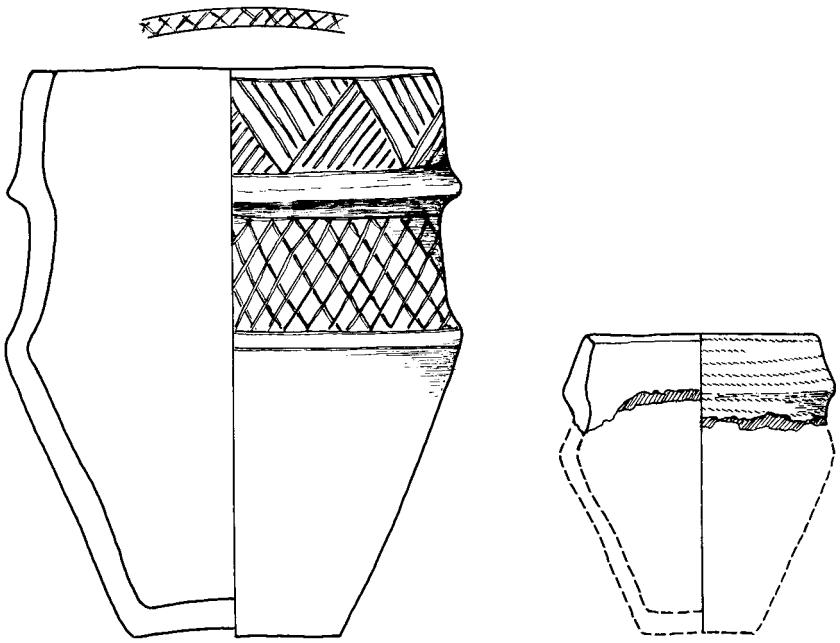
AN EARLY BRONZE AGE CREMATION CEMETERY AT BLAEN-Y-CAE, BRYNCIR, GARNDOLBENMAEN, GWYNEDD:

GAT Project No. G1653

Report No. 518



Bronze Age burial urn and accessory vessel from Blaen-y-cae, Scale 1:4

Prepared for R.M.C. Ltd

By G.H. Smith

February 2004

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EXCAVATIONS IN ADVANCE OF GRAVEL EXTRACTION, JANUARY 2003

GAT Project No. G1653

Prepared for R.M.C. Ltd, August 2004

By G.H. Smith, with reports on the geophysical survey by D. Hopewell (Gwynedd Archaeological Trust), on the human bones by M.P. Wysocki (Department of Forensic and Investigative Science, University of Central Lancashire), on the pottery by F.M. Lynch (Halfway House, Halfway Bridge, Bangor), on the pottery fabrics by Dr. D. Jenkins and on the charcoal by Pat Denne (School of Agriculture and Forest Science, University of Wales, Bangor).

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ILLUSTRATIONS

1. SUMMARY

An archaeological watching brief prior to gravel extraction identified five charcoal-filled pits and another pit containing a decorated pot of Early Bronze Age style. Exposure of a wider area revealed five more pits and several shallow hollows and spreads. Excavation revealed in total two pits with urns, three pits with cremations but no pots and six charcoal-filled pits with no pots and no cremations. Radiocarbon dates from three pits confirmed that this was a small cremation cemetery of the Early Bronze Age, in use within the period 2100-1750 BC.

2. PROJECT BACKGROUND AND ACKNOWLEDGEMENTS

Gravel extraction has been taking place at Bryncir for many years and a number of archaeological finds have been made, the most significant being the remains of the Roman fort of Pen Llystyn. Recent extensions of the quarry have been preceded by archaeological assessment and watching briefs provided by Gwynedd Archaeological Trust at the request of RMC Ltd. The excavation reported here resulted from one of these watching briefs and was carried out thanks to funding from RMC Ltd. Thanks must also go to Gareth Davies, Manager of the Bryncir Quarry for his co-operation and help.

3. ARCHAEOLOGICAL AND TOPOGRAPHIC SETTING

The site is situated on the farm of Blaen-y-cae (SH48264523), 2km to the north-west of Garndolbenmaen. The area comprises gentle slopes at the west side of Mynydd Graig Goch, the westernmost outlier of the Nantlle Ridge. It overlooks the broad valley of the Afon Dwyfach and this and the area around it provided a relatively productive agricultural area that would have been attractive to prehistoric settlement, particularly along the better-drained lower slopes of the mountains, which the pre-19^{h} century road followed before construction of the present A487 road (Fig. 1).

The area between Bryncir and Garndolbenmaen is particularly rich in archaeological remains of all periods. The earliest period is that represented by a Neolithic polished axe found on the land of Dafarn Faig about 1km to the north. On the same farm have also been found a perforated stone, a hammer-stone and several spindle whorls, all probably of Bronze Age date. Another, more spectacular find of the Early Bronze Age was a well-preserved decorated gold lunula, a crescentic-shaped neck ornament, the only example of such object known from Wales. It was found in the peat on Llecheiddior-Uchaf Farm about 1km to the south-west, in the valley immediately west of Bryncir. This object, probably an import from Ireland, was probably a ritual deposit and points to the existence of a wealthy community in the area. There are also a standing stone and a possible burial cairn on Llystyn Gwyn farm adjoining Blaen-y-cae to the north. The hill at Bryncir to the west is a prominent landscape feature and was used for burials in the second millennium BC. In 1821 a stone edged cairn was found there, within which was a line of ten stone cists covering urns containing cremation burials, one with a piece of copper or bronze, all unfortunately now lost (Evans 1923). Other Bronze Age pottery has also been found during gravel quarrying at Bryncir (Griffiths 1959) and during excavation of the Roman fort there in 1960 (Hogg 1969). The settlement to which these burial features belonged was likely to be nearby and possible evidence of such settlement is to be found in the shape of several mounds of burnt stone mounds to the north at Llystyn Gwyn and there are others to the south-east and south suggesting an extensive area of activity. This type of feature is thought to derive from long-term communal cooking activities and of a variety of ages although most of those excavated have been found to be of the Middle or Later Bronze Age (Davidson 1998). There are also remains of a number of stone-built roundhouses nearby at Cefn Trefor Uchaf just to the east and on the slopes of Mynydd Graig Goch (Fig. 1). There are others to the south at Llystyn Uchaf and towards Garndolbenmaen. Some of these may represent the Bronze Age settlement to which the burials and finds belong although past excavations suggest that most of these stone-built round houses belong to the late first millennium BC or to the Roman period while those of the Bronze Age were of timber and have not left any recognisable remains in the present landscape.

The value of the Bryncir area as a good area for agriculture, because of the good drainage of the soils on gravel and for its commanding position in relation to routes from north to south is also demonstrated by its choice for the Roman fort in the first century AD. The original fort, now destroyed, was an auxiliary fort founded about 80 AD, but burnt down soon after. It was subsequently rebuilt as a fortlet for a small garrison between about 100 and 130 AD, but abandoned again within a short period (Hogg 1969). Pen Llystyn is also believed to have been some kind of centre of authority during the early medieval period, the *Llys* in the name referring to a

court, possibly based on an enclosure on the site of the Roman fort, of which there were tentative remains recorded during the salvage work on the fort (Edwards and Lane 1988). The name Llystyn derives from *Llys Dun* – Court of the fort. The importance of the site is supported by the presence of a number of sites of rectangular platform houses of medieval type in the vicinity and of an important inscribed stone of 6-7th century date on the farm of Llystyn Gwyn, suggesting that there was some kind of ecclesiastical foundation here.

Dolbenmaen 2km to the south-east, was itself an important medieval centre at the bridging point of the Afon Dwyfor where it flows through a fairly narrow pass. There are small fortifications that are thought to be of Early Medieval date on both of the rocky crags overlooking the bridging point and there is also the motte or earth mound of a small earthwork and timber castle there, next to the bridging point.

4. THE WATCHING BRIEF

The excavation resulted from a watching brief during stripping of topsoil for an extension to the gravel quarry. An area of approximately 50m by 120m was stripped of which the majority was sterile with no archaeological features present. However, six small pits were uncovered at the very edge and within the north-east corner of the stripped area. The pits were visible because of a very dark fill, which showed up clearly against the mid-brown silty subsoil. The pits lay in a scattered line about 3.5m long aligned approximately north-west to south-east. Five smaller pits varied from 0.25m to 0.30m diameter. These were filled with a black charcoal-rich soil also containing burnt bone fragments and were identified as probable human cremation burials, for which a date within the second millennium BC would be expected. Close to the line of charcoal-filled pits another slightly larger pit was revealed, about 0.40m diameter in which could be seen the outline of a large pot, which was likely to be another cremation burial but in an urn. A piece of the pot disturbed by the machine was identifiable as part of the rim of a decorated Collared urn, a type of pot in use in the Early Bronze Age, in the first half of the second millennium BC. The position of these features, at the edge of the excavation, and their compact layout suggested that they formed part of a wider area of such burials that would extend into the adjoining unexcavated area where they would be affected by future gravel extraction. Such burials are sometimes found in open 'urnfields', occasionally in considerable numbers but ten to twenty might be expected. Similar burials are also found under, within and around burial mounds or cairns (round barrows) and it is possible that such a barrow could have been removed as part of agricultural clearance but even so some trace usually remains, such as a quarry ditch, stone spread or deeper topsoil, none of which are present here. Another alternative was that the line of pits might be part of an arc of burials around some central feature such as a primary burial, lying further to the north. If so then the circle seems likely to be between 10 to 20m diameter.

It was subsequently agreed that further evaluation should take place comprising a geophysical survey of the remainder of the field to look for evidence of other possible features and excavation of an area of about 225 sq. m centred around the known burial pits, the results of which are described below.

5. THE GEOPHYSICAL SURVEY

by David Hopewell

Specification and Project Design

The basic requirement was for fluxgate gradiometer survey of the area prior to topsoil stripping in order to attempt to identify any further archaeological features. Gradiometer survey has the advantage of being non-invasive and relatively swift. It is ideal for detecting larger scale features but can only detect smaller features such as cremations and burials under ideal conditions because of the relatively course resolution (0.5 x 1.0m) of area survey. Associated features such as enclosures and denuded barrows can, however, be detected and thus provide valuable supporting evidence. It should be noted that areas of burning also produce strong magnetic anomalies. The quality of the results is also affected by soil types. A survey carried out close to the Roman fort of Pen Llystyn, about a mile to the west of the current project produced acceptable results suggesting that soils in the area are generally suitable for gradiometer survey.

Instrumentation

Geoscan FM36 Fluxgate Gradiometer.

This instrument detects variations in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetised iron oxides which tend to be concentrated in the topsoil. Features cut into the subsoil and backfilled or silted with topsoil therefore contain greater amounts of iron and can therefore be detected with the gradiometer. This is a simplified description as there are other processes and materials which can produce detectable anomalies. The most obvious is the presence of pieces of iron in the soil or immediate environs which usually produce very high readings and can mask the relatively weak readings produced by variations in the soil. Strong readings are also produced by archaeological features such as hearths or kilns as fired clay acquires a permanent magnetic field upon cooling. Not all surveys can produce good results as results can be masked by large magnetic variations in the bedrock or soil. and in some cases, there may be little variation between the topsoil and subsoil resulting in undetectable features.

The Geoscan FM36 is a hand held instrument and readings can be taken automatically as the operator walks at a constant speed along a series of fixed length traverses. The sensor consists of two vertically aligned fluxgates set 500mm apart. Their Mumetal cores are driven in and out of magnetic saturation by a 1,000Hz alternating current passing through two opposing driver coils. As the cores come out of saturation, the external magnetic field can enter them producing an electrical pulse proportional to the field strength in a sensor coil. The high frequency of the detection cycle produces what is in effect a continuous output (Clark 1990).

The gradiometer can detect anomalies down to a depth of approximately one metre. The magnetic variations are measured in nanoTeslas (nT). The earth's magnetic field strength is about 48,000 nT, typical archaeological features produce readings of below 15nT although burnt features and iron objects can result in changes of several hundred nT. The machine is capable of detecting changes as low as 0.1nT.

Data Collection

The gradiometer includes an on-board data-logger. Readings in the surveys were taken along parallel traverses of one axis of a 20m x 20m grid. The traverse interval was one metre. Readings were logged at intervals of 0.5m along each traverse giving 800 readings per grid.

Data presentation

The data is transferred from the data-logger to a computer where it is compiled and processed using Geoplot software. The following display option is used in this report.

Grey-Scale plot

Data values are represented by modulation of the intensity of a grey scale within a rectangular area corresponding to the data collection point within the grid. This produces a plan view of the survey and allows subtle changes in the data to be displayed.

Data Processing

The data is presented with a minimum of processing. High readings caused by stray pieces of iron, fences, etc are usually modified on the grey scale plot as they have a tendency to compress the rest of the data. The data is however carefully examined before this procedure is carried out as kilns and other burnt features can produce similar readings. Corrections are also made to compensate for instrument drift and other data collection inconsistencies. Any further processing is noted in relation to the individual plot.

