



**ARO33: Beside the River Ayr in prehistoric times:  
excavations at Ayr Academy**

By Iraia Arabaolaza

With contributions by Diane Alldritt, Torben Bjarke Ballin, Beverley  
Ballin Smith, Fraser Hunter

**ARO33: Beside the River Ayr in prehistoric times: excavations at Ayr Academy**

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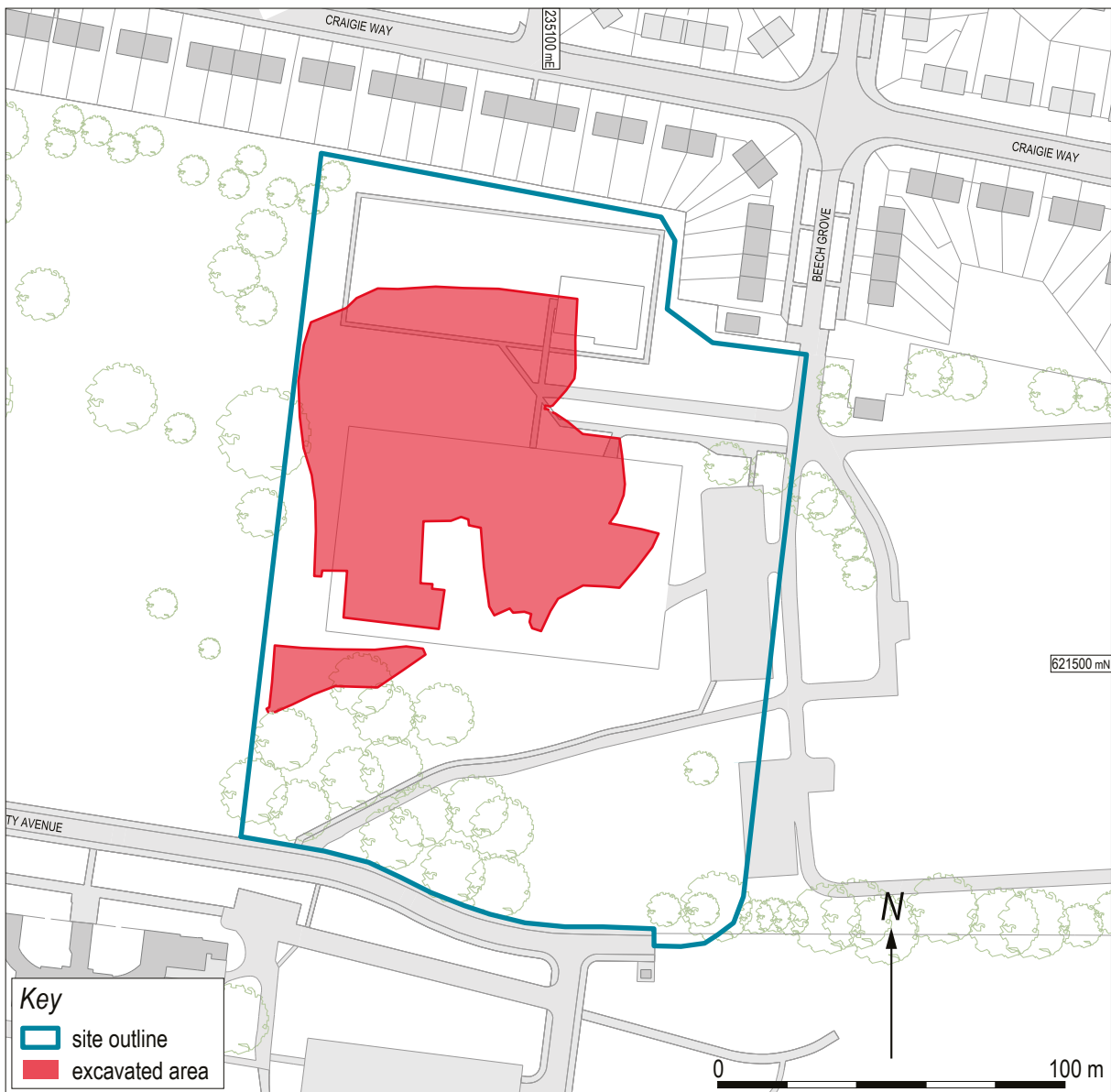
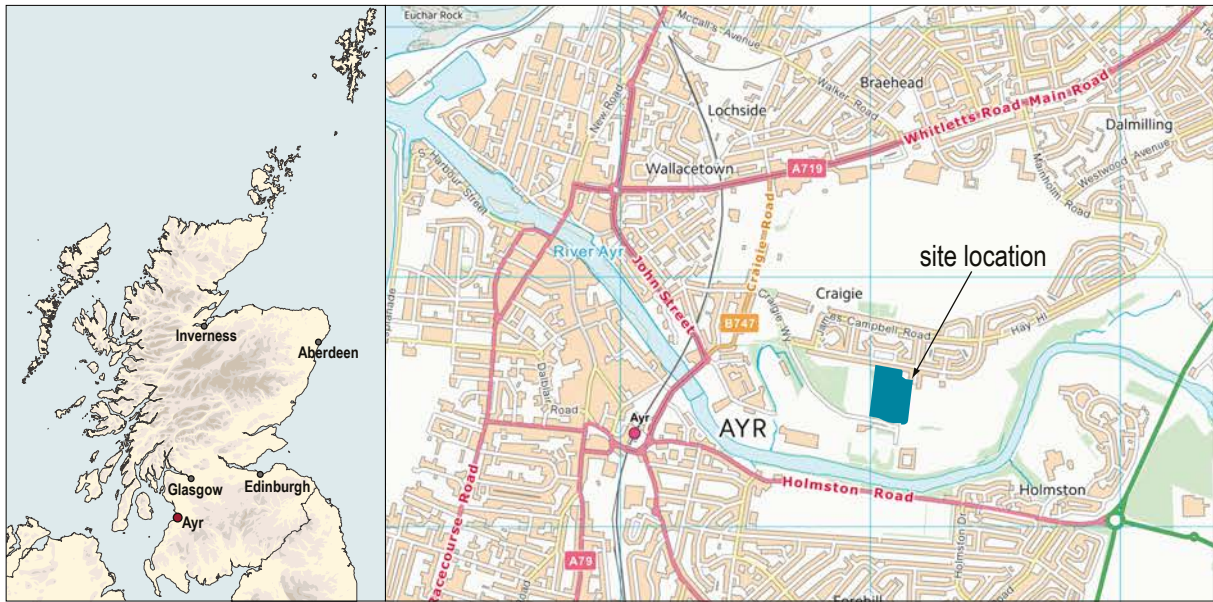
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Figure 1: Site location with outline of the excavated area

## Summary

*Archaeological interventions at Ayr Academy, Ayrshire revealed a number of pits and postholes on a raised beach on a terrace of the River Ayr dating from the late Mesolithic to the late Bronze Age. One group of pits and postholes probably defines a middle Bronze Age burial ground. The environmental and material cultural evidence (pottery and lithic artefacts) hints at seasonality of use of the site rather than continuous occupation.*

**KEYWORDS:** Palimpsest site, prehistoric structure and prehistoric pits, landscape.

## Introduction

GUARD Archaeology Ltd were commissioned by Kier Construction Ltd to undertake the excavation of archaeological remains first uncovered during an evaluation by trial trenching at the site of the new Ayr Academy, Ayr (Arabaolaza 2015a, 2015b). The archaeological remains formed several different patterns: a possible Neolithic structure, one Bronze Age structure defined by postholes, groups of pits and/or postholes from the Mesolithic to the Bronze Age, and other individual features. A series of Roman fire pits were also found on the site (see Arabolaza 2019), but only prehistoric features are described and discussed in this paper.

The site is located 350 m to the north of the present course of the River Ayr at NGR: NS 3509 2156 and is demarcated by the housing estate to the north, mature woodland and grassland to the west, University Avenue to the south and an access driveway from Beech Grove to the east (Figure 1). The site was part green field and woodland, with former roads, paths, car park areas and building foundations. Located on a river terrace, between 10 and 20 m above sea level, it commanded good views to the south. Prior to the construction of a weir across the river to the west (National Record of the Historic Environment - NRHE 42672) which raised the water level, there was a river crossing just south of the site (local resident pers. comm.).

The bedrock underlying most of the site is predominantly sedimentary, overlain by raised beach deposits composed of well-draining sand and gravels ([www.bgs.ac.uk](http://www.bgs.ac.uk)).

## Archaeological Results

The only known archaeological or historical sites within the proposed development area were post-medieval remains. Maps of the area showed that it was not developed and was used for arable pasture until the mid-nineteenth century when Craigie Park, a large tree plantation was planted on the western part of the site. A thick deposit beneath the topsoil and over the subsoil in the west area of site was either the result of the establishment of Craigie Park or material added to level the area.

The potential for prehistoric or earlier historic remains is highlighted by other sites found in the immediate locality and in similar topographic locations. Glaisnock ring ditch (Scheduled Monument: 5502), a 15 m diameter burial cairn or barrow thought to be Bronze Age in date, is located north-east of the site. Closer to the site on the bank of the River Ayr (NGR: NS 356 214) 'Holmston' is a spot find from 2002 consisting of a possible Neolithic flint blade (NRHE: 55553). Another spot find, also to the east and known as 'Overmills', comprised an incomplete rough flanged bronze axe of Balcarry type with a damage butt (NRHE: 6287). Finally, west of the site and next to Ayr Academy, several small pottery urns were discovered in the nineteenth century when levelling a sandbank at Content (NRHE: 6369).

After the initial evaluation demonstrated the presence of significant archaeological features on the site, and following consultation with the client and the monitoring authority West of Scotland Archaeology Service, an excavation was carried out to identify and record all potential archaeology (Figure 2). The results of the excavation are described in chronological order.

### Mesolithic remains

On the west area of site, south of the principal area of excavation, a group of three postholes 139, 141 and 161 and a possible pit 140 was recorded. While pit 140 and postholes 139 and 161 were aligned roughly N/S, posthole 141 was situated further west, parallel to posthole 139 (Figure 3). Possible packing stones were identified within posthole 161 and in pit 140. However, the botanical remains of oak and hazel found in the features do not suggest structural remains. A late Mesolithic date (5209-4999 cal BC - SUERC

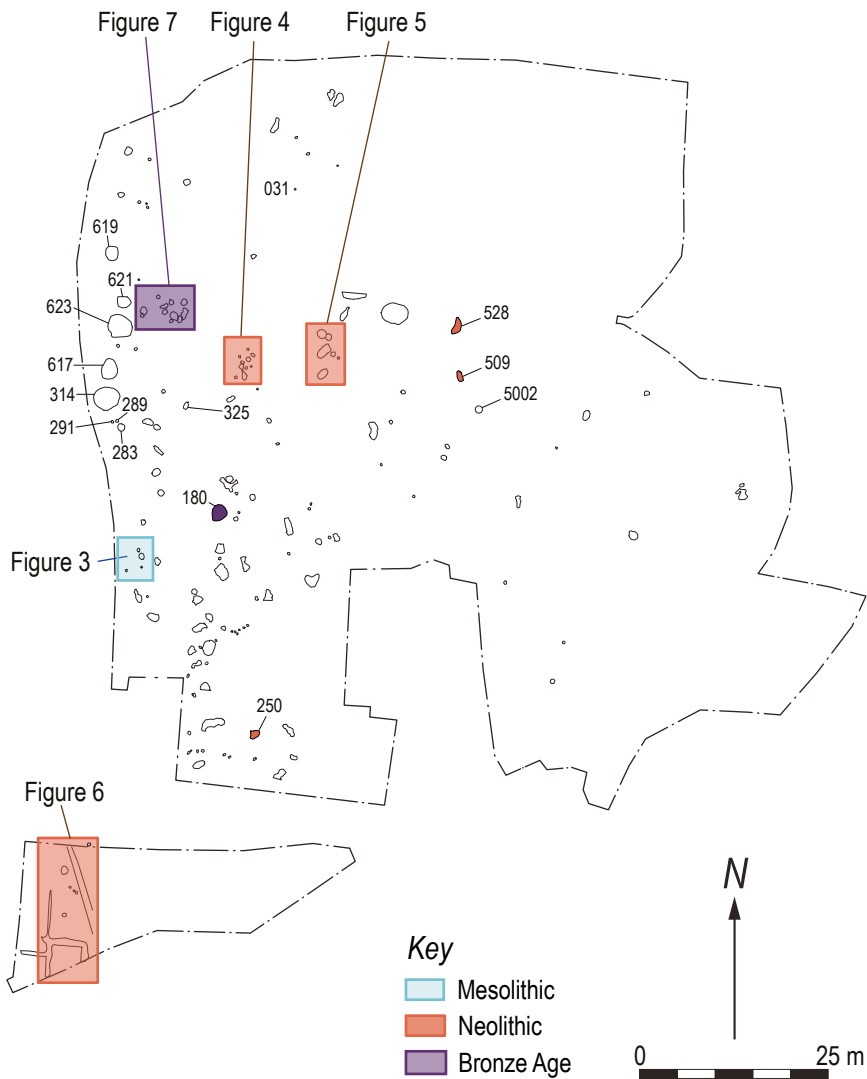


Figure 2: Survey of trench layout overlain with areas of archaeology preserved in situ

