FAN FOEL EXCAVATION 2004

SPECIALISTS' REPORTS

Palaeoenvironmental evidence

A E Caseldine and C J Griffiths

Cremation burials

R Coard

Soil Micromorphology

R I Macphail

Bronze Age pottery

A Gibson

Flints

L Barfield

Appendix to DAT report no. 2004/88

The Palaeoenvironmental Evidence from Fan Foel

Astrid E. Caseldine and Catherine J. Griffiths

The excavations at Fan Foel provided an opportunity to investigate the environmental conditions around the time the cairn was constructed and to see if there was any botanical evidence which would provide an insight into funerary ritual practices. The investigation involved the analysis of pollen, plant macrofossils and charcoal from the site.

Monolith samples were taken for pollen analysis from the kerb of the cairn (Fan Foel 1) and from beneath the mound (Fan Foel 3). Spot samples were also taken from beneath stones making up the kerb and from the primary cremation (context 1033) in the cist, adjacent to the bone in the primary fill (context 1033) of the cist, the deposit (context 1032) surrounding the secondary cremation and a sample from the fill (context 1035) of the food vessel in the cist. The cremation deposits were collected primarily for the analysis of bone but these and the other bulk samples were also examined for plant macrofossils, charcoal and small artefacts.

The provenance of the bulk samples was as follows:

1023 - upper horizon of buried soil
1028 - fill of cist above primary fill 1031
1029 - secondary cremation
1030 - deposit immediately overlying secondary cremation and comprising a mix of 1029 and 1032
1031 - primary fill of cist
1032 - deposit surrounding secondary cremation
1033 - primary cremation deposit in cist
1034 - deposit immediately surrounding pottery in cist
1035 - fill of food vessel within cist

Methods

Pollen

Analysis of the monoliths focused on the buried soil and basal layers of the mound. Subsamples were taken adjacent to the soil micromorphology samples (SM6 from Fan Foel 1 and SM5 from Fan Foel 3) in the laboratory. They were taken at either 5mm intervals or were contiguous 5mm samples. All the samples, including spot samples from other contexts, were prepared following standard procedures including treatment with hydrofluoric acid and micro-sieving to remove minerogenic material and acetolysis to remove cellulose (Moore *et al* 1991). The samples were mounted in silicone oil. *Lycopodium* tablets were added to enable pollen concentrations to be calculated. A magnification of x400 was used for routine counting with x630 and x1000 used for critical identifications. Identification was by comparison with reference material and pollen identification keys (Moore *et al* 1991). The diagrams were prepared using Tilia and TiliaGraph (Grimm 1991). Percentages were calculated on the basis of total land pollen (TLP) with other groups calculated on the basis of TLP plus the sum for the group.

The pollen count was based on 300 TLP where possible. Microscopic charcoal values are concentration values calculated using the *Lycopodium* concentration and 'macroscopic' charcoal values are the number of fragments per ml retained in the 106-um pollen sieve. Nomenclature is modified from Moore *et al* (1991) and follows Bennett (1994) and Bennett *et al* (1994). The results are given in Figs. 1-4.

Radiocarbon
A sample was taken from the peaty horizon at 25.5-26.5 cm in the monolith (FF1) from under the kerb and sent to Beta Analytic Inc for dating.

Plant macrofossils
The samples were processed using a wash-over technique. The residues were washed through the same set of sieves used to collect the flots. The finest mesh used was 250 microns. The samples were sorted down to 250 microns in the flot and 500 microns in the residues. The seeds were examined using a Wild M5 stereoscopic microscope. Identification was by reference to standard works (e.g. Bertsch 1941, Berggren 1969, Schoch *et al* 1988) and modern comparative material. The results are presented in Table 1.

Charcoal identification
Charcoal from the bulk samples was identified using a Leica DMR microscope with an incident light source. The charcoal was fractured to produce clean sections. Identification was by reference to Schweingruber (1978). The results are given in Table 2.

Pollen phases
The following phases have been identified in the diagrams from the pollen monoliths.

Fan Foel 1
FF1.1: This phase is dominated by *Corylus avellana*-type, *Calluna* and Poaceae pollen. *Alnus* and *Quercus* values are relatively low. Occasional grains of herb taxa occur. *Pteridium* and Pteropsida (monolete) indet. spores are present in small amounts. Charcoal is scarce. Pollen concentrations are low.

FF1.2: *Corylus avellana*-type values increase and *Alnus* and *Quercus* values decrease in this phase. Poaceae pollen increases and then declines as do *Pteridium* and Pteropsida (monolete) indet. spores. *Calluna* values are lower than in the previous phase. Of the herbs, *Solidago virgaurea*-type pollen is more frequent. Charcoal continues to be scarce. Pollen concentrations remain low.

FF1.3: *Corylus avellana*-type and Poaceae values are lower and *Calluna* values rise. *Alnus* and *Quercus* values are slightly higher than in the previous phase. *Pteridium* and Pteropsida (monolete) indet. spores are less frequent. Herb pollen continues to be present at a low level. Charcoal is much more frequent. Pollen concentrations fluctuate but show a distinct increase.

FF1.4: A further decline in *Corylus avellana*-type and increase in *Calluna* occurs. Other pollen values are similar to the previous phase but there is a small peak in *Plantago lanceolata* and Cereal-type pollen is present. Charcoal is abundant. Pollen concentrations increase markedly in the upper levels.

FF1.5: *Calluna* pollen decreases and *Corylus avellana*-type pollen increases. *Alnus* values are marginally lower. Representation of other taxa resembles the previous phase. Charcoal values fall but are still frequent. Pollen concentrations are lower

FF1.6: *Calluna* values after declining further, increase slightly. *Corylus avellana*-type values remain relatively high. The frequency of other taxa is similar to previously. Charcoal continues to be frequent. Pollen concentrations are comparable to the previous phase.

Fan Foel 3

FF3.1: This phase is characterised by high *Corylus avellana*-type values. *Calluna*, *Alnus* and *Quercus* values are relatively low. Poaceae pollen is present in moderate amounts. Herb taxa occur occasionally apart from *Solidago virgaurea*- type which is more frequent. Charcoal is scarce. Pollen concentrations are low.

FF3.2: *Corylus avellana*-type pollen declines whilst *Calluna*, *Alnus* and *Quercus* pollen increases. Poaceae pollen shows a slight fall but recovers. Herb pollen continues to be present in small amounts. Charcoal is frequent. Pollen concentrations increase.

FF3.3: *Corylus avellana*-type values increase and *Calluna* values fall slightly. Other taxa are similar to the previous phase. Charcoal remains frequent. Pollen concentrations increase further.

FF3.4a: An initial decline in *Corylus avellana*-type is accompanied by a slight rise in *Calluna* and Poaceae pollen. Herb pollen continues to be present sporadically. Charcoal is frequent. Pollen concentrations are high initially but decline

FF3.4b: The pollen assemblage is similar to the previous phase but *Quercus* and *Betula* values are lower. A brief peak in *Calluna* occurs before returning to a level equivalent to those in FF3.4a. After a slight decline at the end of FFe3.4a, Poaceae values in FF3.4b increase to a level similar to earlier in FF3.4a . Pollen and charcoal concentrations are lower.

Results and interpretation

Pollen

Preservation in the buried soils and spot samples was reasonably good although a decrease in concentration occurred in the lower soil horizons. Some movement of pollen in the profiles and differential pollen preservation cannot be totally ruled out but comparison of the data with the thresholds of pollen assemblage properties which can indicate post-depositional biasing (Tipping *et al* 1994, Bunting and Tipping 2000, Bunting *et al* 2001), suggests they are reliable.

The pollen monolith samples

Zonation is evident down both profiles, essentially corresponding to the different soil horizons. The longest record is from Fan Foel 1 which was taken from beneath the kerb. Overall the assemblage is dominated by *Calluna*, *Corylus avellana*-type and Poaceae pollen, indicating an open moorland environment with hazel scrub probably on the slopes below the summit, perhaps with some birch woodland. On the lower slopes and in the lowland *Quercus*, *Alnus*, *Ulmus* and *Tilia* indicate mixed deciduous woodland with possibly a little pine. Certainly during the early- and mid-Holocene pine frequency appears to have varied considerably from site to site and been dependent on local factors such as soil moisture and nutrient levels (Moore 1978, Walker 1982, Watkins 1990, 1991, Walker *et al* 2001). Changes in the relative frequency of the main pollen types, *Corylus avellana*-type, *Calluna* and Poaceae, suggest shifts in the extent or proximity of the heather, grass and hazel dominated communities. During the earliest phase FF1.1 (corresponding with a bBs soil horizon) the evidence suggests a grass-heath community with some sedges in the immediate area of the cairn, while occasional grains of *Plantago lanceolata*, *Potentilla*-type and other herbaceous taxa suggest limited pastoral activity.

