4 FINDS AND ENVIRONMENTAL EVIDENCE

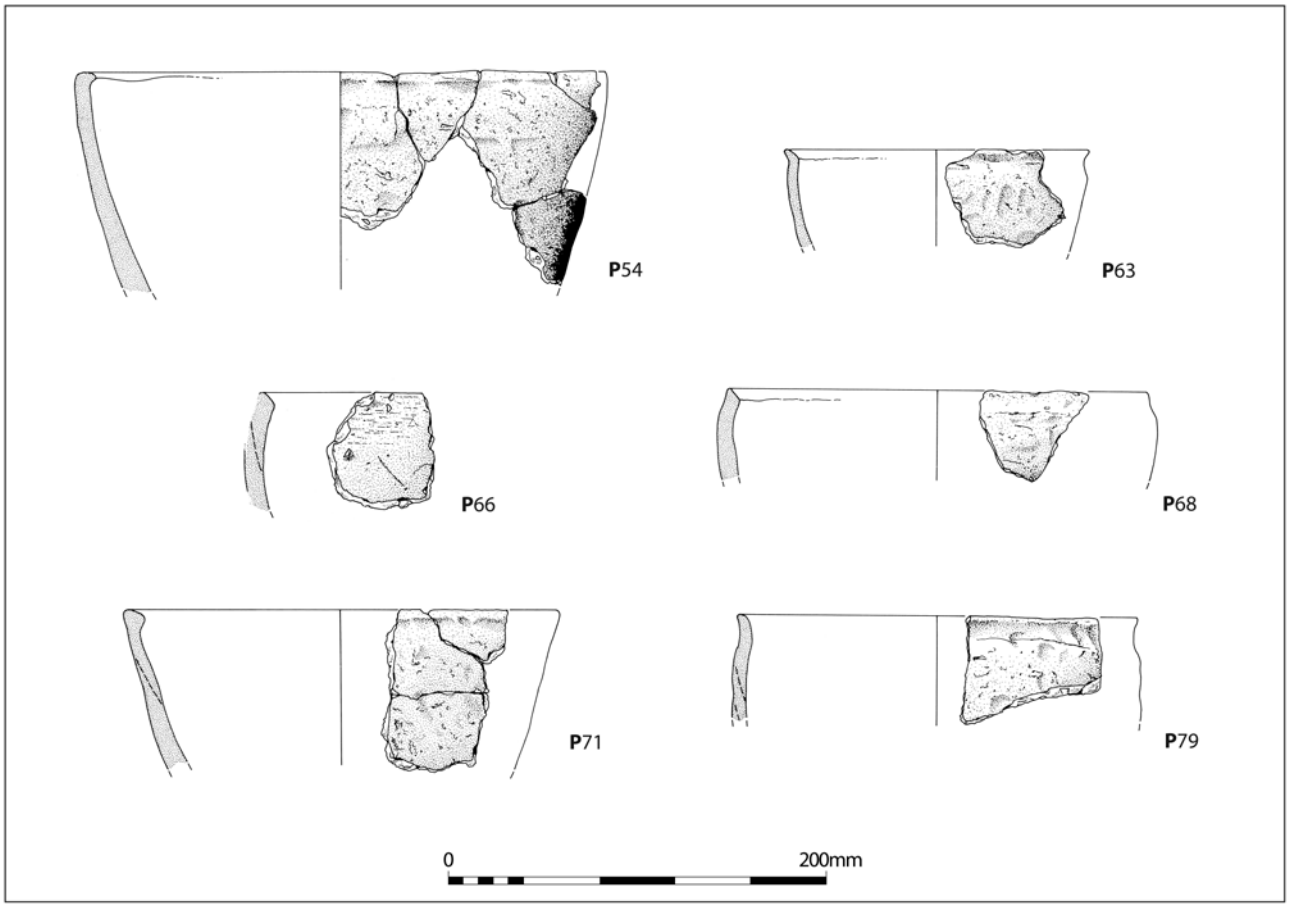
4.1 Prehistoric pottery, by Melanie Johnson

Nine hundred and twenty-one sherds of handmade prehistoric pottery, weighing 18.420kg, were recovered from 31 stratified contexts and during surface cleaning of features, in the latter case a small quantity. The sherds were sorted into sherd families and catalogued according to dimensions, fabric, surface finish, decoration and morphology. A minimum of 111 individual vessels are represented, some of them by only one sherd. The average sherd weight is high, at 20g, which would indicate that the assemblage is in fairly good condition, and this is borne out to some extent as some substantial sherds survive. However, few of the pots have substantial portions of their profiles surviving and the average sherd weight is probably skewed by a small number of very thick and heavy vessels. A full catalogue has been prepared for the site archive.

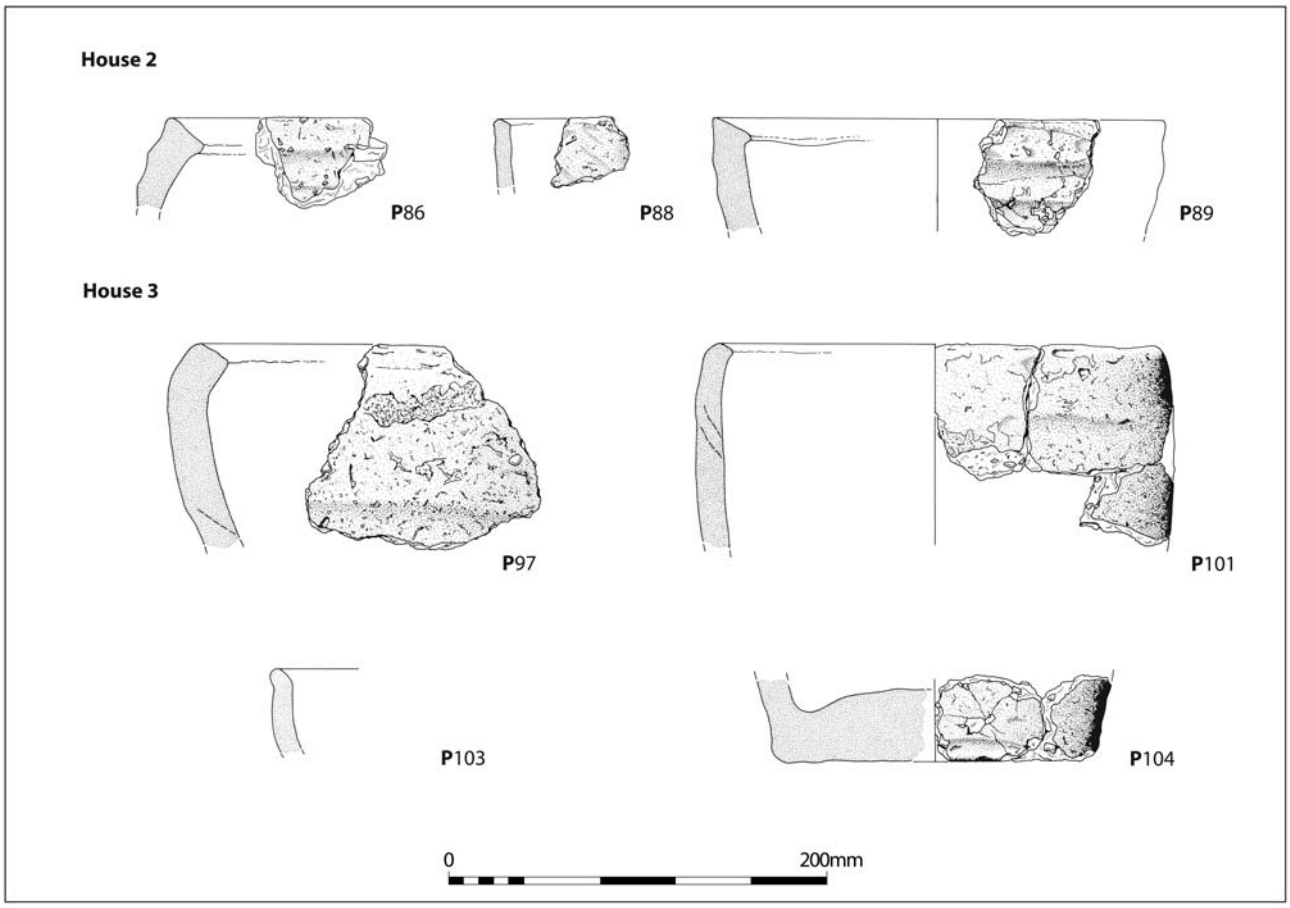
House 1 (illus 13)