Results

An irregular area with maximum dimensions of 120m x 80m was surveyed. Survey conditions were good with reasonable weather conditions and short grass in a fairly level field.

Fig. 2 shows the results from the survey. No anomalies that could be interpreted as archaeological features were detected. The level of background 'noise' from the soil was moderately high, although probably not sufficient to mask any larger anomalies. The variations that can be seen across the survey presumably reflect changes in the gravelly subsoil. The scatter of higher readings at the western side of the survey could be interpreted as a scatter of stones from field clearance or collapse from the adjacent wall.

6. EXCAVATION PROJECT DESIGN

The geophysical survey might have shown areas of pits, disturbance or burning associated with burial, or it could have shown ditches if the cemetery had included burial mounds. Most likely it was hoped that it would at least indicate the extent of the cemetery around the area already exposed. In the event, as described, it did not reveal any possible features around the area of the cremation cemetery or in the remainder of the field. This did not necessarily mean that no features were present, since it might be that the geology of the subsoil was not suitable for such survey. However, judging by the type of subsoil seen in the exposed areas and comparison with surveys on similar subsoil elsewhere it was expected that geophysical survey could be expected to identify features. Since there was no useful information from the geophysical survey to provide guidance as to the area to be excavated, an area was stripped immediately around the known features until it was sufficient to demonstrate that the full extent of the cemetery features had been revealed. The excavated area was 20m by 13m, 260 sq. m (Fig. 2). The negative results of the geophysical survey were confirmed later during a watching brief on topsoil stripping of the remainder of the area around the cemetery in January 2004, which revealed no more features.

The topsoil was removed by excavator with a straight-edged bucket, then cleaned by hand. All features were planned and investigated. Those that proved to be archaeological were sectioned, photographed and recorded. Two features containing pots were lifted as blocks by Philip Parkes of the University of Cardiff, Department of Archaeology Conservation Laboratory. The pots were then separated from the fills, cleaned and conserved ready for drawing, while the fills were returned for flotation and sieving. A summary of the contexts is provided in Appendix 2. All fills were retained for later sieving, consisting of some 24 sacks of soil. These were first floated through 500 micron mesh and the residues wet sieved through 1mm mesh. The flots and residues were then dried and the residues sorted by hand to extract any finds, particularly cremated human bone.

Most fills contained considerable quantities of charcoal and a sample of about 30-50 pieces from each context was identified as to species.

Charcoal from three contexts was submitted for radiocarbon dating.

7. EXCAVATION RESULTS

Six small pits were discovered during the initial watching brief, lying closely together in an approximate line oriented north-west to south-east. One of the pits could be seen to contain a pot and the others had charcoal-rich fills and one of them had fragments of burnt bone. A fragment of the pot showed to be an Early Bronze Age collared urn. It was fairly certain therefore that these pits were part of an Early Bronze Age cremation cemetery. Excavation of a wider area around theses six pits revealed several more features (Fig. 5). However, it was clear that the original six pits were the main focus of the cemetery, which was therefore quite small. The additional features comprised three more small pits lying in the same group as the original six pits, two larger outlying pits and several shallow irregular hollows (Fig. 3). The depths of the features are described as below the sub-soil surface. The ground surface contemporary with the cemetery would have been at least 0.30m above this level, as shown by the truncation of one of the pots by ploughing. Also the subsoil surface around the six pits first discovered was lowered by some 0.10-0.15m during the machining of the topsoil. The topsoil from the remainder of the area was stripped more gently and completed by hand.

Hollows

Several irregular features were recorded in plan. These were of two types. The smaller features (Fig. 3, features 26, 36, 37 and 38) were very shallow spreads of humic peaty material. There were also four larger features (Fig. 3, features 12, 13, 14 and 39) which proved to be very shallow hollows with pock-marked bases up to 0.15m deep and grading out to the edges. Their fill was mainly humic loam with a scatter of glacial pebbles and cobbles and occasional patches of mid-grey gleyed silt. They were not man-made features but their fill did contain some fragments of charcoal. One of them, Hollow 12, had rather more charcoal which seemed to have formed a layer on the base of the hollow before being buried under a silty accumulation (Figs. 4 and 7). Although apparently not a ploughsoil remnant and not man-made the hollows only occurred close to the pits. They have been interpreted as remnants of old land surface contemporary with the pits and preserved within natural hollows.

Outlying pits

These two pits (Pits 1 and 2) lay in a possibly associated pair to the north-east of the other pits. They were both sub-circular in plan and about 0.5m dia. They proved, however, to be rather different on excavation. Pit 1 was a shallow scoop only 80mm deep but Pit 2 was a 270mm deep of a 'bag-shaped' profile (Fig. 4). Both had a similar black, charcoal-rich fill. The fill also contained some grey patches of possible ash as well as some burnt stones. Their irregular shape in plan proved to be a result of the way they had eroded and both had originally been fairly circular. Apart from charcoal neither contained any artefacts or human bone.

Central pits

Pit 3. Circular in plan, 280mm dia. with gently concave sides and flat base, 300mm deep. The fill was black and mainly of charcoal, both fine silty material and small fragments. This is a deep and neatly cut pit for its diameter, considering that it would have been at least another 300mm deep when first dug. Its 'urn-shaped' profile is also exceptional compared to the remainder of the pits here and suggests some deliberate design.

Pit 4. This pit was first recognised by the presence of a small pot truncated by ploughing. It was just sufficient to hold the pot, which was 120mm dia. and the remaining depth was only 650mm. It was not easily visible in the subsoil surface because small amount of remaining fill had no charcoal and was much the same colour as the subsoil in this area. The size of the urn suggests it may have been a secondary 'Accessory vessel' and so may be belong to the same burial cemetery as the urn in pit 6. This is supported by the lack of bone in the pot in pit 4, although so little fill remained that it is not conclusive.

Pit 5. This was a very small pit, which seemed larger on the surface than it was on excavation, perhaps because of plough-action. It was sub-circular in plan, 170mm dia. and 140mm deep with black charcoal-rich fill.

Pit 6. This was sub-circular in plan, 320mm dia. and 340mm deep. The profile (Fig. 3) has been reconstructed because the pot and pit were lifted as a block and dismantled in the laboratory (Fig. 8). It contained an urn, which was complete and buried upright, sitting on the base of the pit. Like pit 4, which also contained a pot, this pit was difficult to identify because it had a grey-brown silty loam fill similar to and only slightly darker than the surrounding subsoil. The fill of the pot was slightly different colour, suggesting that it had been filled elsewhere.

Pit 7. This pit was smaller than most at only 200mm dia, and 120mm deep with a rounded profile. However, comparison with the adjoining pit 6 suggests that about 160mm of the pit had been lost during the initial machining. There were two fills. The main upper fill was mid-grey silty loam with numerous small burnt bone fragments. On the base of the pit was a small deposit of almost pure charcoal with fewer bone fragments.

Pit 8. This pit was 270mm dia. and 180mm deep, but like pit 7, at least 160mm of depth must have been lost during machining. It had a dark-brown to grey-black charcoal rich fill with a few small stones.

Pit 9 (Fig. 6). This pit was 230mm dia. and 150mm deep but at least 160mm of depth must have been lost during machining. It had a slightly cohesive black, silty charcoal-rich fill with occasional burnt bone fragments.

Pit 10 (Fig. 6). This pit was 260mm dia. and 150mm deep, but at least 160mm of depth must have been lost during machining. It had a slightly cohesive black, silty charcoal-rich fill. Unusually amongst the pits this included some very large fragments of charcoal .

Pit 11. This pit was 280mm dia. and 220mm deep overall. However, the lower of the two fills was similar to the subsoil and probably resulted just from percolation and staining from the upper fill of black, silty charcoal rich material. The pit would therefore be only 150mm deep although some of the depth must have been lost during machining. The charcoal-rich fill also contained a few burnt bone fragments.

8. HUMAN BONE

M.P. Wysocki, Department of Forensic and Investigative Science, University of Central Lancashire.

Table 1. Summary of human bone contexts

Pit no.	*Sample no.*	*Weight*	*Comment*	*Indicated age*	*Indicated gender*
2	4	1g	Charcoal-filled pit	-	-
6	16	0.5g	Fill of pit outside urn	-	-
6	17	103g	Fill of urn	Older sub-adult/adult	-
7	11	202g	Charcoal-filled pit	Mature adult	-
9	7	1g	Charcoal-filled pit	-	-
11	1	4.6g	Charcoal-filled pit	-	-

Calcined bone assemblages from four charcoal-filled pits and one urn (Table 1) were received for analysis. Three of the assemblages (from pits 2, 9, and 11) are so insubstantial that little can be said, apart from confirming that the material is calcined bone. The minute fragments, the largest of which is 9mm x 14mm, cannot be identified to any specific skeletal element. One cannot even be positive that the material is of human rather than animal origin, although the context implies that the material is indeed human.

Two assemblages are relatively more substantial and certainly contain calcined human bone. The largest of these (sample 11) was from pit 7. However, more than half of the original depth of the pit (*c.*160mm) had been lost during machining, so the recovered material can only be a residual fraction of the original cremation deposit. The smaller assemblage (sample 17) was an entire deposit, recovered from a complete urn from pit 6 but weighing only 103g can only be regarded as a token deposit. A modern adult cremation is likely to produce between 1000g to 3600g (McKinley 1993, 2000).

The assemblages were analysed following the methods advocated and outlined by McKinley (2000).

All the material was uniformly calcined throughout, highly fragmented, clean white in colour, with a soft finely powdered chalky texture. Clean white calcined bone is associated with efficient cremation practice – high temperatures, well ventilated and fuelled pyres. The majority of fragments have smooth, rounded fracture edges, and surface features are similarly smoothed out. These characteristics probably derive mainly from the wet sieving of the pit fills.

Pit 7 (Sample 11), charcoal-filled pit
The assemblage consists of 202g of highly fragmented calcined bone. Fragmentation and respective weight data are presented in tables 2 and 3. There are no duplications of anatomical material, nor demographic contra-indications to suggest that more than one individual is represented. A list of identified elements is given below.
Identified elements. Cranial fragments; fragment of molar root; fragment rib shaft; fragment humerus shaft; fragment of ulna shaft, right distal; fragment radius shaft; fragment tibia shaft
Age. There are few age indicators. A cranial fragment exhibits a portion of (?lambdoid) suture. The suture is fused and obliterated internally and fused with partial obliteration externally. On this basis one can tentatively suggest middle adult age. The fragment is more likely to represent an adult of over 25 years rather than a younger adult or older adolescent. The relative size and cortical thickness of both the ulna shaft and radius shaft is also consistent with a skeletally mature individual.
Sex. There is no reliable indication of sex. The identified material is not robust and the maximum cranial thickness is 3.12mm.

Pit 6 (Sample 17), fill of urn
The assemblage consists of 103g of highly fragmented calcined bone (see tables 4 and 5). With the exception of a fragment of permanent premolar root, nothing else can be identified beyond the level of cranial fragment or long bone fragment. The premolar root indicates an individual of at least *c*. 12 years. Cranial fragments are thin, postcranial fragments display cortical thickness consistent with adult or older subadult age.

Pit 6 (Sample 16), fill of pit outside urn
One minute fragment of calcined bone.

Pit 2 (Sample 4)
Four tiny fragments calcined bone.

Pit 9 (Sample 7)
Eight very small fragments of calcined bone.

Pit 11 (Sample 1)
A few small fragments of calcined bone, weighing 4.6g. Although there is nothing to suggest that this could be animal bone, there is equally nothing to indicate that it is certainly human.

Table 2. Blaen y Cae cremation cemetery, Pit 7, sample 11. Fragment size: percentage frequency by weight of cremated material not passing through 10mm, 5mm and 2mm mesh sieves.

Fragment size (mm)	***Weight (g)***	***Percentage (%)***
> 10 mm	39	19.3
> 5mm	76	37.6
> 2mm	76	37.6
Residue	11	5.5
Total	202	100

Table 3. Blaen y Cae cremation cemetery, Pit 7, sample 11. Skeletal part distribution by weight.

Skeletal part	***Weight (g)***	***Percentage (%)***
Skull	23	11.4
Postcranium	42	20.8
Not identified	137	67.8
Total	202	100

Table 4. Blaen y Cae cremation cemetery, Pit 6, sample 17. Fragment size: percentage frequency by weight of cremated material not passing through 10mm, 5mm and 2mm mesh sieves.

Fragment size (mm)	***Weight (g)***	***Percentage (%)***
> 10 mm	7	6.8
> 5mm	31	30.1
> 2mm	45	43.6
Residue	20	19.5
Total	103	100

Table 5. Blaen y Cae cremation cemetery, Pit 6, sample 17. Skeletal part distribution by weight.

