1ml	3ml	2ml	40ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	50%
Charcoal										
Alnus cf glutinosa	alder	-	-	-	1 (0.03g)	1 (0.04g)	2 (0.05g)	4 (0.30g)	-	13 (0.87g)
Betula spp	birch	-	-	1 (0.09g)	-	-	1 (0.01g)	1 (0.04g)	-	-
Corylus cf avellana	hazel	-	1 (0.03g)	9 (0.48g)	4 (0.05g)	-	1 (0.01g)	2 (0.16g)	3 (0.06g)	28 (2.95g)
Prunoideae	cherry type	-	-	-	-	-	1 (0.01g)	-	-	-
Quercus spp	oak	12 (0.37g)	2 (0.07g)	4 (0.82g)	-	-	-	-	-	-
Salix spp	willow	-	-	-	-	-	-	-	1 (0.08g)	11 (1.20g)
Indet charcoal	indet charcoal	5 (0.23g)	-	-	-	-	1 (0.07g)	-	-	-
Cereals (carbonised)										
Hordeum vulgare var nudum	naked barley	-	1	-	-	-	-	-	-	-
Hordeum vulgare sl	barley	-	2	-	-	-	-	-	-	-
Indet cereal	indet cereal	-	-	4	-	1	-	-	-	-
Seeds (carbonised)										
Corylus avellana nutshell	hazel nutshell	-	-	-	-	-	-	-	9 (0.13g)	-

Table 3.21: Roundhouse 6: postholes and pits, and to west of.

	Area	West of RH06	Roundhouse 6												
			Postholes					Pits							
	Context	892	1342	1344	1346	1350	1364	1354	1360	1366	1368	1435	1437	1466	1486
	Sample	119	226	227	228	229	232	230	231	233	234	249	250	254	261
	Description	Fill of pit (943)	Fill of probable posthole (1341)	Fill of pit (1343)	Fill of posthole (1345)	Fill of posthole (1349)	Fill of posthole (1363)	Fill of pit (1353)	Fill of pit (1359)	Fill of pit (1365)	Fill of pit (1367)	Fill of pit (1434)	Fill of pit (1436)	Fill of pit (1479)	Final infill event of pit (1436)
Volume of charcoal >4 mm		4ml	1ml	2ml	3ml	15ml	4ml	15ml	15ml	4ml	2ml	10ml	5ml	6ml	4ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Charcoal															
Alnus cf glutinosa	alder	-	4 (0.02g)	-	3 (0.05g)	-	5 (0.35g)	17 (0.63g)	20 (1.95g)	-	-	20 (0.70g)	13 (0.42g)	16 (0.60g)	-
Betula spp	birch	8 (0.33g)	-	2 (0.07g)	2 (0.10g)	-	1 (0.04g)	2 (0.09g)	-	-	-	1 (0.12g)	-	2 (0.07g)	-
Corylus cf avellana	hazel	-	-	3 (0.17g)	2 (0.05g)	41 (1.83g)	7 (0.16g)	18 (1.09g)	-	-	2 (0.29g)	11 (0.44g)	-	-	11 (0.33g)
Ericales	heather type	-	-	-	-	-	1 (0.01g)	-	-	-	-	-	-	-	-
Pinus sylvestris type	Scots pine type	11 (0.38g)	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunoideae	cherry type	-	1 (0.03g)	1 (0.04g)	-	-	-	-	-	-	3 (0.08g)	2 (0.25g)	-	-	5 (0.14g)
Quercus spp	oak	-	-	-	3 (0.07g)	2 (0.07g)	-	2 (0.13g)	6 (0.43g)	10 (0.16g)	-	11 (0.30g)	-	7 (0.34g)	4 (0.13g)
Salix spp	willow	3 (0.08g)	-	-	-	-	-	1 (0.13g)	-	-	-	-	-	-	-
Indet charcoal	indet charcoal	-	-	2 (0.08g)	-	-	3 (0.11g)	-	-	7 (0.28g)	-	5 (0.31g)	-	-	3 (0.08g)
Cereals (carbonised)															
cf Avena spp	cf oats	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Hordeum vulgare sl	barley	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Indet cereal	indet cereal	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Seeds (carbonised)															
Corylus avellana nutshell	hazel nutshell	-	-	1 (<0.01g)	-	1 (0.03g)	-	1 (<0.01g)	2 (0.02g)	-	-	-	3 (0.03g)	1 (0.02g)	6 (0.03g)

Table 3.22: Pit Group 13, ditch(1325), Pit Group 14, pits east of Roundhouses 3-6, and isolated pits near Roundhouse 3-6.

	Area	Pit Group 13		Ditch (1325)		Pit Group 14	Pits East of Roundhouses 3-6			Isolated pits near Roundhouses 3-6		
	Context	1472	1476	1326	1326	894	1412	1416	1420	1302	1306	1455
	Sample	256	258	221	223	120	244	246	247	219	220	253
	Description	Fill of pit (1471)	Fill of pit (1475)	Fill of ditch (1325)	Fill of ditch (1325)	Basal fill of pit (884)	Fill of pit (1411)	Fill of pit (1415)	Fill of pit (1419)	Fill of pit (1301)	Fill of posthole (1305)	Fill of pit (1454)
Volume of charcoal >4 mm		65ml	30ml	1ml	<1ml	25ml	2ml	10ml	1ml	15ml	100ml	6ml
% charcoal >4mm ID		100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	100%
Charcoal												
Alnus cf glutinosa	alder	6 (0.56g)	-	-	-	-	-	-	-	-	-	-
Betula spp	birch	-	-	1 (0.04g)	-	6 (0.35g)	1 (0.03g)	-	-	1 (0.06g)	-	-
Corylus cf avellana	hazel	9 (0.38g)	10 (0.37g)	-	-	25 (0.89g)	4 (0.22g)	24 (0.76g)	-	24 (1.83g)	170 (8.63g)	-
Ericales	heather type	-	-	3 (0.02g)	2 (0.01g)	-	-	-	-	-	-	-
Pinus sylvestris type	Scots pine type	-	-	-	-	-	1 (0.02g)	-	1 (0.01g)	-	-	22 (1.01g)
Quercus spp	oak	-	-	2 (0.13g)	-	-	1 (0.10g)	-	4 (0.06g)	2 (0.05g)	-	-
Salix spp	willow	2 (0.15g)	2 (0.11g)	-	-	19 (1.24g)	-	-	-	9 (0.56g)	-	-
Indet charcoal	indet charcoal	2 (0.52g)	32 (1.32g)	-	-	-	-	21 (1.02g)	3 (0.08g)	-	-	-
Cereals (carbonised)												
cf Avena spp	cf oats	-	-	-	1	-	-	-	-	-	-	-
Hordeum vulgare var nudum	naked barley	2	3	-	-	-	-	-	-	-	-	-
Hordeum vulgare sl	barley	10	-	1	1	-	-	-	-	-	-	-
Indet cereal	indet cereal	-	5	-	3	-	-	-	-	-	-	-
Seeds (carbonised)												
Corylus avellana nutshell	hazel nutshell	930 (14.55g)	-	-	-	201 (3.39g)	-	-	-	34 (0.59g)	-	-