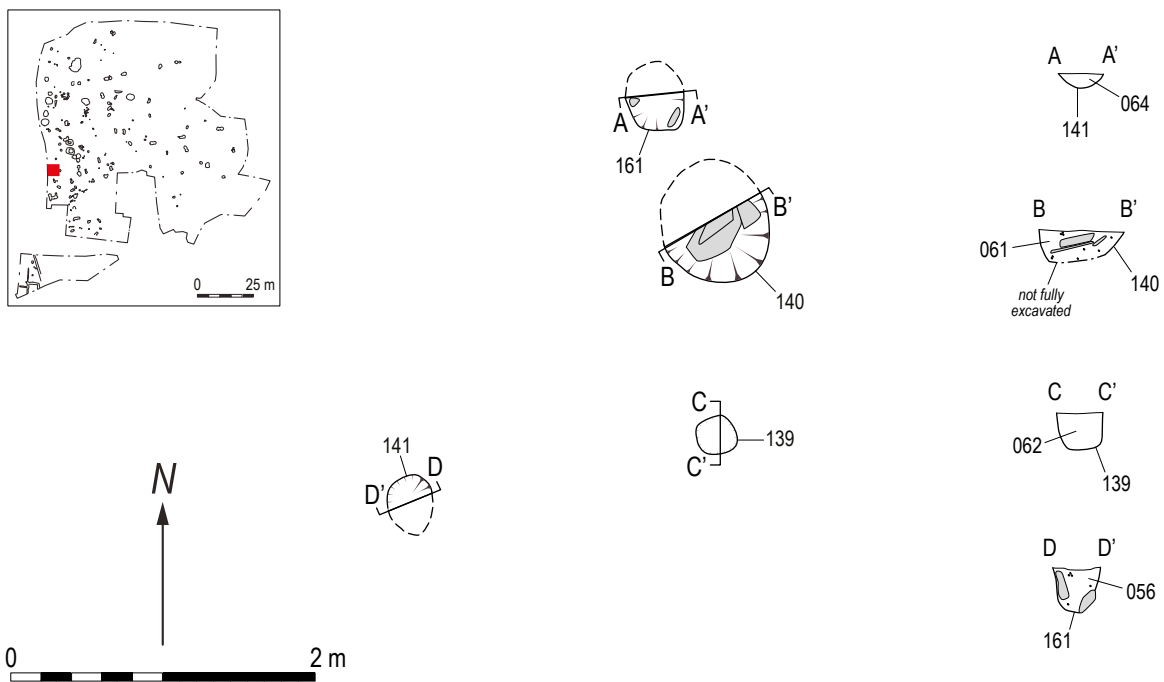


Figure 3: Mesolithic dated features to the west

Sample Nr	Lab Code	Context	Radiocarbon Age BP	Dates at 2 sigma	Delta-13C‰	Period
2	SUERC 66883 (GU40617)	Corylus charcoal from context 106 from the primary fill of pit 059	3282±29	1625-1500 cal BC	-27.7	EBA
40	SUERC 66888 (GU40619)	Corylus charcoal from context 56 the fill of posthole 161	6136±29	5209-4999 cal BC	-26.7	LMeso
51	SUERC 66889 (GU40620)	Alnus charcoal from context 163 from the fill of pit 180	2866±29	1123-969 cal BC 963-932 cal BC	-26.2	LBA
92	SUERC 66892 (GU40623)	Alnus charcoal from context 245, lower fill of pit 180	1950±29	21-11 cal BC 2 cal BC - cal AD 125	-27.1	MIA
175	SUERC 66894 (GU40626)	Corylus charcoal from context 4 from the secondary fill of pit 354	3790±34	2341-2133 cal BC 2081-2061 cal BC	-27.3	EBA
200	SUERC 66898 (GU40627)	Betula charcoal from context 377 the fill of posthole 376	4618±29	3510-3426 cal BC 3383-3347 cal BC	-24.8	MNeo
243	SUERC 66900 (GU40629)	Corylus Avellana carbonised nutshell from context 446 from fill of pit 449	4414±29	3310-3296 cal BC 3284-3276 cal BC 3266-3239 cal BC 3106-2919 cal BC	-23.7	MNeo
2	SUERC 66908 (GU40634)	Corylus Avellana carbonised nutshell from context 15001 from fill of posthole 15002	4468±29	3337-3208 cal BC 3195-3148 cal BC 3142-3081 cal BC 3069-3026 cal BC	-29.1	MNeo
105	SUERC 67236 (GU40624)	Alnus charcoal from context 216 the fill of pit 217	4457±22	3336-3211 cal BC 3193-3151 cal BC 3139-3020 cal BC	-28.5	MNeo

Table 1: Radiocarbon dates

66888) was obtained from a fragment of hazel from pit 161 (Table 1). All features, apart from posthole 141 produced small finds but only SF 24 pottery recovered from pit 140, was identified as middle to late Neolithic Impressed Ware.

An unstratified microburin found in the centre of the area, also indicates early Mesolithic activity on the site (see Lithic artefacts below).

### Neolithic remains

Although no features were dated to the early Neolithic period, some of the small finds

recovered suggest an early Neolithic presence on the site, such as Vessel 19 (SF 33) and a single platform core (SF 149). The presence of oak charcoal as fuel in pit 250 and 509 as well as the large cache of hazel nutshells in some of the pits also suggests an early Neolithic presence (see Botanic remains below).

A cluster of four postholes 374, 376, 378 and 384 and four pits 385, 391, 394 and 432 were located west of the central area, and dated to the middle Neolithic period. They were thought to form a possible oval structure (Plate 1) c. 2.7 m



Plate 1: Pit and posthole cluster from the north

in length by 2 m in width (Figure 4). The postholes were circular in shape and roughly similar in size between 0.3 to 0.36 m by 0.27- 0.33 m and 0.17 - 0.39 m in depth. They seemed to be placed at the corners of the structure with the pits aligned in a row through it. The remains of packing stones were present in pits 391 and 394, as well as an undated pottery vessel (V13) in the former. Small flecks of wood charcoal were recovered from the postholes, which could be remains of structural posts burnt in-situ. A radiocarbon date obtained from a fragment of birch charcoal, thought to be from the remains of timber post from posthole 376 provided a range of 3510-3347 cal BC (SUERC 66898). Two metres south-east of this probable structure, was a posthole 413 with remains of packing stones and single fragment of oak charcoal. It is not clear if it was part of contemporary activity with the structure.

East of the possible structure was another group of archaeological features formed by five pits: 217, 430, 435, 437, 449 and a deposit 445 (Figure 5). Although they did not represent another structure there was a clear relationship between

some of them. Pit 437 truncated the east side of 217, and fragments of a quern (SF 110 and SF 116) were recovered from the fills of pits 437 and 449 (see Worked stone below). Radiocarbon dating of carbonised nutshell from the fill 446 of pit 449 provided a late Neolithic date (3310-2919 cal BC- SUERC 66900), while a fragment of alder charcoal from pit 217 gave a middle Neolithic date (3336-3020 cal BC - SUERC 67236). These dates are supported by the material culture retrieved from this latter pit, which included a scale-flaked knife SF 70 and Impressed Ware vessels (V7, V8 and V9). The presence of significant amounts of hazel nutshell as well as wood charcoal in most of the features indicates they were fire pits with surviving evidence of the processing of hazel nuts for food. Pit 217, was used on several occasions, as suggested by the presence of separate burnt deposits. The lack of silt between the burning episodes indicates that this pit had been used several times within a single season (see Botanical evidence below). The positioning of heat-affected stones in an arc along the south side of this pit reinforces its use as a fire pit (Plate 2).

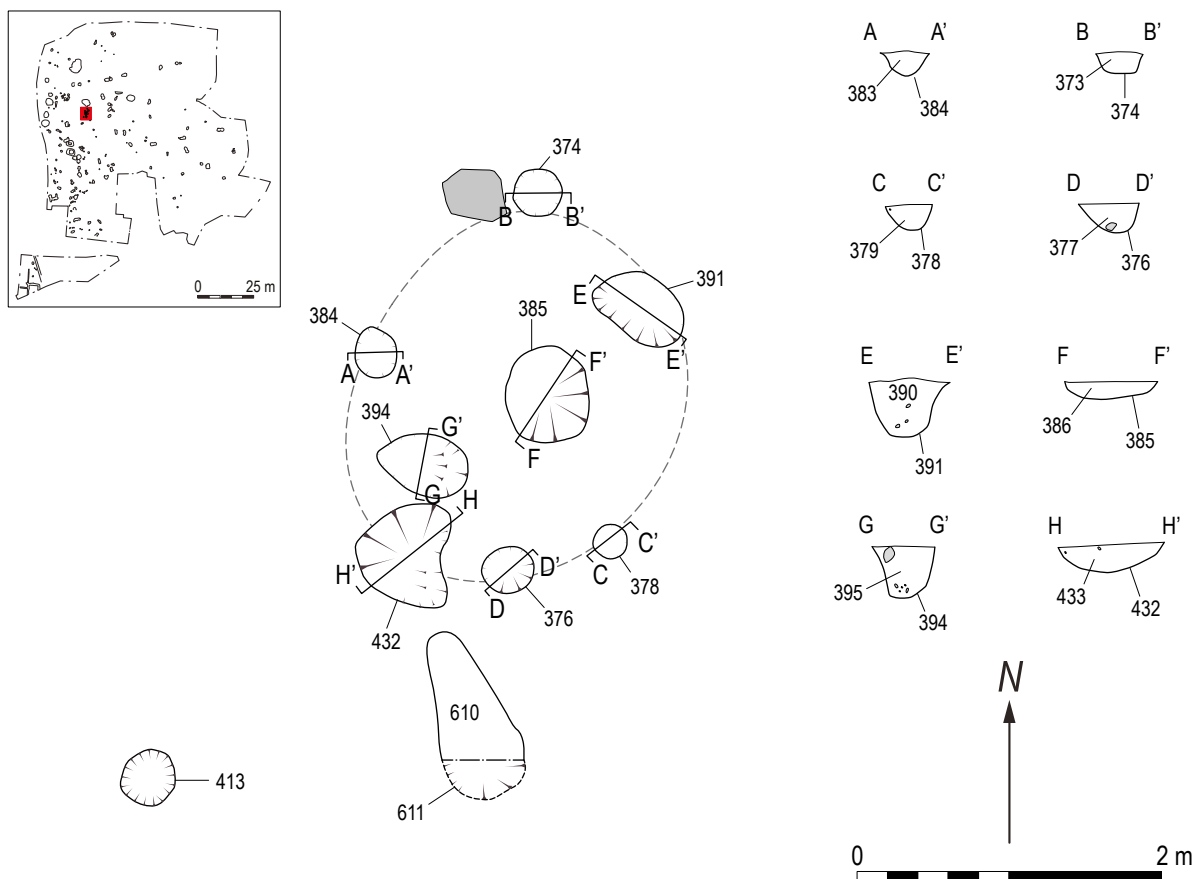


Figure 4: Posthole and pit cluster in the centre of the area



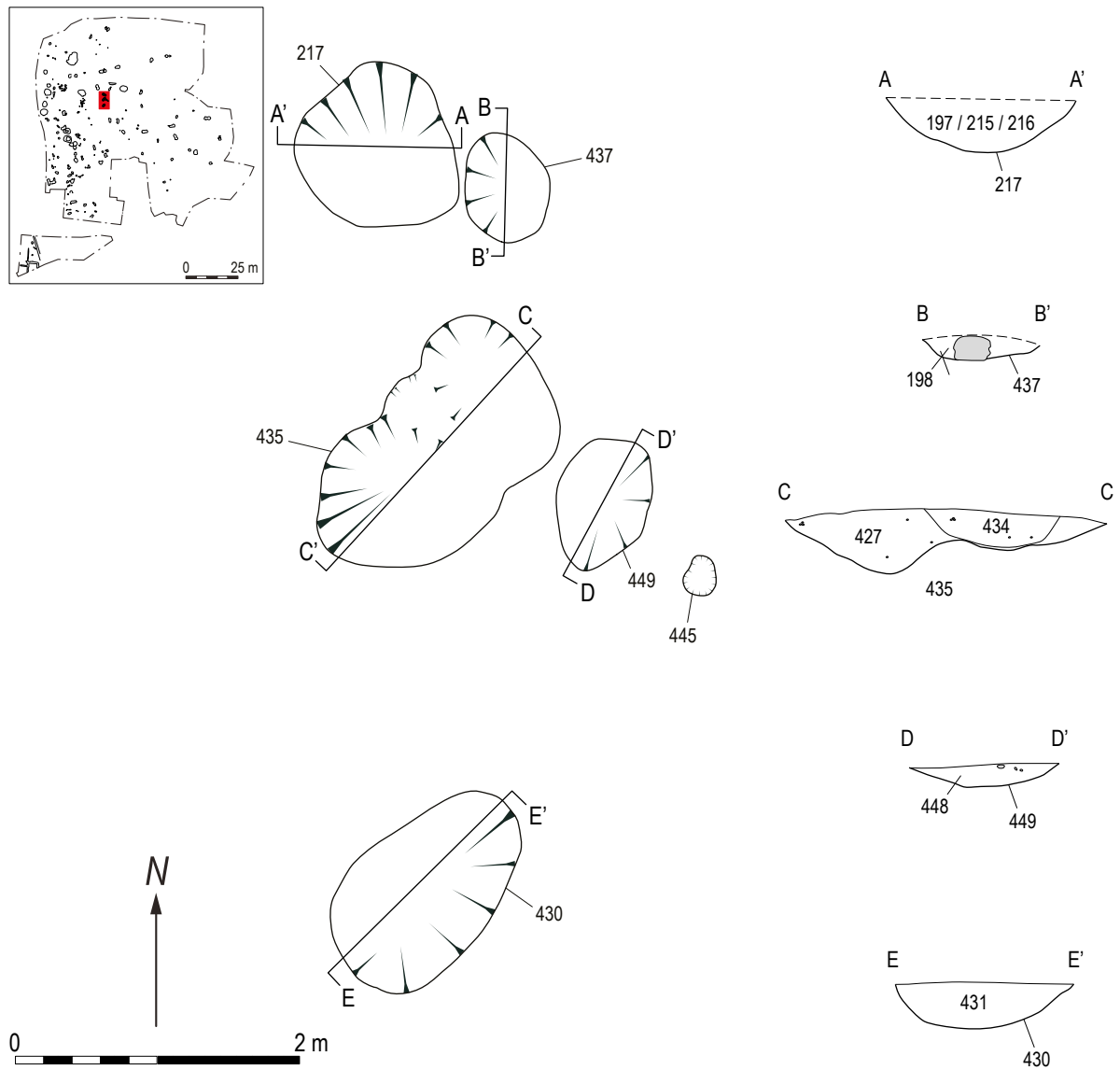


Figure 5: Large pits in the centre of the area



Plate 2: Excavation of pit 217 showing pottery and stones

In the south-west extension of the excavation, a group of four postholes (547, 549, 551, and 553), a pit (122) and two gullies or ditches (533 and 534) were discovered (Figure 6). An additional shallow posthole 15002 with two lithic artefacts was also found in here during the evaluation. A radiocarbon date was obtained from a carbonised nutshell within 15002 produced a middle Neolithic date (3337-3026 cal BC- SUERC 66908) (Plate 3). However, all the flints recovered from this area were identified as probable Yorkshire flint, suggesting a late Neolithic date (see Lithic artefacts, below).



Plate 3: NW-facing section of posthole 15002

## Bronze Age remains

### Structure

To the west, a group of features composed of five pits 058, 059, 112, 349 and 352 and one posthole 334 was identified forming a trapezoidal pattern (Figure 7). The pit and posthole feature was

identified as an oval structure that measured c. 3 m in length by 2.5 m in width. The pits were slightly larger than the posthole and were filled with mixed fuel waste deposits (see Botanical evidence). Pit 352 contained a large number of hazel nutshells, often associated with Neolithic activity, while wheat as well as barley grain was recovered from the fill 005 of pit 059. A sample obtained from this pit provided a late early Bronze Age/beginning of middle Bronze Age date of 1625-1500 BC- SUERC 66883. Several fragments of early Bronze Age pottery, including that of Beakers were recovered from all the pits except 112. Fired clay was also present in the fills of pits (058 and 059) (Plate 4). Two metres west of the structure two pits (354 and 604) were identified. Filled by deposits of spent fuel, two further Beaker vessels (V1 and V11) were recovered from the largest pit 354. The similar material culture present in all these features indicates an association between them.

An unfinished shale bangle was also discovered in the fill (163) of pit 180 (Figure 2) radiocarbon dated to the late Bronze Age (1123-932 cal BC - SUERC 66889). Further radiocarbon dating of a sample of an earlier fill from this pit, provided a late Iron Age/Romano British date (not shown on the table). These contradictory dates indicate the later disturbance of an earlier Bronze Age feature.