3.584kg of pottery was recovered from 12 different contexts. The majority of the pottery (minimum 22 vessels; 3.034kg) was recovered from the fills of the ring-ditch, with a small quantity (0.55kg) from pits and other features associated with the building. One rim sherd was recovered from context 11033, a feature which was radiocarbon dated (see below).

Overall, the assemblage is in fairly good condition, although a number of the vessels have suffered some abrasion and one appeared to have been burnt. Many of the vessels displayed sooting on the surfaces. The fabrics are generally coarse, with rock and sand inclusions; these were identified as primarily quartz (white grains), mica (both as plates or as very fine fragments), and a black and white granular rock (possibly granite). The vessels were in general very heavily gritted, with up to 30% inclusions. Within the fabrics, there tended to be a higher quantity of



Illus 13 Pottery from House 1



Illus 14 Pottery from Houses 2 and 3

sand and small particles of mica supplemented by smaller quantities of small stones. Surfaces were generally smoothed, though some evidence of wiping and finger marking was recorded.

A variety of firing conditions are indicated by the range of colours (orange, brown, grey) of both the surfaces and cores, most likely in an open fire or simple clamp kiln. Only one vessel displayed any evidence of production technique, a laminar fracture on P66 indicating coil construction.

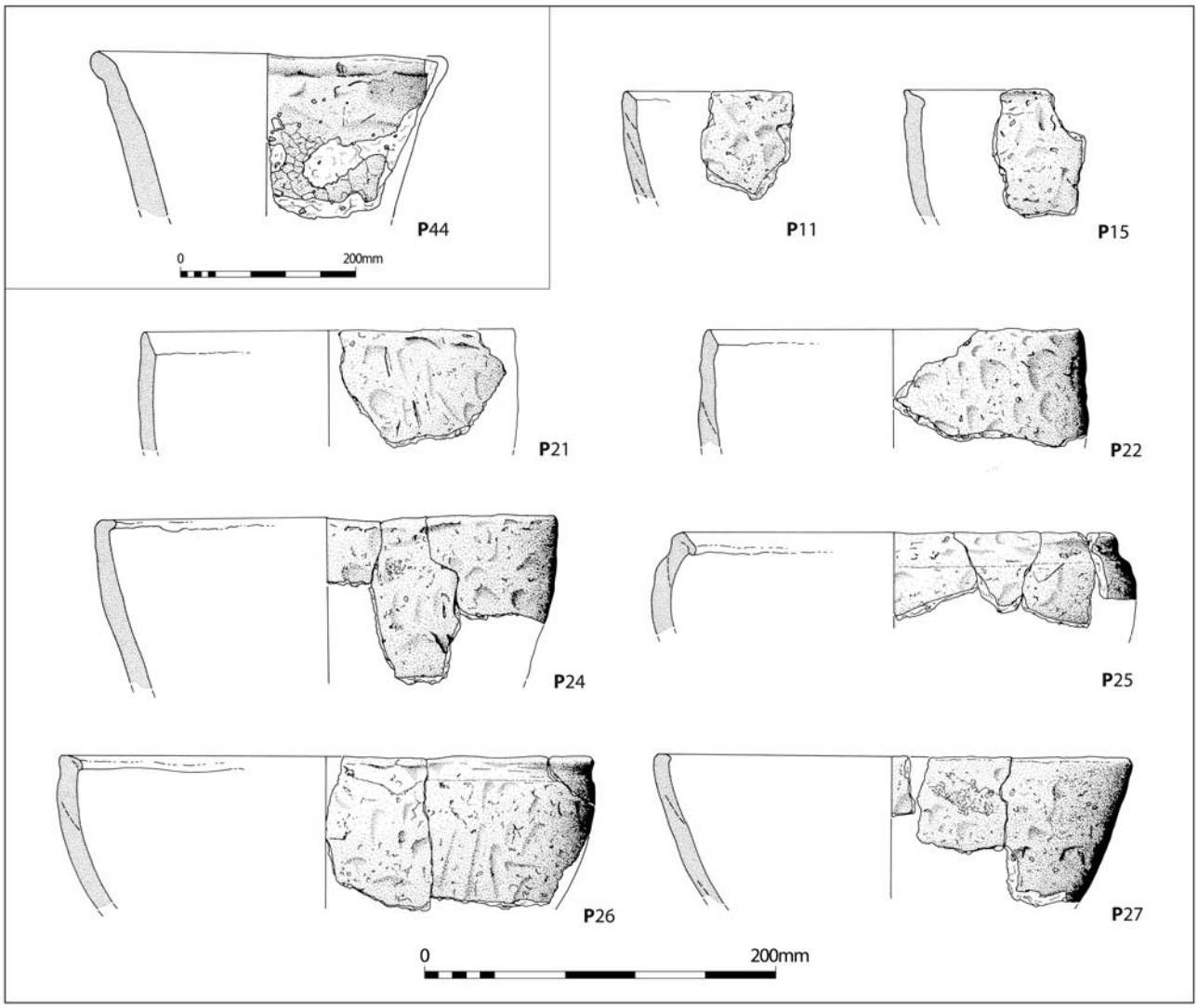
Twenty examples of rims were recorded. These included slightly barrel-shaped vessels with internally bevelled rims (eg P66, P68), upright flat-topped rims (eg P54, P71), upright rounded rims, short everted rims (eg P63, P79) and a single example of a tapered, rounded rim. Measurable diameters ranged between 160mm and 280mm. Seven examples of bases were recovered and these were generally either flat or slightly footed, with four measurable diameters ranging between 90mm and 160mm. Vessel walls are 5–13mm thick, with two base plates measuring 15–17mm thick. There was no discernible morphological difference between vessels found in different contexts within the structure.