Appendix 2: Animal Bone Catalogue

SF	Sample	Context	Area	No.	Sample weight (g)	Species	Bone	Part	L/R	Proximal	Distal	Other	Age inference	Calcined/ burnt/ unburnt	Comments
42		1	1	1		horse	metapodial	distal	L/R		df		A	unburnt	shaft sawn across
42		1	1	1		LU	rib	shaft						calcined	
280		67	Ditch	1		IM		fragment						calcined	
168		1060		1		cf cattle	metapodial	proximal	L/R					calcined	dorsal foramen present
169		1070		2		IM		fragment						calcined	1 is poss. vertebral fragment
170		1104	RH2	1		LM/LU	long bone shaft	fragment						unburnt	bone splinter; no evidence of wear
212		1342	RH6	1		cattle	mandible	oral	L				A	unburnt	reconstructed; M3,2,1
212		1342	RH6	1		cattle	tooth	PM4						unburnt	prob. from above mandible
212		1342	RH6	1		cattle	tooth	PM3						unburnt	prob. from above mandible
212		1342	RH6	1		cattle	radius	proximal	L	pf			I/A	unburnt	proximal fused
212		1342	RH6	1		cattle	radius	distal	L		df		A	unburnt	distal fused
212		1342	RH6	1		cattle	radius	shaft	L/R					unburnt	
212		1342	RH6	1		cattle	tibia	proximal	R	pY			J/I	unburnt	
212		1342	RH6	1		cattle	tibia	proximal	L/R	pY			J/I	unburnt	poss part of R tibia
212		1342	RH6	1		cattle	calcaneum	body	R					unburnt	
212		1342	RH6	1		sheep /goat	scapula	glenoid, neck	R			fused	I/A	unburnt	SLC 18.0
212		1342	RH6	1		sheep /goat	astragalus	fragment	R					unburnt	
212		1342	RH6	1		horse	tooth	lo PM2						unburnt	in 2 fragments; in wear
212		1342	RH6	1		horse	tooth	lo M/PM						unburnt	in wear
212		1342	RH6	1		horse	tibia	distal	L		df		A	unburnt	Bd 65.7; Dd 42.0
212		1342	RH6	15		IM/LU		fragment						unburnt	
212		1342	RH6	50		IM		fragment						unburnt	
212		1342	RH6	1		Cetacean	vertebra	centrum				unfused		unburnt	multiple parallel chop marks ep surfaces
	<002>	17	PG1	1	1.8g	LU	phalanx 1/2	proximal						calcined	prox fragment only
	<002>	17	PG1	1		IM		fragment						calcined	
	<026>	259	PG3	7		IM		fragment						calcined	
	<062>	512	RH01	20	2.4g	IM		fragment						calcined	
	<062>	512	RH01	1		?Ursus	phalanx 2	entire		pf				calcined	further research needed
	<103>	798	PG7	25	3.2g	IM		fragment						calcined	small fragments
	<103>	798	PG7	1		IM		fragment						calcined	length 19.3mm
	<149>	1024	PG7	18	2.1g	IM		fragment						calcined	
	<159>	1060	PG9	26	5.5g	IM		fragment						calcined	
	<179>	1135	PG11	3	17g	MM/SU	vertebra	epiphysis						calcined	do not conjoin
	<179>	1135	PG11	5		IM	poss. vertebra	fragment						calcined	epiphysial surface
	<179>	1135	PG11	1		IM	epiphysis	fragment						calcined	eg femur
	<179>	1135	PG11	250		IM		fragment						calcined	
	<179>	1135	PG11	1		amphibian	cf tibio-fibula	shaft						calcined	double-barrelled' bone
	<179>	1135	PG11	1		cf amphibian		shaft						calcined	
	<190>	1177	PG12	1	24.2g	LM/LU	long bone shaft	shaft						calcined	thick-walled fragment
	<190>	1177	PG12	1		pig/sheep	calcaneum	proximal		?pf			?A	calcined	small fragment
	<190>	1177	PG12	1		cf pig	skull	orbit					?J	calcined	small thin fragment
	<190>	1177	PG12	250		IM		fragment						calcined	small fragments

SF	Sample	Context	Area	No.	Sample weight (g)	Species	Bone	Part	L/R	Proximal	Distal	Other	Age inference	Calcined/ burnt/ unburnt	Comments
	<226>	1342	RH06	1	117g	cattle	tooth	lo M3	L					?unburnt	stage h
	<226>	1342	RH06	1		cattle	tooth	lo M3	R					?unburnt	stage h
	<226>	1342	RH06	1		cattle	tooth	M1/M2						?unburnt	stage k
	<226>	1342	RH06	1		cattle	tooth	M1/M2						?unburnt	
	<226>	1342	RH06	1		cattle	tooth	lo PM3/4						?unburnt	
	<226>	1342	RH06	6		cattle	tooth	fragment						?unburnt	enamel and infundibula
	<226>	1342	RH06	2		cattle	mandible	fragment						unburnt	probably assoc with loose teeth
	<226>	1342	RH06	120		IM		fragment						unburnt	
	<226>	1342	RH06	3		IM		fragment						calcined	small fragments
	<227>	1344	RH06	1	4.8g	cattle	tooth	fragment						?burnt	enamel and infundibula
	<258>	1476	PG13	17	1.1g	IM		fragment						calcined	small fragments
	<266>	1507	PG4	1	29.8g	sheep/goat	femur	~entire	L	pf	df		J/I	unburnt	sturdy; algal staining
	<266>	1507	PG4	2		IM		fragment						calcined	
	<171>	1104	PG11	1	138.8g	red deer	metatarsal	proximal	L					?unburnt	in 2 split fragments
	<171>	1104	PG11	1		red deer	naviculo-cuboid	distal	L					?unburnt	
	<171>	1104	PG11	1		red deer	metatarsal	distal	L/R					?unburnt	prob ch ML midshaft
	<171>	1104	PG11	8		IM		fragment						calcined	blackened core
			Total	869											