Plate 4: SSW-facing section through pits 058 and 059 with stones and pottery

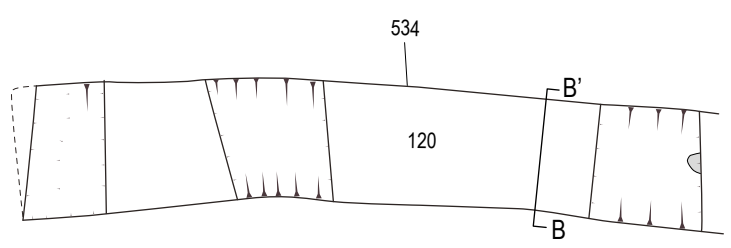
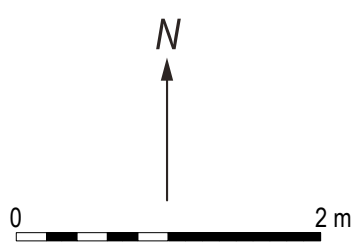
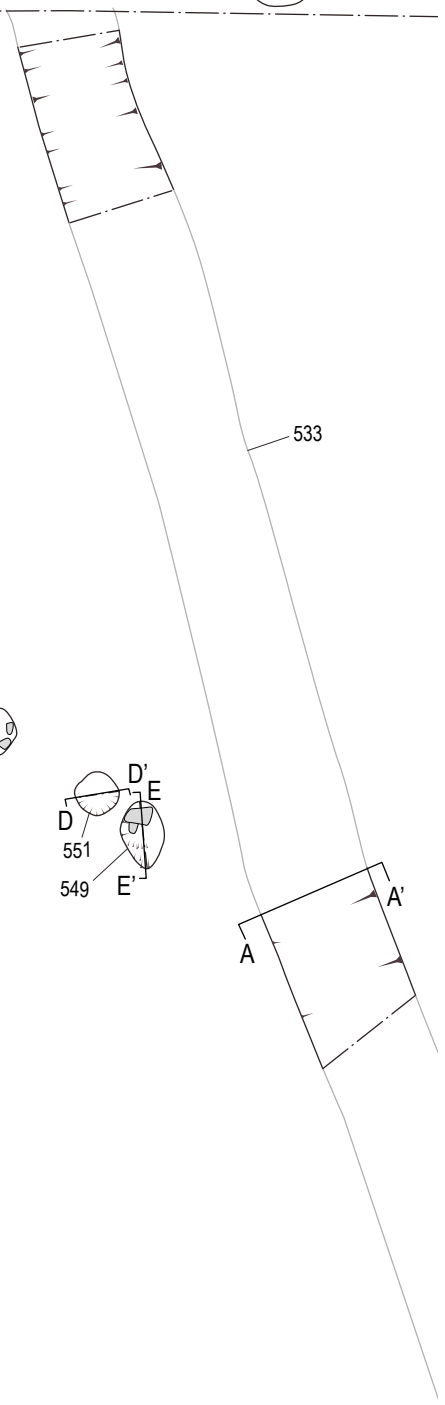
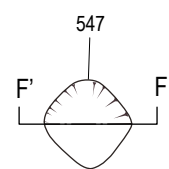
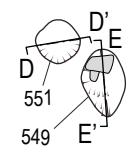
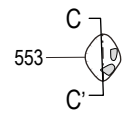
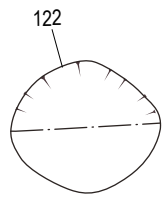
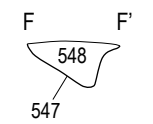
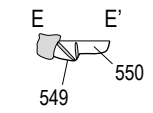
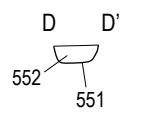
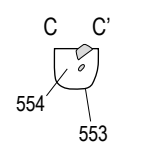
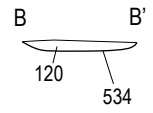
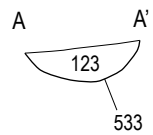
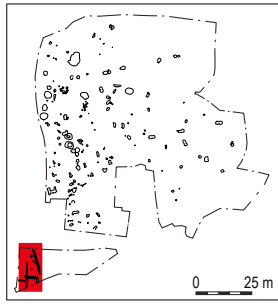


Figure 6: Pits and ditches in the southern part of the area

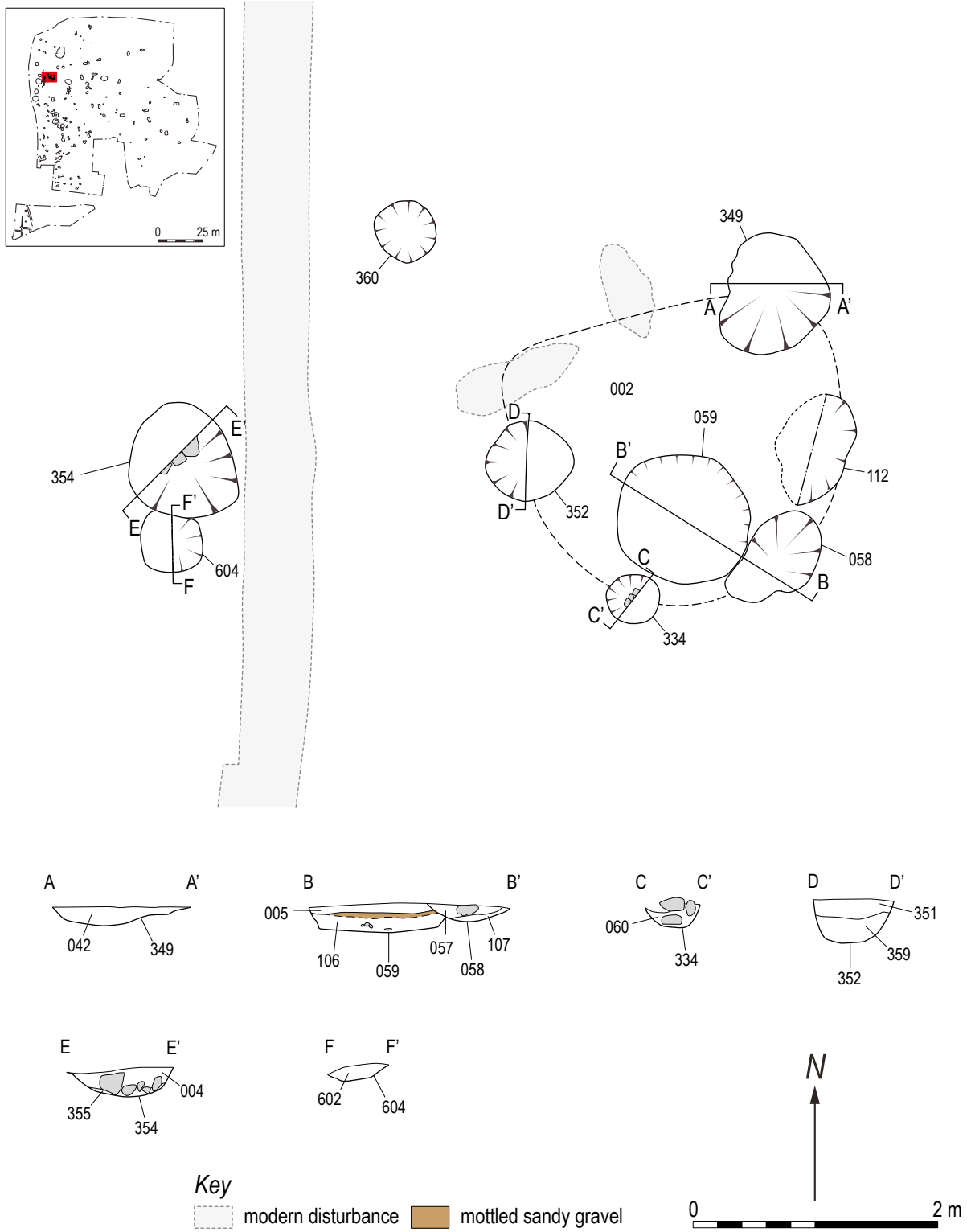


Figure 7: Pits in the north-western part of the area

## Specialist Reports

### Radiocarbon dating results

A total of ten samples from prehistoric features were selected for dating at the Scottish Universities Environmental Research Centre in East Kilbride (SUERC) (Table 1). Nine of them were chosen from features from the excavation, while one was collected from the evaluation. However, one sample only returned a background result

One of the dates obtained from the upper fill 163 of pit 180, suggested its use during the earlier part of the last Bronze Age. However, an additional date attained from an earlier fill (245) within suggested the pit's use during the Roman Iron Age. These dates from the same pit suggest that the late Bronze Age date is the result of either residual charcoal or contamination through ploughing.

### Botanical evidence

By Diane Alldritt

#### Introduction

A total of 372 bulk environmental samples ('GBA' *sensu* Dobney et al 1992) taken from the archaeological investigations at Ayr Academy were fully analysed for carbonised plant macrofossils and charcoal. Only 13 of those examined were found to be completely sterile of any charred remains, with the remainder producing varied amounts of carbonised material ranging from scarce and often non-identifiable trace remains up to highly abundant quantities, depending upon the context. Charcoal fragments, hazel nutshell and other material sorted from the residue portions of each sample were also examined. The results presented here are largely from the features discussed above.

#### Methodology

Bulk environmental samples were subsequently processed by GUARD Archaeology Ltd. using a Siraf style water flotation system (French 1971). The resultant light fraction or 'flot' from each sample was dried before examination under a low powered binocular microscope typically at x10 to x20 magnifications. The heavier 'residue' portion of each sample was dried and then sorted by eye, with carbonised material forwarded to the author for identification. Very small samples

were washed directly through a sieve rather than processing in the flotation tank in order to avoid any loss of material. All identified plant remains including charcoal were removed and bagged separately by type.

Wood charcoal was examined using a high-powered Vickers M10 metallurgical microscope at magnifications up to x200. The reference photographs of Schweingruber (1990) were consulted for its identification. Plant nomenclature used in the text follows Stace (1997) for all vascular plants apart from cereals, which follow Zohary and Hopf (2000). The term 'seed' is used in the broadest sense to include achenes, nutlets and so forth.

Of the 10 samples submitted for radiocarbon dating nine returned dates relevant to the archaeological remains discussed here and one produced only a background result. A range of charcoal types was submitted, including hazel, alder and birch, together with three samples of hazel nutshell, in order to obtain comparative results not biased toward one type of evidence. All results quoted in the text are given at the 95.4% probability range. The dating guidelines recently produced by ScARF have been used throughout the text to interpret the radiocarbon dating results (Brophy and Sheridan 2012, Downes 2012, Hunter and Carruthers 2012).

Amounts of charred remains recorded per sample varied from <2.5 ml to 40 ml of charred detritus, with a mixture of small 20-30 mm sized, crushed, ashy charcoal up to 10 mm fragments. Modern roots were generally present in small amounts of <2.5 ml, although a few samples contained up to 60 ml, suggesting perhaps more intrusion or contexts closer to the surface. A small amount of modern seeds, straw, snail shells and earthworm egg capsules were recorded in a few of the samples indicative of a small degree of bioturbation in the deposits. Post-medieval industrial or more recent disturbance was suggested in some of the areas by the presence of clinker and coal, although some of the coal may reflect the local geology.

#### Results

The environmental samples overall produced a large assemblage of well-preserved carbonised material, located primarily within pit fills. The majority of charred remains recorded were found

to be wood charcoal, along with some large deposits of hazel nutshell located primarily in pits in the middle of the area, while charcoal from other pits in this area largely returned as middle to late Neolithic indicating concentrated periods of prehistoric activity. The main focus of Bronze Age activity lay towards the west of the site, with a number of charcoal samples returning quite early Bronze Age dates. Finds of heather stems, from some pits and other deposits towards the west indicated the use of peat or heathland for fuel, probably during the later phases of prehistoric settlement.

### The evaluation

A sample from trench 15 suggested an early prehistoric date, with mainly oak recorded from (15001) and a small amount of *Corylus avellana* (hazel) nutshell in (15001). The latter from (15001) returned a radiocarbon date of 3337 – 3208 cal BC (SUERC-66908) placing this feature in the middle Neolithic period.

### The excavation

#### Pits

There were a large number of charcoal and hazel nut rich fire pits and other pits exhibiting intensive burning activity in the centre of the excavated area. Some pits produced large concentrations of hazel nutshell together with mixed fuel deposits consisting of small amounts of oak, hazel, birch and alder charcoal. A number of fills from pit 217 including 197, 198, 215 and 216 produced large amounts of hazel nutshell suggesting a sequence of burning activity involving the large scale processing of hazel nuts for food. The material in pit 217 showed repeated episodes of use, although the processing activity may all have taken place in a single season. Alder charcoal from fill 216 and the lower fill (217) was submitted for radiocarbon dating and returned as 3336 – 3020 cal BC (SUERC-67236), placing this burning activity in the middle Neolithic period. Pit (435) showed a similar scale of activity with fills 427 and 434 both producing large amounts of nutshell. A single sample from pit 449, fill 446 also contained a large amount of nutshell waste together with hazel and alder charcoal. Hazel nutshell from its fill was dated as 3310 – 2919 cal BC (SUERC-66900), indicating middle to late Neolithic activity. These pits were using a mixture of woodland fuel types, possibly whatever was

readily available in the local area, with lots of it originating from more open and scrub woodland. They show middle to late Neolithic use of the site as a seasonal processing area for gathered food.

Other pits produced small scatterings of charcoal, perhaps as a result of outlying the main areas of burning or being used as disposal areas for general waste from the main pits, rake-outs and other activity. Pit 430 with fill 431, and pit fill 386, were typical of these smaller scale types of pit, or general waste disposal areas, consisting of mixtures of small amounts of oak, alder and hazel.

The pit fills in the western part of the area tended to produce mixed fuel waste deposits consisting of oak, hazel, alder, birch and occasionally Prunoideae and Maloideae types, and in some deposits, this was also mixed with large amounts of heather, rhizomes and burnt peat. The Prunoideae was probably *Prunus spinosa* (blackthorn) but not particularly well-preserved. There is probably a general trend for many of these pits to be later, perhaps Bronze Age, and they are likely to be waste deposits, rubbish from domestic settlement, rake-outs from nearby fire pits, and so forth. Features with this type of deposit include pits 059 and 354. A 10 mm fragment of well-preserved hazel charcoal from 106 the lower fill of pit 059 was submitted for radiocarbon dating. The charcoal returned as 1625 – 1500 cal BC (SUERC-66883) giving an early Bronze Age date (Figure 7).

In contrast, a few of the fire pit fills were more similar to some of those examined from the central part of the excavation, with consistently large volumes of oak, and occasional finds of other types such as hazel and alder, possibly smaller branches of these types were being used as tinder to start a large oak fire.