Skeletal part	***Weight (g)***	***Percentage (%)***
Skull	3.1	3
Postcranium	16.2	15.7
Not identified	83.7	81.3
Total	103	100

9. ARTEFACTUAL EVIDENCE

The main finds were the two urns, described below. Sieving of the entire pit fills ensured total recovery. Although there were no other significant artefacts there was some flint and a few stone items that may have been deliberately introduced and will be listed. There was a small amount of burnt stone in the pits which must have been incorporated by chance although the fills were otherwise surprisingly pure charcoal. Pit 1 also contained a small irregular piece of black material rather like pottery, with burnt grit and charcoal inclusions, possibly a piece of natural burnt clay.

The Bronze Age Pottery (Fig. 9)

By Frances Lynch

Urn 1 Pit 6

This is a virtually complete collared urn decorated on neck, collar and top of rim with sharply cut incised lines. The scheme consists of counter-hatched triangles on the collar, and a cross-hatched band on the neck. Both bands of decoration have been carefully executed and are contained within horizontal lines; there is another line at the shoulder, achieved without gaps or overlaps. The cross-hatching on the top of the rim is done slightly more carelessly. There is no decoration on the inside.

The diameter at the rim is 210mm and the total height 295mm. The slightly hollowed base is 110mm across. The thickness of the wall is 14-15mm in most parts but thins to 11mm at the flat rim. The collar is boldly formed by pinching out the clay but there is no conspicuous internal moulding; the shoulder is clearly defined both inside and out and has been neatly rounded on the outside.

The clay contains a medium quantity of angular stone clasts and has been well fired. The break shows a thin oxidised outer surface, pinkish beige in colour, and a black interior, which may have some surviving residues that could be investigated. The external surface has been well smoothed and though some large clasts are visible on it, they do not protrude. The inner surface has also been smoothed and tooling marks are visible

Urn 2, Pit 4

Only the rim and collar of a small collared urn survive. The collar is decorated with horizontal lines of twisted cord and there is a hint that this decoration continued onto the neck. There is no internal decoration. Incomplete and undulating lines suggest that the decoration was not carried out with the care shown in Urn 1. The complete circuit of the rim is present so presumably it was buried inverted and the body has been lost to the plough.

The diameter of the rim is 120mm and it is probable that the complete pot would have been 140-150mm tall with walls 8-12mm thick. This size of pot is quite common among collared urns and these smaller ones are often used as Accessory Vessels.

The fabric is ‘gritty', containing a good deal of well-crushed stone, together with some larger angular pieces. The outer surface is a brown/beige and the inner surface is brown; the core is black. The surfaces are relatively smooth but abrasive to the touch. The diagonal joins of coil manufacture are particularly clear. The surface of the pot is eroded on one side and it is difficult to know whether this is due to circumstances of burial or prior damage.

Comparisons

Both these urns are typical of the Middle Group of collared urns in Wales (Lynch *et al* 2000, 120), though it must be said that so little remains of Urn 2 that detailed comparisons are fairly pointless. However Urn 2 from Plas Penrhyn, Anglesey, although larger and with internal decoration, is a good match (Lynch 1991, Fig. 57). Urn 1, on the other hand, has all the appropriate characteristics: a deep, well defined collar but without a step moulding on the inside; a clear shoulder but with no line of indentations; a relatively wide base, and a large-scale decorative scheme.

The detail of the decoration may be compared to Pot H from Bedd Branwen, an urn which contained jet and amber beads and whose bone content has been recently re-dated to 3540 ± 60 BP (2040-1730 cal BC) (Lynch 1971; cremated bone dated by Dr Jan Lanting (GrA-19652)). The decorative scheme of Bedd Branwen H has hatched triangles on the deep collar and a band of cross-hatching on the neck but the quality of the incision is not as careful, and the upper triangles are horizontally hatched, rather than counter- hatched. Counter-hatched triangles on the collar are, however, a relatively common feature, either in twisted cord or incision, but not always paired with the band of cross-hatching. They occur on Urn B from Brenig 44 in Denbighshire and on a pot from Ysceifiog, Flintshire (Lynch 1993, 128-9; Longworth 1984, no.2034). The burial deposit in an undecorated urn associated with Urn B from Brenig has been dated 3550 ± 50 BP (GrA 22970), a date closely comparable to that from Bedd Branwen. Nearer to Bryncir, they are found incised on a fragment from Bryn

Crug near Caernarfon and impressed on the exceptionally large urn from Eithinog-wen, Llanllyfni (Savory 1980, no.409; Lynch 1986, no.105.1). They occur in south Wales, at Letterston, Pembrokeshire (Savory 1980, no.316.6) and widely throughout Britain where the combination with a band of crosshatching on the neck is a feature of Longworth's North-western Style (Longworth 1984, Pl. 82-92).

The shape of the pot, with a deep, confidently moulded collar and well-defined shoulder, sets it apart from the Early Urns which have much narrower collars and a concave internal moulding, and also from the Late series which have deeper collars, often with a sloping rim, and usually a more vertical profile. Strangely, a disproportionately narrow base becomes a feature of the later pots, another characteristic that places this Blaen y Cae pot in the middle, rather than the later group.

Relatively few Bronze Age burial urns survive from south Caernarfonshire because so many of the nineteenth century finds from the area have been subsequently lost (RCAHMW 1960, xlvii-xlix). A study of the records suggests that there were several burial sites, whether barrows or flat cemeteries, in the Caernarfon area and that there had been another cluster of sites in the Llanllyfni/Dolbenmaen district where routes concentrate through Bwlch-derwin and the gravels of the Dwyfach valley would have favoured settlement. A number of cremation burials have been found over the years near Pen Llystyn (RCAHMW 1960, xlvii; 1964, 135), but details are meagre. The pots that survive demonstrate a range of styles, from early to late in typological terms, which is comparable to the fuller sequences from Anglesey. The rarity of grave goods here suggests, as so often, that the mainland may have been less wealthy than the lowland, sea-girt island.

Pottery fabric analysis

By Dr D. Jenkins

Summary (For full report see Appendix 2)

Sherds from two pottery urns recovered from the cremation cemetery at Blaen-y-Cae, Bryncir, were analysed petrographically to provide data on their fabric and composition. This has allowed conclusions to be drawn on (a) their composition, and (b) the provenance of the geological materials used in their production. The former have shown the sherds to be typical of other coarsely tempered Bronze Age urns from northern Wales. The latter was inferred by reference to the solid and superficial geology of the Bryncir area and to a sample of sediment from the site. It is concluded that the materials used as temper differed in detail between both the two sherds and the local sediment, but that all could be related to the solid and superficial geology of the area generally. The vessels were therefore made from materials available within the immediate area but not necessarily from the site itself. Selectivity in the choice of rock material was also evident in the relative abundance of mafic igneous rock, a feature noted previously for Bronze Age pottery: these data place both sherds in Group 3a/3a+ proposed for prehistoric pottery in northern Wales (Williams & Jenkins 2004).

Flint

By George Smith

In the fill of the pot in pit 6 were four small fragments of burnt and slightly vitrified flint. The largest was 15mm long, 5mm wide and 4mm deep. This retained some original flake surface and a slightly convex edge with medium-steep unifacial trimming. These pieces may well derive from a tool deliberately added to the cremation pyre, but which shattered during the process, these fragments being incorporated by chance. The thickness of the object, the type and shape of the retouch suggest it may have been a convex scraper, the most frequently found tool type.

Stone objects (Fig. 10)

By George Smith

The upper fill of pit 2 contained two white quartz pebbles, 25 and 45mm long. This fill was regarded as backfill of the pit above the main deposit of charcoal-rich material. The pebbles were the only such objects found during the excavation and almost certainly were deliberately introduced.

The lower, charcoal-rich fill of pit 2 also contained a sub-angular piece of only slightly rolled quartz, 37mm by 32mm by 17mm. Again, this seems like a deliberate introduction as the only other pieces of quartz from the whole excavation were below 10mm long.

The lower fill of pit 2 also contained a large, thin sub-rectangular flake of burnt igneous rock, 71 by 46 by 6mm. It seems to derive from deliberate flaking rather than just by burning. This was the only piece of such material in this fill, which was almost stone-free. Although its irregular fracture means it is impossible to say whether it was man-made, it has edges sharp enough to be useful in cutting.

In pit 5 were three smaller fragments of the same stone as that found in pit 2. These were broken fragments of larger flakes and were 28, 37 and 41mm long and 5-7mm thick. All had edges sharp enough to be useful for cutting. These three pieces and that from pit 2 were the only such flakes from all the pit fills on the site.

Pit 8 contained a thin split part of an oval pebble of softer rock than the flakes in pits 2 and 5 and 69 by 34 11mm. As there were quite a few stones in this pit, unlike the rest, this was probably a chance natural inclusion.

10. WOOD CHARCOAL IDENTIFICATION

By Pat Denne, School of Agricultural and Forest Sciences, University of Bangor

The charcoal was collected by floatation and wet sieving of the entire fills of the pits. The amount collected from some pits was quite considerable and in these cases a random sub-sample of at least 30 pieces was taken for identification.

Table 6 Summary of wood charcoal identification

Pit no.	***Sample no.***	***Context no.***	***Identification and Ring width (RW)***						
			Oak RW >2mm	***Oak RW <2mm***	***Oak twig***	***Oak total***	***Hazel total***	***Birch total***	***Comment***
1	9	15	49	26	1	76	-	-	Random sample
2	2	23	17	24	-	41	3		Random sample
2	4	24	40	-	-	40	-	-	Random sample. Variable ring widths
3	5	19	37	13	-	50	-	-	Random sample
4	18a	34	4	6	-	10	-	-	Fill of pit outside urn. All pieces identified
4	18b	34	12	6	-	18	-	1	Fill of urn. All pieces identified
5	8	16	32	5	1	38	-	-	Random sample
6	16	25	-	46	-	46	-	7	Fill of pit outside urn. Random sample
6	17	17	20	5	-	25	-	15	Fill of urn. Random sample
7	11		3	2	-	5	-	2	All pieces identified
8	3	22	12	18	-	30	-	-	All pieces identified
9	7	18	20	24	1	45	5	-	Random sample
10	6	17	40	-	-	40	-	5	Random sample
11	1	20	25	16	5	46	1	-	Random sample
11	10	21	8	-	2	10	-	-	All pieces identified
12	12	30	18	27	-	45	1	1	Random sample
12	14	29	3	8	-	11	-	2	All pieces identified
13	13	31	6	-	-	6	-	-	All pieces identified

11. DISCUSSION AND DATING

1. General background to Bronze Age burial in north-west Wales

The majority of burials known from this period were covered by earthen mounds or stone cairns. Cairns occur of a variety of forms and simple mounds also often prove on excavation to cover structures of stone or timber and to result from a series of constructional episodes. Most of the 'round barrow' burials known in this area are located in the upland where they have survived well, partly through their stone construction and partly because they lie in areas marginal to agriculture where they have not been affected by cultivation. In the lowland however, below about 250m OD there are very few known round barrow burials because the above ground remains of most have been destroyed by clearance or cultivation. Therefore although about 500 round barrows are known in north-west Wales, the distribution is very much biased towards the uplands. From the late third and through the first half of the second millennium BC burial rites gradually changed from an emphasis on inhumation towards cremation. Whereas inhumation was normally covered by mounds and cremations burials too were often placed below mounds there was an increasing tendency towards simple burial in pots, either in the top of pre-existing mounds, around pre-existing mounds or in 'flat' cemeteries without covering mounds, such as seems to have been the case at Blaen-y-cae although in some cases apparently 'flat' cemeteries may have once been covered by a mound which has since been levelled or eroded away during cultivation. Whichever, such burials are nor visible in the landscape and as a result relatively few are known. Those that have been recorded have been discovered purely by chance during, for example, cultivation, ditching or building work and most of those during the 19th century. Cremation burials could be placed in pots in pits, in pots in stone cists or in cists or pits without pots. If the latter and without other grave goods or pots such burials would be unlikely ever to be recognised during chance discovery. In some cases they may have been very little or even none of the original cremated remains. It may even be that burial in flat cemeteries was the commonest method during this period because we have no way of estimating the overall frequency in the landscape. Table 7 summarises the numbers of cists and cremation burials known in north-west Wales compared to round barrows and cairns.