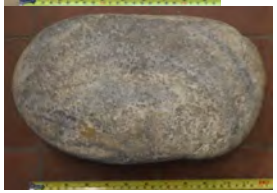
Appendix 3: Worked Stone Catalogue

SF No.	Context No.	Area/ feature	Context Information	Nr of pieces	Material type	Description	Weight (g)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Maximum Height/ Depth (mm)	Maximum Diameter (mm)	Photo
2	14	1	Fill of ditch 009	2	Garnet schist	**Roofing slate** fragments - recent. Not recorded futher	284	n/a	n/a	n/a	n/a	n/a	Not illustrated 
5	21	1	Fill of ditch 20		Blonde sandstone	**Architectural piece**, a part of a column rather than an coping stone. Tooling marks not visible.	2500	140	130	120	n/a	n/a	
20	52	Culvert	Stone-built post-medieval culvert	2	Blonde sandstone	**Architectural piece**. Semi-circular long stone, damaged at one end, used as a **coping stone**. Finely tooled all over the top and on the surviving end. The tooling is to dress the stone and provide a smooth surface.	36000	640	270	100	n/a	n/a	
9	10002		Fill of pit 10001	1	Quartz / quartzite	Cobble used as a **pounder** at both ends, although the wear is shallow.	1440	120	100	95	n/a	n/a	
76	707	Palisade	Fill of posthole 706	1	Quartzite	Cobble used as a **pounder** with a discrete area of fine indentations at one end, and the otherend has a worn area that is slightly facetted through **grinding.**	948	55	45	16	n/a	n/a	
83	489	Void	Void	1	Dolerite	Flattened and rounded cobble flaked at one end. With pounded area at the edge of the broader end and discrete pounded area along the opposite edge. **Pounder.**	670	110	105	35	n/a	n/a	
161	1024	PG7	Fill of pit 1023	1	Quartz	Small cobble with faceted wear at both ends through pounding. One end has not had all its surface removed, and the other end is flawed by stiking along the edge of something hard. A well used **pounder.**	360	86	55	44	n/a	n/a	

SF No.	Context No.	Area/ feature	Context Information	Nr of pieces	Material type	Description	Weight (g)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Maximum Height/ Depth (mm)	Maximum Diameter (mm)	Photo
209	1342	RH6	Fill of probable posthole 1341	1	Quartzite	Small cobble with one apex with discrete area of peck marks. **Pounder**	132.1	55.7	50	31.3	n/a	n/a	
216	1372	RH5	Fill of posthole 1371	1	Quartz/ Quartzite	Cobble slightly used by pounding at both ends. Not a good **pounder.**	1046	120	85	75	n/a	n/a	Not illustrated
239	1398	RH5	Fill of posthole 1397	1	Dolerite	Well worn and heavy cobble flaked at one end and used as a pounder. Other end has significant flaking scars with two areas towards each side resulting from its use as a **pounder.**	2000	138	95	73	n/a	n/a	
241	1486	RH6	Fill of pit 1436	1	Quartzite	Cobble lightly pecked at one end and slightly facetted. The other end is also pecked and one side has slight peck marks. Lightly used **pounder.**	3432	195	130	80	n/a	n/a	
278	550	RH1	Fill of load-bearing posthole 549	1	Quartz	Small cobble with large area of pounding at its broad end, with slightly facetted wear 50 x 40 mm. Other end is also facetted through use 45 x 35 mm. **Pounder.**	420	82	60	58	n/a	n/a	
80	692	RH1/ Palisade	Fill of posthole 691	1	Quartz/ quartzite	Split cobble. The narrow end has been used for pounding, the other end is severely shattered by hammering. **Pounder/hammerstone.**	696	105	83	60	n/a	n/a	
81	550	RH1	Fill of posthole 513	1	Quartz/ quartzite	Elongated cobble pounded and flaked at one end, and possibly natural flaking at the other end. **Pounder/hammerstone**?	864	142	88	45	n/a	n/a	
243b	1364	RH6	Fill of posthole 1363	1	Ferruginous sandstone	Elongated cobble with slight wear though **pounding/hammering** at either end and down one side.	512	167	70	35	n/a	n/a	

SF No.	Context No.	Area/ feature	Context Information	Nr of pieces	Material type	Description	Weight (g)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Maximum Height/ Depth (mm)	Maximum Diameter (mm)	Photo
77	546	RH1	Fill of posthole 513	1	Mica schist	Small cobble used as a **hammer** at one end. The stone is disintegrating.	1470	125	110	60	n/a	n/a	
79	663	RH1	Fill of posthole 662	1	Mica schist	Cobble with two slight flake removed at the narrower end. **Hammerstone**	924	135	95	40	n/a	n/a	
123	776	PG6	Fill of posthole 775	1	Quartzite	Elongated cobble broken across its shaft. Flaked in two direction at its surviving end. **Hammerstone**.	448	90	79	33	n/a	n/a	
177	1121	PG11	Remains of a cist chambe	1	Mica schist	Elongated cobble with slight damage at both ends for flaking and hammering, Possible **hammerstone**.	754	150	72	50	n/a	n/a	
64	334	SW of RH	Fill of posthole 333	1	Schist	Wedge of a cobble, with surviving surface exceptionally smooth, especially towards tip. May have been used as a **polisher**. Recheck.	116.1	77.3	44.5	41.2	n/a	n/a	
75	550	RH1	Fill of posthole 549	1	Red sandstone	Shaft of an elongated cobble. Possibly used as a **whetstone**, as half one surface and the adjoining side are smoothed. Recheck.	133.5	72.2	50.5	27.8	n/a	n/a	
182	1141	PG11	Fill of posthole 1140	1	Schist/ sandstone	Flattened rounded cobble with large dark areas on both flat surface with discrete area of pecking on c. 1/3 of the circumference. **Polisher**?	604	97	90	48	n/a	n/a	