Pit fill 004 falls broadly into this category and may well indicate Neolithic activity. A fragment of very well-preserved *Corylus* (hazel) charcoal from fill 004 was submitted for radiocarbon dating and interestingly returned a Chalcolithic/early Bronze Age transition date of 2341 – 2061 cal BC (SUERC-66894) indicating some cross-over with the typical Neolithic signature extending into the very early Bronze Age. Other pits producing nutshell, albeit in very low amounts, included 059, as well as pit fill 004.

## Postholes

A series of postholes produced very scarce trace remains, mainly consisting of very small fragments of wood charcoal. Some of the charred material may have been swept or wind-blown into the features after the post was removed, although it is possible some of the charcoal could be trace remains of structural posts burnt in-situ. Posthole fill 373 contained single fragments of *Quercus* (oak), whilst 377 produced two pieces of *Betula* (birch), possibly structural remains of timber posts. The birch from 377 was submitted for dating and returned as 3510 – 3347 (SUERC-66898) providing a similarly middle Neolithic date as the pits. Fill (382) contained both oak and hazel, whilst fill 390 had *Corylus avellana* (hazel) nutshell, and in these two cases it is more likely this material was swept into a void in the ground, or became lodged when the post was still present. The hazel nutshell recovered from posthole 391 with fill 390 was submitted for radiocarbon dating but was quite small and unfortunately returned a background result possibly due to machine error or lack of carbon. Posthole fills 379, 383 and 395 were sterile, although occasional fragments of clinker were present, suggesting some possible recent intrusion in the deposits. The posthole arrangements suggested some structural elements existed here, with the larger posts most likely constructed from oak, whilst smaller timbers of birch and hazel could have been used for wattle screens or fences (Figure 4).

Posthole 161 in the western part of the site contained packing stones and a very small fragment of hazel charcoal from its fill 056, which was submitted for radiocarbon dating and returned a Mesolithic date of 5208 – 4999 cal BC (SUERC-66888). This charcoal is probably intrusive, but suggested some earlier burning activity in the vicinity.

Nothing could be identified from gully fill 120, pit fill 527 or posthole fills 548, 550, 552 and 554. Fills 527, 548 and 552 contained coal with 527 also containing a large amount of clinker, so it is possible these are more recent features or have been heavily truncated or contaminated.

## Discussion

### Gathered resources

Substantial caches of hazel nutshell were recorded

from the fire pits in the center of the area, whilst some hazel shell was produced elsewhere, but generally in very low trace amounts, suggesting perhaps some earlier Neolithic events occurring in these areas. In the central area, the greatest quantities were recovered from pit 217, in particular fill 215, and from pit 435, fill 434 and pit 449, fill 446. These pits all produced a very strong signature for Neolithic activity and hazel nutshell from fill 446 in pit 449 was submitted for radiocarbon dating. This sample returned as 3310 – 2919 cal BC (SUERC-66900) placing the burning activity in the middle-late Neolithic period.

Hazel nuts were a seasonally gathered resource during the Neolithic period and the evidence, particularly from the central area, suggested the large-scale processing of nuts for food, possibly for storage over winter. Bishop's survey suggested that in general the Southern Scottish sites tended to comprise more wild plant material throughout the Neolithic (Bishop et al. 1990, 69) and this would appear to be similar at Ayr Academy. Fuel for the roasting of hazel nuts consisted of mixed woodland resources, including oak, hazel, alder and birch.

### Fuel and building resources

Identification of wood charcoal fragments from the site indicated a significant amount of burning activity taking place. The fire pit and other pits contained the greatest volumes of charcoal, most likely all fuel waste. In contrast the posthole fills were mostly sterile, offering little indication as to the types of wood in use for structural purposes, although it is possible some of the more substantial posts to the south and west of the site were oak, with hazel and alder used for smaller structures.

In some of the pit deposits the remains tended to be more oak and hazel dominated with substantial quantities of nutshell present, suggesting a probably earlier, most likely Neolithic date for these features, particularly pits 217 and 435. Indeed, the lower fill of pit 217 returned a middle-Neolithic date of 3336 – 3020 cal BC (SUERC-67236) from alder charcoal. Of course, there are exceptions to these divisions and it is probably more valid to see the site as a multi-period landscape, with higher concentrations of activity datable to certain periods more heavily focused in certain areas.

Mixed deciduous oak woodland with more open and scrub areas of hazel, alder and birch were being exploited for fuel at various points in time. Both the west and east areas are interesting as they showed a marked divergence toward a wider fuel use, to include more open and scrub types of wood, but also utilizing peat and heathland resources, which is concurrent with the Bronze Age and later dating for the activity in these areas. None of the 'peat as fuel' indicators were present in the early phases of the central part of the site which fits the overall middle-late Neolithic radiocarbon dating of the features in this area.

Bishop's review of results from 75 Scottish sites indicated the most common cereal grain recorded from the Neolithic period was naked barley, supplemented by collection of hazelnuts and wild fruits, although mixtures of hulled and naked barley were found in many assemblages (Bishop et al. 2009, 90). However, grain was not found in the prehistoric pit fills at Ayr Academy. It is important not to overlook the role of wild plants and woodland particularly in earlier prehistory, the seasonal gathering of hazel nutshells for food being perhaps the most noticeable early dating 'marker' in an assemblage. Natural woodland resources and - later in the Bronze Age - peatland resources, were exploited for fuel and building materials.

The archaeobotanical assemblage from Ayr Academy comprises predominantly charcoal and is probably most closely comparable with the early Neolithic to Bronze Age dated material identified from Ladywell, Girvan. There were some close similarities in the types of feature excavated also, such as charcoal-rich fire pits dominated by oak and hazel nutshell contrasted with the more 'domestic-related' type of pits containing a mixture of charcoal types and sometimes cereal grain and peatland resources (Alldritt 2015). The obvious geographical closeness of Girvan and Ayr may point to similar patterns in use of the landscape, in particular for collection of local gathered resources, such as wood, fruits and nuts during the Neolithic. The A1 excavations in East Lothian suggested similar use of gathered wild resources during early prehistory with an accompanying intensive use of woodland resources for fuel and building materials, whilst cereal use only really becomes more widespread later on during the Bronze Age

settlement (Lelong and MacGregor 2008). As such, it may be possible to demonstrate a shift in the patterns of landscape use and settlement in these low-lying coastal regions with seasonal use of local woodland for fuel and food during early prehistory eventually giving way to a more settled farming existence on the fertile valleys and coastal plains lying slightly back from the sea later on.

The environmental samples from Ayr Academy produced a large assemblage of carbonised plant remains, with the bulk of the charred material consisting of fragments of wood charcoal. In general pits across the site tended to produce mixed deposits of charcoal, including oak, hazel, birch and alder. Some of the pits were often associated with large concentrations of hazel nutshell, particularly focused around pit 217, with smaller amounts of nutshell recorded from other areas.

Evidence for agricultural activity in the form of cereal grain and weeds associated with cleared or disturbed ground were extremely scarce from the prehistoric features, with the majority of samples producing no grains or weed seeds.

Overall the plant assemblage indicated evidence for prehistoric activity on the site and in the case of some mixed fuel and hazel nutshell-rich pits, this was probably Neolithic activity. Bronze Age reuse of the site, perhaps involving settlement is highly likely given the potential structural layout of some of the pits/postholes and the broad mixture of open woodland, non-oak, types of charcoal identified from some of the pits.

## Conclusion

The environmental samples from Ayr Academy produced some large concentrations of carbonised plant remains, mainly consisting of general waste pits and other deposits. Charcoal identification suggested mixed deciduous oak and open woodland in the local area being exploited for fuel and building materials. Notable caches of hazel nutshell were recovered from some of the general pit fills, and were particularly focused in the centre of the area, with occasional outlying finds of discrete concentrations of nutshell in a couple of the west pits. The site was used for seasonal processing of hazel nutshells in the mid-late Neolithic phases with the subsequent



appearance of heath and peatland fuel indicators from the Bronze Age onwards shown across the various types of pit deposits.

Pottery and lithic remains from the site suggested prehistoric activity provisionally dated from the early Neolithic to Bronze Age. The combination of plant remains present in the environmental assemblage produced a strong signature for early prehistoric activity, with recovery of charred material typical of Neolithic through to Bronze Age dated burning events. More recent intrusions including spreads of clinker and other burnt deposits were visible in some of the samples.

The radiocarbon dating programme revealed evidence for activity taking place from the Mesolithic through to the later Bronze Age, although occurring in greater concentrations during certain periods and with strong spatial divisions in the more focused areas of settlement and other activity. A middle to late Neolithic phase, characterised by a series of charcoal and hazel nutshell-rich fire pits was located around the centre of the site, possibly representing seasonal returns to the area for processing gathered resources. A Bronze Age phase focused largely in the west probably included a structural/settlement element, and consisted of large scale burning and waste deposition in domestic pits, but with some burnt rubbish being re-deposited in the central area – perhaps sealing or closing off these earlier features.

The environmental evidence from Ayr Academy, and in particular the radiocarbon dates generated from the samples, have both local and regional significance to the understanding of Prehistoric and later settlement and other activity in Ayrshire and SW Scotland.

## Fired clay

By Beverley Ballin Smith

### Introduction

The recovery of 264 pieces of unfired clay fragments weighing 690.2 g mainly from pits across the excavated area is unusual. The number is large and the weight significant in comparison to the much smaller amounts that have been found recently at other South Ayrshire prehistoric sites such as The Curragh, Ladywell and Barassie (Ballin Smith 2014, 2015b and 2017).

## Description of the pieces

The clay is largely raw clay, probably dug from the banks of the River Ayr, to which organic material has been added to make the clay more pliable, and some gravel added as a strengthener. It is not pottery, but has been used in an unfired or unburnt raw state as a constructional material together withies and hurdle-type wooden constructions. Its main function was as an insulating and infilling material. This combination of wooden withies and clay is traditionally known as wattle work or 'stake and rice' in Scotland (Walker and McGregor 1996, 38). If protected from the weather it was both a windproof and somewhat of an impermeable barrier. In the archaeological record this relatively soft clay substance was used as a building material for light weight, non-load bearing structures such as the walls of round houses and for smaller structures such as ovens, hearths and furnaces. Clay was generally locally available, cheap and plentiful, as was the organic binder or additive, usually straw or dung. It has a long history of use, not just in Britain but also worldwide, and the different base materials and additives produced different variants such as *adobe*, *cob* and *daub* (Graham 2004, 27).

The natural colour of the clay found at this site was grey/yellow to buff which changed to orange/red when burnt. There was also pink clay, which may be derived from modern activities. In Scotland, due to taphonomic processes (mainly water and root penetration, and mechanical abrasion) much of the material is lost from the archaeological record, especially if it was not hardened through burning. This latter event would normally only occur through the burning down of a house or structure, or through the prolonged heat of a furnace or hearth. Fired clay pieces normally survive as irregular, abraded but relatively soft clay lumps. Table 2 (below) indicates the number of pieces and the weight from the different contexts in which this material was found.

Context	No. pieces	Weight (g)
057 within pit 058 (early Bronze Age)	75	145.5
005 within pit 059 (early Bronze Age)	93	139
106 within pit 059 (early Bronze Age)	96	405.7

Table 2: Number of clay fragments and their weight by context

## Location and distribution

Small abraded and burnt fragments of clay were found in the fill of two prehistoric pits (058 and 059), with pottery sherds. Both a radiocarbon date and the pottery (see Tables 1 and 3), suggest that the activities associated with the pits and their filling took place in the early Bronze Age. The weights and amounts of clay recovered indicate that a wooden structure(s) with daubed walls may have been constructed using the pits as bases for load-bearing timbers.

## Conclusions

It is quite clear that unfired clay (daub) had a long currency as a structural material at this site. The materials of clay (from the river or subsoil), vegetable matter (possibly dung), some stone (gravel from the subsoil) and wooden branches (from nearby trees) were readily available locally for constructional purposes. It was used certainly around the early Bronze Age for the building of a shelter, walling or an oven in the north-western part of the excavated area, as surviving burnt examples indicate. It is quite possible that other prehistoric structures on other parts of the river terrace were built using this material as part of their design, but evidence of them has not survived in the archaeological record. If buildings were not burnt down, the organic parts of buildings would decay and unfired clay would disintegrate and become an indistinguishable part of the natural soils of the area.

Later activities are tentatively suggested by the incidence of pink stony clay with modern roots and cereal crop evidence within pits associated with the early Bronze Age. Deeper ploughing, dumping of soil on the area and bioturbation, possibly by animal burrowing, may account for this unusual occurrence.

## Prehistoric Pottery

by Beverley Ballin Smith

### Introduction

Fragments of 19 prehistoric pots spanning a period from the early Neolithic, through to the middle and later Neolithic, the Beaker period and into the early and later Bronze Age, were identified from pits, a posthole and a deposit across the excavated area. The assemblage is unusual for the area as few pottery assemblages have been noted there in the past. The pottery also demonstrates the longevity of use of the site near the River Ayr and the importance vessels had in the activities that took place there.

### Methodology

The assemblage is a collection of prehistoric pottery. The sherds were gently brushed before examination with a x6 hand lens and their attributes and statistics compiled in an archivable table devised in Microsoft Excel. The pottery was analysed according to the revised guidelines of the Prehistoric Ceramics Research Group (1997) and the IFA's *Standards and Guidance for the collection, documentation, conservation and research of archaeological materials* (2001). Diagnostic sherds of pottery, such as rims and bases have been photographed in detail.

### Analysis and description of the pieces

A total of 289 sherds of coarse hand-built pottery were recovered from the excavation, which also included small fragments found during the processing of soil samples. All the pottery was recovered from pits, postholes and an occupation deposit, predominantly on the western side of the excavation. The total weight of the pottery assemblage is 1.675 kg.

The assemblage (Table 3) includes only 8 rim sherds but the even lower number (3) of base sherds can be explained by a number of factors (discussed below), including the use of round bottomed early Neolithic vessels. Almost 96%,

Sherd	Rims	Carinations	Base sherds	Body sherds	Decorated sherds	Total
Numbers	8	1	3	277	36	289
Percentage	2.8	0.3	1	95.8	12.5	100

Table 3: Sherd forms

of the collection comprises body sherds, which is high in comparison with other prehistoric assemblages in South Ayrshire (Ballin Smith 2015a) and suggests an elevated degree of fragmentation. The number of decorated body sherds (36) compares well with other regional collections and is accounted for by some vessels that had all-over decoration.

All sherds with both surfaces present were measured across their broken sections. Sherds of early Neolithic date were c. 8 mm in width, middle/late Neolithic Impressed Ware sherds measured from 12.4 mm to 22.5 mm, Beaker sherds ranged from 7.1 mm to c. 11.6 mm, while sherds considered to be fragments of Bronze Age urns measured between 10.9 mm and 12.6 mm. The average thickness of the all the sherds is 14 mm.