Table 7 Summary of Bronze Age burial evidence from north-west Wales

	Simple mounds or cairns	***Structured cairns (ring cairns etc)***	***Cists***	***Cremations***
Meirionnydd	178	34	7	6
West Conwy and Arfon	152	39	4	3
Dwyfor	49	6	7	7
Anglesey	35	4	5	5

2. The size and characteristics of cemeteries

Where cist or cremation burials are found by chance, as is usual, they are often single finds and the original extent of the cemetery remains unknown. Occasional multiple finds show that burials may often be part of larger cemeteries, such as at Brithdir, Meirionnydd where 7 urns were found, at Pant-y-neuadd, Tywyn, where 'several' urns were reported, at Plas Penrhyn, Anglesey where there were 7 urns and at Cae Mickney, Llanidan, Anglesey, where there were 25 urns (Smith 2001, 2002 and 2003). More recently, extensive archaeological excavations in a few cases have recovered the full extent of cemeteries, At Capel Eithin, Gaerwen, Anglesey 16 urn burials were discovered in a relatively small area but placed with no evident pattern although close to a small cairn which covered a number of charcoal-filled pits (White and Smith 1999). The same site had previously been the focus of activity in the later third millennium and was used again for burial in the mid first millennium and again in the early medieval period. At Cefn Cwmwd, Rhostrewfa, Anglesey rescue excavations in advance of the new A5 trunk road discovered a group of nine small pits, all of which contained fragments of cremated human bone and seven of them had Bronze Age urns. The pits lay at the edge of the excavated area and it was thought possible that the cemetery may have continued further (Davidson and Hughes, forthcoming).

Although these cemeteries vary in size and that at Blaen-y-cae is one of the smallest, they probably represent local communities. However, overall, even taking into account burials added in or around pre-existing round barrows there are few too few burials to account for the whole population, It may be that only persons of special status were being accorded burial in this way. When bones have been studied they show that a range of ages and sexes were being buried, for instance at Capel Eithin the sexes, where identifiable were fairly evenly represented and there were 1 older adult, 6 mature adults, 2 juveniles and 3 infants. In the case of the infants,

they were all found accompanying adults, perhaps representing death during childbirth. Cemetery analysis as at Capel Eithin does show a low proportion of younger age ranges although these can be expected to have dominated the actual mortality. This might show that the younger ages were accorded different burial modes or it might simply be that cremation of infants is much less likely to leave identifiable remains. This might account for some burials where only 'token' amounts of bone are present as here in pits 9 and 11. The range of ages in cremation cemeteries show that it could not have been just the leaders of the kin group that were being buried but perhaps individual family groups. If so then there may have been many such small cemeteries dotted about in the landscape. This was to some extent refuted by the work on the A55 trunk road, Anglesey, which provided a sample transect some 22km long yet produced only the one cremation cemetery, referred to above, and two other monuments of probable Bronze Age funerary and ritual type – a ring ditch and a post-circle, even though it did, for instance identify 6 burnt mounds, representing Bronze Age domestic activity (*ibid*).

3. The date of cemeteries

The samples used for radiometric dating at Blaen-y-cae were selected as examples of the different types of feature present. One was from the fill of the urn in Pit 6, one was from a small charcoal-filled feature, Pit 10 and the other was from the unusual large charcoal-filled Pit 2. The measurements were carried out by the Beta-Analytic Inc., Florida, U.S.A., one of the world leaders in radiometric dating. The full details of the dating results are given in Appendix 1 but in summary as follows:

Pit 2 (Beta-186976): Intercept with radiocarbon curve Cal BC 1750. 2 sigma calibration Cal BC 1920 to 1620.

Pit 10 (Beta-186977): Intercept with radiocarbon curve Cal BC 2130. 2 sigma calibration Cal BC 2290 to 1940.

Pit 6 (Beta-186978): Intercept with radiocarbon curve Cal BC 1910. 2 sigma calibration Cal BC 2120 to 2100.

If we take the intercept dates alone the dates span 400 years and this seems at odds with the size of the cemetery group, which is small and closely grouped, with no suggestion of long-continued use apart perhaps from pits 1 and 2 which are set apart from the rest so the later date could be justified. Some of the disparity in the dates can probably be accounted for by the predominance of oak amongst the charcoal (Denne, above). Oak is a long-lived species and so the inclusion of heartwood from an old tree can potentially provide a date several centuries earlier than the date of felling. However, this does not create greater statistical error, simply making the overall date older. The true date can therefore be expected to be nearer to the youngest of a range of dates. Of course the unknown mixture of charcoal from young and old rings means that the effect is variable and unquantifiable. There was some charcoal from birch, a short-lived species in pits 6 and 10 but too little to provide a conventional date.

However, although there is not as good a match between the dates as could be hoped, the general date range matches well with dates obtained elsewhere for this type of cemetery and in association with the style of pottery found in pits 4 and 6, e.g. from Bedd Branwen, Anglesey and Brenig, Denbighshire (Lynch 1971 and 1993), from Capel Eithin, Anglesey and from Cefn Cwmwd, Anglesey (Davidson and Hughes, forthcoming).

4. Layout and interpretation of the cemetery

All the pits but 1 and 2 lie in a closely adjacent group that forms an approximate line oriented north-west to south-east. It is also notable that all the pits respect each other despite their proximity to one another. Although not neatly aligned or spaced the fact that they were likely to have been inserted over a considerable time-span suggests that their position was marked above ground in some way. There are no holes to suggest marker posts, for instance, although in some cases elsewhere, burial pits were marked by stone covers and recent cultivation here would have removed them.

The dates obtained are too few, too widely spread and with too great a statistical error to allow any idea of the internal chronology of the cemetery. However, burials are usually placed singly and so cemeteries grow sequentially over time. The primary burial is therefore often central to the group, and often is of the highest status. Here, Pit 6, with its urn and possible accompanying flint tool and associated accessory burial of Pit 4 is the highest status in terms of material goods, and is also fairly central to the group as a whole but the linear pattern of the group makes it difficult to envisage how it developed. Pits 1 and 2 do seem to be a distinct pair by their proximity and isolated position but although of similar size in plan they were quite different in depth and profile, suggesting that they had different functions. Pit 5 is also set somewhat apart and pit 3 is different in

nature to the others. This leaves a 'central' group of seven pits. Of these 4 and 6 may be a pair. Of the remaining five pits, 2, 7, 9 and 11 have cremated bone. Of the whole group of eleven pits only two, Pit 6 and 7 have sufficient bone to be regarded as properly representing a burial but even then only a small proportion of the original total and so, perhaps, just 'token' deposits. Pits 2, 9 and 11 have such minute amounts of bone that these may be purely coincidental inclusions while the rest of the pits have charcoal-rich fill only. The bone identifications from pits 6 and 7 have no evidence of gender but that from 7 is of an adult and that from 7 a sub-adult/adult.

Pits with charcoal-rich fill, but without cremated bone, are frequently found in association with Early Bronze Age burials. These have been interpreted elsewhere as symbolic deposition, perhaps belonging to rites based around the importance of fire although not themselves being actual deposits of funeral pyre material (Lynch 1993, 142-3). Pyre sites are known, as well as deposits of pyre material, and in other cases areas of less intensive burning beneath barrows have been interpreted as clearance of vegetation prior to construction (Ashbee 1960, 58). The group of pits here could represent burials with contemporary associated charcoal-filled pits. Examples of this situation have been recorded elsewhere, for example inside a disc barrow at Earl's farm Down, Wilts and under an earthen barrow at Chick's Hill, Dorset (*op cit* 83). Pits 1 and 2 form a natural pair and their difference in nature could be explained if 2, the deeper pit was a 'burial' pit, even though insufficient bone was found in it to be conclusive. Examples of barrows have been found in Glamorgan and in Somerset where pits underneath the mounds contained charcoal but no burials (Lynch 1993, 136). Of the other pits here, if we assume that pit 4 was just an accessory to a burial in pit 6 then there are eight pits remaining, four with bone and four just charcoal-filled. These could be four pairs of pits therefore, but except for pits 9 and 10, they do not form obvious adjacent pairs, so this interpretation is not except in the case of pits 9 and 10.

An alternative interpretation might see the adjacent pits 6 and 7, both with significant amounts of cremated bone, as associated with each other and central and primary to the group. They could represent two different but associated burials placed at the same time or closely following one another, or even the same burial deposited in two parts. This scenario could see all the other pits as being deposits placed at the same time or simply in relation to the central burial, that is the group represents basically a single burial monument, rather than a cemetery. This idea is at odds with, but not refuted by the timespan of the radiometric dates. The charcoal identifications show similar species of wood used in all the pits and so do not provide any evidence of difference in period or function between them.

The use of cremation means that burial itself was a more complex process than inhumation. The body went through two stages of transmutation, first on the fire and second when the burnt remains were buried. There were therefore two sites of importance, the pyre site and the cremation burial site. All the pyre material could not easily and apparently was not buried (McKinley 1997). Token amounts of pyre material might be deposited and Lynch has suggested that the charcoal-filled pits may derive from a ritualisation of this process in that over time charcoal was buried simply to symbolise the pyre (Lynch 1993, 142-3). This was hinted at by the discovery at Brenig, Denbighshire, that the wood species represented in the charcoal-filled pits at Brenig 44, a ring cairn were mainly birch and hazel, while the pyre material was mainly oak (*ibid* 132). These differences were not evident at Blaen-y-cae where the fills of both burial and charcoal-filled pits were dominated by oak with only very small amounts of hazel and birch and the largest group of birch coming from the fill of the urn in Pit 6 (Table 6). Neither was there any evidence that the charcoal-filled pits differed from the burial pits in terms of relative proportion of narrow-ringed to broad-ringed wood. Pit 7 in fact, although containing a burial, was in other respects just a charcoal-filled pit, and whereas it might be expected to have large pieces of charcoal from a pyre had charcoal that was finely comminuted with few pieces large enough to identify.

Finally, much remains uncertain about the meaning of this small group of pits. The amount of burial or ritual activity was quite slight and possibly of short duration but the burials still represent the culmination of at least two adult lives, so could derive from a single generation of one family group. If they did belong to settlement nearby, perhaps indicated by the burnt mounds, then the domestic evidence is much more substantial than the burial evidence. There are at least four burnt mounds nearby and each probably represented hundreds of cooking episodes so they represent an extended period or periods of domestic activity.

There were also other burials in the vicinity, during about the same period. There was a cairn with several ten cremation burials in urns and possibly other cremation burials on the hill at Bryncir (Evans 1923 and Griffiths 1959). Such a prominent position is a typical position for burial mounds. The Blaen-y-cae pits however, were placed in a nearly level area in a dip within the local hillocks, a 'concealed' or at least 'reserved' position not visible from afar or itself having any prominent viewpoints. The shallow natural hollows found alongside the pits but not elsewhere in the field suggests some kind of connection with the pits or their location. It is still

possible that there had been a mound of some kind over the burials that protected a small area of old land surface, represented by the hollows found. On the other hand the hollows might simply be the remnant of a slight dip in the ground here or could indicate clearance of the ground of trees or scrub prior to use of the cemetery. The two larger hollows, 13 and 14 might represent individual tree-holes. Since the main group of pits lies neatly between them it may even be that they represent standing trees which formed boundary markers for the cemetery. Whatever the explanation pits 1 and 2 do lie parallel to the line of the other pits and so may have a deliberate relationship. The line of pits is oriented approximately north-west to south-east and this orientation might have some significance in relation to the position of sunrise at mid-winter or sunset at mid-summer. It seems a significant coincidence that the ten burials found on the hill at Bryncir in 1821 were also reported to be in a line, although there is no record of the orientation.

Whatever the intention of this small group of pits was, it was quite different to that of building the cairn on the hill at Bryncir. Could it be, for instance that prominent positions and complex monuments were reserved for people of higher status? The difference may be important to understand, as it has been proposed that understanding burial traditions can throw light on society generally because they reflect the contemporary world-view, itself dependent on means of subsistence. Burial traditions in Britain changed dramatically in emphasis between the third to second millennia BC from inhumation to cremation and from communal burial to single burial. It has been suggested that these all have a bearing on the general lifestyle, economy and beliefs of the people in the change from a more mobile economy and lifestyle to a more settled and agriculturally dependent economy (Owoc 2001).

12. **RECOMMENDATIONS FOR FUTURE WORK**

The identification of this small cemetery demonstrates the presence of prehistoric activity here. However, its isolation within the fairly large area examined by watching brief shows that the cemetery was a fairly short lived episode and not part of any long term funerary and ritual complex. Bronze Age burials are often placed in areas marginal to agriculture and this seems likely to be the case here, if, as proposed, the area of associated domestic activity was 400m to the north, on the better-drained land at the foot of the hill-slopes. Ideally this area would be investigated too or at least a radiocarbon date taken from one of the burnt mounds to see if it might be contemporary with the cemetery. Further watching briefs during topsoil stripping of the quarry area as it continues to expand may reveal further evidence about prehistoric use of the area.