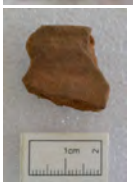
SF No.	Context No.	Area/ feature	Context Information	Nr of pieces	Material type	Description	Weight (g)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Maximum Height/ Depth (mm)	Maximum Diameter (mm)	Photo
210	1364	RH6	Fill of posthole 1363	1	Schist	Possible **whetstone** as one surfaces is darkened with polish. The stone has not been much used as there are no or little wear on its edges.	728	145	60	60	n/a	n/a	
130	778	PG6	Fill of posthole 777	1	Pink sandstone	Wedge shaped block from a boulder with a pecked hollow in the upper flat surface. Hollow measures 70 by 70 by 18 mm. Probably an **anvil**.	8500	370	200	95	n/a	n/a	
190	1083	RH2	Fill of pit 1082	1	Sandstone	Elongated rounded and flattened boulder, damaged down one edge. Slight pecked indentation on one surface from its use as an **anvil**, but the wear is minimal.	7500	320	160	70	n/a	n/a	
236	1372	RH5	Fill of posthole 1371	1	Schist	Cobble recently damaged at one end, other end has been flaked and a large area is flattened and smoothed by **polish**ing. One area on one surface has been used as an **anvil** with discrete pecked hollowing.	1990	170	100	85	n/a	n/a	Not illustrated
14	15006		No information	1	Mica schist	Flattened rounded boulder of soft schist. The piece is split down the middle and across one edge. What is left of the lower surface is slightly convex and work. One edge has been deliberatly rounded but the stone split and broke. The upper surface is unworn. **Quern rubber?**	2572	200	142	55	n/a	n/a	Not illustrated
15	15006		No information	2	Mica schist	Fragment of a flattened boulder broken across. Upper surface unworn. Lower surface is convex through use as a **quern rubber**. Has significant wear, facetted and sm0oth on one edge/corner.	2684	185	165	50	n/a	n/a	
118	794	PG7	Fill of posthole 793	1	Mica schist	Hard boulder with a rounded top. It is split and its lower surface was used on a quern as it is slightly conve in both planes. It is also smooth towards one end of the worked surface. **Quern rubber.**	3422	264	140	55	n/a	n/a	

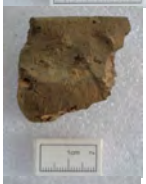
SF No.	Context No.	Area/ feature	Context Information	Nr of pieces	Material type	Description	Weight (g)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Maximum Height/ Depth (mm)	Maximum Diameter (mm)	Photo
127	776	PG6	Fill of posthole 775	1	Mica schist	Flattened boulder with much mica, possibly chipped around its surviving edge. The stone has broken down its length and across its width. The lower surface has slight convex wear and is smoothed around its edges but rougher in the middle of the stone. It is well used. **Quern rubber**.	3932	200	180	60	n/a	n/a	
151	936	PG11	Fill of pit 936	3	Mica schist	Joining fragments of a **quern rubber**, which is partly burnt. The lower surface is used and smoothed around the edges of that surface. The surviving end is rounded and the other is missing.	2810	240	170	45	n/a	n/a	
183	1141	PG11	Fill of posthole 1140	1	Quartzite	Elongated rounded boulder, very worn on the lower surface. There is distinct areas of smoothing at either end of this surface and convex wear in the middle. The upper surface is slightly smooth due to handling, but is otherwise unworked. **Quern rubber.**	7500	295	180	85	n/a	n/a	
202	1284	RH4	Fill of posthole 1283	1	Mica schist	Flattened and elongated boulder with recent damage on one edge. Smooth upper surface but lower working surface is very smooth with an edge to the wear. It is concave in two planes. Probably a **quern rubb**er but not a great stone as it is laminating on the worked surface.	4500	270	200	65	n/a	n/a	Not illustrated
203	1272	RH4	Fill of pit 1271	1	Mica schist	Rounded and flattened of boulder with lower working surface. It is smoothed in part and has smoothing on one end and facetting and smoothing on one lateral side. There is some recent damage on one edge and the worked surface has only slight wear and is convex in one plane only. The top surface of the stone is slightly smooth from use. **Quern rubber.**	5000	265	210	70	n/a	n/a	
243a	1364	RH6	Fill of posthole 1363	1	Schist/ quartzite	Small boulder with lower surface used as a **quern rubber**. Some of the edges of the worked surface are very smooth but rougher in the middle.	3256	200	160	60	n/a	n/a	Not illustrated
245	1374	RH5	Fill of posthole 1373	1	Mica schist	Poor **quern rubber** from a small wedge-shaped boulder. The top is unworked, but the worked surfce is convex in 2 planes, with some surface damage. It was roughened before it was discarded. One side is smoothed.	9000	320	200	75	n/a	n/a	

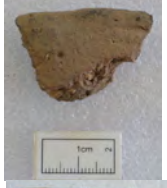
SF No.	Context No.	Area/ feature	Context Information	Nr of pieces	Material type	Description	Weight (g)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Maximum Height/ Depth (mm)	Maximum Diameter (mm)	Photo
248	1372	RH5	Fill of posthole 1371	1	Quartzite	Rounded, bun-shaped stone with lower surface with a fracture and loss of part of it. The lower surface is very smooth in the centre and around the edges, but repecked areas are visible. It possibly broke during repecking. Convex in two planes. **Quern rubber**.	8000	260	245	95	n/a	n/a	
277	550	RH1	Fill of load-bearing posthole 549	1	Mica schist	Dense cobble, damage on its upper surface, with some loss, probably recent. The lower surface is very worn and mostly smooth with sight convex wear in two planes. A **quern rubber.**	2340	190	150	65	n/a	n/a	
19A	12002	Culvert	Stone-built post-medieval culvert	1	Micaceous sandstone	Could be a fragment of a **saddle quern**. No working surface. Possibly chipped around the surviving edge.	179.1	104.4	64	20.6	n/a	n/a	Not illustrated
174	1	u/s	Topsoil		Quartzite/ schist	Hard, large boulder, domed on one side and concave on the other. The worked surface is well-used. It is tooled down one side and at both (narrowed) ends and along both top side edges, and partly on the working face. The wear is off centre and is very pronounced. The stone is lipped at one side through use. A very good **saddle quern**.	94000	745	430	240	n/a	n/a	
179	1115	PG11	Fill of posthole 1114	1	Mica schist	Fragment of boulder, worn to a significant concave shape but broken across where it was thinnest in the middle of the stone. Smoothing of the stone is visible at the top and sides of the worn area, but tooling for re-roughening are noted. **saddle quern fragment.**	48000	520	450	170	n/a	n/a	
189	1095	RH2	Fill of posthole 1084	1	Mica schist	Fragment of boulder with a steep working surface that is smooth and worn worn. The bottom of the worked surface may have had an inclusion close to where it broke. Used as a **saddle quern** and is well work	8500	270	225	120	n/a	n/a	Not illustrated
200	1282	RH4	Upper fill of posthole 1281	1	Quartzite	Large rectangular block used as a **saddle quern** on upper surface. Was roughened by pecking and worn smooth. The stone seems to have split lengthways. Not a nice piece.	78000	540	310	275	n/a	n/a	