Generally fungal spores were not preserved but Type 55A, a sordariaceous spore associated with decaying vegetation and, more particularly, dung was found in this phase. *Pteridium* and Pteropsida monolete spores may reflect a fern understorey within woodland or invasion of open areas, including abandoned ground. The higher representation of these spores in this phase compared with the upper zones could reflect differential preservation with depth, but this seems unlikely as, rather than declining, they do in fact increase in the zone FF1.2, immediately above. At the same time *Corylus avellana*-type pollen increases, as does Poaceae pollen while *Calluna* pollen declines, indicating that an expansion in hazel scrub and grassland occurred at the expense of heather moorland. From the evidence it appears that these changes were accompanied by an expansion in fern communities. The occurrence of *Plantago lanceolata* and other herbaceous taxa, including an increase in *Solidago virgaurea*-type, hint at continued human activity and pastoralism in the area but do not suggest high levels of activity at the site.

In the following phase, FF1.3, a decline in *Corylus avellana*-type and Poaceae pollen corresponds with an increase in *Calluna* and reflects the re-expansion of heather moorland. The presence of microscopic and 'macroscopic' charcoal indicates burning episodes, either as a result of natural events, i.e. lightening strikes, or purposive anthropogenic activity and possibly deliberate attempts at management. The 'macroscopic' charcoal includes ericaceous remains, confirming that local heather communities were being burnt. Occasional herb taxa, including *Plantago lanceolata*, occur suggesting a continuation of pastoralism in the area, but again do not indicate high levels of activity in the immediate area of the site. This is in agreement with the soil micromorphological evidence (Macphail 2006) for the upper part of this zone and bEag soil horizon, which points to trampling, probably by humans rather than animals, as well as burning.

A further fall in *Corylus avellana*-type pollen and increase in *Calluna* pollen in phase FF1.4 coincides with high charcoal values. These changes suggest a further expansion in moorland/blanket peat vegetation communities and decline in hazel at the moorland fringes. Particularly high microscopic charcoal values occur in the upper levels whilst the 'macroscopic' charcoal shows a distinct alternating pattern, also evident in the previous phase, and the soil micromorphological evidence (Macphail 2006) again shows evidence of trampling. Pollen concentrations peak, pointing to a trampled buried surface. The soil micromorphological evidence for this and the previous phase suggests trampling and slaking and that compaction led to localised waterlogging. Further evidence for this is an increase in Zygnemataceae (algae), which are indicative of shallow, stagnant mesotrophic water in spring-time (van Geel 1978), in this phase.

Herbaceous taxa remain present in low amounts but a small peak in *Plantago lanceolata* and a cereal type pollen grain occur. In general the evidence suggests a continued low level of pastoralism with perhaps attempts at deliberate burning of the moorland to increase the productivity, but it seems unlikely that there would have been any attempt at cultivation in the immediate vicinity of the site and that the grain is derived from lower altitudes.

A decline in *Calluna* and increase in *Corylus avellana*-type during phase FF1.5 coincides with the peaty loam horizon. Charcoal also declines although charcoal could not be easily quantified because the samples comprised partially burnt material which had not been reduced to charcoal, a difficulty also encountered on other sites such as Linga Fiold, Orkney (Bunting *et al* 2001). The soil micromorphological evidence indicates a level of burning consistent with management of moorland/heathland by fire (Macphail 2006). Herbaceous taxa indicative of low levels of pastoralism are present and again a cereal-type pollen grain was recorded, indicating cultivation in the region. A radiocarbon date of 3820+/- 40 BP (Beta-209006; Cal BC 2430-2140, Cal BP 4380-4090 (calibration: Stuiver *et al* 1998)) was obtained from the organic sediment. This predates the date of the primary cremation of *c* 3650 ^{14}C yrs BP and is in keeping with the interpretation of the humose deposit as 'turf' material.

The pollen assemblage in phase FF1.6 is from a redeposited sandy loam similar to that below the peat horizon. The assemblage resembles that in earlier levels but interpretation is limited given the nature of the deposit.

The pollen sequence from Fan Foel 3 from the buried soil and basal deposits towards the centre of the mound are broadly similar to those from the profile, Fan Foel 1, from beneath the kerb. *Corylus avellana*-type values are relatively high in the lowest levels (phase FF3.1) whilst *Calluna* values are comparatively low, as in phase FF1.2 from beneath the kerb. This is followed by a decline in *Corylus avellana*-type values and increase in *Calluna* (phase FF3.2), accompanied by an increase in charcoal, especially 'macroscopic' charcoal. This corresponds with phase FF1.3. An increase in *Corylus avellana*-type and decline in *Calluna* occurs in phase FF3.3 for which there is some slight evidence in the upper levels of phase FF1.3. Again the soil micromorphological evidence indicates trampling during the latter two phases (Macphail 2006) and differences between the two profiles could perhaps be due to this. The pollen above, phase FF3.4, is from a humic horizon comparable to that in phase FF1.5. Microscopic charcoal values are initially very high, as in phase FF1.5 but the pollen spectra and concentration levels show some similarities with both phase FF1.4 and phase FF1.5. The decline in pollen concentration values during FF3.4a could perhaps indicate the remains of an inverted turf.

The phase FF3.4b above from a silty clay loam contains a similar assemblage but with a lower concentration.

Spot samples from beneath the kerb

The kerb stones overlay the edge of the barrow and are regarded as the result of later secondary activity dating to the period when the secondary cremation was deposited. This is confirmed by the radiocarbon dates of 3540±40 BP (GrA-29950) and 3510±40 BP (GrA-29949) from the secondary cremation compared with those of 3650±40 BP (GrA-29950) and 3635±40 BP (GrA-29963) from the primary cremation. The spot samples from beneath the kerb stones should therefore give some indication of the environment when the stones were emplaced, although the assemblages may comprise a mix of

contemporary pollen and pollen from redeposited material, thereby limiting their interpretation. All the samples indicate a similar moorland/ grass-heather environment to that recorded in the buried soils, suggesting little change in the environment. High concentrations of microscopic and macroscopic charcoal occur, reflecting either contemporary or earlier burning activity. Occasional grains of *Plantago lanceolata* and low amounts of *Potentilla*-type provide evidence for grazing activity, if limited, and the presence of a Type 55A fungal spore supports this.

Spot samples associated with the cremations and pottery vessel

The pollen spectra from the contexts associated with the cremations and the pottery vessel are essentially similar to those from the spot samples from beneath the kerb stones and the buried soils, with the exception of sample 1033 from the primary cremation. The spectra are largely dominated by *Corylus avellana*-type, *Calluna* and Poaceae with lesser amounts of *Alnus*, *Quercus*, *Betula* and Cyperaceae and probably mainly derive from material making up the mound. Hence the pollen spectra from sample 1035 provide no information about the possible use of the pottery vessel. However, the sample from the primary cremation differs in the relatively high percentage of *Filipendula* pollen. It also contains *Ilex aquifolium* and *Prunus*, taxa not recorded in other samples, but these are just single grains and most likely are derived from background pollen rain. A small amount of *Filipendula* was also recorded from sample 1032, the sample from adjacent to the secondary cremation. The percentage of *Filipendula* pollen in 1033 is too high to be accounted for by aerial pollen rain, especially as it is an entomophilous species, and it is unlikely to have been growing in the immediate vicinity of the site. There are two species of *Filipendula*. *Filipendula ulmaria* (meadowsweet) is particularly common in fens and wet woodland but is also found on wet rock ledges, by rivers and in wet meadows but is absent from acid peat, whilst *Filipendula vulgaris* (dropwort) occurs in calcareous grassland. Furthermore if it had been growing locally then it is likely that higher values would have occurred in other contexts from the site and there is only the occasional grain. As the pollen is from the sediment surrounding the bone, it seems likely that it could represent a purposeful anthropogenic deposition at the time of burial. The occurrence of *Filipendula* pollen at more than 1% total land pollen in the sample from adjacent to the secondary cremation also suggests that *Filipendula* could have been deliberately placed with that cremation as well.