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APPENDIX 1 BLAEN-Y-CAE: RADIOMETRIC DATING RESULTS

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.8:lab. mult=1)

Laboratory number: **Beta-186976**

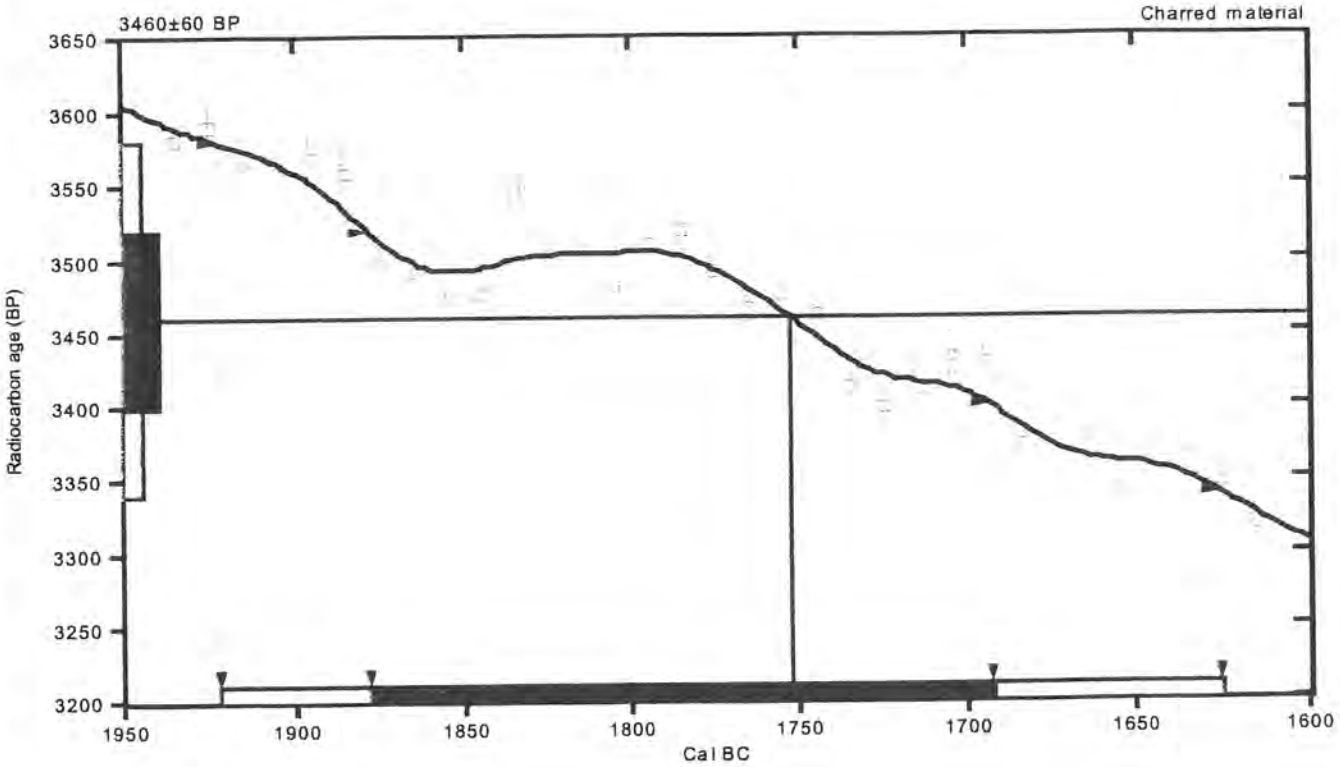
Conventional radiocarbon age: **3460±60 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 1920 to 1620 (Cal BP 3870 to 3580)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 1750 (Cal BP 3700)

1 Sigma calibrated result: (68% probability) Cal BC 1880 to 1690 (Cal BP 3830 to 3640)



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Database used

Intcal98

Calibration Database

Editorial Comment

Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii

INTCAL98 Radiocarbon Age Calibration

Stuiver, M., et al., 1998, Radiocarbon 40(3), p1041-1083

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26:lab. mult=1)

Laboratory number: **Beta-186977**

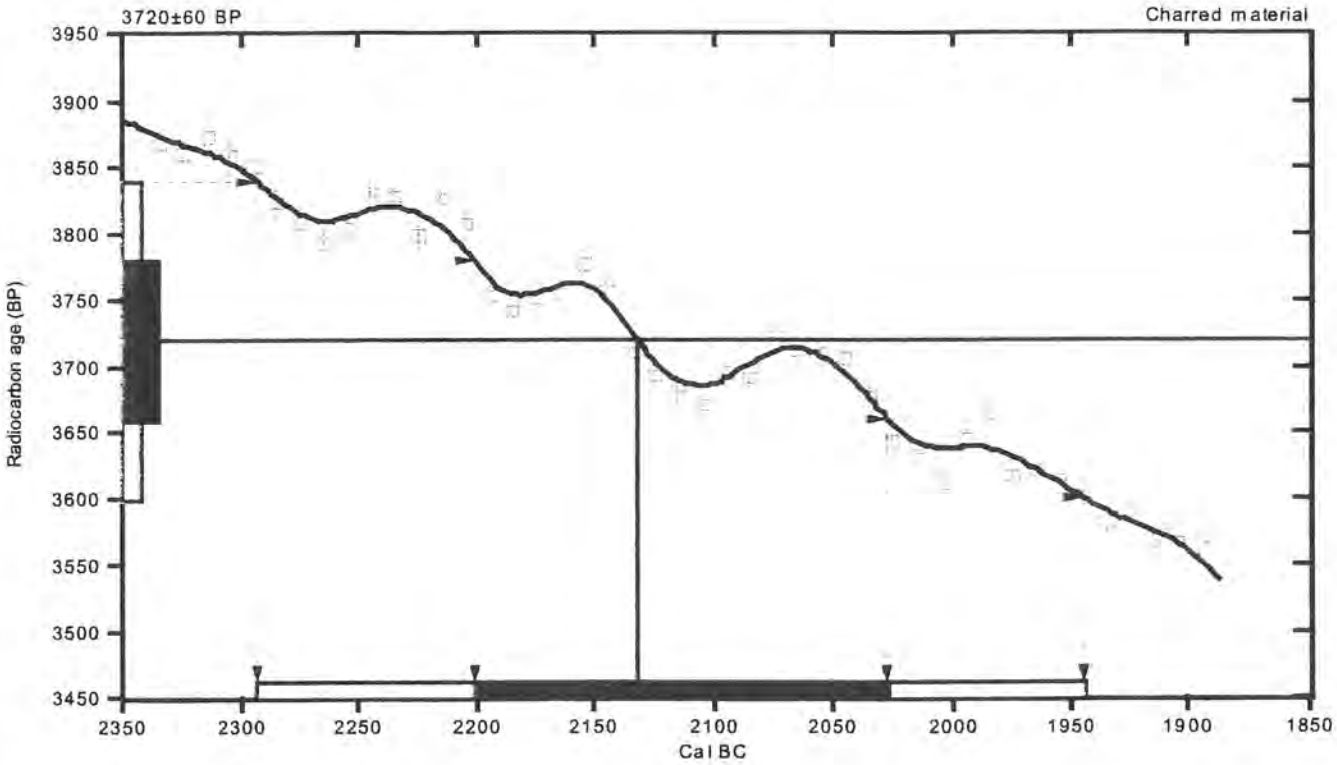
Conventional radiocarbon age: **3720±60 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 2290 to 1940 (Cal BP 4240 to 3900)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 2130 (Cal BP 4080)

1 Sigma calibrated result: (68% probability) Cal BC 2200 to 2030 (Cal BP 4150 to 3980)



References:

Database used

Intcal98

Calibration Database

Editorial Comment

Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii

INTCAL98 Radiocarbon Age Calibration

Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.2:lab. mult=1)

Laboratory number: **Beta-186978**

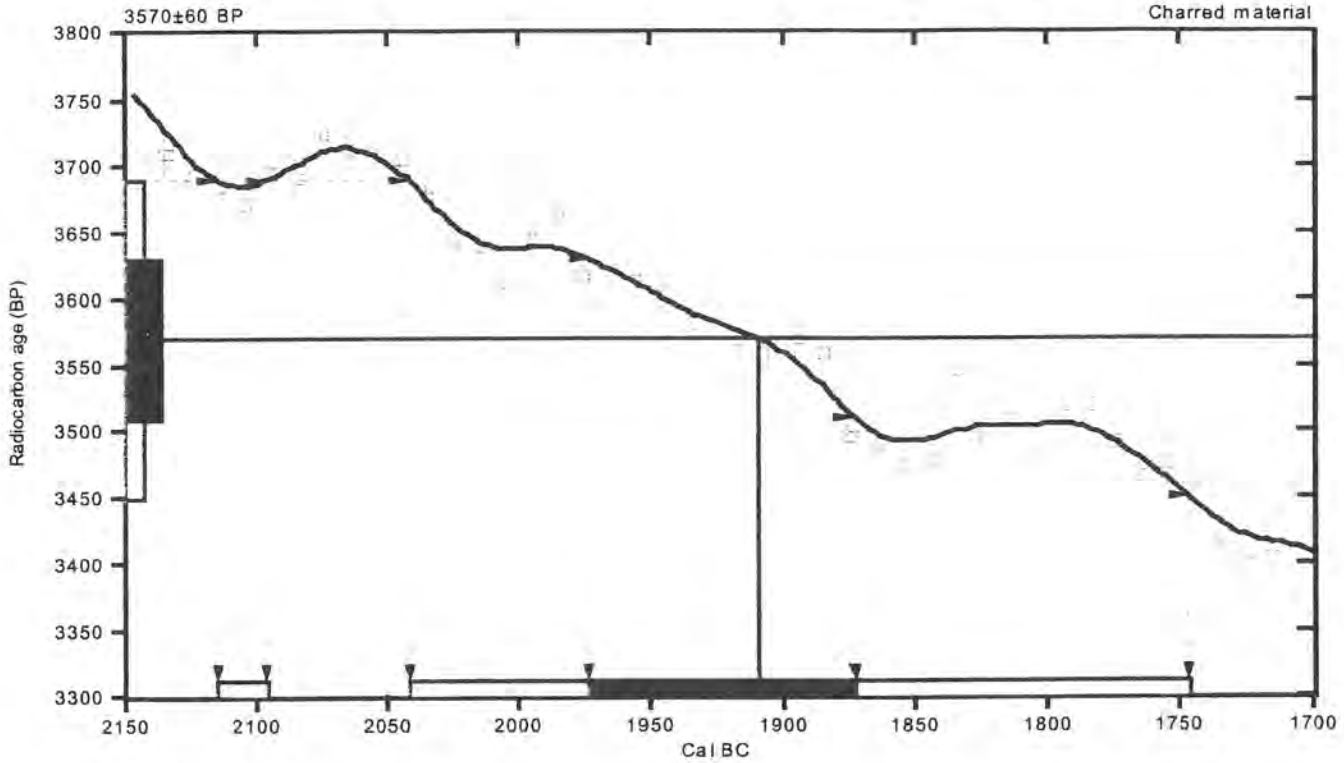
Conventional radiocarbon age: **3570±60 BP**

2 Sigma calibrated results: **Cal BC 2120 to 2100 (Cal BP 4060 to 4050) and**
(95% probability) **Cal BC 2040 to 1750 (Cal BP 3990 to 3700)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 1910 (Cal BP 3860)

1 Sigma calibrated result: Cal BC 1970 to 1870 (Cal BP 3920 to 3820)
(68% probability)



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Report to Gwynedd Archaeological Trust on the

PETROGRAPHY of TWO COLLARED URNS from Blaen-y-Cae, Bryncir (G1653).

by
John Ll W Williams and David Jenkins

Summary

Sherds from two pottery urns recovered from the cremation cemetery at Blaen-y-Cae, Bryncir, were analysed petrographically to provide data on their fabric and composition. This has allowed conclusions to be drawn on (a) their composition, and (b) the provenance of the geological materials used in their production. The former have shown the sherds to be typical of other coarsely tempered Bronze Age urns from northern Wales. The latter was inferred by reference to the solid and superficial geology of the Bryncir area and to a sample of sediment from the site. It is concluded that the materials used as temper differed in detail between both the two sherds and the local sediment, but that all could be related to the solid and superficial geology of the area generally. The vessels were therefore made from materials available within the immediate area but not necessarily from the site itself. Selectivity in the choice of rock material was also evident in the relative abundance of mafic igneous rock, a feature noted previously for Bronze Age pottery: these data place both sherds in Group 3a/3a+ proposed for prehistoric pottery in northern Wales (Williams & Jenkins 2004).

1. Methodology

Standard thin-section preparation of resin-impregnated samples was preceded by dividing the respective sherds into two halves, one half being fired in an oxidising atmosphere at 500ºC to remove dark carbonaceous matter from the matrix. This, together with a final polishing of slides with 1µm diamond paste, facilitated petrographic analysis. The sections were examined with a polarising microscope and a point-count analysis was undertaken (400+ points) with a Swift point counter to provide quantitative data for a number of standard components (Voids >20µm; Matrix <63µm; Grains 63-630µm; Grog >630µm; Clast types >630µm). The texture and fabric of the matrix together with the presence of any bioliths was also noted. Full slide microphotographs were obtained directly using a Nikon Coolscan IV (Figure 2): microphotographs of selected features at higher magnifications (Figure 3) were obtained with a Leitz Ortholux-pol / Nikon 990 system.