### Temper

The majority of the assemblage contains coarse to very-coarse rock temper, with only sherds of Beaker Vessel 10 having finer grits as part of its clay matrix. The manufacture of the pottery will have included the gathering of local resources of clay and stone, presumably from the sides of the River Ayr or the subsoil. The latter is very gravelly and this material may account for the wide range of unidentified rock fragments found in the pottery. Identified material includes quartz rock and sand, diorite, dolerite, mica and flecks of haematite were also noted. The amount of stone added to the clays has not been calculated due to the generally small sherd size and their low average weight of 5.8 g. Approximately half the sherds of the assemblage contain organic temper (cut grass/straw stems?) which was added to the clay with the stone. Whereas stone helped in the distribution of the thermal shock encountered during the use of the finished pot in or over a hearth, it also made the vessel more robust and heavy, but organic temper was added not only to make the pot lighter but as a binder to improve the workability of the raw clay.

### Post-depositional changes

In a fragmented assemblage, such as this, it is difficult to be certain whether changes to the pottery took place before it was buried or afterwards. For example, several sherds of Vessel

8 are burnt, possibly due to its use as a cooking pot but more probably due to further hot fires being lit in the same pit in which it was buried. Abraded sherds are common, a result of their movement in the soil due to disturbances from ploughing or the reuse of their depositional context. Taphonomic conditions, such as the percolation of surface water through the soil profile or the penetration of grass roots, has affected this pottery negatively. The majority of the assemblage was fired at low temperatures and the fabric is soft, fragile and prone to root infiltration and lamination, with surface cracking and flaking.

Other post-depositional changes have affected the survival of base sherds as they represent only 1% of the assemblage. Although there can be a number of other contributing factors, some vessels such as the possible Bronze Age urns could have been buried upside down with their bases subsequently removed by deeper ploughing.

One slightly unusual change can be seen on predominantly, but not exclusively burnt sherds, from Vessels 15 and 16 and SFs 97, 98 and 150. Up to 54 sherds are affected by a shiny, waxy-type coating originally considered to be a form of vitrification. However, the sherds have not necessarily been hardened in the process but the coating is seen on the surface and inside the decoration and is quite noticeable through the sections as the substance has penetrated right through the sherds. Sherds SF 97 and 98 were found in postholes associated with a central pit, which together formed a possible small structure towards the west of the excavated area (Figure 4). Their occurrence in the postholes implies they could have derived from activities related to the central pit and on the destruction of the building became incorporated in the fills of the postholes. Sherds SF 150 were found in a deposit or dump of material in the centre of the area, which suggests it was raked out from a nearby hearth. The remainder of the sherds (Vessels 15 and 16) were located in a pit to the south-east, towards the eastern edge of the trench. As all these sherds were found in three separate areas distributed across the site, it implies that the coating was derived from similar processes such as contemporary food processing or from later activities including soil contaminants.

## Manufacture of the pottery

The pottery was all coil-built. This is demonstrated by sherd SF 150, which broke at the junction of two coils and by the finger moulding noted on the surface of sherds from Vessel 14. These marks were not removed from the pot surfaces during the finishing process as several vessels still retain them.

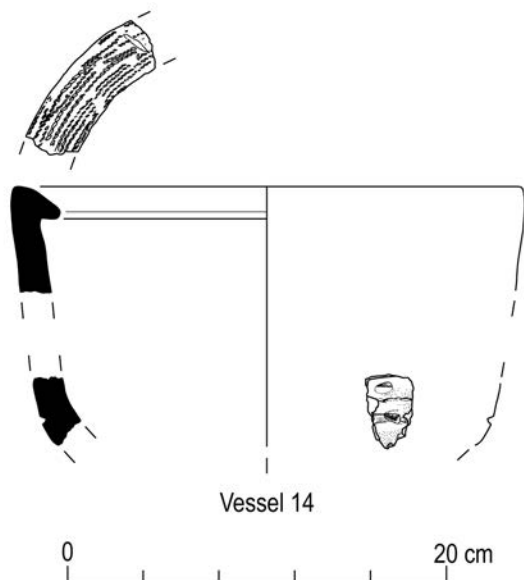


Figure 8: The pottery

## Rims

The small number of rims includes fragmentary examples and examples of uneven moulding. Vessel 1 is typical with a weak rounded topped rim which may have had an altered profile around the circumference of the vessel. The rim of Vessel 5 is also rounded and everted, but this was one of the few sherds that produced an indication of the size of the vessel, one with a c. 100 mm diameter mouth. Vessel 12 is a similar rim which is simply rounded, and is in a straight alignment with the neck and body of the vessel. The variation in rim shape is noted in Vessels 3 and 6 which are both flat-topped and everted and also in Vessels 4 and 14 which are bevelled internally. Vessel 14 has the most complex rim of the assemblage, which is a deep sloping rim to a straight-sided pot, but a rim that slopes into interior of the vessel. It is also decorated and measures c. 125 mm in diameter externally. The rim of Vessel 19 is gently moulded and in a straight alignment with the neck of the piece. The differences in rim form and also vessel shape indicates variation with time and with function.

## Bases

Although base sherds are poorly represented in the collection the best preserved from Vessel 8 is a substantial sherd with a thickness of 20-25 mm. Its form includes a rounded basal edge between the body and base of the vessel and its content of a large amount of very coarse grit is characteristic of the middle to late Neolithic Impressed Ware pottery. The actual diameter of the base of the vessel could not be measured.

## Cordons and carinations

Evidence of carinations from the early Neolithic has not survived in the archaeological record, and evidence for cordons is rare. Vessel 2 has a cordon, which has been pinched out of the body of the vessel, but given the amount of coarse temper found in the pottery, the result is poorly executed. The presence of this cordon and the other characteristics of the pottery suggest this sherd is from an early Bronze Age cordoned urn.

Vessel 17 is represented by a decorated sherd with an applied narrow cordon which is bordered by a horizontal line of cord impressions. It is tentatively suggested that this sherd is from an early Bronze Age vessel.

## Decoration

A significant percentage, 12.5%, of this pottery is decorated by two main methods – by *incisions* or by *impressions*. Incising or scoring the surface of a pot has usually been done to create straight lines, or small motives such as dots, carried out using a tool such as a pointed bone, quill or a piece of twig. The tool is not a decorative motif in itself but is a means of carrying out a simple linear and often parallel design. In this assemblage, Vessels 1 and 15 are incised with horizontal parallel lines and Vessel 13 with a simple small, fine cross.

Impressed motifs can be more complex. The method used is to push something, be it a taut piece of twine, the end of a bone or a comb, into the surface of the clay and the motifs can be shallow or deep depending on the tool used and the potter's intentions. A multiplicity of designs can be created. One of the earliest decorations on the pottery is that made by pressing the end of a bird humerus into the clay to create a blocky figure of eight-type shape. The design on the top of the rim of Vessel 3 has been executed with a

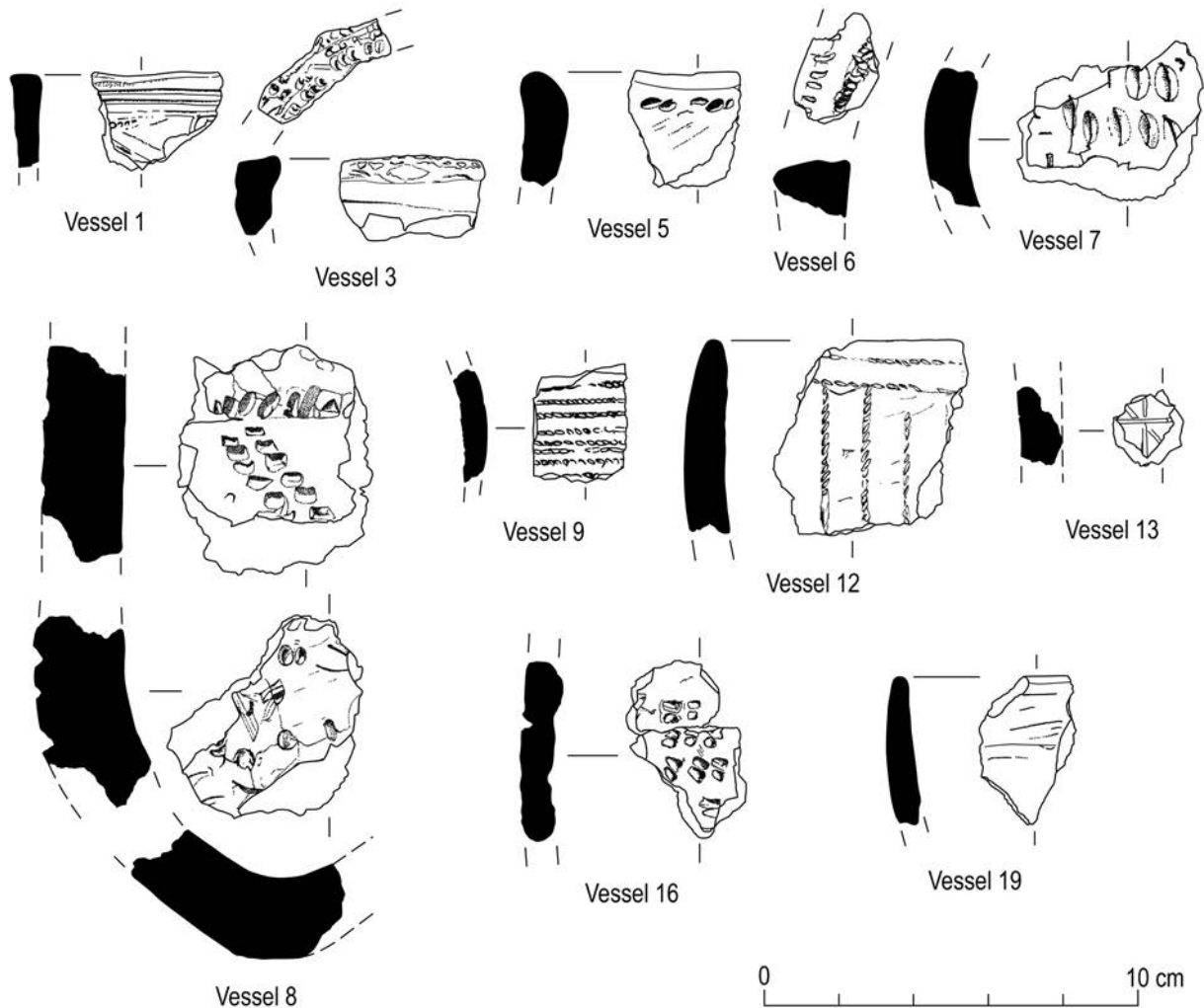


Figure 9: The pottery

fine bone, and the motif is grouped in threes, in two lines. Vessel 4 has been made using the same technique on the edge of the rim and just below the rim bevel. In this instance, the motif is a line of individual impressions. The top of the rim of Vessel 6 is slightly more random and not as well executed, but is thought to be made by the end of a bird bone. The decoration on Vessels 8 and 16 has been made by two different sized bird bones. In Vessel 8 the bone is small and the decoration appears to be horizontal lines of single impressions with oblique double lines running from it. The decoration of Vessel 16 is much less well executed as if the clay was still wet or the potter was less careful with the design of roughly parallel individual incisions. The bone was pushed into the clay and dragged out at an angle

Impressed designs were also made by the end of a finger nail and these can be seen on Vessel 7 where vertical and slightly parallel curved impressions can be seen, creating a decorative band or an all-over design. The design on Vessel

14 is similar but different as it is also made by a fingernail. In this instance, a fairly long fingernail has been pressed into the clay and withdrawn bringing with it a piece of clay, and leaving behind a small crescent-shaped scoop. The impressions are random but widespread and may have been made over most of the surface of the vessel. Most of these designs are probable middle to later Neolithic in date.

Designs from the early Bronze Age on this site predominantly use twine or close twisted wool that was pressed into rims and surfaces to create simple or more complex patterns. A single line of cord impressions can be found beneath the rim of Vessel 5, two lines on either side of the cordon of Vessel 17, but the evidence on Vessel 18 is faint due to abrasion. The design on Vessel 10 is more complex as several parallel impressions have been closely positioned to create the design. The parallel lines on Vessel 11 are faint but also wider apart. Vessel 12 is more complex with both horizontal lines below the rim and vertical lines

on the body, suggest that this was an all-over pattern. The most complex pot is Vessel 14, which in addition to external fingernail scoops, also has the internal rim bevel decorated with closely positioned parallel cord impressions. Only Vessel 19 has both incised and impressed motives, with faint but oblique comb impressions below the incised neck and rim of the vessel.

### Other surface detail

All pots would have been smoothed or wiped after forming and this is noted on vessels such as 1, 5, 6, 7 and 19, which were well finished with smooth surfaces, but actual traces of burnishing, which some pots are likely to have had, has not survived. Surface detail is generally quite sparse owing to the burning and disturbance of sherds from their original deposition or burial context. In contrast, sherds of Vessels 8, 14 and 16 are slightly more informative as several preserve grass impressions on their surfaces from wiping the pot.

Some soot and carbonised food residues have been found on the surfaces of decorated Vessels 10 and 16, possibly on Vessel 8 and on plain Vessel 19. Most other prehistoric assemblages would normally display more evidence of residues on vessels used on the hearth or for cooking, but again, taphonomic conditions may be responsible for the paucity of its survival at Ayr.

### Description of the vessels

The full description of the identified 19 vessels can be found in Table 4. Omitted are c. 50 undiagnostic sherds and small attributed pottery fragments. These were plain small body sherds mainly collected from soil samples. They are heavily abraded, light in weight and generally accompanied by small pottery fragments.

### Vessel form and function

This assemblage produced a range of vessels across nearly two millennia, indicating the widespread use of the area and repeated visits to it. The presence of early Neolithic activities is demonstrated by Vessel 19, which was likely to be a round bottomed bowl with a straight neck to a generally rolled over or slightly everted rim. The carination, separating the straight upper portion of the pot from the rounded lower part was missing. This type of vessel was storage for

food preparation where the pot sat directly in the ashes of the hearth. Interestingly Vessel 1 is also decorated, which is a rare occurrence on pots of this date in the west of Scotland.

The middle to the later Neolithic produced evidence of seven pots, Vessels 3, 6, 7, 8, 14, 16 and probably 15, all are decorated. During this period the pottery became noticeably much more substantial in construction than those from the early Neolithic, and with more coarse stone temper added to the clay allowing for the manufacture of larger, heavier and more robust vessels. These pots appear to have been bucket-shaped with possible rounded bellies and with an attempt to make flatter bases, as the sherds from Vessel 8 indicate. The decoration is most likely to have been all-over patterning, affecting rims as well as the external appearance of the vessels and does not appear to have affected the function of the pot. Vessels 8 and 16 were probably cooking pots from the evidence of sooting/carbonised food residues but both were also highly decorated. Vessel 15 may have been a bowl as a similar profile was noted on a vessel from Ford in Northumberland and a vessel of this period with an inturned rim and external decoration was identified from Meldon Bridge, Pebbleshire (Gibson 2002, 79).