House 2 (illus 14)

The assemblage from this building is the smallest of the three, weighing only 343g and comprising nine individual vessels. Pottery was recovered from eight different contexts: the fills of each segment of the ring-ditch (including 10031, P89) and secondary ditch (10024, P88), two pits (10010, P86; 10058) and an area of burning (10047). All of these contexts produced only 1–3 sherds each, with the largest quantity recovered from ditch fill 10031 (122g).

The assemblage had suffered some abrasion, and four of the vessels had slight sooting on their interior surfaces. The fabrics are generally hard and coarse, with on average a lower proportion of inclusions than pottery from the other buildings: these were recorded as being generally 2–3% of sand and small stones, with some stone up to 20mm across recorded. A variety of firing conditions are indicated by the range of colours (orange, brown, grey) of both the surfaces and cores, most likely in an open fire or simple clamp kiln.

Four diagnostic vessels were recorded. These included two rim sherds with internal bevels (eg P88) and two rims (P86, P89) of a type which were not replicated elsewhere in the site assemblage.



Illus 15 Pottery from other features

These were both very thick with a slight internal bevel: one (P86) had a ridge/cordon (triangular profile) on the exterior just below the rim while the other (P89) had an overhanging lip on the interior and two gentle ridges on the exterior just below the rim. Only one diameter, P89, was measurable at 300mm. Surfaces were smoothed and wall thickness ranged between 6mm and 16mm.

House 3 (illus 14)

Pottery was only recovered from four contexts associated with this roundhouse, the vast majority from the fill of the ring-ditch (4.529kg). Most of this was found in the upper fill (17003), with only undiagnostic body sherds from the basal fill (17008). Two pits (17016, 17037) in the centre of the roundhouse contained only undiagnostic body sherds.

The sherds had all undergone some degree of abrasion but were otherwise in relatively good condition. Some body sherds from 17003, 17008 and 17016 appeared to have been burnt. The pottery from this structure is coarser and more poorly finished than that from the other buildings. The fabrics were generally hard and coarse, containing up to 20% sand and small stone inclusions; stones up to 15mm were recorded. P104, a base, contained inclusions of a dark grey stone not seen in any of the other pottery from the site. Surfaces were generally smoothed, with some finger marking present, though some of the base sherds were more roughly finished. A variety of firing conditions are indicated by the range of colours (orange, brown, grey) of both the surfaces and cores, most likely in an open fire or simple clamp kiln. Only one vessel, P106, displayed evidence for manufacture in the form of laminar fracture.

Nine diagnostic vessels were recovered from the upper fill of the ring-ditch (17003). These comprised three bases (eg P104) and six rims (eg P97, P101, P103). One of the bases (P104) was an extremely

thick and heavy example from a very large pot, base diameter 170mm. The diameters of the other bases were not measurable.

Three of the rims were flat-topped (eg P101), one had a slight internal bevel and P103 had an internal bevel with a slight neck on the exterior. P97 was a more unusual form, comprising a thick, heavy inturning rim from a very large pot. Where the shape of the vessels was discernible they were barrel-shaped. Only the diameter of P101 was measurable, at 240mm. Vessel walls ranged from 8mm to 18mm thick, with base plates measuring up to 30mm thick (P104).

Feature Group 1 (illus 15)

A large quantity of pottery was recovered from the fill of ditch 029 (8.208kg), including 39 diagnostic vessels, the majority of which were rim sherds, although base sherds were also represented. Undiagnostic body sherds weighed 5.603kg. The bases comprised both flat and footed types, ranging in diameter from 120 to 200mm. The rim forms included both upright flat-topped rims (eg P24, P27) and upright rounded rims, but the majority had internal bevels on upright rims (eg P11, P15, P21–22), with some suggestion of barrel-shaped vessels; there was some variety in the angle of the internal bevel, and several had a slight overhanging lip on the interior, while some were slightly everted in profile (eg P15). Two vessels had slight necks and globular bodies, and slight internal bevels producing an overhanging lip (P25–26). Measurable diameters ranged from 140mm to 360mm. Vessel walls ranged from 6mm to 17mm thick, with base plates measuring up to 20mm thick.

Many of the sherds had suffered some degree of abrasion, and most had slight sooting on one or other of the surfaces. There were no discernible differences in fabric or surface finish between the sherds from these features and those from the structures, following generally the same pattern of coarse, heavily gritted fabrics with smoothed surfaces. The same range was also present in the fabric colours.

Feature Group 2

Pit 041 contained a rim sherd (P44; illus 15). This was a thick, heavy rim, diameter 400mm, slightly flared, with a bevel and an outer lip which had been folded over to give a slight everted appearance. Pits 033, 035 and 039 yielded only undiagnostic body sherds.

Pit 006

Pit 006 yielded body and simple flat base sherds from four vessels, with diameters of 110mm and 140mm.

Discussion

The assemblage is made up of heavily gritted coarse pottery, all undecorated, and comprising rims that are flat, rounded, short everted or internally bevelled, with only two rims displaying ridges or cordons below the rim on the exterior. The sherds tend to be quite thick-walled, and the vessels are generally either bowl or barrel-shaped, with upright or inturning rims, or more globular bodies. This type of pottery is often referred to as Flat-rimmed Ware and is a rather ill-defined ware common throughout Scotland in the Late Bronze Age.

Some slight differences appear to exist between pottery fabrics recovered from Houses 1–3. For example, House 3 produced pottery which was coarser and more poorly finished than that from the other two, while that from House 2 generally contained fewer and smaller inclusions. However, the general morphology of the pots does not suggest any major differences between the structures, although the pottery from House 2 contained the only examples of external ridges or cordons while House 3 had examples of unusually large and heavy pots (P104 and P97). These differences could be chronological, functional or relate to the procurement of raw materials from different sources or the manufacture of pots by different people.