A reference sample of the local stream sediment was also collected from the bank of the Afon Dwyfach at SH 478450, immediately to the west of the archaeological site. From this the 0.6-2.0mm fraction were separated and resin-impregnated and a thin-section prepared in the same manner as for the sherds. A petrographic analysis of clasts was made (% of a total of 137 grains), the information so obtained being relevant to identifying the material available locally for the production of pottery.

2. Analytical Results

Detailed fabric descriptions are appended, and results summarised in the Table below.

Table: Analytical petrographic data

	Bryncir Pit No.4	**Bryncir Pit No.6**	**Sediment** (0.6-2.0mm)
Lab. TS No.	2218	2219	2220
	(Vol.% from 400+ counts)		(% of 130)
Voids	**9.5**	**5.2**	
Matrix	**49.0**	**63.6**	
Grains	**5.2**	**4.7**	
Grog	**-**	**2.0**	
Clasts:	**36.1**	**24.4**	**(100.0)**
Petrology			
Ophitic dolerite	-	13.7	1.0
Pyrox. Dolerite	30.7	-	<1.0
Altered mafic	-	-	2.0
Rhyolitic	5.2	10.2	63.0
Silt/sandstone	-	0.5	9.0
Slate	-	-	14.0
Vein quartz	0.2	-	11.0
i.e. **Group***	**3a**	**3a+**	

N.B. * - Williams & Jenkins 2004; "-" = not detected, i.e. < 0.2%

3, Discussion

The petrographic analytical data can be used to (a) characterise the sherd fabrics in terms of Bronze Age pottery generally, and (b) suggest the provenance of the materials used for both the matrix and clasts in the pots.

(a) General fabric.
Within the broader spectrum of early Bronze Age cinerary urn fabrics in north western Wales, the data tabled above indicate that the two vessels from Bryncir have fabrics typical of those previously recorded from this area (Fig.2) in terms of porosity (low -5-10%) and clast content (coarse – 26/36%). Their compositions place them in **Group 3** of the classification proposed by Williams & Jenkins (2004), *i.e.* fabrics heavily gritted with rock clasts, and more specifically within **Sub-group 3a** for **Urn 4** in which clasts are dominated (>95%) by mafic igneous rocks, and for **Urn 6** within **3a+** (mafic igneous>67%). The rock clasts in urn 6 are supplemented by minor amounts of grog (2%) of similar fabric, but this was concentrated within a small area of the thin section illustrating the inherent sampling error of the analyses. Too much significance cannot therefore be placed on this difference between the two sherds analysed.

(b) Provenance of components.
With regard to **clasts**, the mafic igneous rock material differs in detail between the two sherds, and is accompanied by minor rhyolite and quartz in Urn 4 and by rhyolite and sandstone in Urn 6. In Urn 4 the mafic material takes the form of an altered plagioclase-rich dolerite with secondary amphibole, some heavily oxidised (Fig.3a-b) and some retaining a core of fresh clinopyroxene (Fig.3c-d). In urn 6 the dolerites include a much altered iron-stained version (Fig.3g-h) and an ophitic version containing fresh clinopyroxene (Fig.3i-j) with some development of actinolitic fibres (Fig.3f): there are also clasts of rhyolite (Fig.3g-l) and a lithic sandstone (Fig.3k-l). It is possible that several dolerites from different sources are represented in the two urns. The mineralogy of the grain fraction in the “clay” in both vessels consists of quartz and feldspar accompanied by small fragments of the igneous rocks in the clast fraction, but no bioliths (*e.g*. phytoliths, diatoms, spicules, *etc*.) were observed in either sherd.

The **solid geological map** (BGS 1994) shows Bryncir in an area underlain by Ordovician fine-grained silicic igneous rocks (rhyolitic tuffs and lavas) within a minor syncline on the west flank of the main Snowdon syncline. To the east, beyond an intervening strip of Cambrian slaty rocks, rhyolitic lavas and tuffs are intruded by a number of dolerite sills which show evidence of low grade metamorphism in the development of fine prismatic actinolitic bundles. These rock types were redistributed by **glaciation** which covered the solid geology on the coastal lowlands with extensive glacial deposits which in turn were re-sorted and transported to the south by glacifluvial processes: Bryncir lies just within this zone (Addison *et al*. 1990) The main direction of movement recorded in striae and landforms is westwards and southwards bringing rhyolitic rocks and slates together with minor doleritic material from the Pennant valley and central Snowdonia. However, Bryncir lies outside the limit of Irish Sea till brought in from the north east and, in a later phase, from the north across Anglesey.

The clast fraction (0.6-2.00mm) analysed from the **Dwyfach river sediment** is dominated (63%) by fragments of rhyolitic material – devitrified welded tuffs and lavas, some porphyritic, some showing weak spherulitic structures. These are accompanied by rare coarser crystalline rhyolitic material and by metamorphosed argillaceous rocks (slates - 14%) showing banding with textures ranging from fine grained to silty, the latter merging into more schistose structures. The remaining fragments belong to sedimentary rocks ranging from siltstones (9%), often heavily iron stained, to fine grained quartz sandstones and vein quartz (11%). Chloritic clasts of presumed mafic

igneous derivation are rare (1% of the sediment), but one sub-angular fragment of a clinopyroxene crystal was seen. This suggests that the material is derived mainly from the north (*e.g*. Llwyd Mawr; Roberts 1969) by glacifluvial activity, but with a detectable minor influence of glacial material from the east in the form of clinopyroxene fragments.

The **provenance** of the material used to temper the two vessels is therefore different in detail, and possibly represents different source dolerites even within the individual sherds. It also differs from that of the local sediment, but all are consistent with the general geology of the west Snowdonia area. The provenance of the matrix material is also consistent with the geology of the area, and the lack of bioliths suggests a "sterile" source such as glacial till or resorted glacifluval deposits. The small differences observed in petrology and fabric between the two sherds could all be found within the material in local glacial sediments.

4. Conclusions

In archaeological terms the two sherds are both typical of Bronze Age urns from north west Wales in terms of fabric and the selective use of mafic igneous clasts as filler, (Williams & Jenkins 1999) placing both in Group 3a/3a+ of Williams & Jenkins (2004). Such material was probably selected from glacial deposits available on site or within the immediate area, the filler having been obtained by the crushing of individual cobbles or perhaps as a by-product of other processes such as the production of hammer stones and the use of boiler stones, for both of which dolerites were again preferred. The particular dolerites used show mineralogical features found in central Snowdonia, indicating a local provenance for the materials used and suggesting local manufacture of the urns.

Acknowledgements
The helpful comments of Dr B Roberts on the detailed mineralogy and petrology of the sherds is gratefully acknowledged

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APPENDIX: Slide descriptions:

Urn Pit4 (TS 2218)
The clasts comprise sub-angular/sub-rounded rock fragments varying in size between 0.63-4.0mm: no grog was seen. The principal clast component (30.7%) is derived from a much altered mafic igneous rock - an ophitic dolerite in which the original pyroxene constituent is rarely preserved being replaced by fibrous aggregates of a pleochroic (v. dark/pale green) amphibole. An accessory clast fraction (5.2%) is represented by fragments of a fine grained rhyolitic rock containing rare altered plagioclase crystals and relict structures: it is heavily iron stained in parts. The grain fraction is not abundant (5.2%) and is represented by sparse angular quartz/feldspar grains and small detached particles of the two principal rock types. The silty-clay matrix shows moderate aggregate birefringence and mica is sparse; no bioliths were seen. It is loosely compacted and traversed by longitudinal fabrication cracks accounting for 9.5 % of the total fabric.

Urn Pit 6 (TS 2219)
The clasts comprise sub-angular/sub-rounded rock fragments, varying in size between 0.63-4.0mm: Grog particles (2.0%) are also present within one area of the section and are of similar composition to that of the host sherd, with a rhyolite clast in one fragment: they are distinguished in the re-fired sample by a darker matrix and fabric orientation The principal clast component (10.2%) is derived from an ophitic pyroxene-rich mafic igneous rock in which the colourless clinopyroxene encloses laths of highly altered plagioclase with the development of fibrous actinolite; there are also heavily altered dolerite clasts present. These are accompanied by minor clasts (2.5%) of a fine grained silicic rock (rhyolite) which contains occasional feldspar phenocrysts, and is often Fe-stained. Rare clasts (1.5%) of a fine grained lithic sandstone are also present. The grain fraction is not abundant (4.7%) being represented by small angular grains of quartz/feldspar (2.0%) and fragments of the two principal rock types (2.7%). The matrix is clay-rich, sparse in mica and develops moderate to strong aggregate birefringence: no bioliths were seen. The sherd is traversed by broad construction cracks and shrinkage voids surrounding clast fragments, these features accounting for 5.2% of the total fabric.

Stream sediment (0.6-2.0mm; TS 2223)
The coarse sand clasts (0.6-2.0mm) in the river sediment are dominated (60%) by devitrified rhyolitic material comprising both fine-grained porphyritic lavas, some showing a weak spherulitic structure and often iron-stained, and also welded tuffs in which deformed sherds are still evident. These are accompanied by minor argillaceous rock clasts showing well developed cleavage (*i.e*. slate 14%), together with siltstones (9%) and vein quartz, some enclosing euhedral chlorite (11%). There are also traces (2%) of coarser silicic rock material, oxidised chloritic clasts (altered mafic rock material?) and rare large crystals of plagioclase feldspar and fresh clinopyroxene (probably derived from dolerites).

T45 reference sediment (0.6-2.0mm: TS 2224)

T99 reference sediment (0.6-2.0mm: TS 2225)

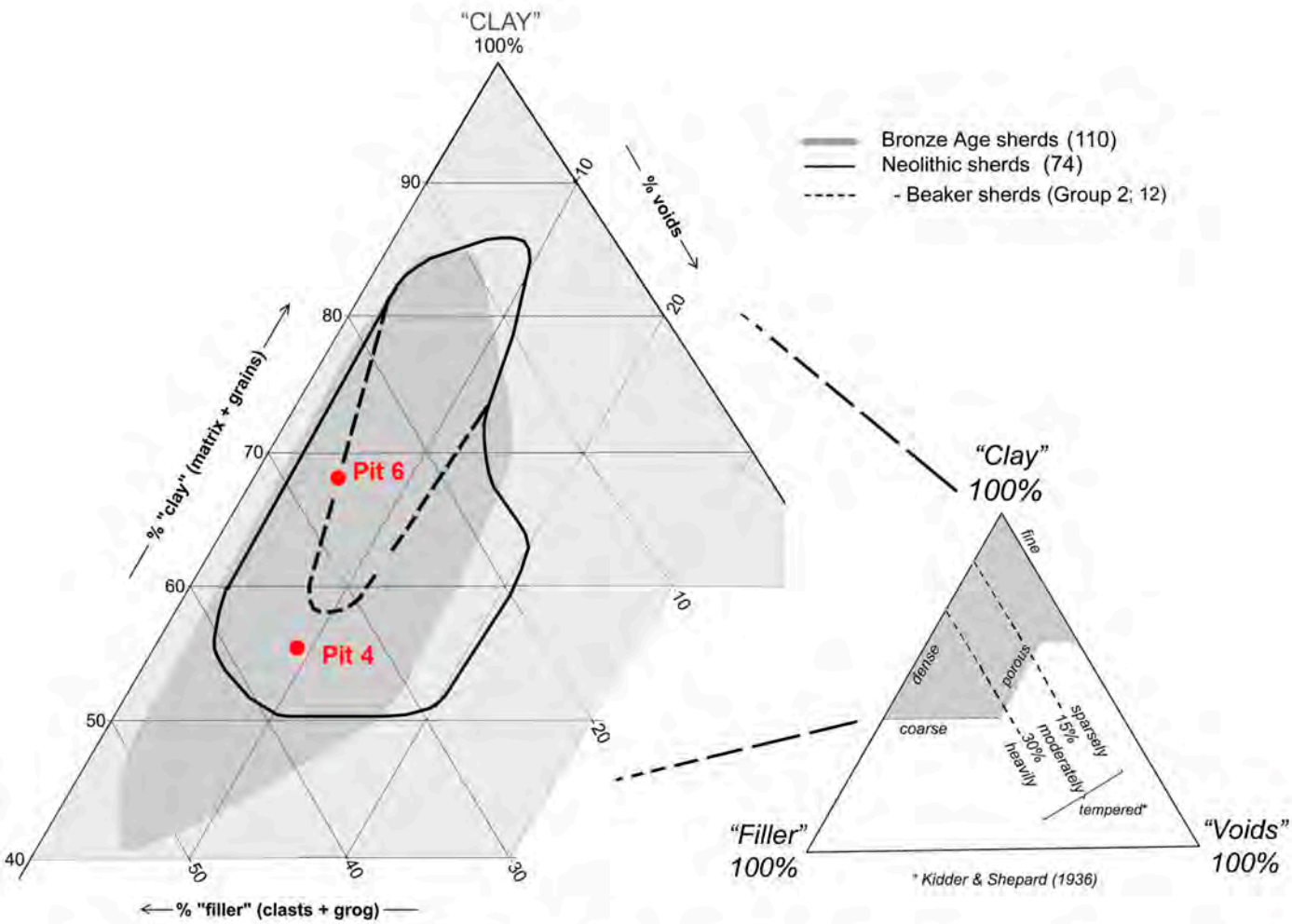


Figure 2a: Fabric of sherds in terms of % "clay", "filler" and voids (Williams & Jenkins, 2004)