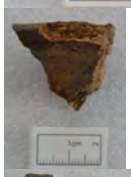
SF No.	Context No.	Area/ feature	Context Information	Nr of pieces	Material type	Description	Weight (g)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Maximum Height/ Depth (mm)	Maximum Diameter (mm)	Photo
232	1440	RH5	Deposit	1	Mica schist	Rounded and split boulder, with lower surface very worn and smoothed, and concave across the stone. Possibly a small **saddle quern** rather than a quern rubber.	7000	295	210	90	n/a	n/a	
267	1556	PG5	Colluvium deposit	1	Micaceous quartzite	Dense boulder fragment hollowed on one surface. Smoothed around its surviving edges. The sides and other surface are unworked. Fragment of a **saddle quern**.	5000	250	200	100	n/a	n/a	
19B	51	Culvert	Stone-built post-medieval culvert	1	Sandstone	**Upper stone from rotary set**. Stone broken through the eye and both ends of stone appear damaged. Its edges are roughly tooled. The eye is formed by pecking around its sides, but both the broken edges are worn. The stone has two rectangular rind slots on the working surface. They measure 60-85 by 50 by 20 mm. They are slightly oblique angles and the bottoms of the slots are not smooth. The working surface of the stone is tooled along one edge and end, where there are clear roughening tool marks. Otherwise the working surface is very smooth and concave in two planes. The upper surface thins out towards the edges, and has been tooled to give the stone a good shape. In this surface is a 43 mm deep rectangular slot 30 by 35 mm, within 40 mm of the eye. This is probably a small slot for a hopper.	59000	860	385	75	n/a	135	 

Appendix 4: Prehistoric Pottery Catalogue

Vessel Nr	SFNr/ Sample	Context	Total Nr pieces	Description of rims, bases and decorated sherds	Average Diameter mm	Grain size	Stone/ Mineral	Organic matter	Description of finishing & use	Image
Vessel 1	153	Isolated pit 1000 fill of pit 999	4	Two large conjoined sherds have broken along a coil join and are from the lower part of a round-bottomed vessel. Other sherds are slightly corky. **EN** Average thickness 15 mm, Wt 308.6 g		C	Predominantly quartz rock with some unidentified grey mineral	✓	Cracked and spauled exterior surface, smoothed, some 14C deposits, wiped	
Vessel 2	2	10002 fill of pit 001 in Tr 10	1	Large fragment of a decorated rim, carination and lower part of the bowl. On the interior the rim coil attachment is noted. The rim is 23.5 mm broad and is partly decorated with deep vertical lines (incised with thick cord?) followed by a 4-5 line and deeply incised horizontal pattern with a single line of 3 separate oblique slashes with further horizontal lines following. The rim top is much abraded, the rim edge is rounded and slightly uneven. The carination is 42 mm below the rim edge. The neck is decorated by oblique lines (from bottom left to top right) with 2-3 mm wide slashes (10). **Probably a EBA FV** Av thickness 11.2 /17.2 mm, Wt 297 g	280 mm diam & 15% present	C-VC	Uncertain but includes grey mineral , mica and some quartz sand	✓	The rim is heavily abraded with 14C residues. Moulding marks on exterior and interior with much cracking round larger grits.	
Vessel 3	3	10002 fill of pit 001 in Tr 10	5	Open mouthed plain bowl, with straightish sides and rounded base. Rim is flattish with a rounded edge, rim shape varies slightly with finger moulding on both surfaces noted. Possibly a **plain BA vessel?** Average thickness 9.2/12.8 mm, Wt 168.7g	140 mm & 13% present	C	Uncertain grey mineral with quartz rock	✓	Has iron staining, somwhat corky with loss of organic matter. Heavily wiped with grasses, smoothed,	
Vessel 4	107	Spoil c. 681	1	Slightly angular shape to a rounded topped rim with a slight bevel to the exterior from moulding. Slightly concave neck **BA?** Average thickness 7.8 mm, Wt 7.8 g	c. 160 mm, c. 5%	M	Quartz rock, sand and unidentified grey mineral	✓	Smoothed, and sooting on rim top	
Vessel 5	54	PG3 257 hardened floor with evidence of burning	159	These are all plain sherds. The rims could be from 9 different but similar vessels with the rims straightish to slightly everted, 5 have concave necks, the others are straight. Fragments of carinations , 3 are slight and rounded but broken off at the coil join, the other 4 are slightly more angular and pronounced. The 2 base sherds are considerably thicker than the rest. Much breakage along coil joins. One body sherd is corky, suggesting there is a mixture of vessels here. **BA** Av thickness 8.5-10.5 mm, 2012.2 g	c. 240 mm diameter pots	M	Quartz sand and rock, possibly other minerals	✓	Iron pan adhering to the sherds with sand is common on c. half the sherds, grass and moulding marks, some 14C deposits. Smoothed surfaces	
Vessel 6	61	PG3 257 hardened floor with evidence of burning	10	Some sherds burnt with iron pan or other adhesions. Rim is more or less straight with a thin flattened top but abraded internally. **BA** Av thickness 8.9 mm, Wt 64.7 g	n/m	M-C	Quartz rock and sand, possible grey mineral	✓	Smoothed exterior, finger moulding	
Vessel 7	55	PG3 259 fill of pit 258	45	A good proportion, in two conjoining parts (11 sherds) and (7 sherds) of one vessel, with other similar spare rims, 2 carinations, possibly from the same vessel and other sherds from lower down the vessel. Very similar to SF 54. Straight to slightly everted finely rounded rims to a slightly concave neck and to a weak carination. A well-made thin and graceful pot. Some sooting and iron staining, probably not much used before it broke along the coil joins. **BA** Av thickness c. 7.5 mm, Wt 1086.3 g	c. 240-250 mm , 18% +20% present	M-C-VC	Quartz rock and mica, possibly other minerals	✓	Smoothed exterior, well finished, some food deposits externally , some grass marks	
Vessel 8	147	PG5 957 fill of pit 956	1	Thin inturned rim with straight edge. Plain with coil join marks visible **BA** Av thickness 8 mm, Wt 14.5 g	c.170 mm, 6% present	C	Quartz rock, sand and unidentified grey mineral	✓	Uncertain because of adhering iron and sand	
Vessel 9	S136	PG7 968 fill of pit 967	4	Fragmentary rim with 16.5 mm broad top decorated with closely positioned incised herring bone design. Other sherds are corky. **MN** Av thickness 6.5 mm, Wt 9.1 g	n/m	C	Quartz rock	✓	Not recorded further	