Although it seems unlikely that *Filipendula* would have been growing at the site of Fan Foel itself, an exposed summit at 781m AOD, it is perhaps possible that the *Filipendula* could have been collected from elsewhere in the area. Certainly there is some evidence for *Filipendula* growing in the uplands of south Wales, at least into the Neolithic. *Filipendula* is recorded in the pollen records from beneath the cairns at Corn-du and Pen-y-fan, but usually only in low amounts though it reaches *c* 5% TLP during a zone dated to 4830±80 BP to 4160±80 BP at Pen-y-fan (Chambers and Lageard 1997). The latter was interpreted as representing a mixed heath-grass community with some *Filipendula*, but as suggested this would have been an unusual mix of taxa and represent a vegetational community for which there is no modern analogue (Chambers and Lageard 1997). However, at one site at Waun Fignen Felen (Smith and Cloutman 1988), approximately 4.5km to the south of Fan Foel, relatively high *Filipendula* values persisted until *c* 4600

^{14C} yrs BP, reflecting marshy conditions at the margin of the lake basin, and it is perhaps possible that elsewhere in the area localised stands of *Filipendula* adjacent to pools of open water survived into the Bronze Age. Hence the *Filipendula* could perhaps have been gathered en route to burial of the cremation. Alternatively the *Filipendula* could have been placed with the cremated bone prior to it leaving the cremation site in the 'lowlands'. The dominance of oak and the presence of alder in the small charcoal assemblage from the cremation (see below) also suggests the funeral pyre was built at a lower altitude.

The occurrence of *Filipendula* pollen at Fan Foel is of particular interest because high percentages of *Filipendula* pollen have been recorded elsewhere in Britain, notably Scotland, on Bronze Age burial sites and similarly attributed to anthropogenic activity. Several explanations have been put forward for the high counts, including mead or honey, where it was found with high amounts of *Tilia* pollen, as the source (Dickson 1978), flavouring of porridge or fermented ale (Bohncke 1983) or floral tributes, either the deliberate deposition of flowers or vegetation mats at the time of inhumation (Whittington 1993, Tipping 1994, Tipping 1997, Whittington 1997, Clarke 1999). The *Filipendula* from Fan Foel includes immature pollen grains and clumps of grains and this has been interpreted as indicating the former presence of flowerheads (Lambert 1964, Dickson 1978, Bohncke 1983, Whittington 1993, Tipping 1994, Clarke 1997). On several sites high counts of *Filipendula* pollen have been associated with 'body stains', and for example at Whitsome were found in the area around the head and interpreted as indicating a head-dress or pillow (Clarke 1999). At Sandfjold on Orkney, they were obtained from dust and cremated bone on the floor of an urn but because of high amounts of *Spergula*-type pollen, and the possibility that this represented corn spurrey which has been used as a famine food, it was concluded that the *Filipendula* could have been used as flavouring in a meal (Tipping 1994). The pollen spectra at Fan Foel do not indicate any other use for the *Filipendula* than as a floral tribute. It has attractive clusters of cream-white flowers and both the flowers and leaves, the latter when crushed lightly, give off an aromatic scent (Tipping 1994). However, its association with a cremation at Fan Foel, rather than a burial and the possible need to counteract the smell of rotting flesh, perhaps adds weight to the suggestion of its symbolic status in the Bronze Age (cf Clarke 1999).

Plant macrofossils

The samples contained both charred and uncharred remains, mainly the former. Heather (*Calluna vulgaris*) remains predominated in the charred assemblage and occurred in all the samples. However, they were comparatively scarce in the primary cremation deposit 1033 and were probably incorporated at the time of deposition or intrusive from the primary fill of the cist rather than part of the initial cremation deposit. The only other remains in the cremation deposit were a few grass (Poaceae) fragments. The relatively low incidence of *Calluna* remains tends to support the view that the cremation occurred elsewhere. Of the other species in the assemblage, deergrass (*Trichophorum cespitosum*) was the most abundant, notably in the primary fill, 1031, of the cist, although this is primarily a reflection of the much greater quantity of material processed. Deergrass, though rare, and heather were present in the secondary cremation deposit 1029. Again it is probable that the origin of these remains, although they were possibly broadly

contemporary, was not directly associated with the cremation. The other species that were present in the assemblage, mainly from 1031 (the largest sample examined), include hare's-tail cottongrass (*Eriophorum vaginatum*), rushes (*Juncus* sp.), great wood-rush (*Luzula sylvatica*), and grasses (Poaceae) and, along with the heather and deergrass, indicate an open moorland environment. The *Potentilla* seeds were not sufficiently well preserved to identify them with certainty to species level but are likely to be tormentil (*Potentilla erecta*), a species commonly found on moorland, frequently where there is grazing activity. It seems likely that most of the heather, deeergrass and other remains found in the contexts associated with the cremations derive from the old land surface and 'turves' from the surrounding area brought onto the site. The only possible cultivar was a caryopsis of oat/grass (*Avena* sp. /Poaceae) from 1030, a deposit associated with the secondary cremation, but unfortunately the caryopsis was incomplete. If it is oat it is also possible that it is a wild rather than a cultivated variety but its occurrence is of interest because in later periods oat, especially bristle oat (*Avena strigosa*), was frequently the chosen crop in the uplands of Wales.

Generally waterlogged/uncharred remains were scarce in the samples, the exception was the presence of bulrush (*Typha* sp.) seeds which occurred in large quantities in two samples. They were found only in the secondary cremation context 1029 and context 1030, a context incorporating the top of 1029 and material immediately adjacent to the cremation, the latter equivalent to context 1032 at a lower level. The absence of bulrush seeds in 1032 suggests that the bulrush seeds in 1030 derive from the cremation element in the sample. Bulrushes grow in reedswamps, lakes and rivers and not on moorland, hence their presence in the cremation contexts suggests that they represent plant material that was deliberately collected and deposited either at the time of emplacement of the cremation or that they represent later, intrusive material brought to the site and buried by birds or animals. The low incidence of other waterlogged seeds in these and other samples possibly supports the latter view but the bulrush seeds do appear to be largely confined to the cremation context. If contemporary with the cremation, as with the *Filipendula* pollen recorded in the primary cremation, bulrushes may have been brought with the cremation or collected on the way to the internment. Hence they may originate from the lowland or adjacent to an upland lake or pool. A small peak in *Sparganium/Typha* pollen is recorded at Waun-Fignen-Felen *c* 4000 ^{14C} yrs BP (Smith and Cloutman 1988). *Typha latifolia* (bulrush) and *Typha angustifolia* (lesser bulrush) flower in the middle of the summer but bulrush does not shed its seed until the following February - March (Clapham *et al* 1987), hence the deposition of the secondary cremation could have occurred at any time from late summer through to the beginning of spring.

The only other uncharred seed which could be of significance is an uncharred bramble (*Rubus fruticosus*) seed in the primary fill 1031 of the cist. Again, it is unlikely that bramble would have been growing in the immediate area of the cairn and it is probable that it was brought from elsewhere. It could have some ritual meaning associated with deposition of the cremation, or simply represent 'natural' deposition of a seed which had been transported to the site perhaps in a bird dropping or attached to the feet of animals or humans.

The heather assemblage from the buried soil at Fan Foel is similar to that encountered in the old ground surface and turf samples from Corn-du and Pen-y-fan (Caseldine and Barrow 1997), although there the state of preservation was much better and much of the plant material was uncharred as well as charred. The occurrence of large quantities of charred *Calluna* remains in the buried soil demonstrates burning at the site. This could represent 'natural' fires or deliberate fires which were created either in an attempt at land management to increase browse (cf Caseldine and Barrow 1997), or to deliberately clear the site prior to construction of the cairn and, given the location of the site on the summit of Fan Foel, may have been of symbolic/ritual significance. The limited evidence for pastoral activity at the site supports the latter interpretation but nor are the possible alternatives mutually exclusive. It is possible that the site could have developed as a burial site from a site already established as a ritual site, either accidentally or intentionally, by the use of fire.

Charcoal

Wood charcoal is generally scarce in samples from the site, even in the actual cremation deposits, and was absent from the buried soil. Oak (*Quercus* spp.) dominates the assemblages from the cremations although alder (*Alnus glutinosa*) and hazel (*Corylus avellana*) are also present in the primary cremation. Small amounts of oak occur in the other contexts associated with the cremations, apart from 1032 which contains only two fragments of hazel charcoal. Oak and hazel are the main species found on Bronze Age sites in Wales (Caseldine 1990, forthcoming). On a number of sites oak charcoal has been found with bone, presumably from the funeral pyre, which suggests deliberate selection (Hogg 1977, Lynch 1984, Caseldine 1991, 1993).

The assemblage differs from the pollen record in which *Corylus avellana-type* is the dominant arboreal taxon with *Alnus* and *Quercus* less well represented, indicating hazel woodland or scrub on the upper summital slopes and oak and alder woodland at a lower altitude. The low incidence of wood charcoal and the nature of the assemblage suggests that the funeral pyre was located elsewhere, on the lower slopes or in the valley.