Three significant concentrations of pottery were found. The largest number of individual vessels and the greatest weight of sherds were recovered from the fill (002) of curvilinear ditch (029) in Feature Group 1. The second largest concentration was context 17003, the ring-ditch fill of House 3, and the third was context 11005, the ring-ditch fill of House 1. House 2 produced very little pottery in comparison with the other two roundhouses. Pits and other associated features lying within the roundhouses produced very little pottery overall. This distribution suggests that specific depositional practices were occurring either during the structures' periods of use or following their abandonment. The large quantities of pottery found in the infill of the ring-ditches, particularly the upper fills, suggests this material was not deposited during the primary occupation of the roundhouses but may relate to the final stages of occupation within the roundhouses or have been deposited following their abandonment. The function of ditch 029 is not clear; the large quantity and variety of pottery recovered from it does suggest its use as a rubbish pit, but the majority of the vessels are represented by just a few sherds each, begging the question of where the remainder of these broken vessels has ended up.

The site has been radiocarbon-dated broadly to the Middle/Late Bronze Age, a date which accords well with the characteristics of the pottery assemblage. Very good parallels for both the fabrics and the morphology of the vessels are provided by the excavations at Forest Road, Kintore (MacSween 2008, 189), which by comparison produced very little later prehistoric pottery. Alexander (2000,

47) commented that there was very little published local material with which to compare Aberdeenshire assemblages. Forest Road, Kintore produced flat and internally bevelled rims on thick-walled bucket-shaped vessels and also had examples of external ridges or cordons below the rims. Other Aberdeenshire ring-ditch houses have also provided small assemblages of comparative material. At Deer's Den, Kintore, Aberdeenshire (Alexander 2000), ring-ditch houses dating to the Middle and Late Bronze Age (spanning 1600–700 cal BC) produced bucket- and barrel-shaped vessels with flat bases and closed mouths, their rims including plain flat rims and short everted rims with internal bevels. At Ednie, near Peterhead (Strachan & Dunwell 2003), the second millennium BC Structures 2 and 4 produced pottery with forms and fabrics very similar to Oldmeldrum, including plain inturning, flat and internally bevelled rims. The very much smaller, and possibly later, assemblage at Wardend of Durris (Russell-White 1995) also produced flat and inturning rims.

There are parallels for this period elsewhere in Scotland, for example Green Knowe in Peeblesshire (Jobey 1980) and Lintshie Gutter, Lanarkshire (Terry 1995); this latter site in particular provides good parallels for the ridged exteriors and dates slightly earlier than Oldmeldrum, to the first half of the second millennium BC. These sites do not appear to have the proportions of internal bevelled rims which are common on the Aberdeenshire sites, so there is likely to be some regional or chronological refinement within the larger group of 'Flat-rimmed Ware' or later Bronze Age domestic ware.

4.2 Fired clay, by Melanie Johnson

A small assemblage of fired clay (271g) was recovered from three different contexts. A few amorphous fragments (35g) were recovered from context 002, the fill of a curved ditch (029) in Feature Group 1. As a large proportion of the pottery was also recovered from this feature, these fragments may be very abraded pottery sherds.

The remainder of the assemblage was recovered from contexts associated with House 2. The majority (168g) came from context 10032, a lower ring-ditch fill, and comprised fragments of what may be a possible crucible or piece of kiln lining up to 35mm thick. The material was overfired/slightly vitrified with a red-brown interior, although it lacked an internal face, and a black outer surface with cracks in it. The fabric was coarse, hard and gritty, with some large stones up to 20mm.

The pieces (68g) from context 10040, a basal ring-ditch fill, comprised amorphous pieces of fired clay containing large stones and unfired mud. The fragments had no surviving surfaces, and were orange with a dark grey core. The material was poorly fired, soft and friable. This material may represent the waste from an accidental firing or pieces of hearth lining.

The assemblage is small and does not contain any significant, identifiable pieces to allow interpretations of its origin and function. The material is also unlikely to be in situ but instead has probably been re-deposited as rubbish.

4.3 The lithic assemblage, by Torben Bjarke Ballin

Ninety-eight lithic artefacts were recovered. The lithic assemblage is predominantly in flint (71 pieces), but with a substantial proportion of the finds being in quartz (24 pieces). One piece is in chalcedony, one is quartzite and one probably shale. Although there were four main groups of flint, all were derived from regionally available resources (obtained within 10–50km of the site), such as the Buchan Ridge Gravels near Peterhead and the North Sea shores. The quartz was all procured from the same (probably local) outcrop, or at least from outcrops in the same limited geological area. Chalcedony is particularly associated with igneous rocks (Pellant 1992, 88), and occasional occurrences are known throughout Aberdeenshire (Stephenson & Gould 1995). Quartzite is quite common in the north-east, from immediately north of Oldmeldrum to Fraserburgh (Woodland 1979). Shale does not outcrop in the vicinity of the Oldmeldrum site, and it is quite possible that this material was imported from sources outwith north-east Scotland.

Approximately one third of the flint and quartz assemblages had been exposed to fire. The affected flint has generally been burnt white, and these pieces are in most cases severely crazed. The burnt quartz varies from slightly 'granulated' to advanced stages of disintegration. Approximately 90% of the burnt pieces were recovered from contexts within Houses 1 to 3.

Forty-one pieces of flint debitage were recovered from the site. They include 33 flakes, 4 blades, 2 indeterminate pieces and 2 platform rejuvenation flakes. The flakes and blades probably represent two different technological approaches, with two of the blades having been detached by the application of soft percussion, whereas all definable flakes were detached either by hard percussion or bipolar technique.

The blanks are dominated by corticated pieces (primary and secondary pieces), and with 15%, the group 'primary pieces' is quite numerous. Only 34% of the blanks are inner, or tertiary, pieces. The proportions differ somewhat between flakes and blades, as one third of the flakes are tertiary specimens, whereas two thirds of the blades belong to this category. Preparation flakes are few in number, and only two platform rejuvenation flakes were recovered. They are of approximately the same size, with average dimensions of 20 × 20 × 5mm. One side-/end-scraper was manufactured on a core tablet.

Only four flint cores were retrieved from the site: one core with two platforms at an angle (illus 16, No. 1), one irregular core, and two bipolar cores (illus 16, No. 2).

Twenty-six flint tools were retrieved. Simple edge-retouched pieces dominate the category (50%), although scrapers are almost as prolific (nine pieces or 35%). The 26 tools correspond to a very high tool ratio of 37%, possibly due to the finds' being largely hand-collected rather than retrieved by systematic sieving.

The nine scrapers include two short end-scrapers, two side-scrapers, three side-/end-scrapers, one concave scraper, and one scraper-edge fragment. One side-scraper (illus 16, No. 3) is a broad hard-hammer flake (22 × 30 × 7mm) with a convex, relatively acute scraper-edge along its distal edge. It is clearly a highly expedient piece. A burnt side-/end-scraper (illus 16, No. 4) is based on a small, irregular hard-hammer flake (18 × 15 × 8mm). Only one concave scraper was recovered (illus 16, No. 5). This piece is based on an indeterminate flake (24 × 16 × 4mm), and it has a concave, steep scraper-edge along its right lateral side. The working-edge was formed by retouch from the dorsal face, and it has sporadic blunting along its opposite lateral edge. The proximal end has broken off, and the tool is clearly an expedient piece.