Vessel Nr	SFNr/ Sample	Context	Total Nr pieces	Description of rims, bases and decorated sherds	Average Diameter mm	Grain size	Stone/ Mineral	Organic matter	Description of finishing & use	Image
Vessel 10	158a	PG7 1016 fill of pit 1015	1	Small bowl represented by a badly abraded but decorated curved body sherd. Interior surface is corky. Decorated by what appears to be deeply incised fingernail marks or other linear stab marks. **M/LN** Av thickness 13 mm, Wt 46.1 g	c. 120 mm	M	Sparse quartz rock, mica and psammite and possibly other mineral	✓	Exterior surface is lost.	
Vessel 11	158b	PG7 1016 fill of pit 1015	4	Three larger plain sherds from the same vessel, other+ fragment from a different one. Well made sherds, the thickest two conjoin and are from near the base of the vessel. The separate large sherd probably has fragment of a rim/carination, with three incised lines. Very slightly corky. **MN?** Av thickness 8-16.8 mm, Wt 193.1 g		C-VC	Sparse quartz rock and unidentified grey mineral	✓	Well-smoothed surface, finger moulding and 14C	
Vessel 12	160a	PG7 1024 fill of pit 1023	1	Rounded rim with a decorated bevel and a prominent carination to a bowl-shaped vessel. Large grits show through the fabric. Bevel 13.4 mm wide, decorated with two parallel rows of incised marks created by incised finger nail. Corky. **MN?** Av thickness 11.5 mm, Wt 23.8 g		C-VC	Quartz rock and unidentified grey mineral	✓	Obvious moulding marks, some grass marks and smoothing	
Vessel 13	162	PG7 1028 fill of pit 1027	4	One large plain sherd with finger moulding and grass impression, two smaller plain sherds and one with a possible decoration with 6 shallow rounded depressions c. 4 mm in diameter, in an inverted V design. Slightly corky. **Neolithic** Av thickness 9.7 mm, Wt 80.5 g		C-VC	Unidentified grey mineral with some quartz	✓	Well-smoothed surface, grassmarks, and finger moulding	
Vessel 14	163a	PG7 1032 fill of pit 1031	6	The rim is strongly everted with a concave neck to the carination. A second fragmentary sherd may be part of a rim. A second carinated sherd conjoins with the rim. Three other sherds are fragmentary. The flat/bevelled rim top is 20.3 mm wide and has two parallel lines of incised finger nail marks. Large grits have left craters on the neck and carination while loss of organic matter from the surface leaves it slightly corky. **MN?** Av thickness n/m, Wt 96.8 g		C-VC	Quartz rock and mica and small grey pebbles	✓	The surface finishing does not survive but there are 14C deposits externally	
Vessel 15	163b	PG7 1032 fill of pit 1031	1	Decorated sherd with a weak but definate carination. The sherd has lost surface below the carination and above it are the remains of four oblique incised lines c. 8 mm long and up to 2 mm wide. The pot is likely to have been corky. **MN?** Av thickness 15 mm, Wt 22.8 g		C	Predominantly quartz rock and mica	much	The exterior surface has not survived. 14C deposits internally.	
Vessel 16	165	PG7 1036 fill of pit 1035	6	Two body sherds join. Rim sherd is extremely everted with a slightly rounded top that is 18-20 mm wide. The rim has broken off the neck, but its top is decorated with two deeply incised lines of long (15-20 mm) pointed linear motifs possibly made by a sharpened twig. Very slightly corky. **MN** Av thickness 14 mm, Wt 81.2 g	c.210 mm, c. 5% present	VVC	Presominately sandstone/quartzite, sand, with other minerals, one piece up to 16 mm in length	✓	Smoothed exterior, finger moulding and sooting	
Vessel 17	166	PG7 1040 fill of pit 1039	6	Two conjoing rims with a body sherd, two plain body sherds join and a piece from near the base. The rim is straight to a carination, with a 40 mm deep neck/collar and gently tapering vessel body. The rim has a well-formed edge with an interior bevel 17-20 mm wide. The bevel is decorated by 3-4 roughly parallel rows of slightly oblique stab marks, c. 5-8 mm long and 2 mm wide probably made by a sharpened/pointed stick. The clay seemed to be quite wet when the decoration was incised. The same decoration on the neck is incised in an angular arrangement on one piece. On the body the same tool has made inverted V's. The fabric of the vessel is corky. **MN** Av thickness 10.7 mm, Wt 202.9 g	c. 240 mm, c. 10% present	C-VC	Predominantly quartz rock and mica	✓	Smoothed exterior	
Vessel 18	178	PG11 1115 fill of posthole 1114	1	Rounded topped plain rim, but badly abraded. Finger moulding has created a corrugated surface, with cracking around the larger grits. **BA?** Av thickness 17.3 mm, Wt 46.6 g	n/m	C	Quartz rock, quartz sand	✓	Exterior surface has not survived with iron deposits.	