Environmental Discussion

The results from Fan Foel are in accord with other palaeoenvironmental evidence from the Black Mountain where an expansion in heathland is recorded during the later Neolithic and Bronze Age. At Waun-Fignen-Felen, *c.* 4.5 km to the south of Fan Foel, an increase in *Calluna* is recorded generally between c 4500- 42/000 ^{14}C yrs BP although at one site this did not occur until *c* 3700 ^{14C} yrs BP (Smith and Cloutman 1988). Carbonised remains of *Calluna vulgaris* and *Erica tetralix* in peat deposits dated to *c* 3800-2600 ^{14}C yrs BP confirm that heath-burning was widespread in the area and at one site occur at *c* 3600 ^{14}C yrs BP, similar to the dates from the cremations at Fan Foel. Together with substantial amounts of *Plantago lanceolata* pollen and *Pteridium* spores, the charred remains are interpreted as evidence of human pressure on the landscape during the Bronze Age. Further evidence occurs five kilometres to the south of Waun-Fignen-Felen, in peat deposits close to the cairn of Carn Goch and a ring cairn at Mynydd y Drum, where birch carr gave way to a more open local environment comprising heaths, sedges and grasses (Chambers *et al* 1990). These changes were accompanied by

increased charcoal representation and were interpreted as representing marked human activity in the area *c* 4350 ^{14}C yrs BP. Later fluctuations in arboreal and non-arboreal pollen are considered to indicate human impacts during the Bronze Age with the most dramatic episode dated to *c* 3500-3300 ^{14}C yrs BP. Pollen evidence from buried soils beneath the cairns themselves indicates they were constructed in an already substantially altered landscape dominated by either heath or hazel scrub. A consistent picture therefore emerges of a largely open heath and grass dominated landscape already established in the Bronze Age on the Black Mountain where the cairns were located.

This picture is repeated in the Brecon Beacons where comparison with the pollen and radiocarbon data from the cairns at Corn Du and Pen-y-fan (Chambers and Lageard 1997) show close similarities with that from Fan Foel. The radiocarbon date of 3820±40 BP (Beta-209006; Cal BC 2430-2140, Cal BP 4380-4090) from the peaty loam 'turf' at Fan Foel is statistically indistinguishable from those from the top of the mound and the old ground surface in a monolith taken through the mound at Corn Du, as well as other dates from the old ground surface (Table 3). It is also similar to that from mineral-rich peat, considered to be the old ground surface, directly beneath the peat and wood from a secondary cut at Pen-y-fan, but overall the dates are less consistent (Table 3). However, dates from the monoliths for the old ground surfaces at Corn-du and Pen-y-fan are not statistically different and suggest construction of both monuments in the period roughly between 2550-2050 Cal BC, a period which encompasses the date from Fan Foel (2430-2140 Cal BC).

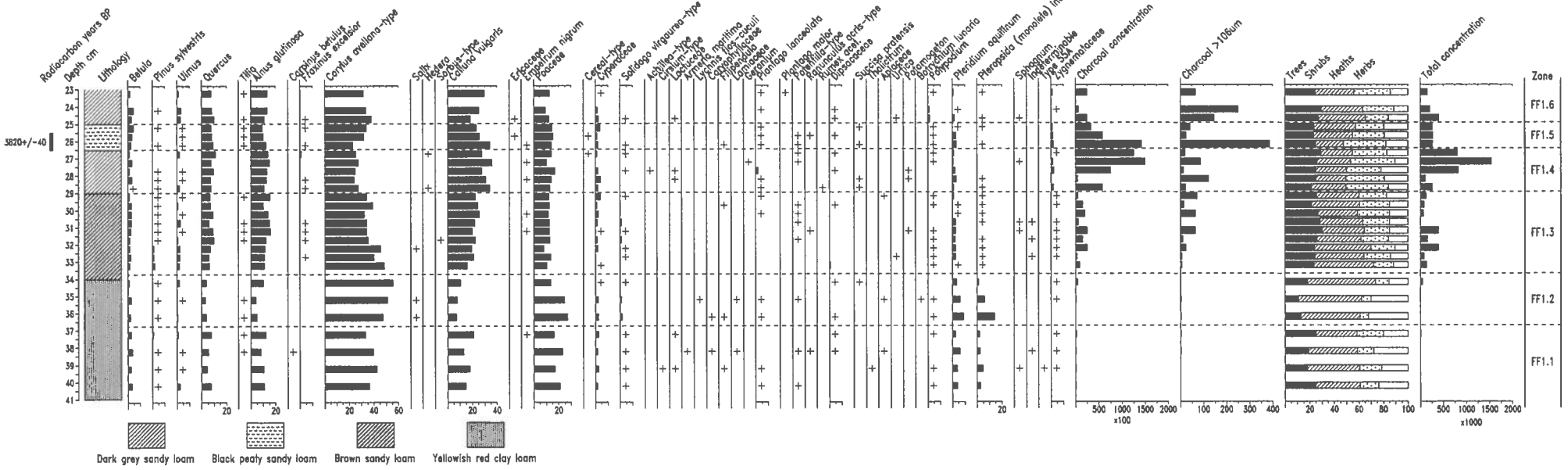
As on the summit of Fan Foel, the local environment suggested by both the pollen (Chambers and Lageard 1997) and plant macrofossil records (Caseldine and Barrow 1997) at Corn-du and Pen-y-fan is one of a grass-heath vegetation community with hazel scrub. The latter was reduced in extent and proximity to the summital sites by the time the cairns were constructed. Prior to this a period of hazel regeneration with grassland peaks occurred at the beginning of a phase dated to c 5300-3650 Cal BC, which in turn followed a period of opening of a hazel dominated woodland environment and increase in heather. Similar phases are recorded in the pollen records from Fan Foel, although dating of these phases is uncertain.

There is clear evidence for burning of heathland vegetation during the Bronze Age on both the Black Mountain and the Brecon Beacons and with the increased frequency of pastoral indicators may reflect deliberate attempts at land management to improve grazing or natural lightening strikes which incidentally could have improved productivity. However, the evidence for burning at Fan Foel, Corn-du, Pen-y-fan and Mynydd y Drum could perhaps relate as much to deliberate ritual fires, especially given the limited evidence for animal activity at Fan Foel, prior to construction of the cairns, or burning for management reasons could have to led to or enhanced the symbolic significance of the summital peaks. Alternatively, natural fires could have perhaps contributed to the symbolic importance of the summital cairn sites.

Conclusions

The environmental evidence from Fan foel is in keeping with evidence from elsewhere in the region. A grass-heath vegetation community dominated on the summit at the time of cairn construction with hazel scrub on the slopes immediately below and mixed woodland on the lower slopes and in the valley. Burning of heathland at the site may represent ritual activity and be of symbolic importance, rather than represent an attempt at land management to increase grazing or 'natural' fires. There is also some evidence for the ritual deposition of plant remains.

FAN FOEL 1


Radiocarbon years BP
Depth cm
Lithology
3820+/-40
Betula
Pinus sylvestris
Ulmus
Quercus
Tilia
Alnus glutinosa
Corylus avellana-type
Salix
Hedera
Sorbus-type
Calluna vulgaris
Ericaceae
Empetrum nigrum
Poaceae
Cerealia-type
Cyperaceae
Solidago virgaurea-type
Achillea-type
Cirsium-type
Lactucoideae
Armeria maritima
Lysimachia nemorum-type
Caryophyllaceae
Filipendula
Lamiaceae
Geranium
Plantago lanceolata
Plantago major
Potentilla-type
Ranunculus acris-type
Rumex acetosa
Dipsacaceae
Succisa pratensis
Thalictrum
Apiaceae
Urtica
Potamogeton
Botrychium lunaria
Polypodium
Pteridium aquilinum
Pteropsida (monolete) indet.
Sphagnum
Indeterminata
Type 55A
Lycopodiaceae
Charcoal concentration
Charcoal >105um
Trees
Shrubs
Heaths
Herbs
Total concentration
Zone
FF1.6
FF1.5
FF1.4
FF1.3
FF1.2
FF1.1
x100
x1000
Dark grey sandy loam
Black peaty sandy loam
Brown sandy loam
Yellowish red clay loam