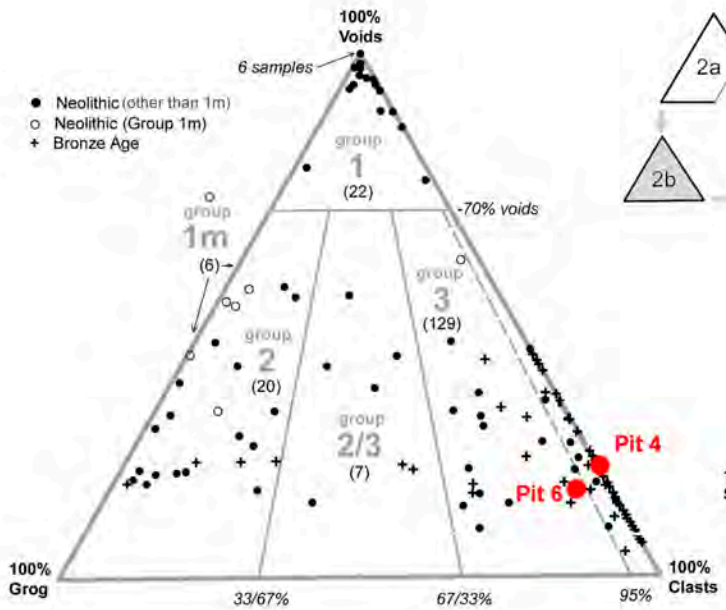


Figure 2b: Composition of filler (% voids/grog/clasts)

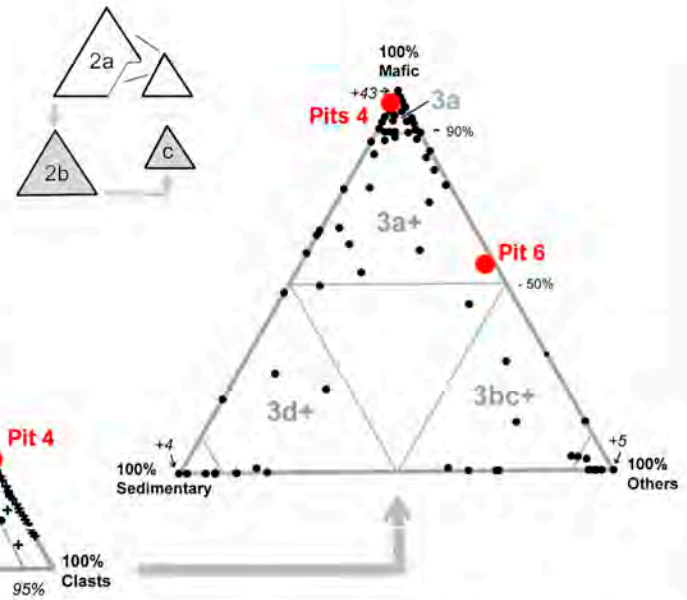


Figure 2c: Lithology of Group 3 clasts

APPENDIX 3 BLAEN-Y-CAE: SUMMARY OF FINDS

Feature no.	*Layer no.*	*Finds summary*
1	15	Charred peat/turf/soil
1	15	Burnt bone
2	23	2 quartz pebbles
2	24	1 quartz pebble, 1 stone flake
4	32	Pot, small collared urn
5	16	3 stone flakes
6	25	Pot, collared urn
6	25	Burnt bone
6	33	4 fragments of partly vitrified flint
7	28	Burnt bone
8	22	Small fragments of burnt stone
8	22	Split pebble fragment
9	18	Burnt bone

APPENDIX 4 BLAEN-Y-CAE: SUMMARY OF SOIL SAMPLES

Sample no.	*Feature no.*	*Layer no.*	*Volume (litres)*
1	11	20	10
2	2	23	9
3	8	22	5
4	2	24	74
5	3	19	17
6	10	17	4
7	9	18	4.5
8	5	16	0.5
9			10
10	11	21	0.75
11	7	28	4
12	12	30	2
13	26	27	For soil analysis only
14	12	29	1.5
15	13	31	2
16	6	25	6
17	6	33	7
18A	4	34	2
18B	4	34	0.5

APPENDIX 5 BLAEN Y CAE:
SUMMARY OF EXCAVATED CONTEXTS

Contex	Category	Filled by	Fill of	Description	Interpretation
1	Pit	15	0	Circular cut seen as a circle of charcoal. Flat-bottomed cut with slightly concave sides. initial half-section produced regular circualr pit with very loose sides. Depth 0.06-0.07m.	
2	Pit	23	0	Occasional grey patches in main fill 24 may be bone or ash. Possibly some small bone fragments and a few stones that may have been heat shattered.	
3		19	0	Roughly U to V shaped pit filled with charcoal and carefully dug into stony subsoil.	
4	Pit	32	0	Shallow pit containing the rim of a small pot. Lifted as a block.	First revealed as a small pot rim in outline. A vague area of mid-brown humus was cleaned off to reveal that the pot lay in a shallow cavity in the top of the subsoil, just large enough to hold the pot
5	Pit	16	0	Small pit with dark, charcoaly fill	Seemed large on the surface because of slight spread. The main smaller feature quite well-defined so seems to be a man-made feature.
6	Pit	25	0	Caontained urn 1. Lifted as a block. The urn was upright sitting on the base of the pit which had about 5cm of fill around the pot.	
7	Pit	28	0	Small sub-circualr pit.	Comparison with pit 6 adjoining suggests about 0.16m of the depth of pit 7 hhas been lost due to machining.
8	Pit	22	0	Small sub-circular pit	
9	Pit	18	0	Small sub-circular pit	
10	Pit	17	0	Small sub-circular pit	Cremation pit? No bone seen in fill but some large pieces of charcoal.
11	Pit	20	0	Small sub-circular pit	Cremation pit Some burnt bone fragments in fill. upper fill of dark charocal-rich silt. The lower may be just a result of staining of the subsoil.
12	Hollow	29	0	Irregular hollow with a 2-4cm thick layer of charcoal beneath a very light grey silty layer.	
13	Hollow	31	0	Vague stony darker spread, when removed this revealed a shallow, pock-marked hollow, not man-made but possibly a natural hollow containing remnants of an old land surface, like hollows 12, 14 and 26	
14	Hollow	0	0	Shallow, irregularly pock-marked hollow containing darker soil and occasional charcoal pieces. Not man-	

Contex	Category	Filled by	Fill of	Description	Interpretation
15	Layer, pit-fill	0	1	Fill of almost pure charcoal, mostly crushed to dust with a few larger pieces and occasional stones.	
16	Layer, pit-fill	0	5	Charcoal-rich layer	
17	Layer, pit-fill	0	10	Charcoal-rich layer	
18	Layer, pit-fill	0	9	Charcoal-rich layer, contains occasional bone fragments	
19	Layer, pit-fill	0	3	Charcoal-rich layer	
20	Layer, pit-fill	0	11	Charcoal-rich layer	
21	Layer, pit-fill	0	11	Silty loam. probably not actual pit-fill but sub-soil stained from the pit fill above although it did contain a few charcoal fragments	
22	Later, pit-fill	0	8	Charcoal-rich fill, more charcoal at top	
23	Layer, pit-fill	0	2	Silty loam similar to subsoil but darker	Pit backfill
24	Layer, pit-fill	0	2	Charcoal-rich fill	
25	Layer, pit-fill	0	6	Silty loam fill	Possibly old topsoil used as backfill
26	Hollow	27	0	Shallow irregular hollow filled with dark soil	Possibly a natural hollow containing a remnant of old land surface, like hollows 12,13 and 14
27	Layer, hollow-fill	0	26	Dark brown loam with occasional charcoal fragments	
28	Layer, pit-fill	0	7	Silty loam with numerous small bone frags, charcoal concentrated towards the base	
29	Layer, hollow-fill	0	12	Light grey silt, occasional charcoal	Possible remnant of old land surface. The grey could be ash but more likely gleyed soil
30	Layer, hollow-fill	0	12	Dark grey/black silt with occasional charcoal frags	
31	Layer, hollow-fill	0	13	Dark grey silty loam	
32	Layer, pit-fill	0	4	Mid-brown loam	
33	Layer, pot-fill	0	6	Mid-brown silty loam. Fill of pot in pit 6	
34	Layer, pot-fill	0	4	Mid-brown silty loam. Fill of pot in pit 4	
35	Layer, hollow-fill	0	14	Dark brown silty loam	Possibly remnant of old land surface
36	Hollow/spread	0	0	Shallow, irregular patch of dark silty soil	Possibly remnant of old land surface
37	Hollow/spread	0	0	Shallow irregular spread of dark silty soil	Possibly remnant of old land surface
38	Hollow/spread	0	0	Shallow, iregular spread of dark silty soil	Possibly remnant of old land surface
39	Hollow	0	0	Shallow, iiregular spread of mid-brown silty loam similar to hollows 13 and 14	Possibly remnant of old land surface

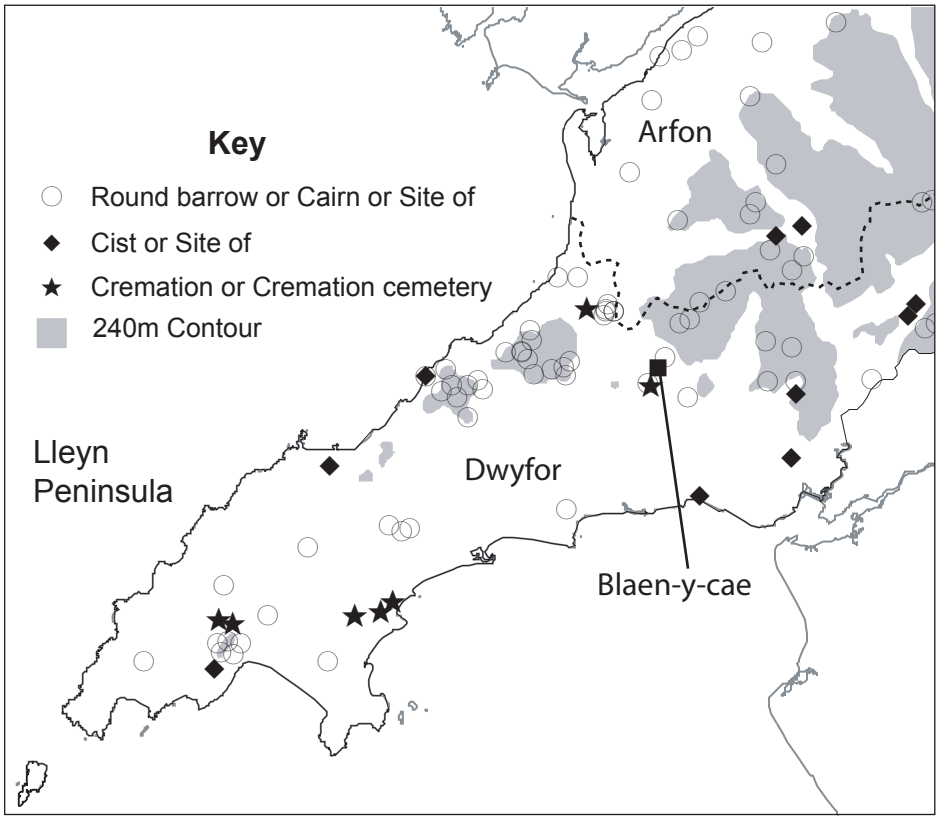
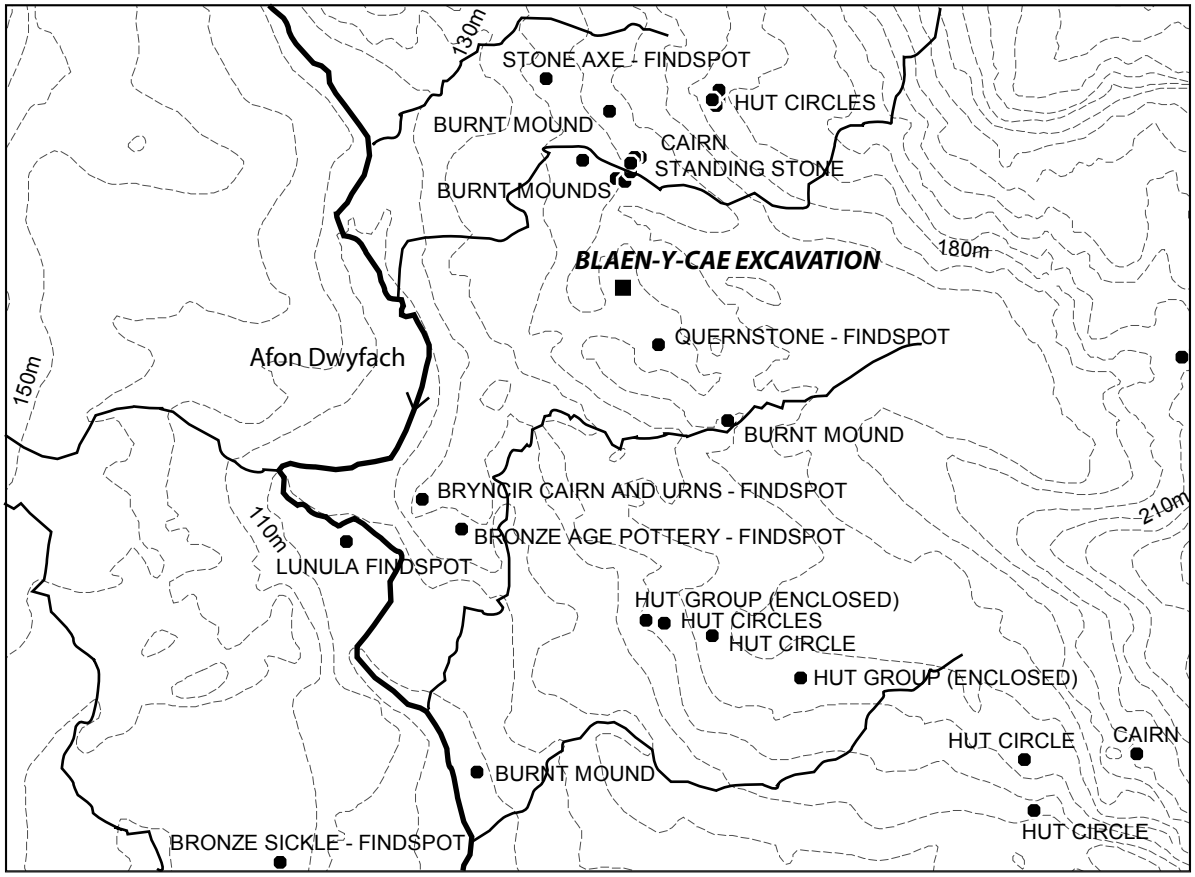