Vessel Nr	SFNr/ Sample	Context	Total Nr pieces	Description of rims, bases and decorated sherds	Average Diameter mm	Grain size	Stone/ Mineral	Organic matter	Description of finishing & use	Image
Vessel 19	228	PG13 1472 fill of pit 1471	13	Probably all from the same vessel, including one decorated rim, two decorated body sherds, plain body sherds and two possible base sherds. The latter are much thicker than the other sherds and they are both angled internally but suggest the base may have been fairly rounded. The rim edge is slightly everted to a straightish neck. The rim has a 15 mm wide and slightly rounded bevel to the interior. The bevel is decorated by two rows of slightly oblique ovals (4 x 3 mm) possibly made by a bone or stick. Slightly larger ovals (5 x 4 mm) decorate the sherd surface in three paralle roughly obliquel lines. The impressed ovals are also present on two other sherds. The rim is pierced by the same implement 20 mm below the rim, made before firing. A second hole 15 mm to the left does not pierce the rim because of stone temper. Other sherds are slightly corky. **MN**	c. 220 mm, c. 7.5% present	C -VC	Predominantly quartz rock with unidentified grey mineral and other minerals	✓	14C deposits near base bottom internally, smoothed, wiped, copious marks from grass, finger moulding marks	
Vessel 20	146	PG14 883 fill of pit 882	2	Largest piece with a protruding decorated collar made by an attached cordon that protrudes c. 4 mm. Above the cordon there are two incised oblique lines oriented lower left to top right. The lines are 15-18 mm long and 1.5 mm wide and are deeply incised. They are 11-14 mm apart. Smaller sherd is no-joining but from the same vessel. Both are slightly corky. **MN?** Av thickness 11.4 mm, Wt 45.5 g	n/m	C -VC	Predominantly quartz rock with unidentified grey mineral	✓	The finishing has not survived but the vessel was probably smoothed	
Vessel 21	98	RH1 515 Occupation deposit in centre of RH	1	Heavily burnt surfaces to a flat-topped plain rim 13 mm wide, straight to slightly inverted and unevenly moulded. Grey in colour because of burning. Cracked surfaces with large grits protruding through uncertain if corky. Found with possible mould fragment. **MN?** Av thickness 13.3 mm, Wt 10.7 g	n/m	C- VC	Some quartz and unidentified grey mineral	✓	Although smooth, some distortion and sooting is noted.	
Vessel 22	87	RH1 621 packing fill of posthole 620	13	Poorly preserved sherds, very abraded. The rim is from a bowl and has a 15 mm wide top that forms a interior ledge. Remaining sherds are non-joining. Thin **BA?** Av thickness 8.7 mm, Wt 182.1 g	c. 180 mm c. 6.5% present	M-C	Quartz rock with other mineral	✓	Too abraded for finishing to survive, but 14C deposits	
Vessel 23	101	RH1 681 basal remains of prehistoric soil around RH1	4	Sherds conjoin. Thin, rounded topped and slightly straight rim to a plain vessel **BA** Av thickness 7.8 mm, Wt 9.6 g	c. 170 m, c. 8.5% present	M-C	Quartz rock and sand	✓	Abraded exterior surface, interior 14C deposits	
Vessel 24	110a	RH1/ Palisade 401 basal remains of prehistoric soil around RH1	2	Joining rim and body sherd of plain well-made vessel. Rim is thin, simply rounded and slightly everted to a concave sweeping neck down to a carination. Has iron deposits. **BA** Av thickness 7.8 mm, Wt 23.1 g	c.180 mm, c. 4%	M-C	Quartz rock and sand	✓	Very smoothed, probably burnished.	
Vessel 25	110b	RH1/ Palisade 401 basal remains of prehistoric soil around RH1	2	Coarsely moulded rim with non-joining body sherd. Thin rounded-topped rim, slightly everted and plain. **BA** Av thickness 8.6 mm, Wt 13 g	c. 200 mm, c. 5%	M-C	Quartz rock and sand	✓	Loss of surface finished but not as well made as SF 110 a	
Vessel 26	60a	RH1/ Palisade 401 poss prehistoric soil preserved below colluvial on W side of Areas 2/3; cut by features from RH1 and palisade enclosure	5	Rim round topped and fairly straight. Uneven moulding. Has what looks like a partial perforation but isn't. Plain body sherds part of the same vessel, with negative impressions from loss of mineral or vegetable temper**. BA** Av thickness 12.1 mm, Wt 61.2 g	n/m	C	Quartz rock, sand, mica and grey mineral	✓	Smoothed exterior, moulding marks on rim, traces of 14C deposits	
Vessel 27	94a	RH1/Palisade 510 fill of pit 509	1	Well-made plain rim with slightly bulbous round topped rim with 11 mm diameter perforation drilled thorough the vessel wall, c. 28 mm below the rim top. The perforation is made from the exterior surface with the perforation measuringing only 3 by 4 mm on interior. **Neolithic** Av thinkness 9.6 mm, Wt 49.2 mm	c.250 mm internally c. 7 % present	C	Quartz rock with other mineral	✓	Smoothed, wiped with grass marks, cracking round grits.	

Vessel Nr	SFNr/ Sample	Context	Total Nr pieces	Description of rims, bases and decorated sherds	Average Diameter mm	Grain size	Stone/ Mineral	Organic matter	Description of finishing & use	Image
Vessel 28	94b	RH1/Palisade 510 fill of pit 509	3	Straight plain rim to a missing carination, with rounded edges to a flat rim top. Adhering iron pan. Other sherds are laminated. **BA** Av thickness 9.8 mm, Wt 48.9 g	c.140 mm internally c. 7.5 % present	M-C	Quartz rock, mica with other mineral	✓	Smoothed exterior under adhesions, cracking round protruding mineral temper	
Vessel 29	67c	NW of palisade 409 secondary fill of pit 408, with possible packing stones for a post	3	Two of the four decorated sherds conjoin. Their rim has a flattened edge with a c. 15 mm flat bevel to the interior of the vessel. Beneath the rim edge, the rim/neck is slightly concave. This area is decorated by a finger tip impressions. The bevel is decorated by two rows of slightly linear stab impressions from a sharpened stick or bone.The third rim is a small fragment from a different vessel. Both vessels are corky. **MN vessel** Av thickness for V29 and V30 10.8 mm, Wt 36.8 mm	n/m	M-C	Quartz rock and sand, possible grey mineral	✓	Surfaces badly cracked, iron staining and burnt.	
Vessel 30	67c	NW of palisade 409 secondary fill of pit 408, with possible packing stones for a post	1	The fourth rim has a bevel which is c. 18 mm thick and has two rows of stabbed motifs. Beneath its rounded rim edge is a horizontal row of triangular stab motif. And a perforation 6 mm in diameter pushed through the clay before firing. Vessel is corky. **MN**	n/m	M-C	Quartz rock and sand, possible grey mineral	✓	Surfaces badly cracked, iron staining and burnt. This piece is in poor condition.	
Vessel 31	91	NW of palisade 497 fill of pit 496	6	Joining plain rim sherds. Slightly everted and rounded topped. Body sherds from same vessel. **BA** Av thickness 7.5 mm, Wt 29.3 g	n/m	M-C	Quartz rock, sand and mica	✓	Finger moulding, 14C deposits	
Vessel 32	S52	NW of palisade/RH1 407 fill of posthole 406	1	Plain rim sherd, everted rim **BA** Av thickness 9.2 mm, Wt 7.8 g	n/m	C	Quartz rock with other mineral	✓	Smoothed	
Vessel 33	21	NW of palisade/RH1 112 fill of pit 111	4	Thin rounded rim slightly everted to a bulbous bodied plain vessel. Highly fragmented. **BA** Av thickness 9.5 mm, Wt 39.6 g	n/m	C	Uncertain	✓	Exterior was smoothed, 14 C deposits	
Vessel 34	50	NW of palisade/RH1 132 fill of pit 131	1	Damaged straight rim with a rounded top and back to the interior. **BA** Av thickness 12.8 mm, Wt 18.4 g	n/m	C-VC	Predominantly quartz, mica and some quartz sand	✓	Smoothed exterior, moulding marks	
Vessel 35	48	NW of RH1 144 fill of pit 143	5	Slightly everted rim with rounded top, iron pan adhering to all sherds. **BA** Av thickness 20.1 mm, Wt 42.1 g	n/m	C	Quartz and other dark mineral	Uncertain	Carbon/burnt deposits	
Vessel 36	58	SW of RH1 332 fill of pit 331	5	Two plain non-joining sherds with another fragment of rim. Rim is straight, rounded edges to a flat top. Joining lines visible on interior. The thick sherd is probably part of a rounded base. **LBA?** Av thickness 18.2 mm, Wt 82.4 g	180 mm, c. 11% present	C-VC	Predominantly quartz rock	✓	Smoothed and wiped exterior, moulding marks and 14C	
Vessel 37	148	RH2 942 post pipe of posthole 941	1	Straight plain rim with slight bevel to interior. Possible moulding lines visible. Grits show through surface. **BA** Av thickness 10.8 mm, Wt 24.1 g	c. 220 mm, 5% present	C	Includes dolerite and unidentified grey mineral	✓	Exerior surface abraded but possibly smoothed, 14C deposits internally	
Vessel 38	173	RH2 1091 fill of posthole 1090	2	Conjoined rims, slightly inturned with slight bulge to interior. Moulding of rim shown on interior. Some loss of exterior surface and surface cracking. **LBA?** Av thickness 15.6 mm. Wt 96.1 g	c.240 mm. 8% present	VC	Unidentified grey mineral	✓	Smoothed or wiped, with 14C deposits	
Vessel 39	261	RH4 1481 burnt post residue in posthole 1480	3	Non-joining rim of SF 260. Rim is straight to a barrel shaped vessel. The rim has an internal bevel up to 16 mm deep but is very poorly moulded, simply folded over and not finished from the rim top. The rim is also unevenly moulded and its diameter is approximate. Heavily gritted with grits protruding through its surface. **LBA** Av thickness 12.8 mm, 169 g	c. 220 mm c. 10 %	C-VC	Grey mineral and psammite	✓	Good 14C deposits, sooted and plentiful moulding marks	