FAN FOEL 3

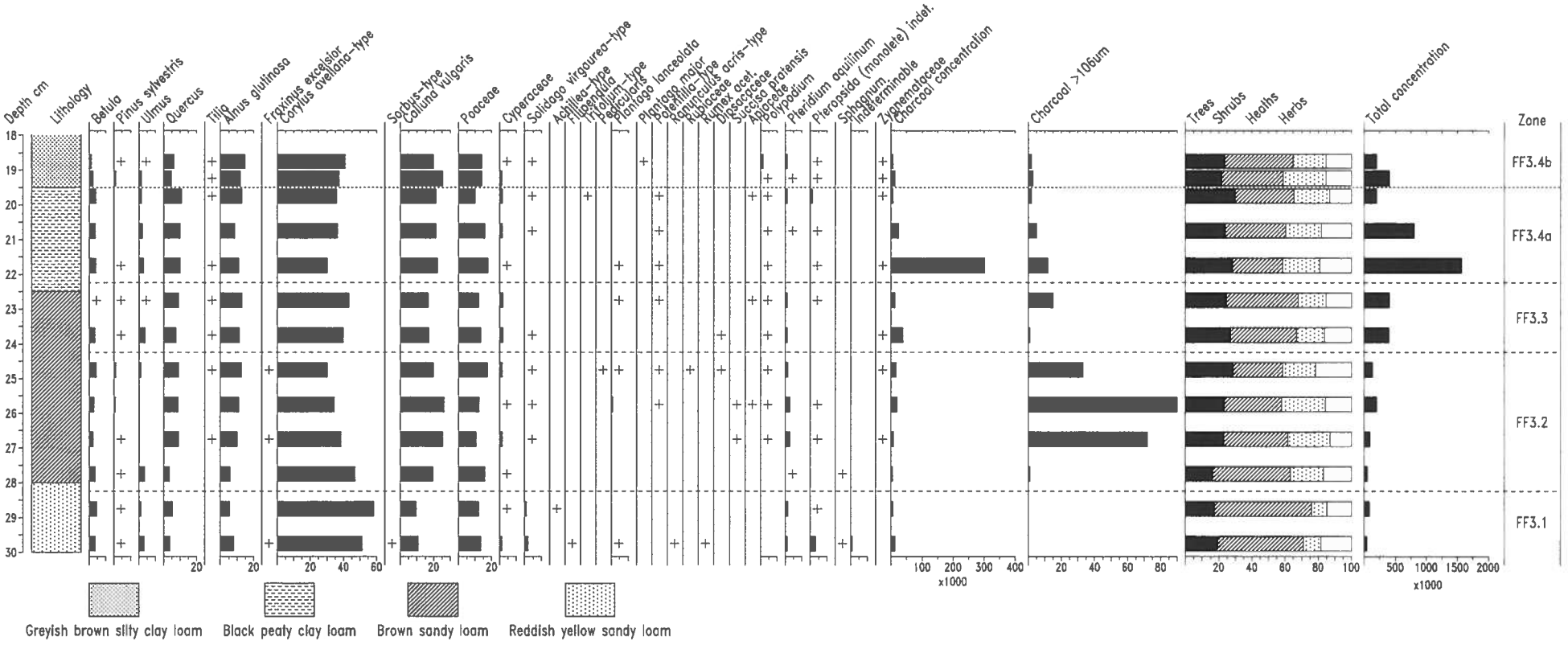

Depth cm
Lithology
Betula
Pinus sylvestris
Ulmus
Quercus
Tilia
Alnus glutinosa
Fraxinus excelsior
Corylus avellana-type
Sorbus-type
Calluna vulgaris
Poaceae
Cyperaceae
Solidago virgaurea-type
Achillea-type
Filipendula
Trifolium-type
Pelecularis
Plantago lanceolata
Plantago major
Potentilla-type
Ranunculus acris-type
Rubiaceae
Rumex acet.
Dipsaceae
Succisa pratensis
Apiaceae
Polypodium
Pteridium aquilinum
Pteropsida (monolete) indet.
Sphagnum
Indeterminable
Zygnemataceae
Charcoal concentration
Charcoal >106um
Trees
Shrubs
Heaths
Herbs
Total concentration
Zone
FF3.4b
FF3.4a
FF3.3
FF3.2
FF3.1
x1000
x1000
Greyish brown silty clay loam
Black peaty clay loam
Brown sandy loam
Reddish yellow sandy loam

Figure 2 The pollen evidence from under the barrow mound at Fan Foel.

Figure 3 The pollen evidence from under the stones of the kerb at Fan Foel.

FAN FOEL

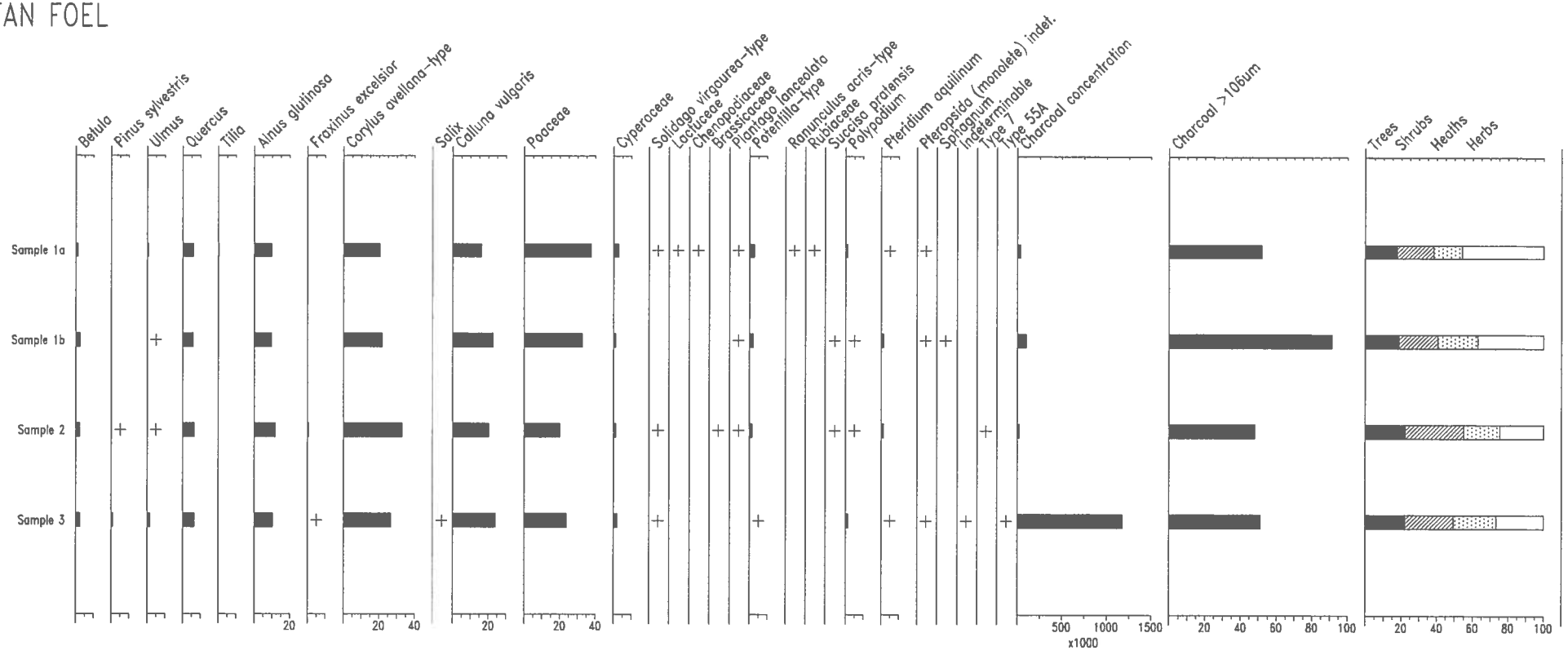

Betula
Pinus sylvestris
Ulmus
Quercus
Tilia
Alnus glutinosa
Fraxinus excelsior
Corylus avellana-type
Salix
Calluna vulgaris
Poaceae
Cyperaceae
Solidago virgaurea-type
Lactuceae
Chenopodiaceae
Brassicaceae
Plantago lanceolata
Potentilla-type
Ranunculus acris-type
Rubiaceae
Succisa pratensis
Polypodium
Pteridium aquilinum
Pteropsida (monolete) indet.
Sphagnum
Indeterminable
Type 7
Type 55A
Charcoal concentration
Charcoal >106um
Trees
Shrubs
Heaths
Herbs
Sample 1a
Sample 1b
Sample 2
Sample 3
20
20
40
20
20
40
500
1000
1500
x1000
20
40
60
80
100
20
40
60
80
100

Figure 4 The pollen evidence from the cremations and the pottery vessel at Fan Foel.