Other tool forms include one piercer, one piece with double truncations, and two notched pieces. The latter includes a very small, thin hard-hammer flake (20 × 17 × 5mm), with a diminutive lateral notch (chord 2–3mm) (illus 16, No. 6) and the fragment of a much larger, thicker hard-hammer flake (49 × 36 × 19mm), with a broad proximal notch (chord 17mm) (illus 16, No. 7).

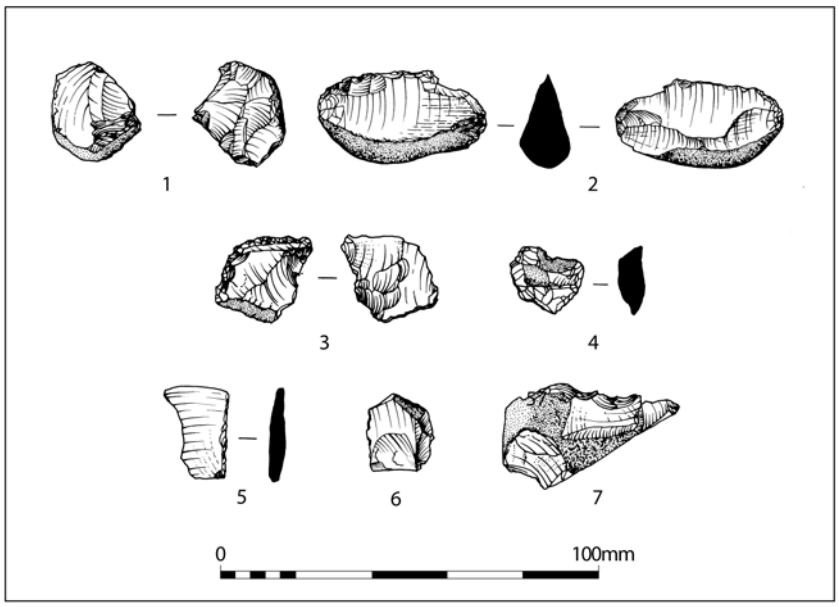
The quartz assemblage primarily consists of debitage (23 pieces), supplemented by one tool, a side-scraper. The debitage category embraces two chips, 12 flakes, and nine indeterminate pieces. The 12 flakes include three hard-hammer flakes, two indeterminate (probably hard-hammer) platform flakes, four bipolar flakes, and three indeterminate flakes.

Three objects in other raw materials than flint and quartz were also retrieved: a small microblade (18 × 6 × 3mm) in chalcedony with retouch at the central parts of both lateral sides; a chunky indeterminate piece in quartzite (57 × 29 × 25mm) which may have been used as a hammerstone; an indeterminate fragment of a finely foliated piece of sedimentary rock, probably shale (30 × 17 × 11mm), with no definite signs of modification, but it may be production waste from the formation of a shale artefact.

The assemblage is likely to represent material from at least two prehistoric industries, one dating to the early prehistoric period (probably Neolithic) and one to the late prehistoric period (probably Late Bronze Age).

The early prehistoric sub-assemblage

This assemblage represents a blade industry, aiming at producing so-called macro-blades (W > 8mm). The average dimensions of these blanks are 34 × 15 × 5mm, and the blades are generally well-executed, robust pieces. They were manufactured by the application of soft percussion. The production of regular blades would have required initial decortication of the parent cores, and – although crested pieces were not recovered – probably the formation of guide ridges. The distinct curvature of one piece suggests that these cores would have been conical, or sub-conical, single-platform cores. Two core tablets were



Illus 16 Lithics

Table 1 Distribution of securely (typo-technologically) dated early and late lithic elements

Feature	Early prehistoric assemblage	Late prehistoric assemblage
House 1	truncated piece; blade	side-/end-scraper; notched flake
House 2	blade	side-scraper
House 3	side-scraper; platform rejuv flake; side-/end-scraper	piercer; concave scraper; multi-platform core
Feature Group 1		end-scraper; scraper-edge; multi-platform core
Feature Group 2	blade	

recovered, as well as one scraper on a core tablet, indicating that careful maintenance of the striking platforms was carried out between the production of the individual blade series.

Although this industry aimed at manufacturing blade implements, like for example side-scrapers, other blanks were also used in the production of tools, such as core tablets, and ordinary flakes from either the decortication of blade cores or from simple flake cores. Most of the implements were modified by the application of plain edge-retouch, but the distal working-edge of one side-/end-scraper is exceedingly regular and must have been shaped by the application of pressure technique. No bifacial tools were found.

It is uncertain whether the modified chalcedony microblade dates to the Mesolithic period or whether it may be an unusually narrow Neolithic blank, thus forming part of the assemblage characterised above.

The late prehistoric sub-assemblage

This assemblage represents a flake industry, aiming at producing expedient flakes. It is not possible to put forward measurements for these blanks, as the unsystematically produced decortication flakes of the above industry cannot be separated from the main blanks of this industry. Late Bronze Age debitage is described and discussed in Ballin (2002), and the attributes of LBA flakes correspond to the attributes of the simpler waste (eg decortication) flakes from most other periods: squat, frequently hinged, flakes with a high degree of cortication, pronounced – occasionally multiple – bulbs, and many corticated, usually untrimmed platforms (see also Young & Humphrey 1999).

The presence of this industry is mainly evidenced through its modified pieces, and the selection of poor-quality flakes for tools. Based on the choice of blank, in conjunction with generally expedient execution, the following implements are thought to be products of this industry: one end-scraper, one side-scraper, one side-/end-scraper, one scraper-edge fragment, one concave scraper, one piercer, two notched pieces, and most pieces with edge-retouch.

The operational schema of the Late Bronze Age is generally unsystematic, including no core preparation, and most later prehistoric cores are simple platform cores, or irregular multi-platform cores. Most of the bipolar cores, flakes and tools are thought to belong to this sub-assemblage.

Due to the way quartz fractures (Ballin 2009), it is not possible to say whether the quartz belongs to one or the other of the two sub-assemblages, but it is known that Later Bronze Age industries tended to be less critical in their selection of lithic raw materials (cf Ballin forthcoming).

Distribution

Table 1 gives an overview of the distribution of the artefacts. As it is not absolutely certain whether the edge-retouched pieces and the bipolar flakes belong to one or the other assemblage, they have been excluded from the table.

This suggests that the early and late elements may be mixed throughout the site, and that it may not be possible to separate the two assemblages. Several contexts contain lithics from both periods, such as the House 1 entrance area, and the House 3 ring-ditch fill (17003).