Four Beaker Vessels, 1, 10, 11 and 12 are typical pots of the late Neolithic/early Bronze Age and are commonly found on both settlement and ritual sites of this period, usually represented by low sherd numbers. These are finer vessels than the middle to late Neolithic Impressed Wares, and display decoration carried out using twine or cord or a comb. Vessel 12 is slightly unusual in form having a straight to slightly bulbous rim to neck to body profile, and its decoration is simply vertical lines as well as horizontal ones just below the rim. A Northern 4 shaped Beaker from Skye has a similar but slightly more complicated decoration with plain fields between groups of four vertical lines (Clarke 1970, 368, no 730). Only Vessel 10 has evidence of carbonised food residues perhaps confirming its use in feasting, rather than as a vessel for containing human remains after a cremation.

Of the remaining six vessels, only two (Vessels 2 and 5) can be identified with any certainty as deriving respectively from the early and the later

Vessel No	Context	Description	Vessel type/date
Vessel 1	SF 2, context 004/355 fill of pit 354 in the west area	This single rim sherd weighs 7.7g with a maximum thickness of 6.6 mm. The fabric contains coarse white quartz, an unidentified black rock and other mineral temper, and organic material is also present. It is a weak round-topped rim with uneven moulding that indicates it may have been slightly everted around the circumference. Approximately 8-10 mm below the rim there are three incised parallel and horizontal lines. The neck and rim of the vessel are straight. The vessel probably had a good surface finish.	Beaker
Vessel 2	SF 3, 4 and 5, context 005 fill of pit 059 in the west area	A total of 24 body sherds weighing 96.8g with wall thicknesses averaging 12 mm form this vessel. The pottery contains very coarse unidentified rounded grit, probably gravel. Fragments of a roughly pinched carination were present otherwise the pottery was plain. The sherds are friable and may not have received more than surface smoothing. The firing temperature may have been fairly low.	Early Bronze Age
Vessel 3	SF 6, context 108, unstratified from the west area	This vessel is represented by a single rim sherd weighing 10.5 g and wall thickness of 8.8 mm. The clay contains quartz grits and organic temper. The rim is flat, decorated on its top, and angled from the interior to the exterior, and slightly everted with a concave moulding runnel beneath. The finishing of the pot surface does not survive. The decoration is created by the impressing the end of a small bird bone in three rows on top of rim. The decoration is divided by possible double fingernail impressions.	Middle to late Neolithic Impressed Ware
Vessel 4	SF 24, context 061 fill of posthole 141 from the west area	Two body sherds weigh 1.2 g, are very small but are probably from a vessel with an internally bevelled rim to a straight necked vessel. The piece is abraded but may have had a burnished finish. Its grits are coarse but unidentified. A line of fine incised bird humeri cross the edge of the rim with a similar line just below. The rim could have had an internal bevel that was decorated with hatched lines (fingernail?).	Middle to late Neolithic Impressed Ware.
Vessel 5	SF 29, context 163 fill of pit 180 from the west area	This single rim sherd weighs 14.7g with a wall thickness of 12.6 mm. It attained a diameter of c. 100 mm but only 5% remains. It has quartz and dolerite coarse to very coarse grits. The rim is rounded and everted, and is plain except for the decoration below the rim which is formed by an impressed cord. The sherd is well made and smoothed externally. Possibly an urn fragment.	Early Bronze Age urn
Vessel 6	SF 32, context 187 deposit from the west area	This is the top of an everted flat-topped rim that weighs 7.8 g. The pottery contains coarse unidentified light to dark grey rock. The vessel was smoothed before it was decorated but surface loss may have attributed to the loss of the rim. It has two rows of deep incisions (by a bird bone?) on its top. One row is clear and the marks parallel, the other is more haphazard.	Middle to late Neolithic Impressed Ware
Vessel 7	SF 35 and 36, contexts 215 and 216 fills of pit 217 from the central area	These two body sherds weigh 29.3 g with a wall thickness of 13.9 mm. They contain unidentified coarse/very coarse grits of stone with organic matter. The surface was smoothed prior to decoration although the interior is rough with grits showing through the surface. The pottery has a pink tinge to its exterior with a grey fire skin internally. It is decorated with fingernail impressions. One sherd has two and the other seven impressions. The larger piece suggests the decoration was in rough horizontal bands formed by vertical impressions.	Middle to late Neolithic Impressed Ware
Vessel 8	SF 37-52, 56-61, 63, 64 and 67, context 215 middle fill of pit 217 from the central area	This vessel comprised the largest number of sherds, 47 in total, of which 17 are base/base edge sherds, and nine decorated body sherds. The rest are body sherds with no rim sherds present. The sherds weigh 873.3 g. and their average thickness varies between 15.5 and 22.5 mm with the base/base edge sherds thicker still. The pottery contains coarse to very coarse unidentified dark grey stone, but with quartz rock, sand with some haematite and also vegetable matter. The pottery is poorly formed and finished. The surfaces are burnt, cracked and uneven with some pitting, flaking/abrasion leading to surface loss. There is evidence of some wiping by grass and smoothing. The decoration is predominantly deep closely-positioned incised marks made by a bird humerus. The marks on some sherds are poorly executed.	Middle to late Neolithic Impressed Ware
Vessel 9	SF 66, context 216 lower fill of pit 217 from the central area	These seven burnt sherds are slightly finer in construction than vessels 7 and 8. They weigh 95.6 g, but are heavily laminated and fragile. They were only found in the lower fill of the pit and are likely to be a separate vessel	Middle to late Neolithic?
Vessel 10	SF 89, 91b, 94 and 95, context 351 (359) fill of pit 352 and context 042 fill of pit 349 from the west area	A total of eleven body sherds weighing 33 g and with an average wall thickness of 7.1 mm comprise fragments of a decorated vessel. The fabric has fine-medium grits including mica and also vegetable matter. The sherds derive possibly from the neck, the body and towards the base (base edge) of the vessel. The decoration comprises closely positioned lines (up to 8) of horizontal and parallel cord impressions. Some internal sooting suggests it may have contained a burial.	Beaker

Table 4: Vessel descriptions

Vessel No	Context	Description	Vessel type/ date
Vessel 11	SF 90, context 004 fill of pit 354 from the west area	A single body sherd, weight 4.6 g and wall thickness of 8.1 mm is all that remains of this vessel. It contains fine to coarse grits but the pattern is wide spaced, with four incised lines of parallel cord decoration c. 4 mm apart. It is abraded and from a thicker vessel than Vessel 10.	Beaker
Vessel 12	SF 91a, 92 and 93, context 042 fill of pit 349 from the west area	This comprises 6 sherds including one rim sherd which weighs 66.2 g. Their average wall thickness is 11.6 mm. The coarse temper is unidentified. The rim is simply rounded and straight with the neck and body of the vessel. Only the rim is decorated with two parallel lines of cord impression just below the rim continuing four equally spaced vertical lines below.	Beaker
Vessel 13	SF 99, context 390 fill of posthole 391 from the central area	Three small body sherds comprise this vessel, which weighs 6.5 g. The fabric is coarse and includes diorite. Has a cross formed of two incised lines c. 1 mm wide with another line running through the centre. One small sherd may be a flat topped rim tapering to the body of the vessel. Uncertain date but possibly later intrusive material into the pit.	Bronze Age
Vessel 14	SF 108 and 113, context 198 fill of pit 447 and 446 fill of pit 449 from the central area	Five sherds weigh 153.9 g with a wall thickness of 12.4 to 20.4 mm. The fabric contains coarse to very coarse rock temper including quartz and diorite and organic material is present. The external surface is rough, with wipe marks clearly visible. There is surface cracking and one finger nail impression and moulding marks. There is some evidence of burning. The vessel is a large plain urn except for the rim which is in line with the body of the pot, suggesting it was straight sided. It measures c. 125 mm externally with c.10% remaining. The rim bevel is 31.2 mm wide and forms a deep lip to the interior of the pot. It is decorated with 11 parallel lines of incised cord on its surface and on each edge. Some of the lines are well executed others less well so. The curve on a body sherd indicates that it is near the base of the vessel, perhaps at the base edge, which could have been rounded. It and another body sherd have finger nail incisions (3 incisions in total) and are considered part of the same vessel.	Middle to late Neolithic
Vessel 15	SF 120b, context 505 fill of pit 528 in the central area	A probable body sherd with a weight of 1.7g and thickness of 7.8 mm is decorated. The sherd has coarse unidentified grits. It is decorated with two deep incised horizontal lines or grooves. The interior surface of the piece is lost. Both surfaces are slightly shiny and the internal surface is burnt.	Middle to late Neolithic Impressed Ware
Vessel 16	SF 120, 121, 122 and 125b, 126, 129, context 505 fill of pit 528 in the central area	50 sherds weigh 110.5g with only one having a measurable wall thickness of 16.7 mm. The stone temper is unidentified but it is coarse to very coarse. Organic matter has been identified in some sherds. The majority of sherds are body sherds, with one possible rim and one possible base sherd. Most sherds are highly abraded and fragmentary with loss of a surface. Many sherds are burnt, with a coating that makes them appear shiny but not hardened. SF 120c has a row of three irregular tear-drop shaped incisions. One sherd of SF 122 has two finger nail impressions and another (with two sherds from SF 125b) has a double incised decoration in two rows. The implement has been dragged. The pottery is similar to Vessel 8. It is possible that different vessels could be represented by the different motifs.	Middle to late Neolithic Impressed Ware
Vessel 17	Sample 10 from the 057 fill of pit 058 in the west area	The small body sherd weighs 5.1 g but its temper is not easy to see as it is highly abraded. The sherd is decorated with two horizontal lines of incised cord impression, either side of a small cordon. There is in addition single horizontal line of cord impression on the reverse indicating this sherd is from near the rim or neck of the vessel.	Early Bronze Age
Vessel 18	SF 111, unstratified from the north area	This body sherd weighs 7.1 g and has a wall thickness of 10.9 mm. It has coarse grits including quartz and organic material. This heavily abraded sherd is poorly preserved but it has faint traces of cord impression on its external surface. It could be a fragment of Beaker vessel, but is probably more likely to have derived from a decorated Bronze Age urn.	Early Bronze Age
Vessel 19	SF 33, unstratified from the eastern area	Small gently rounded rim weighing 7.7 g with a wall thickness of 8.7 mm. Straight rim to a slightly curved vessel. The fabric has medium coarse grits with slightly rounded grains including some quartz rock. The piece has carbonised food remains on the external surface. A well-made pot and well fired.	Early Neolithic?

Table 4 (continued): Vessel descriptions



Bronze Age. The characteristics of the remainder suggest they are also likely to be fragments of Bronze Age pots. Vessel 2 is cordon from a cordoned urn, suggesting a burial receptacle, and Vessel 5 is likely to be a bucket-shaped urn. Although the latter could have been for ritual purposes, there is no evidence to indicate it was used for food preparation.

### Vessel distribution and dating

There is a clear distribution of pottery across the excavated area. An early Neolithic unstratified sherd (Vessel 19) was found in the northern part of the site but it might have derived from elsewhere. During the middle to late Neolithic the western part was favoured but with activities of that period also noted in the central part of the area. The late Neolithic/early Bronze Age pottery was again predominantly centred in the western area, with an early Bronze Age urn (Vessel 2) and one from later in the period (Vessel 5). Only Vessel 18, a possible Bronze Age urn came from an unstratified context in the northern part of the excavated area, possibly indicating disturbance of its burial context.

This distribution indicates that a 50 m by 50 m square area covering the western and central parts of the investigation contained the majority of the pottery from all periods, and certainly all the Beaker sherds. This relatively small area was significant enough to be repeatedly revisited for activities associated with the digging of pits for hearths and probably feasting. One particular area had an arrangement of eleven features (pits and postholes) in two groups covering a 7 m by 4 m area (Figure 6) possibly a structure. Sherds of six vessels were recovered from the feature fills (Table 5). Radiocarbon dates suggested two periods of activity one at the beginning of the early Bronze Age c. 2341-2061 cal BC (SUERC 66894), and the other towards the end of that period and into the middle Bronze Age 1625 to 1500 cal BC (SUERC 66893) (see Table 1).

Pit	Vessel No.	Period
58	17	Early Bronze Age
59	2	Early Bronze Age
349	12 Beaker	Late Neolithic/early Bronze Age
352	10 Beaker	Late Neolithic/early Bronze Age
354	1 and 11 Beakers	Late Neolithic/early Bronze Age

Table 5: Vessels from an association of pits in the western part of the site

Another group of five pits and a posthole in the central area produced middle/late Neolithic Impressed Ware Vessels 7, 8 and 9 from the fill of pit 217 and Vessel 14 from pit 447/449 (Figure 5). Although Vessel 9 is possibly of similar date to the other two, its sherds are heavily burnt and in poor condition and this cannot be confirmed. However, two radiocarbon dates generated an acceptable time range (see Radiocarbon dating Table 1 and Table 6): a middle to late Neolithic date was returned for pit 217 (3336-3020 cal BC-SUERC 67236), and an range of 3310-2919 cal BC (SUERC 66900) for pit 446/449, which agreed with the pottery identified. Other middle to late Neolithic pottery was either unstratified (Vessel 3), or recorded from a posthole and a deposit (Vessels 4 and 6) in the west part of the site or from a pit in the central area (Vessels 15 and 16). Pottery of uncertain date (Vessel 13) was found in a feature group (Figure 4) in the central area with other loose sherds including SF 98 (with an unknown surface coating).

The main focus of human activity was the west/central area, which began in the fourth millennium BC during the middle Neolithic and ended sometime at the beginning of the first millennium BC towards the end of the later Bronze Age.

### Discussion and conclusions

The assemblage indicates activities from possibly as early as the early Neolithic, but more definitely from the middle and late Neolithic where nine vessels were identified, and into the early and later Bronze ages. This range of vessels is similar to collections recovered from pits from other recent excavations in South Ayrshire. Whereas the early Neolithic is better represented at Ladywell (Ballin Smith 2015b and forthcoming), both Ladywell and Monkton (Ballin Smith 2015a) produced interesting collections of middle to late Neolithic vessels (ten from the former and four from the latter). Although this pottery is considered relatively uncommon, these three sites have added another 23 vessels to the corpus of pottery from this period and from the west coast of Scotland (see references in Johnson 2010). The burial contexts of this pottery from Monkton were not dated, but two radiocarbon dates from Ladywell (Mooney forthcoming a) produced a span of potential currency between

Vessel No.	Feature	Radiocarbon dates at 2 sigma
1	Context 004/355 fill of pit 354 in the west area	Possible Beaker vessel SUERC 66894 3790±34 2341-2061 cal BC
2	Context 005 fill of pit 059 in the west area	Cordoned urn - early Bronze Age SUERC 66893 3282±29 1625 to 1500 cal BC
3	Context 108 unstratified from the west area	Middle to late Neolithic Impressed Ware vessel
4	Context 061 fill of posthole 141 from the west area	Middle to late Neolithic Impressed Ware vessel
5	Context 163 fill of pit 180 from the west area	Bronze Age (Bucket) Urn SUERC 66889 2866±29 1123-932 cal BC
6	Context 187 deposit from the west area	Middle to late Neolithic Impressed Ware vessel
7	Contexts 215 and 216 fills of pit 217 from the central area	Middle to late Neolithic Impressed Ware vessel
8	Context 215 middle fill of pit 217 from the central area	Middle to late Neolithic Impressed Ware vessel
9	Context 216 lower fill of pit 217 from the central area	Uncertain, middle to late Neolithic Impressed Ware? SUERC 67236 4457±29 3336-3211 cal BC
10	Context 351 (359/042) fill of pit 352 from the west area	Late Neolithic/early Bronze Age Beaker vessel
11	Context 004 fill of pit 354 from the west area	Possible Beaker vessel SUERC 66894 3790±34 2341-2061 cal BC
12	Context 042 fill of pit 349 from the west area	Possible Beaker vessel
13	Context 390 fill of posthole 391 from the central area	Uncertain
14	Context 198 fill of pit 447 and 446 fill of pit 449 from the central area	Middle to late Neolithic Impressed Ware SUERC 66900 4414±29 3310-2919 cal BC
15	Context 505 fill of pit 528 pit in the central area	Middle to late Neolithic Impressed Ware
16	Context 505 fill of pit 528 pit in the central area	Middle to late Neolithic Impressed Ware
17	Context 057 fill of pit 058 in the west area	Early Bronze Age?
18	Unstratified from the north area	Bronze Age Urn
19	Unstratified from the eastern area	Early Neolithic

Table 6: Summary of vessels, their location and date

3366 to 3037 cal BC for this pottery, which is comparable with the radiocarbon date of 3310-2919 cal BC for Vessel 14 from Ayr.