FAN FOEL

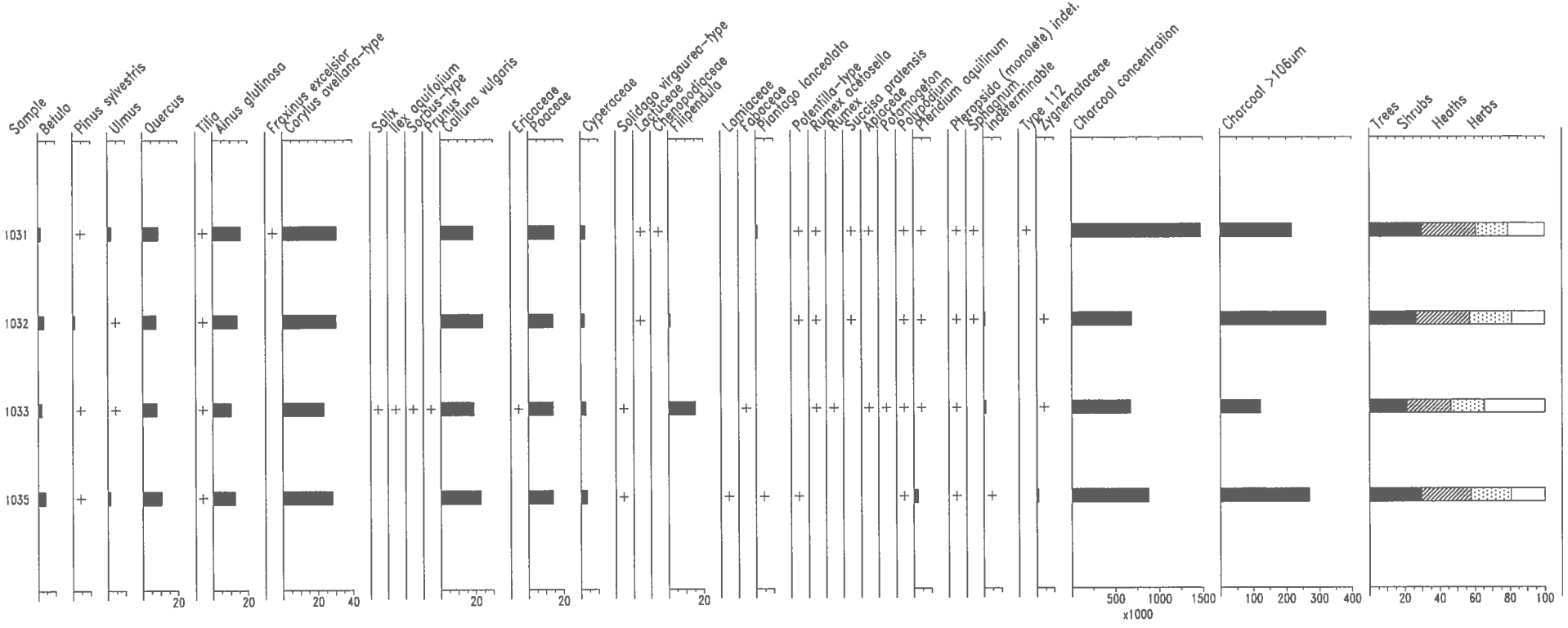

Sample
Betula
Pinus sylvestris
Ulmus
Quercus
Tilia
Alnus glutinosa
Fraxinus excelsior
Corylus avellana-type
Salix
Ilex aquifolium
Sorbus-type
Prunus
Calluna vulgaris
Ericaceae
Poaceae
Cyperaceae
Solidago virgaurea-type
Lactuceae
Chenopodiaceae
Filipendula
Lamiaceae
Fabaceae
Plantago lanceolata
Potentilla-type
Rumex acetosella
Rumex
Succisa pratensis
Apiaceae
Potamogeton
Polypodium
Pteridium aquilinum
Pteropsida (monolete) indet.
Sphagnum
Indeterminable
Type 112
Zygnemataceae
Charcoal concentration
Charcoal >106um
Trees
Shrubs
Heaths
Herbs
1031
1032
1033
1035
20
20
20
40
20
20
20
20
500
1000
1500
x1000
100
200
300
400
20
40
60
80
100

Table 1 Plant macrofossils from Fan Foel

Sample	**1023**	**1028**	**1029**	**1030**	**1031**	**1032**	**1033**	**1034**	**1035**
Sample size - litres	**10**	**3.5**	**10.5**	**15.5**	**64.5**	**8**	**4.5**	**1.25**	**1**
Waterlogged									
Calluna vulgaris (L.) Hull (Heather)- stem frags.	-	-	10s	-	1	-	-	-	-
Calluna vulgaris (L.) Hull semi-charred stem frags.	-	-	-	-	20	-	-	-	-
Rubus fruticosus L. agg. (Bramble)	-	-	-	-	1	-	-	-	-
Juncus sp. (Rushes)	-	-	-	-	1	-	-	-	1
Trichophorum cespitosum (L.) Hartman (Deergrass)	-	3	-	-	-	1	-	-	-
Typha sp. (Bulrush)	-	-	1000s	1000s	-	-	-	-	-
Sphagnum sp. (Sphagnum moss)	-	-	-	-	1	-	-	-	-
Charred									
Calluna vulgaris (L.) Hull (Heather) - flowers	81	20	-	14	3	-	-	30	80
Calluna vulgaris (L.) Hull stem frags.	1000s	100s	100s	100s	100s	1000s	10s	100s	100s
Potentilla sp. (Cinquefoil)	2	1	-	2	2	1	-	-	-
Juncus sp. (Rushes)	-	-	-	-	5	-	-	1	-
Juncus sp. - capsule	-	-	-	-	1	-	-	-	-
Luzula sylvatica (Hudson) Gaudin (Great wood-rush)	-	-	-	-	2	-	-	-	-
cf. *Eriophorum vaginatum* L. (Hare's-tail cottongrass)	-	-	-	1	1	-	-	-	-
Eriophorum vaginatum L. sclerenchymatous spindles	-	-	-	5	-	-	-	-	-
Trichophorum cespitosum (L.) Hartman (Deergrass)	8	4	1	8	101	21	-	4	3
Avena sp./Poaceae (Oat/grass)	-	-	-	1	-	-	-	-	-
Poaceae (Grass)	1	-	-	-	-	-	-	-	-
cf. Poaceae	-	1	-	-	-	-	-	-	-
Poaceae stem/rhizome frags.	5	5	-	-	-	-	2	10	-
Indets.	-	-	-	-	1	-	-	-	-

Table 2 Charcoal identifications from Fan Foel

Sample	**1023**	**1028**	**1030**	**1031**	**1032**	**1033**	**1034**
Quercus spp. (Oak)	1	14	4	10	-	17	1
Alnus glutinosa (L) Gaertner (Alder)	-	-	-	-	-	1	-
Corylus avellana L. (Hazel)	-	-	-	-	2	4	-
Total	1	14	4	10	2	22	1

Table 3 Radiocarbon dates from Pen-y-fan and Corn-du (Gibson 1997)

Context	Date BP	Lab. No.	Cal BC (68%)	Material
Pen-y-fan				
OGS	3590+/-70	CAR-1367	2037-1883	turf
OGS	4350+/-70	CAR-1386	3073-3069 or 3040-2911	wood
Secondary insertion, N Quadrant	3820+/-60	CAR-1365	2453-2422 or 2070-2046	wood
Core 1 3-5cm Below slab against cist	4160+/-80	SWA-1	2893-2652 or 2648-2611	peat
Core 3 0-1cm Below cist	3770+/-80	SWA-2	2335-2130 or 2075-2044	peat
Corn-du				
OGS	3800+/-75	CAR-201	2452-2426 or 2396-2372 or 2368-2138	vegetation
OGS	3695+/-75	CAR-202	2199-2151 or 2150-2017 or 2003-2209	vegetation
OGS	3870+/-70	CAR-1479	2466-2278 or 2235-2209	vegetation
Core 3 0-1cm Top of mound	3890+/-60	CAR-1541	2468-2298	peat
Core 3 30.5-31.5cm OGS	3870+/-60	SWA-4	2464-2283	peat

Bibliography

Bennett, K.D.1994 *Annotated Catalogue of Pollen and Pteridophyte Spore Types of the British Isles*. Department of Plant Sciences, University of Cambridge.

Bennett, K.D., Whittington, G. and Edwards, K.J. 1994 Recent plant nomenclatural changes and pollen morphology in the British Isles. *Quaternary Newsletter* 74, 1-6.

Berggrenn, G. 1969 *Atlas of seeds and small fruits of Northwest-European plant species with morphological descriptions. Part 2. Cyperaceae*. Stockholm

Bertsch, K. 1941 *Früchte und samen. Handbücher der praktischen Vorgeschichtsforsschung*. I Stuttgart: Frdinand Enke.

Bohncke, S. 1983 The pollen analysis of deposits in a food vessel from the henge monument at North Mains. In Barclay, G.J. ed., Sites of the third millennium BC to the first millennium AD at North Mains, Strathallan, Perthshire. *Proceedings of the Society of Antiquaries of Scotland* 113, 270-272.

Bunting, M.J. and Tipping, R. (2000) Sorting dross from data: possible indicators of post-depositional assemblage biasing in archaeological palynology. In Bailey, G., Winder, N. and Charles, R. (eds), *Human Ecodynamics*. Oxford: Oxbow Books, 63-69.