As the roundhouses are dated to the Middle/Late Bronze Age, all early prehistoric pieces are obviously residual, whilst the typical late artefacts in the ditch fill of Houses 2 (10024) and 3 (17003), as well as Feature Group 1 (002), are likely to be broadly contemporary with the excavated features.

4.4 Coarse stone, by Adam Jackson

A small coarse stone assemblage was recovered but the artefacts were unfortunately stolen before they could be studied in detail. The items comprised a large natural boulder that had been used as a grinding platform; a worked slate disc, from the fill (002) of the curvilinear ditch in Feature Group 1, which was probably used as a pot lid; and a weight. The latter find was recovered from context 10024, the fill of a ditch associated with the second phase of House 2. Perforated stones are commonly found on sites of all periods. The majority are of rough asymmetrical form with central drilled perforation. However, the example from House 2

Table 2 Distribution of vitrified material from the site

Structure	Area	Burnt earth (g)	Vitrified amalgam (g)
House 1	North-west quadrant	224.7	8.5
	North-east quadrant	7.7	0
	South-east quadrant	310.4	0
	South-west quadrant	94.4	2.9
	Entrance	58.5	144.9
	Location unknown	120.3	0
House 3	Quadrant 2	0	2.1
–	Feature Group 2 (034)	119.2	0
Total quantity		**935.2**	**158.4**

took a very unusual form, being carefully worked, elongated and highly symmetrical. At one end there was a rounded terminal and at the other, wider end, a perforation with an hourglass section formed by drilling from both sides. Just below the perforation a shallow groove ran around the circumference to form a neck. The object was broken at the perforation, probably in antiquity. The function of this object is uncertain but perforated stones of cruder form from domestic contexts are commonly described as loom weights, and this object could have served a similar purpose. However, the time and energy that was invested in its manufacture was beyond what was required to create such a purely utilitarian item, indicating that the object had some other and/or additional significance.

4.5 The vitrified material, by Dawn McLaren

1.09kg of burnt and vitrified material was visually examined, allowing it to be broadly categorised using standard terminology (eg McDonnell 1994; Spearman 1997; Starley 2000). Categorisation is based on criteria of morphology, density, colour and vesicularity.

There was no evidence of metalworking residue.

All burnt material from the site was fragmentary and had been formed during a high-temperature pyrotechnic process, perhaps in a domestic hearth. It was formed due to the exposure of intense heat on soil resulting in the formation of amorphous amalgams of burnt earth, sand and stones and in some cases, perhaps where the heat was more intense, a vitrified amalgam composed of a light, porous material.

Table 2 shows the distribution of this material. The majority of the assemblage was recovered from House 1. One fragment was recovered from the fill of a pit (034) in Feature Group 2, and another single fragment came from the fill of the central hollow within House 3 (17003).

The vitrified material was recovered throughout the deposits associated with House 1, with the largest concentrations of material coming from the north-east quadrant surrounding the off-centre hearth and from the fill of the ring-ditch on the east side of the roundhouse, associated with lenses of burning. It is likely that most, if not all, of this material was formed during high-temperature activities relating to the use of the central hearth, and represents a loose spread of re-deposited hearth material.

4.6 Bone remains, by Jennifer Thoms

Ninety-six fragments of burnt bone were retrieved from seven contexts. All were small (30mm or less in diameter) and in poor condition. None could be identified to skeletal element or species. Most came from contexts within House 1, the majority from the fill of the ditch on the east side of the roundhouse (11005). The House 2 ring-ditch fill (10007) produced only two fragments of bone, and no bone was retrieved during the excavation of House 3. The faunal remains appear to represent burnt domestic refuse, possibly deposited as ash and cinders around the site. Soil conditions did not favour the preservation of unburnt bone.

4.7 Charred plant remains, by Mhairi Hastie

Of 96 bulk soil samples taken from the fills of pits and ditches for palaeoenvironmental analysis, 67 contained carbonised cereal grains, seeds of wild taxa and fragments of hazelnut shell. The plant remains varied in preservation, with occasional assemblages of well-preserved cereal grains being recovered, although the majority of the plant remains were highly abraded. The quantity of macroplant remains recovered was generally low and the diversity of the plant remains limited.

Naked barley dominated the samples, although four grains of possible hulled barley were also present, suggesting the possible cultivation of hulled barley in small amounts. Naked barley is typical of the Bronze Age, but the recovery of hulled barley from Bronze Age deposits is unusual. Previous

evidence from mainland Scotland suggests that hulled barley replaced the naked variety during the Iron Age. Unlike the free-threshing naked variety, where the outer hulls are loosely adhered to the kernel, the hulls of the grain are more difficult to remove and require more processing. Nevertheless, the grains are higher in energy than the naked variety. The presence of a small quantity of possible hulled barley at Oldmeldrum may therefore indicate that this variety was already being cultivated in small amounts in this area from the Late Bronze Age, possibly for specific purposes such as brewing. Occasional oat grains were also recovered. It was not possible to identify the oat grains to species level because of poor preservation. Oat only became common in Scotland during the post-Roman period and there is no evidence to suggest that oat was being cultivated during the Bronze Age period. It is likely, therefore, that the grains are of the wild variety, *Avena fatua*.

Seeds of wild taxa were recovered from most samples. The wild taxa are similar in composition to numerous other Scottish prehistoric assemblages and include:

Segetal component:	mix of seeds brought to the site along with the harvested crops;
Ruderal component:	taxa indicative of more disturbed ground probably growing around the edges of the settlement;
Heath and damp loving species:	occasional heath species likely brought to the site with turf to be used as building material or fuel.

Fat hen, chickweed and corn spurrey are all common weeds of agricultural land and are frequently recovered along with the carbonised cereal assemblages from many Scottish archaeological sites from prehistoric and later periods. They would have been accidentally incorporated with the barley crop during the harvest. The weed seeds would have then been sieved and winnowed from the main crop and either discarded onto middens or thrown on the domestic fire.

Large concentrations of charcoal recovered from across the whole of the excavated area indicate that the main source of fuel was undoubtedly wood. However, the presence of a ruderal seed component along with other damp ground/heathland species and occasional fragments of monocotyledon rhizomes does suggest that turf was also being collected, most likely as a secondary source of fuel or for turf walls that no longer survive. The turfs may have been specifically collected to dampen the domestic fire prior to food processing or cooking (Miller et al 2000).

Ruderal seeds, for example dock, could have also been growing around the settlement site on nitrogen-rich ground such as middens or near to animal pens. The seeds from these plants would have been distributed around the settlement area on clothing and shoes of the inhabitants and charred accidentally.