Fig 1 The distribution of Bronze Age funerary monuments in the Dwyfor and Arfon area of Gwynedd



Blaen-y-cae Fig 2

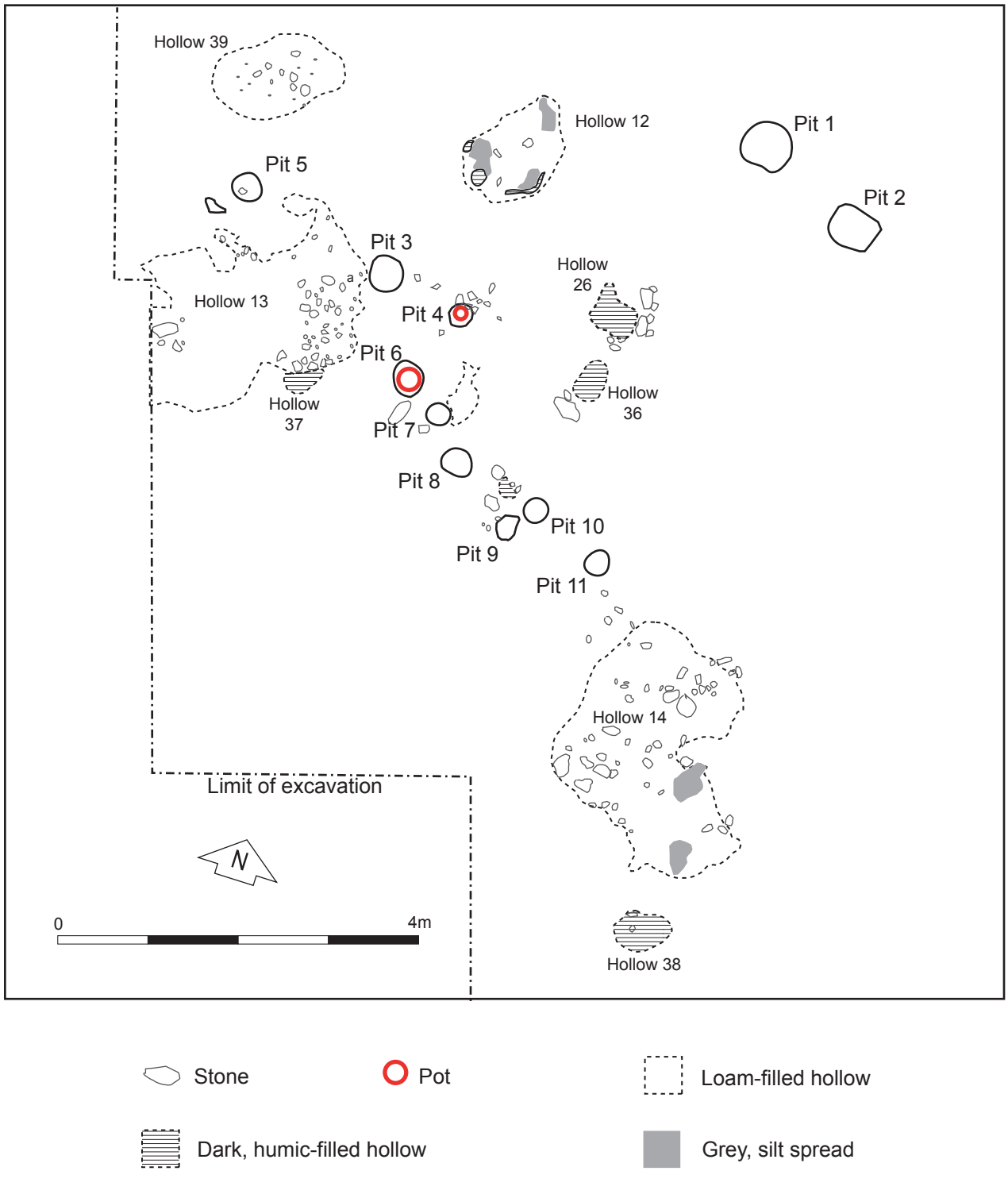
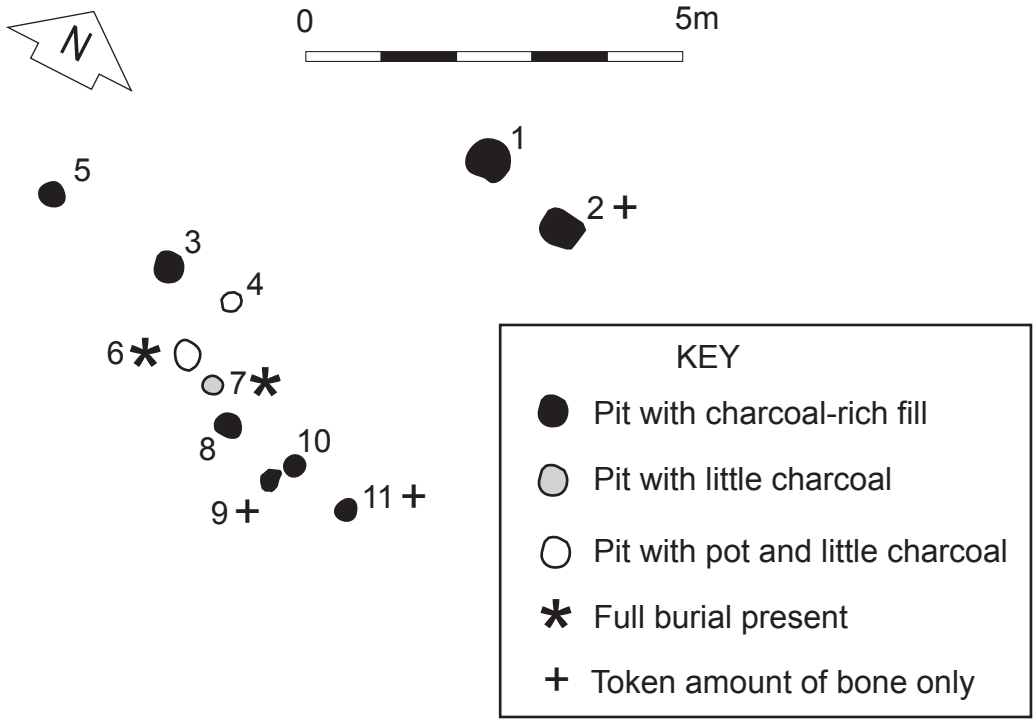


Fig. 3 Blaen-y-cae : Excavation plan showing cremation pits and other features



Blaen-y-cae Fig. 4

Fig. 5 Blaen-y-cae The cemetery area after cleaning, from the north-west. Scales with 0.5m divisions

Fig. 6 Blaen-y-cae Pits 9 and 10, half-sectioned. Scale with 1cm divisions

Fig. 7 Blaen-y-cae: Hollow 12, half-sectioned, from the west, showing the charcoal lens. Scale with 1cm divisions

Fig. 8 Blaen-y-cae: Cardiff University conservator Philip Parkes block-lifting the urn in Pit 6.

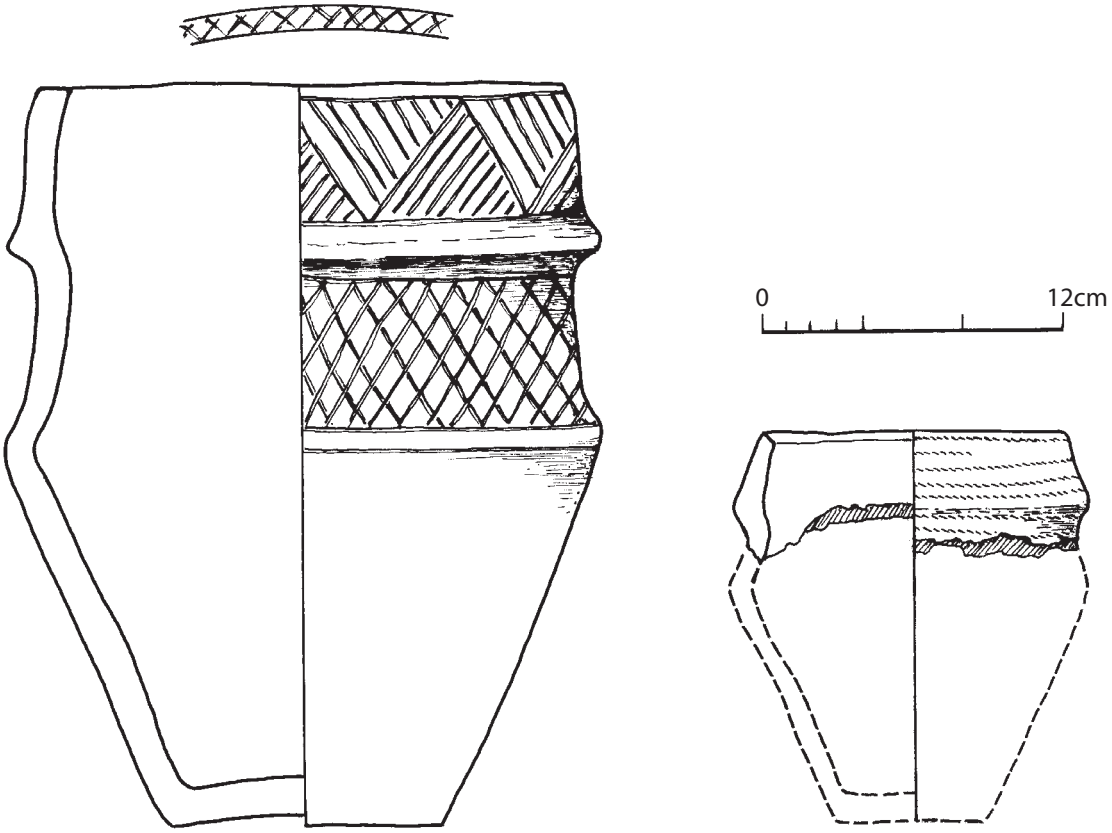


Fig. 9 Blaen-y-cae: Pottery

Fig. 10 Blaen-y-cae: Stone objects

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

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