Bunting, M.J., Tipping, R. and Downes, J. 2001 "Anthropogenic" pollen assemblages from a Bronze Age Cemetery at Linga Fold, West Mainland, Orkney. *Journal of Archaeological Science* 28, 487-500.

Caseldine, A. 1990 *Environmental Archaeology in Wales*. Lampeter, St David's University College.

Caseldine, A.1991 Aber Camddwr II: Appendix 4, Palaeoenvironmental evidence. In Marshall, E.C. and Murphy, K., The excavation of two Bronze Age cairns with associated standing stones in Dyfed: Parc Maen and Aber Camddwr II. *Archaeologia Cambrensis* CXL, 65-69.

Caseldine, A.E. 1993 Appendix V The carbonized plant remains from Carneddau. In Gibson, A., The excavation of two cairns and associated features at Carneddau, Carno, Powys, 1989-90. Archaeological Journal, **M1**/24-30.

Caseldine, A.E. and Barrow, C.J. 1997 The plant macrofossil evidence from Pen-y-fan and Corn-du. In Gibson, A., Survey, Excavation and Palaeoenvironmental Investigations on Pen-y-fan and Corn-du, Brecon Beacons, Powys, 1990-1992. *Studia Celtica* XXXI, 30-45.

Chambers, F.M and Lageard, J.G.A. 1997 Palaeoenvironmental analyses of peat samples from Pen-y-fan, Corn-du and Tommy Jones's Pillar, Brecon Beacons. In Gibson, A.,

Survey, Excavation and Palaeoenvironmental Investigations on Pen-y-fan and Corn-du, Brecon Beacons, Powys, 1990-1992. *Studia Celtica* XXXI, 45-71.

Chambers, F.M., Lageard, J.G.A. and Elliot, L. 1990 Post glacial environmental history of the Mynydd y Drum opencast site. In Dorling, P and Chambers, F.M., Field survey, Excavation and Pollen Analysis at Mynydd y Drum, Ystradgynlais, Powys, 1983 and 1987. *Bulletin of the Board of Celtic Studies* XXXVII, 234-245.

Clapham, A.R., Tutin, T.G. and Moore, D.M. 1987 *Flora of the British Isles*. Cambridge, Cambridge University Press.

Clarke, C. 1999 Palynological investigations of a Bronze Age cist burial from Whitsome, Scottish Borders, Scotland. *Journal of Archaeological Science* 26, 553-560.

Dickson, J.H. 1978 Bronze Age Mead. *Antiquity* LII, 108-113.

Gibson, A. 1997 Survey, Excavation and Palaeoenvironmental Investigations on Pen-y-fan and Corn-du, Brecon Beacons, Powys, 1990-1992. *Studia Celtica* XXXI, 1-81.

Grimm, E.C. 1991 *TILIA and TILIAGRAPH*. Springfield, Illinois State Museum.

Hogg, A.H.A. 1977 Two cairns at Aber Camddwr, near Ponterwyd, Cardiganshire. *Archaeologia Cambrensis* 126, 24-37.

Lambert, C.A. 1964 The plant remains from cist 1. In Henshall, A.S., A dagger-grave and other cist burials at Ashgrove, Methilhill, Fife. *Proceedings of the Society of Antiquaries of Scotland* XCVII, 166-179.

Lynch, F.M. 1984 Moel Goedog Circle I. A complex ring cairn near Harlech. *Archaeologia Cambrensis* 133, 8-50.

Macphail, R.I. 2006 Fan Foel: soil micromorphology. Unpublished report for Cambria Archaeology.

Moore, P.D. 1978 Studies in the vegetational history of mid-Wales V: stratigraphy and pollen analysis of Llyn Mire in the Wye Valley. *New Phytologist* 80, 281-302.

Moore, P.D., Webb, J.A. and Collinson, M.E. 1991 *Pollen Analysis*. Oxford, Blackwell Scientific Publications,

Schoch, W.H., Pawlik, B. and Schweingruber, F.H. 1988 *Botanical macro-remains*. Berne and Stuttgart, Paul Haupt.

Schweingruber, F. 1978 *Microscopic Wood Anatomy*.

Cremation report: Fan Foel FF04 1029. The secondary cremation

Cremation FF04 1029 consists of human remains, some urn fragments, charcoal fragments and some worked animal bone. This report considers the human remains and the worked animal bone. The cremation is part of the excavated remains of a Bronze Age burial mound from Mynydd Du, within the Brecon Beacons National Park, Carmarthenshire (SN 8215 2234). Excavations were undertaken by Cambria Archaeology.

Treatment of remains

The material was air dried prior to sieving and sorted by eye. Some fragments were examined under a low powered light microscope. The material was sieved using a 4 mm and 2 mm for the extraction of bone and cultural remains. The bone, pottery, charcoal and worked bone were sorted removed and bagged separately. The total number of cremated bone fragments was not counted. The total weight of the cremated material is l 257.27 g. Fragments were removed for 14C dating (mandible fragment – including complete sockets of incisors and partial sockets = 1.14 g., ulna shaft fragment = 1.76 g., fragment of ulna = 2.09 g. and one possible ulna fragment = 3.13 g.). The worked bone and some of the identified material are bagged separately.

Number and age of individuals

It is possible that two individuals are represented here. The first has permanent dentition and is likely to be an adult. The tooth roots are completely formed and are so from 13-16 years of age (Hilson, 1990). Equally the fusion of the surviving epiphyses, mainly finger and toe bones, suggest an age of at least mid-teens (Scheuer and Black, 2000). Very few bones with epiphyses have survived and what is present is not diagnostic beyond the mid-teens years. The bones do however look fully adult size (if on the gracile side) so an adult is perhaps the most reasonable estimate for this individual. There is even less certainty about the second individual. If correctly identified there are deciduous teeth present (maxillary upper molars) in which the crown formation is complete and there is root development. This would give a lower age of at least 2 years of age. However there is some ambiguity in the roots in that it is unclear if they are simply broken or are being reabsorbed and also broken. If the latter, it would place an upper limit of 8 years old for this individual (Hilson, 1990).

Sex of individuals

It has not been possible to determine the sex of the individuals – no unambiguous diagnostic pieces have survived. Sexing of juveniles is notoriously difficult under such circumstances. The adult individual is not large nor do any fragments have pronounced muscle markings and although this would rule out a robust male, it could still include younger/more gracile males and females.

Condition of bone

Generally the condition of the bone is not good. It is highly fragmented with the longer fragments (of which there are few) around 4 cm long. Although much of the bone shows little to no cracking some does show the more characteristic U shaped fissuring. The bone is broken longitudinally but with little twisting (tubular curving). The surface retains a grainy texture and this all suggests not very high firing temperatures. The suggestion of lower firing temperatures is also supported by the colour of the bone, much

of which falls into the buff, pale/dull orange/yellows through to lighter greys (10YR 7/3 and 10YR 8/3 through to 7.5YR 8/2). These hues are indicative of firing temperatures around 525 ^{0}C but higher temperatures of nearer 600+ ^{0}C may have been achieved at times or in certain parts of the cremation. (Firing temperatures are compared to those published by Shipman *et al.*1984.) As an observation this cremation looks lighter than the primary cremation and may indicate a higher firing temperature or firing for a greater duration.

Some fragments show a porous texture where the bone surface is eroding. This could be due to weathering due to re-exposure or degradation due to acidic soils.

The bone is not fully calcined and there is a possibility that some organic content remains. However, the degree of fragmentation may make the extraction of usable organic material difficult, even if a relational association is a possibility.

Cultural or environmental materials
The cremation contains fragments of pottery (fragments of an urn?) and charcoal (possibly and more probably pyre material) but little else. The only cultural remains included were three fragments of worked bone.

1 of 3 fragments: the largest fragment of worked bone has a perforation, essentially a hole drilled at the top, to which both sides of the bone have been thinned. The piece is broken across the perforation and, by the lack of sediment encrusted into the bone, more recently. The reverse side is smooth and polished. Under the microscope striations (to thin the bone cortex) appear to be superficial and multi-directional in the main but uni-directional near the perforation. One deep but narrow incision to the reverse side of the bone runs the length of the fragment but is only well defined in parts. The whole of the reverse side looks polished and feels smooth. Again more recent damage shown by the 'chipping' of this surface to reveal fresh white bone can be seen. The front (anterior) surface of this piece is laterally broken with an old break. This does not appear to conjoin the other fragments. The front surface has four deep but wide incisions, all with 'U' shaped profiles and all incisions are well defined.

2 of 3 conjoins 3 of 3: smallest of the three fragments displaying two partial incisions and broken near a third incision. The breaks do look 'old' but have less sediment in them and a fresher look (sharper edges) than the other two fragments.

3 of 3 a 'terminal' fragment that conjoins 2 of 3: this is the middle sized fragment and again displays old breaks with different amounts of sediment encrusted on it. This piece has 4 deep incisions all of which are well defined.