Fragments of barley rachis (chaff) were recovered from House 2 post-hole fill 10063 and House 3 ring-ditch fill 17003. Chaff, produced during the threshing of the grain, is rarely recovered from Scottish archaeological sites and this may be a consequence of discard methods, the chaff being either ploughed back into the fields as manure or used as fodder rather than being burnt (Reynolds 1981). The presence of, albeit small, quantities of chaff alongside the grain at Oldmeldrum could suggest that crop processing was being carried out at the settlement site.

There is a general uniformity to the quantity and diversity of plant remains recovered throughout most features, including roundhouse ditch fills, post-hole fills and pit fills. No floor deposits survived. Only two concentrations of plant remains are apparent (see further below).

Most of the charred grain and other plant remains do not relate to the original function of the feature from which they were recovered; the material is more likely to have become incorporated into the fill of these features during deliberate or natural infilling. The presence of carbonised grain throughout numerous different features and deposits, particularly associated with the roundhouse structures, suggests that at least some small burning events were occurring. Vitrified material, most likely formed during the everyday use of the hearths within the roundhouse structures, was also spread throughout many different contexts with a similar general spread to the plant remains (McLaren, above). These burning events were probably associated with daily activities such as small-scale processing of grain on the domestic hearth or spillage of grain directly into the fire or via floor sweepings. The burnt material would then have been mixed with other sediments to create a relatively homogenous background level of grain.

Of note is the recovery of a small assemblage of cultivated flax seeds from the upper ring-ditch fill and two post-holes (11027, 11051) associated with House 1. Flax seeds were not recovered from any other features or roundhouse structures and this spatial distribution would seem to suggest that processing of the seeds was being carried out only in House 1. Flax was probably grown for both the fibres for linen and for the production of linseed oil. Production of either does not involve fire and it is rare for concentrations of the seeds to be recovered from dry-land archaeological contexts. Because they are charred, the seeds recovered here are likely to be the remnants of seeds collected for culinary purposes.

Concentrations of charred cereal grain

Two discrete, large concentrations of carbonised grain were recovered from the rear of House 2,

within the fill of a post-hole (10035) and the fill of an adjacent ditch (10033). The grains were generally well preserved, unlike the majority of plant remains spread across the rest of the excavated area, and this suggests that the charred grain had undergone little movement. There is no evidence that would suggest that House 2 had burnt down, but it seems likely that the charred grain must, in some way, have been related to the roundhouse structure. It is possible that the grain concentration relates to an accident during corn-drying, which was dumped with other rubbish, as the ditch fill (10033) also contained the fragments of a crucible or kiln lining (see Johnson, above). The general spread of grain throughout other features associated with House 2 and across the rest of the site may also be linked to this one large burning event from which charred grain has been reworked and diluted through unrelated deposits.

One large and almost pure assemblage of hazelnut shell was recovered from Pit 004 (003), located to the east of House 1. The pit was filled with heat-shattered stone and occasional fragments of charcoal in addition to the high concentration of hazelnut shell. Pits containing large quantities of charred hazelnut shell and burnt stone are usual features of much earlier sites, principally dating to the Mesolithic period. It has been suggested that these pits may be the remnants of roasting pits used to roast the hazelnuts to prolong storage and to aid grinding of the kernels (Hastie 2003). Hazelnuts would have been available locally during the Bronze Age period and the recovery of occasional fragments of charred shell from a number of contexts associated with the roundhouse structures could suggest that this food source was being exploited during this period. Hazelnut shell may also have been brought to the Bronze Age settlement along with brushwood, and the connection in most cases of hazelnut shell with large concentrations of charcoal does suggest that this was probably the origin of the majority of shell spread across the site. Nevertheless, the resemblance of Pit 004 to similar Mesolithic pits, as well as the residual early prehistoric lithic evidence (Ballin, above), could indicate an early prehistoric date for this feature.

4.8 Charcoal analysis, by Mike Cressey

The charcoal assemblage was generally poor, with amorphous-shaped fragments dominating. Roundwood representing branches and twigs was low in frequency. None of the fragments identified showed evidence of tooling (eg facets or cut marks) or vitrification as an indicator of secondary burning.

Five species of wood are represented within the charcoal assemblage from the site. *Corylus avellana* (hazel) is the most abundant charcoal (n=759) with *Quercus* (oak) (n=258) also frequent. *Betula* sp. (birch) is less frequent (n=145) with *Salix* sp. (willow) and *Alnus glutinosa* (alder) present in only trace amounts.

The individual charcoal assemblage for each roundhouse is provided in table 3. House 1 had more oak present than Houses 2 and 3. House 2 had more hazel present than in Houses 1 and 3. House 3 features contained only birch and hazel.

Samples of charcoal from House 1 post-hole 11043 had over 50 fragments of oak present, of which the bulk was large blocky fragments (> 40mm length), which is probably attributable to the remains of a post. Whether or not the post was deliberately burnt prior to insertion into the ground is not clear.

Woodland environment

All of the species identified in this study would have been a major component of the local woodland. Hazel is one of the most commonly occurring charcoal species and is always well represented in Scottish charcoal and pollen assemblages (Tipping 1994), as well as by the occurrence of charred hazelnut shell (Hastie, above). This provides direct evidence for mature stands of exploitable hazel within the vicinity of the site. Birch is a light-demanding pioneer that is very tolerant of acidic soils and typical of upland heath environments. Oak is also widely distributed within Scottish charcoal assemblages and would have been tolerant to the local soil conditions. Both alder and willow are trees of the wetland and would have thrived alongside streams and in other local semi-waterlogged environments.

Discussion

Taphonomic processes have affected the quality of the charcoal, with much of the material fractured to an amorphous state. Most of what survives is the result of a number of factors, including burning conditions (temperature, intensity of fire, length of exposure, heating environment) and wood properties (size, moisture content, taxon anatomical structure). These have a direct effect on taxonomic representation within the charcoal assemblage. Small diameter twigs that may have been used as

Table 3 Houses 1–3 charcoal assemblages, weights in grams

	Alnus glut.	***Betula* sp.**	***Corylus avel.***	***Salix* sp.**	***Quercus* sp.**
House 1	–	3.9	28.8	0.2	134.0
House 2	0.7	13.0	48.7	–	5.1
House 3	–	8.2	12.5	–	–