Vessel Nr	SFNr/ Sample	Context	Total Nr pieces	Description of rims, bases and decorated sherds	Average Diameter mm	Grain size	Stone/ Mineral	Organic matter	Description of finishing & use	Image
Vessel 40	231	RH5 1392 fill of ring ditch 1391	1	Straight to slightly inturned flat topped and plain rim, which bulges to the interior. Top of the rim is c.12 mm wide. **BA?** Av thickness 8.8 mm, Wt 18.3 g	c. 220 mm, c. 5% present	C	Includes dolerite, quartz sand and unidentified other minerals	✓	Finger moulding, wipe marks and 14C deposits	
Vessel 41	227	RH6 1344 fill of pit 1343	4	Rim is a heavily gritted piece. A straight-sided vessel with a fairly sharp uneven rim edge and an uneven bevel c. 15.3 mm wide to the interior. The rim join is visible on the interior. The vessel may have been made gritty, as it has a gritty surface - cooking pot. Two smaller pieces are likely the same vessel as the rim, the other body sherd is smoother and from a separate vessel. **L BA**? (see SF 215) Av thickness 10.5, Wt 65.1 g	c. 260 mm, c. 6% present	C	Psammite and other grey minerals	✓	Grass marks, much finger moulding and 14C deposit	
Vessel 42	207	RH6 1346 fill of posthole 1345	5	The rims (non-joining) are probably all from the same vessel but vary because their moulding is uneven. The largest piece has rounded rim edges and its top is flattish. One rim is bevelled and 12.8 mm wide, others are c. 16 mm wide. Moulding marks below the large rim is especially noted, and on the interior of another rim sherd. Grits show through the surfaces. **LBA?** Av thickness 9.5 mm, Wt 92.5 g	c. 240 mm, c. 14.5% present	C-VC	Psammite and other grey minerals, some quartz	✓	Moulding marks, grass marks and 14C deposits	
Vessel 43	229	South of PG13 1468 fill of pit 1466	10	Slightly everted rim with much moulding below it, and most of the interior bevel c. 14.2 mm wide has been lost. The sherds are visibly gritted. No surviving base, but curved sherds suggest the lower portion of the vessel was slightly bulbous. Two curved pieces from near the base join. **LBA** Av thickness 9.3-12.3 mm, Wt 164.8 g	c. 240 mm, c. 10% present	C-VC	Predominantly rock quartz with broken pebbles of feldspar	✓	Rim has smoothed surface and good 14C deposits. Moulding marks and grass marks, some loss of temper noted on surface	
Vessel 44	215	RH6 1486 deposit within stone setting 1489	28	Straight rim with an internal bevel c. 12.3 mm wide. Poorly moulded and uneven the rim coil had been turned over to the inside and poorly joined. **LBA.** Body sherds are coarsely formed with grits protruding through the surface. (see SF 277) Av thickness 10 mm, Wt 324.5 g	c.240 mm, c. 4% present	C-VC	Psammite, diorite and other grey minerals	✓	Finishing has been mostly lost, but smoothing, 14C deposits, moulding marks and some grass marks are present	
Vessel 45	249	RH6 1486 final infill of pit 1436	113	Flat base sherds, two pieces join but sherds are very fragmented and distorted. Rim sherds are small and non-joining and indicate a flat/slightly bevelled rim with rounded edges, with a straight neck. Rim irregularly moulded. The bodys sherds are highly fractured and laminated due to large size of temper. **Later BA** Av thickness 8.8-16.3 g, Wt 694 g	Base c. 180 mm, c. 25%, rim c. 220 mm, c. 17.5% present	M-VC	Predominantly large pieces of quartz with some grey mineral	✓	Smoothed, finger moulding and 14C deposits	No image
Artefact	214	RH5 1388 fill of posthole 1387	1	Finely made pottery with little noticeable temper. This tapering wedge-shaped piece has lost both ends but is worn smooth on its largest surface and its adjoining sides. There are fine scratches on one side and surface. The fabric is slightly corky. A possible **handle or tool? BA?** Length 33 mm, width 27.5 mm, average thickness 21.5 mm, Wt 16.2 g.		F	Includes some sand	✓	Smoothed	

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