Not only are the radiocarbon date ranges similar but the vessels as well. The shape and decoration of Ayr Vessel 14 is very similar to those of Vessels 10 and 12 from Monkton (Ballin Smith 2015a, figure 6) and Vessels 16 and 18 from Ladywell (Ballin Smith 2015b). This indicates some degree of transmission of ideas, forms and motifs. A more detailed discussion of these pots, their comparison and their dates can be found in the forthcoming Ladywell publication (ibid).

Fragments of Beaker pottery with cord or toothed decoration are common on prehistoric archaeological sites throughout Scotland, but incised lines like Vessel 1 are perhaps less so. Most of the Beaker sherds indicate simple all-over cord (AOC) designs which could indicate the vessels are early in date. A small AOC Beaker was found at Rothes 2012 (Ballin Smith 2014, 10-11) and considered to be c. 4th/3rd millennium BC in date (Case 1977, Fig 4:3). However, Needham (2005, 183) dates them to c. 2500-2100 cal BC, between the end of the Neolithic and beginning

of the Bronze Age. The form of the Ayr pots is not known but it is plausible they could also be of this period but possibly associated with feasting (found in fire pits) rather than burial, as there is a paucity of evidence of the latter. Vessel 12 is unusual in its design and somewhat in its shape and this may indicate it is a later vessel and may be comparable to the Final Northern Beakers (N4) of Clarke's classification (1970, 368, no 1675, 543), or towards the end of the 19th or 20th centuries BC.

Fragments of later Bronze Age vessels demonstrate that activities, both ritual (urn fragments) and domestic (cooking pots), continued across the area, until somewhere between the 10th and 12th centuries BC, but the evidence is sparse and again predominantly from the western part of the excavated area.

What is interesting about this particular site is the continued use of the river terrace, at what may have been the lowest crossing point of the River Ayr, but affording protection, fresh water, yet a relatively open landscape and one with useful resources that was visited on numerous occasions throughout prehistory. This site is one of the few

riverside terraces that have been investigated in modern times, which has yielded comparable information to the raised beach areas down the South Ayrshire coastline. The use and reuse of pits, the burials of sherds of different vessels in the same pit, indicate there was more than sitting around a fire in a large pit while eating or drinking. There were actions and beliefs associated with the cleaning out of fire pits and their closure, and the role a pot or specific sherds of a single pot played in these actions. Why or how pieces of pottery were chosen is another unknown. However, the more sites like this are excavated and produce pottery, and other artefacts, that can be dated by association or through radiocarbon dates, the more we learn about the common cultures that existed in the past. The clear similarities of some pots and their decoration, suggests social inclusion among communities along the west coast and interchange of pottery styles and ideas, and presumably belief systems. However, we do not know whether pots were used on more than one occasion, or whether new ones were made for annual or seasonal activities. Whatever the activities were for on the river terrace, decorated pottery played an essential part and tells us these were not isolated actions, but part of much larger local or regional events that were often repeated.

## Lithic assemblage

by Torben Bjarke Ballin

### Assemblage

From the excavations 84 lithic artefacts were recovered. They are listed in Table 7. In total, 88% of this small assemblage is debitage, whereas 6% is cores and 6% tools.

### Raw materials – types, sources and condition

Most of the assemblage is flint (54 pieces), supplemented by some chert (13 pieces), chalcedony/agate (eight pieces), quartz (eight pieces), and one piece of coal or jet. The flint is dominated by local material, but 12 pieces (or almost one-quarter) were defined as probably Yorkshire flint. The identification of the Yorkshire flint is based on a number of different factors, such as high quality (vitreous, pure), large size, colour (grey), and the fact that half of the 12 pieces have soft cortex, suggesting procurement from a primary source (Ballin 2011). However, it should be borne in mind that it can be difficult to distinguish between some forms of Yorkshire and Antrim flint. The cortical pieces of local flint generally have abraded cortex, indicating procurement from a pebble source.

	Flint	Chert	Chalcedony/agate	Quartz	Other	Total
<b>Debitage</b>						
Chips	18	4	2	4	1	29
Flakes	20	7	4	4		35
Blades	1	1				2
Microblades	1					1
Indeterminate pieces	5		2			7
<b>Total debitage</b>	<b>45</b>	<b>12</b>	<b>8</b>	<b>8</b>	<b>1</b>	<b>74</b>
<b>Cores</b>						
Single-platform cores		1				1
Bipolar cores	4					4
<b>Total cores</b>	<b>4</b>	<b>1</b>				<b>5</b>
<b>Tools</b>						
Scale-flaked knives	1					1
Microburins	1					1
Piercers	1					1
Pieces w invasive retouch	1					1
Pieces w edge-retouch	1					1
<b>Total tools</b>	<b>5</b>					<b>5</b>
<b>TOTAL</b>	<b>54</b>	<b>13</b>	<b>8</b>	<b>8</b>	<b>1</b>	<b>84</b>

Table 7: General artefact list

The chert, chalcedony/agate and quartz are all thought to represent locally available material, with the chert deriving from sedimentary rock forms and chalcedony/agate from igneous rock forms, whereas quartz would be available from all three main types of rock, sedimentary, igneous and metamorphic. The black water-rolled piece defined as either coal or jet may well be coal from local seams. Another piece, SF 31 originally defined by the excavator as possibly shale, was identified as coal and discarded.

Eight pieces of chert, chalcedony/agate and quartz were characterized as water-rolled, whereas none of the more numerous flint artefacts are rolled. It is possible that this is a chronological indicator, where the water-rolled pieces are generally early (one possibly early Mesolithic microburin was found), whereas most of the flint may post-date the Main Holocene Transgression (the Yorkshire flint and the blade-based scale-flaked knife may date to the later Neolithic) (see dating section).

Seventeen pieces (or one-fifth) of the flints are burnt, and seven of these pieces were defined as heavily burnt or vitrified (superficially melted). Five of the latter have soft cortex, indicating a late date. It is a well-known fact that lithic artefacts fall into domestic fires and become lightly fire-crazed during the production or use of lithic implements, whereas vitrification is usually associated with either cremation burials or industrial processes (metal-working, glass or ceramic production, or lime production). The fact that the heavily burnt pieces tend to be large, and either plain or unworked with soft cortex, may suggest importation from the south of flint for industrial purposes. This suggests a possibly a late date (even medieval or post medieval).

## The assemblage

### Debitage

The 74 pieces ofdebitage include 29 chips (39%), 35 flakes (47%), three blades and microblades 4%), as well as seven indeterminate pieces (10%). No preparation flakes (crested pieces or core tablets) were recovered. The raw material composition of thedebitage reflects the composition of the assemblage as a whole (see above).

Most of the technologically definable unmodified and modified flakes and blades are either hard percussion or bipolar specimens, supplemented

by three blades and microblades manufactured by the application of soft percussion. As the assemblage is numerically small, and as most of the blanks are broken, it is not possible to estimate the average dimensions of the variousdebitage and blank categories. However, the Mesolithic microburin is definitely based on a broad blade (width 10.4 mm), and the scale-flaked knife is also based on a broad blade (width 8.5 mm), although this broad blade is unusually narrow, considering its use as a knife blank.

No preparation flakes (crested pieces and core tablets) were retrieved from Ayr Academy.

### Cores

The assemblage only includes five cores: one single-platform core in chert and four bipolar cores in flint. The single-platform core SF 149 measures 44 by 27 by 32 mm, and it is based on an abraded chert pebble. It has its narrow flaking-front at one end of an elongated platform, technically defining it as a handle-core (for discussion of this core type, see reports on the assemblages from mainly Mesolithic Nethermills Farm, Aberdeenshire, early Neolithic Gathdee Road in Aberdeen and Mesolithic/middle Neolithic Monksford in the Borders; Ballin 2013; 2016; Ballin and Barrowman 2014). This piece is a blade-core from which only a few blanks were detached.

The four bipolar cores SF 72, 138, 140, 141 are all in Yorkshire flint (several have soft cortex), which may indicate how precious this imported raw material was. After production of blade blanks from blade-cores, these cores would have been exhausted completely by the application of bipolar technique. These cores measure on average 27 by 18 by 11 mm, and they are evenly distributed across unifacial and bifacial specimens. They all have one reduction axis (set of opposed terminals), indicating that they were not re-orientated during production. Interestingly, three of the bipolar cores were recovered from linear ditch 534, along with three blades and flakes which are also in Yorkshire flint.

### Tools

Only five tools were recovered from the site, including one scale-flaked knife, one microburin, one piercer, one piece with invasive retouch, and one piece with edge-retouch. They are all based

on flint; the knife and the piece with invasive retouch may be in Yorkshire flint.

The scale-flaked knife SF 70 (CAT 10, Figure 10) is the proximal fragment of an elegant soft percussion blade (18.2 by 8.5 by 4 mm) with neat scale-flaking along its entire right lateral side. The scale-flaking probably represents the cutting-edge of the implement. The microburin SF 109 (CAT 26, Figure 10) is based on the proximal end of a broad soft percussion blade (14.8 by 10.4 by 2.3 mm). It is a standard, well-executed microburin, with the remains of a regular retouched notch in its right lateral side, and a typical oblique microburin facet in its left lateral side. The piercer SF 76 (CAT 14, Figure 10) is an elongated primary hard percussion flake (20 by 11 by 6 mm) with steep retouch along both lateral sides. This retouch meets at the distal end to form a piercer tip. The outermost part of this tip has broken off. SF 78 (CAT 16, Figure 10) is an indeterminate flake fragment (21 by 19 by 7 mm) with invasive retouch along one edge. It cannot be ruled out that this is the broken-off terminal of a bipolar core like the ones described above. SF 73 (CAT 13, Figure 10) is the split off cortical face of an indeterminate flake (greatest dimension 16 mm) with some surviving edge-retouch along one edge.

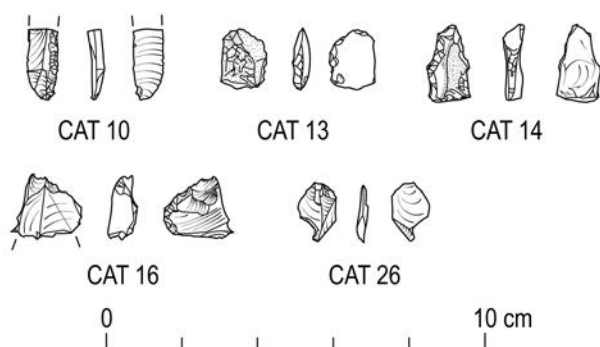


Figure 10: The lithics

### Technological summary

This summary is based on information presented in the raw material, debitage (tool blanks), core and tool sections above. The analysis of the lithic finds shows that local as well as exotic flint was procured for the production of implements. The assemblage clearly represents several visits to the site in prehistoric times, but due to the small numerical size of the assemblage, and the palimpsest nature of the site, it is not possible to construct any detailed operational schemas

linked to any of these Mesolithic to early Bronze Age visits to the location.

In general terms, the collection shows that broad blades were produced at the site, with some probably dating to the early Mesolithic period and some to the later Neolithic (see dating section). A number of different technological approaches have been identified at the site, such as soft percussion, hard percussion, and bipolar technique, and tool modification was carried out as edge-retouch as well as invasive retouch.

### Distribution and activities

Due to the palimpsest nature of the location, it was chosen to focus on the distribution of a small number of elements relevant to the dating and interpretation of the site.

Microburin SF 109 (CAT 26) was recovered from the topsoil in the site's central part and therefore offers little information apart from the fact that it indicates a Mesolithic presence at the site. Single-platform core SF 149 was found in pit 536, but as this feature also included a piece of slag (SF 130), the core may simply represent residuality in a late prehistoric or historic period pit. The scale-flaked knife SF 70 (CAT 10) was retrieved with prehistoric pottery from pit 217, and these finds were preliminarily dated by the excavator to the early Bronze Age. However, the fact that this well-executed piece is based on a neat blade suggests an earlier date, as the production of proper blades had ceased by the Neolithic/Bronze Age transition, unless this lithic object is a residual piece in a Bronze Age pit.

The exotic flint was recovered from a number of different contexts, such as:

- Pit 217: The scale-flaked knife (Cat 10) and one bipolar core.
- Pit 449: (immediately east of pit 217): Simple flake.
- Pit 059: Simple flake.
- Pit 136: Simple flake.
- Pit 291: Piece with invasive retouch.
- Pit 534: Six pieces, three of which are bipolar cores.

Some of these features include prehistoric pottery which may allow them to be dated in relative terms, whereas charcoal provides absolute dating for three of the pits (217, 449 and 059, See Table 1).

Burnt flint was retrieved from a number of contexts across the site, with seven pieces being defined as heavily burnt or vitrified. As mentioned above, the heavily burnt/vitrified pieces may relate to later times and industrial processes, and this suggestion is supported by the recovery of four of these pieces from Context 558. This context also included white-glazed pottery and slag-like fragments. The interpretation of the heavily burnt/vitrified pieces as products of industrial processes is also supported by the completely glazed surface of SF 142 (unstratified, SW extension), as well as the fact that this glaze has rust-coloured inclusions.

## Dating

The assemblage only includes a small number of diagnostic elements. Microburin SF 109 is definitely Mesolithic (e.g. Butler 2005; Ballin 2013), and the fact that it is based on a broad blade rather than a narrow one makes an early Mesolithic date more likely than a late Mesolithic one (e.g. Ballin 2012; 2013; Saville et al. 2012). Scale-flaked knife SF 70 is dated by its invasively retouched cutting-edge to the framework Neolithic/early Bronze Age, but the fact that it is based on a proper blade suggests a pre-Bronze Age date which was corroborated by the radiocarbon dating. Blade-based scale-flaked knives are commonly found in later Neolithic contexts (Manby 1974, 88; Ballin 2011). Single-platform core SF 149 was for the production of relatively narrow blades, suggesting a date within the later Mesolithic/early Neolithic bracket (Butler 2005).