Table 4 Radiocarbon dates

House number	Lab code SUERC-	Context	Sample material	Lab age BP	δ13C	Calibrated dates	
						1σ	2σ
1	12830	**11033**	Grain: Naked barley	2870 ± 35	–22.4	1120–1000 BC	1190–920 BC
1	12831	**11033**	Grain: Naked barley	2925 ± 40	–23.5	1210–1050 BC	1270–1000 BC
1	12832	**11049**	Hazelnut shell	2865 ± 40	–27.1	1120–970 BC	1200–910 BC
1	12836	**11049**	Charcoal; Hazel, roundwood fragment	2775 ± 40	–27.0	980–840 BC	1020–820 BC
2	12837	**10004**	Hazelnut shell	3100 ± 40	–26.0	1430–1310 BC	1450–1260 BC
2	12838	**10004**	Hazelnut shell	3020 ± 40	–26.3	1380–1210 BC	1400–1120 BC
2	12839	**10075**	Barley grain	2990 ± 40	–24.5	1310–1130 BC	1390–1080 BC
2	12840	**10077**	Hazelnut shell	3070 ± 35	–26.2	1400–1305 BC	1430–1250 BC
2	12841	**10077**	Hazelnut shell	3125 ± 35	–26.0	1440–1320 BC	1500–1310 BC
3	12842	**17016**	Hazelnut shell	3060 ± 35	–24.5	1395–1295 BC	1420–1210 BC
3	12846	**17005**	Grain: Barley indet.	3155 ± 50	–22.9	1495–1390 BC	1530–1300 BC
3	12847	**17005**	Grain: Naked barley	3145 ± 40	–24.9	1500–1380 BC	1500–1310 BC

kindling are more likely to be entirely consumed in lower temperatures, whereas pieces of wood lying at the centre of the fire heat faster and thus can burn completely (Smart and Hoffman 1988). On the other hand, charcoal that is buried in the ash at the bottom of the hearth has a greater chance of preservation due to lack of oxygen (Zicherman and Williamson 1981). However, sufficient roundwood charcoal was recovered to show that branchwood material formed the bulk of the assemblage, and this was exploited from the local woodland.

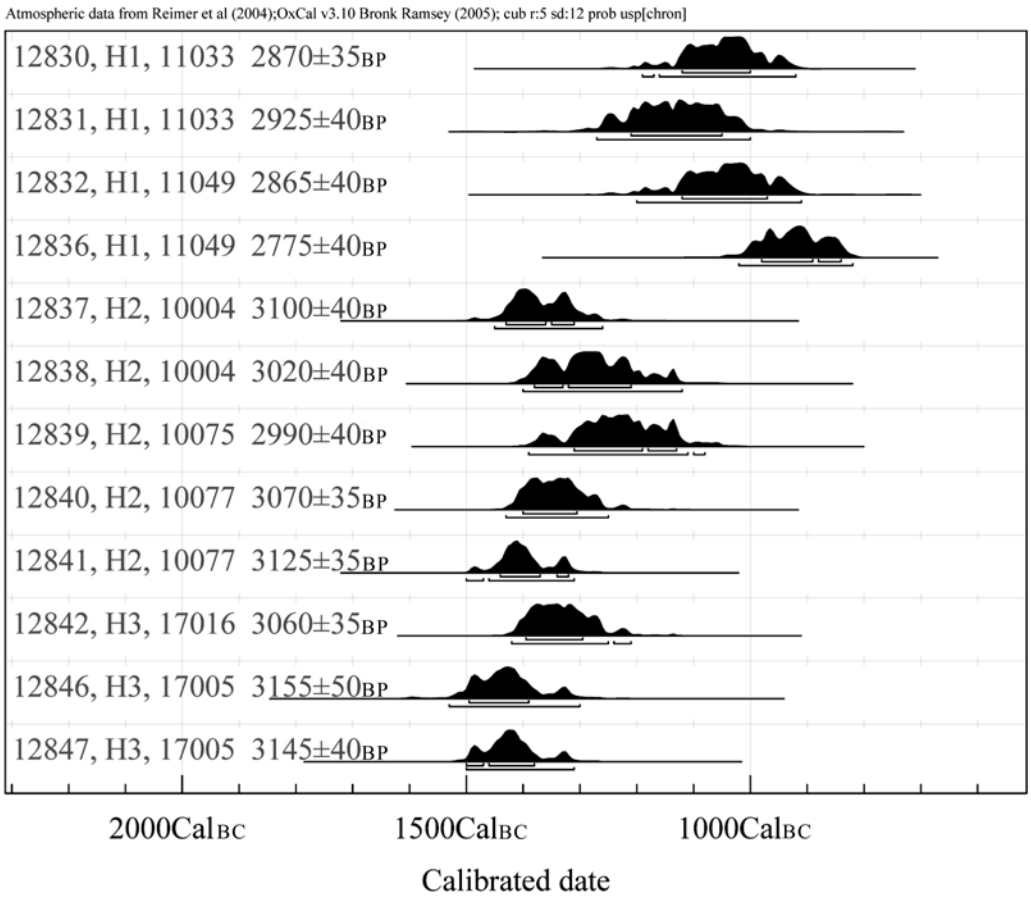
4.9 Radiocarbon dating

Two pairs of AMS dates were retrieved from House 1, two pairs and one lone single entity of AMS dates were obtained from House 2, and one pair and one lone single entity of AMS dates were retrieved from House 3 (the intended partners of the singletons proved unsuitable for dating). Radiocarbon assays were carried out at the Scottish Universities Environmental Research Centre, East Kilbride, and dates were calibrated using OxCal software v3.10. The results are presented in table 4 and illus 17.

The sampling strategy aimed to retrieve dates that relate to the use of Houses 1–3. The dates from House 1 were retrieved from one of the post-holes in the porch and one from the post-ring. The dates from House 2 came from three post-holes in the post-ring, and the House 3 dates came from the hearth pit and the large pit in the centre of the roundhouse. It is likely that the datable material recovered from the hearth in House 3 derives from the use of the building, even if that was the final use. The taphonomy of the dated samples from Houses 1 and 2 is less certain, as it is not known when the dated material was incorporated into the post-holes. Deposition could have occurred during construction of the building, the replacement of those posts during the use of the buildings (particularly for House 2, where archaeological evidence of structural refurbishment was detected), or during or even following abandonment of the structures. As a result, the radiocarbon determinations can be used to date the buildings only in very general terms, and we cannot rule out the possibility that the dated material was residually occurring carbonised material that was burnt before the roundhouses in which they were found were built (residual early prehistoric lithic artefacts were recovered from deposits within the roundhouses). However, the calibrated dates suggest *termini post quem* for the infilling of the features.

The calibrated radiocarbon dates from Houses 2 and 3 are broadly contemporary and, assuming the dates accurately reflect the dates of occupation, place them within the third quarter of the second millennium cal BC, within the Middle Bronze Age. The dates from House 1 are more recent, focusing upon the 10th to 12th centuries cal BC, within the Late Bronze Age.

None of the paired samples, when combined, failed a chi-squared test, meaning that each pair could, statistically, relate to a single event. However, the taphonomy of the dating samples is such that it would not be scientifically justifiable to produce combined radiocarbon dates with reduced ranges, either for paired dates within individual contexts or for dates from different contexts within buildings.



Illus 17 Radiocarbon plot

next section