The systematic exchange of flint over large distances is predominantly a post Mesolithic phenomenon, with the trade in Antrim flint seemingly being a largely early Neolithic phenomenon, although more research into this lithic raw material is clearly needed (Saville 1999a; 1999b). Yorkshire flint is predominantly a later Neolithic phenomenon (Ballin 2011).

Recovered pottery suggests that the site was also visited in the Bronze Age as well as in later

prehistoric/historic times, and the industrial processes indicated by the heavily burnt/vitrified flint may well be as late as post medieval times.

## Discussion

Although it may be possible to date individual features to specific periods, the site as a whole is clearly a palimpsest, representing visits to the site over a long period indeed. As indicated by the worked lithics, these periods include the Mesolithic to early Bronze Age framework, but pottery and burnt flint suggest that the site was also the focus of activities in later, even post medieval, times. Due to the numerically small size of the assemblage, in conjunction with the palimpsest character of the site, the lithic collection has little research potential other than informing us that the location was visited on numerous occasions in the past.

## Shale analysis

by Fraser Hunter

### Description

SF 31 is an unfinished bangle of cancelloid shale which split horizontally around its mid-point during final polishing. Rounded D-section; the rounded inner edge has circumferential and some vertical abrasion scars; the outer edge is close to finished, but the surviving face has extensive abrasion marks and, towards the ends, some variation in thickness which suggests deeper facets which were being polished out. Length 53 mm, width 12 mm, height min 6.5 mm; internal diameter 50-55 mm (28% survives). Conchoidal fracture and laminar structure suggest it is cancelloid shale.

### Discussion

One fragment of shale jewellery was recovered from the site: an unfinished bangle of cancelloid shale. It is likely to be from a local source as such materials are common in Coal Measures geology. The bangle broke near the end of the production process, in the final polishing stages. Its diameter suggests it was probably intended as a female ornament (Figure 11).

The bangle comes from a pit fill (163) radiocarbon-dated to the late Bronze Age (1123-969 cal BC). However, as discussed in the radiocarbon dating section, this date is unreliable. When dating

such items; many are from old excavations or are unstratified finds, making it very difficult to understand chronological variations in the use of this long-lived jewellery type. While most common during the Iron Age, there is other evidence for the use of such bangles in the late Bronze Age. For instance, such bangles were found in the hoards of St Andrews (Fife) and Heathery Burn (Co Durham; Cowie et al. 1991; Greenwell 1894, 106), while examples from settlements are spread widely across the country. To the south, there are bangles from Yorkshire sites such as Thwing (Manby 1980, 322). Few Scottish examples come from well-dated contexts, but one may note a shale bangle roughout from late Bronze Age levels in excavations at Larkhall, South Lanarkshire (Moonie forthcoming b) and, to illustrate their widespread use, from late Bronze Age/early Iron Age levels at Mavis Grind on Shetland (Cracknell and Smith 1983, fig 9 no 28).



Figure 11: SF 31 the shale bracelet

Jewellery of shale and related materials is very common in Ayrshire in later prehistory (though little is well dated) because of the ready availability of raw materials, so the bangle fits into a well-attested local pattern of shale jewellery manufacture and use (e.g. Hunter 1998, 51). The presence of only a single find suggests small-scale, intermittent manufacture rather than centralised production; it is possible that the roughout was prepared elsewhere and only brought to site for final finishing, but a bigger assemblage would be needed to confirm this.

## Worked Stone

by Beverley Ballin Smith

Six pieces of stone retrieved from the centre of the excavation area were worked or struck (Table 8). All are prehistoric, most probably all of middle to late Neolithic date.

SF Number	Context	Description
110	Fill 198 of pit 437	Large sub-angular fragment of quern or mortar
114	Fill (446) of pit 449	Struck cobble
115	Topsoil (002) over pit 449	Struck cobble
116	From subsoil	Non-joining fragment of quern or mortar

Table 8: The worked stone

SF 110, a fragment of stone mortar or quern was found in the fill (198) of pit 437 (Figure 5) in the central area of the site, which also contained middle to late Neolithic Impressed Ware vessels 14 and 15. The pit was closely connected to adjacent pits containing similarly dated pots. The stone is an irregularly-shaped piece of blonde, medium-coarse sandstone that had latterly been used as a hollowed mortar, but earlier had been a quern, which rested on the ground as its lower surface is curved. Originally, the piece may have been much bigger but the surviving piece is a wedge-shaped boulder fragment with a slight hollow. The edges around its upper worked surface as well as its surviving end were chipped and pecked to shape it. The evidence of the finely ground worked surface towards the upper edge of the stone indicates that it was earlier used as a quern. The stone has broken across its thinnest part possibly through the pressure of being worked.

The wear on the upper surface of the stone is slightly unusual includes two broad shallow grooves that run across it from side to side, rather than the traditional hollowing caused by friction when being rubbed or ground from end to end. The grooves are between 50 and 60 mm wide, and up to 10 mm deep and suggest that a narrow stone, perhaps an elongated pebble or ground-ended pestle was rubbed across the stone to create them. The grooves indicate that the stone was reused as a mortar after it had broken.

Subsequent damage on one side may have been the product of it being used as a packing stone, or the stone has been chipped and broken through the action of deep ploughing. The stone weighs 6.5 kg and measures 280 by 260 by 130 mm.

SF 116, most likely a non-joining part of SF 110, was found at the bottom of the subsoil near pit 437. It is a wedge-shaped piece with upper concave surface ground smooth. It weighs 173 g and measures 75 by 65 by 69 mm. It had lain close to the surface of the present ground layer and is marked on its lower surface by plough scars. Ploughing may have broken this piece off the larger stone SF 110.

SF 114 from the fill (446) of the adjacent pit 449 to the south was a dense cobble of very fine-grained igneous/metamorphic rock with smooth and shiny surfaces, which has been struck and shattered into three sharp-edged irregular fragments. SF 115, a piece from the topsoil above the pit (449) is a non-joining part of the same cobble.

## Discussion

The archaeological remains found at Ayr Academy, indicate that the area had been used throughout prehistory. The position of the site on an elevated but flat river terrace is essential in partly explaining the richness in quantity and variety of archaeological features found there. Rivers as well as the sea were the main means of communication during prehistory, as the land had extensive woodland cover. The presence of a river crossing south of the site could have facilitated communication between both banks as well as further afield. The additional access to the sea that the river would have offered made this situation valuable. Previous archaeological remains found in the vicinity of the site and along the River Ayr, support the central role of the river in a prehistoric human landscape. Moreover, the paucity of known archaeology in the vicinity mostly identified as spot finds (i.e. the flint blade from Holmston and a bronze axe from Overmill) emphasizes the density and importance of the remains found at the Ayr Academy site. The location had some advantageous features, conditions and resources that made it ideal for people to use and occupy repeatedly.

During prehistory, the evidence for the use of the site varied through time, with some periods leaving only sparse traces and others represented by more significant features. The palimpsest nature of the site is probably the main reason for this disparity in preservation as well as some of the discrepancies between dates in some of the features.

## Mesolithic remains

Towards the west and central areas of site, the small finds and radiocarbon dated features demonstrated a presence of human activity dating to the late Mesolithic. The reason why this nomadic hunter-gatherer/fisher society visited or occupied this site remains unknown as none of the evidence retrieved suggests any particular function or activity. However, the mere existence of these remains is important, as evidence from this period can be scarce due to the seasonal nature of some of the sites. Similarly dated sites found in the vicinity include scattered lithic finds discovered north of the site at Monktonhead Farm (NRHE: 6249, 6261) as well as further north in Loans, Troon (NRHE: 6564). Recent excavations at Main Street, Monkton also provided Mesolithic evidence through radiocarbon dating and the occurrence of microliths (Rennie 2015).

## Neolithic remains

Evidence of the use of the site through the Neolithic period is varied, although all periods are represented. Early Neolithic remains were recorded either as small finds or implied by the large concentration of oak and/or the presence of copious number of hazel nutshells recorded in some fills of pits.

The most significant and frequent remains from this period were dated to the middle to late Neolithic, either through radiocarbon dating or by material cultural associations. They were concentrated in the central west area of the site and in the SW extension with isolated Impressed Ware pottery fragments recovered from features in the west and at the east side of the site. Remains of settlement were apparent in the structural elements present in the centre of site, with larger posts most likely constructed from oak and smaller timbers of birch and hazel, possibly used for wattle screens or fences. The measurements



and shape of this possible structure (Figure 4) were similar to the oval buildings found at Beckton Farm, Lockerbie, Dumfries and Galloway (Pollard 1997) and Cowie, Stirling (Atkinson 2002), where most structures measured 2.7-4.4 m long by 2-2.8 m in width. However, remains of modern seeds, coal and clinker recovered within these features, suggest probable contamination. It is possible therefore that the pattern they form is entirely coincidental, and while some features might represent Neolithic occupation, others might be later in date.

Further east, a cluster of five pits exhibited intensive burning activity was identified. Their fills, rich in hazel nutshells and mixed fuel deposits, were evidence of a large-scale processing of hazel nuts for food, supported by the discovery of quern fragments in pits 437 and 449. Radiocarbon dates obtained from samples from two of these pits gave a middle to late Neolithic date range, which was supported by the material culture recovered. Although no reuse was noted in any of the features, the truncation of the oldest dated feature (217) suggests that this particular area was used during different seasons, which could correspond to the radiocarbon dating time span (see Table 1).

The survival of some of the finds, particularly the scale-flaked knife, and the presence of fragments of Impressed Ware pottery, some of them burnt, suggests a possible ritualistic meaning to the seasonal gathering, processing and possible feasting of the wild resource of hazel nutshells. The presence of three different vessel fragments in pit 217 reinforces this idea. The role that these finds played in what we consider a mundane activity is controversial. Some authors consider that these finds were accidentally included in the fills throughout everyday activities (Conolly and MacSween 2003) while others suggest that they were intentionally added as structured depositions (Alexander 2000). However, as stated by Pollard (1997) the differentiation between ritual and domestic during the Neolithic period might not have been as clear cut as we assume. In recent years, a hypothesis merging both the ceremonial and domestic activities has emerged (Brophy and Noble 2012). This proposes that everyday activities, such as processing food could have a ritualistic meaning (or actions). The high concentration of hazel nutshells as

well as the material culture present in these pits might represent the remains of a feasts or/and offerings. They could also symbolize the end of a seasonal gathering.

The similarities between the vessels shape and decoration and the radiocarbon date ranges identified between Ayr and other sites along the west coast of Scotland, including Monkton, Ladywell and Girvan, indicate a flow of ideas, techniques and possible beliefs. It might also signify a cultural affinity between these separate groups of people or the seasonal movements of particular groups. Moreover, the presence of Yorkshire flint in the lithic assemblage indicates an inter-regional trade between Ayr and Yorkshire, also apparent at Monkton (Rennie 2015).

### Bronze Age remains

The fragments of two Beaker vessels as well as a cordoned vessel and an urn found in the group of features forming a trapezoidal structure on the north-west side of the site, suggest its use as a ritual or burial ground (Figure 3). The high number of fired clay pieces recovered indicates that a wooden frame with daubed walls may have been constructed using the pits as bases for load-bearing timbers. The lack of cremated human remains associated with the pits could be the result of detrimental taphonomic conditions or could indicate that human remains were simply not present. Some authors have speculated about this possibility, although it is associated more often with empty cists rather than pits (Pollard 1999; Duffy 2007, Bailie 2013). A similar site, Sandy Knowes, discovered in 1867 c. 900 m to the west of Ayr Academy, included a cist with a biconical food vessel, which was also empty of human remains (NRHE: 6392).

The large amount of hazel nutshell, often linked with Neolithic features, found in one of the pits (359) implies that the exploitation and preparation of this gathered food resource carried on into the Bronze Age. The deposition of a significant number of pottery sherds from the two Beakers and other vessels, together with the hazel nutshells suggests a possible offering or feasting conducted prior to, during or after the burial rite. Evidence of food residues identified on Vessel 10 from pit 352, supports this interpretation. There have been a few examples of Bronze Age Beakers with either honey, mead or a flavoured

drink present on them such as Home Farm, Udny Green, Aberdeenshire (Murray and Shepherd 2007). Some Bronze Age human burials, either cremations or inhumations, have also been found with animal bones, such as Abbey Mains Farm (Lawson et al. 2002) and Glennan, Kilmartin (MacGregor 2003). The lack of a hearth or signs of scorching noted on the subsoil surface indicates that no cremation process or pottery production occurred within the structure. Instead, it seems that it might have acted as a shelter during the possible feasting/offering act, as waste deposits and smaller hazel nutshell remains suggest.

During the Bronze Age the identity of the individual became prevalent as opposed to the communal identity displayed by Neolithic societies (Brophy and Sheridan 2012). It is possible that an individual or individuals used the site, considered as special because of its association with their ancestors and to reinforce their ownership or connection to the landscape that had wild resources and an excellent position. A flanged Bronze Age axe found on the shore of the River Ayr (HER: 6287), might suggest a votive ritual offering, as examples of metalwork deposition in areas of the landscape considered special are known across Scotland (Cowie 2004).

## Conclusion

The excavation at Ayr Academy revealed a site that is a palimpsest, but it is one of the earliest multiple use and complex prehistoric sites in this area on the west coast of Scotland. Previously, only prehistoric spot finds had been discovered in the vicinity. The quantity and quality of the archaeological remains encountered at Ayr Academy, offer a glimpse of the prehistoric landscape around present-day Ayr, even though the picture is distorted by the palimpsest nature of the site.

The topography was probably one of the defining factors in the use of this location. The well-drained higher ground of the raised beach, the closeness to the River Ayr (fresh water, communication and food) and the sea (food and communication), its elevated position and the good views from it (defence) would have been important. The available wild resources in form of food (hazel nuts) and woodland (for fires and shelter) would have also played a significant part in people using the landscape. Other similar and

roughly contemporary palimpsest sites, both in raised beaches, have also been discovered at comparable topographical and geographical settings such as Monkton and Barassie (Arabolaza 2017).

The longevity of the site across the different periods of use, either continuously or intermittently, suggests that the strategic and/or value of Ayr Academy as a useful location did not diminish over time. However, during early prehistory people seemed to have gathered there due to its availability of wild resources including hazel nutshells, whose exploitation and preparation during the Neolithic features supports this. During the Bronze Age, however, the value of the site and its use changed to one of a ritualistic landscape, as suggested by the possible burial/ritual ground.

The discovery of this site at Ayr Academy is important because of the numerous archaeological features, its material cultural remains and the broad time span covered by it. It also provided an opportunity to understand the landscape, its changes and different uses through time, and its relationships to other sites in the area. The unexpected wealth of information at this one site might help to highlight potential areas where surviving evidence of our past might be found in the future.

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