From the shape and size of the bone a reasonable guess would be that this is a worked piece of radius, possibly from a larger deer but more probably a small cattle sized animal. These fragments show a different history to the other bone remains in that they have not been cremated. There is no colour distortion, deterioration to the size or structure of the bone or the warping/fracturing associated with cremation.

Interpretation.
Given the total weight of this cremation hardly exceeds 250 g. but contains more than one individual, it can only be surmised that a significant amount of material is not present in this assemblage (in such circumstances it is reasonable to expect in excess of 2000 g. to be present (Trotter and Hixon 1974). Given the degree of fracturing it is plausible to conclude either that removal from the cremation area when the bones were still hot (and highly friable) may have occurred, and/or that there may have been significant post deposition movement (and hence damage). This is contested to by the fact that the worked bones show varying amounts of soil adhering to the broken surfaces (indicating the surfaces were exposed at varying times). Some of this damage does look recent (e.g. the chipping on the reverse of the largest fragment). Post depositional moves may also be supported from the bones with poorly preserved surface texture, if this was due to weathering once re exposed or due to movement into the acidic soils and away from the protective environment of the depositional environment.

Regardless of when this damage happened what is clear that the worked bone was included as grave goods (at the point of burial) and not pyre goods (at the point of cremating). It is possible that some of the oldest damage (as evident by the bone with the most severely encrusted sediment) may have occurred deliberately or accidentally but at least at the point of burial as there is little difference in this level of encrustation on parts of these pieces and those of the other cremated bone.

References
Hilson, S. 1990 *Teeth*. Cambridge: Cambridge University Press

Scheuer, L. and S. Black, 2000 *Developmental Juvenile Osteology*. London: Academic Press

Shipman, P., Foster, G. and Schoeninger, M. 1984 Burnt bones and teeth: an experimental study of colour, morphology, crystal structure and shrinkage. *Journal of Archaeological Science* 11:307-325

Trotter, M. and Hixon, B. B 1974 Sequential changes in weight, density and percentage ash weight of human skeletons from an early fetal period through old age. *The Anatomical Record* 179: 1-18

Prepared by Dr Ros Coard
Department of Archaeology and Anthropology
University of Wales, Lampeter

Cremation report: Fan Foel FF04 1033. The primary cremation

Cremation FF04 1033 consists of human remains, animal remains, some pottery fragments, charcoal, some (unidentified) carbonised material, burnt flint, a single fragment of 'exotic' stone (a quartz/quartzite material) and a bone pin.

The cremation is part of the excavated remains of a Bronze Age burial mound from Mynydd Du, within the Brecon Beacons National Park, Carmarthenshire (SN 8215 2234). Excavations were undertaken by Cambria Archaeology. The cremation was bagged in four different bags, representing the excavation in quadrants. The preparation of the bone was undertaken maintaining the quadrants.

Treatment of remains

The cremation was examined by eye and fragments (of a human juvenile ulna and vertebra) suitable for radiocarbon dating were identified and removed. Preparation of the remaining bone prior to analysis consisted of washing all the cremation through a series of stacked sieves and then air drying. The sieves sizes used include 4 mm and 2 mm for the extraction of bone and cultural remains and further sieves of 1 mm, 500 micron and the flot residue for environmental sampling. All the material was air dried for several weeks until completely dry. All items of cultural or environmental import were removed and the material picked over to remove the sediment. The total number of fragments was not counted but all those over the 2 mm and above sieve sizes were weighed. The total weight of this bone is 1810.18 g.

Number of individuals and age estimates.

The cremation represents the remains of three individuals including an adult and two juveniles. The adult is mature in that the tooth roots are closed, there is evidence of wear on the teeth and fusion of the cranial sutures is present. In terms of an age estimate some thoracic and lumbar vertebrae show lipping. Snodgrass (2004: 460) suggests that in modern samples individuals over the age of 40 always show some lipping to the thoracic vertebra. In the lumbar vertebrae however such lipping is more evident nearer 45 years of age. If this were the case in ancient populations it would place this individual in or around this age range (i.e. 40-45+). One of the juveniles is estimated to be a very young teenager (the length of the femoral neck compares well with a modern samples between 10-12 years of age). The second juvenile is that of a baby of no more than a one-year old. This estimate is based on the lack of root development on an un-erupted maxillary second molar and the basi-occipital measurement. The tooth crown is fully formed, this occurs around 6 months, but there is little or no root development, which would occur around 9 months old, with eruption around 12-16 months (Hilson, 1990). Measurements of the pars basilaris a portion of the basi-occipital at the base of the cranium, also supports an age of a young individual in that the maximum length of this bone is less than the width. This transition in length-width ratio occurs over the age of 5 months (Scheuer and Black, 2000). Equally this bone has not retained adult size and it does so around two years of age (Scheuer and Black, 2000). An individual of around 9 months may be a reasonable estimate.

Sex of individuals
The sex of the adult individual is most probably female. A fragment of mastoid process suggests this as well as part of the frontal bone and femoral head measurements. Estimates of the vertical diameter of the femoral head fall into the female ranges when compared to those published in Bass (2003) and this remains the case this is even if 10-15% is added on for shrinkage during the cremation process. It is always possible to misidentify sex, especially when the more highly diagnostic indicators are considered in isolation and are highly fragmented. It is possible that the remains may represent a more gracile male but given the age of the adult, at this stage of maturity a female is much more likely. The juveniles remain unsexed.

Animal remains
The cremation also contains the remains of at least one pig. It is a juvenile represented by the right front limb bones including the scapula, humerus, radius, ulna, metapodia and phalanges, including an accessory or dew claw. The fusion suggests an individual of at least one year, the proximal radius and distal humerus are fused and these do so around 1 year and possibly two years old based on the fusion of a distal metapodial. The distal radius appears unfused and this does so at 3.5 years of age. This would give an age range of certainly one year, possibly two but not as old as 3.5 years. Fusion rates are taken from Silver (1969). This individual looks small compared to comparative material so an age not much over two years may be a reasonable estimate. These are bagged separately.

The bones of this animal display similar colour, texture and damage due to the cremation process. This indicates that they were part of the pyre goods as opposed to grave goods.

Condition of bone
Much of the bone has preserved well with some diagnostic pieces surviving. Some of the fragments are large, possibly indicating more careful removal once the bone had cooled. There is some twisting and warping consistent with the burning process but much of the bone is relatively unaffected. Some of the bone shows longitudinal cracking but little transverse cracking is present and this combination with a grainy texture to the bone is indicative of firing at lower temperatures. Equally the colour of the bone supports lower firing temperatures. From the colour ranges displayed on the bone and the teeth, predominantly dull-oranges (10YR 7/3) and black-greys (10YR 5/1and 5/3) through to fewer creamy-whites, firing estimates of around 440-525 ^{0}C may be suggested. Higher temperatures may have been achieved at times or in certain parts of the pyre. Firing temperatures are compared to those published by Shipman *et al.* (1984). As an observation this cremation looks darker (greyer) than the secondary cremation and may indicate a lower firing temperature or firing for less time (this could equally account for the overall larger fragmentation of the bone).

Much of the very white bone is highly calcined and may belong to the younger of the two juveniles; this is certainly the case with some skull fragments. The bulk of the bone is not fully calcined and may still retain some organic content; this along with the larger fragmentation may raise the possibility of extracting sufficient or usable organic material

for DNA or isotope analysis from at least the older of the two individuals. A relational association may be a distinct possibility here.

Charcoal or other environmental materials
Many small particles of charcoal were removed and bagged separately. However, there is not so much as to suggest this was a pyre location so removal to a secondary or subsequent location is probable. The charcoal is oak.

Cultural materials
Small fragments of carbonised material as yet unidentified, small fragments of worked flint, fragments of pottery (?), a single fragment of natural quartz/quartite material and six fragments of a bone pin were also recovered. The bone pin remains incomplete. These are all bagged separately. The bone pin, flint, and carbonised material are all modified due to the burning process. All of these items are burnt indicating that they are pyre goods not grave goods with the exception of the single fragment of quartz/quartzite. This appears not to have been burnt but it is most probably a natural rather than a cultural occurrence.

Conclusions
The weight of bone here at 1810.18 g is just below the average quoted for a single white female of 2297g (Trotter and Hixon, 1974) but if the bones below the 2 mm sieve size were added then a weight approaching this may be a more accurate estimate. However this does fall way below the expected for this cremation as there are at least two more individuals and some animal bone represented also. The larger fragments of bone may suggest careful removal or at least when the cremation was cooler (the hotter the bone the more it fragments when moved). There is no evidence of post-depositional damage, all of the sediment adhering to the bone and cultural objects is consistent (i.e. uniform) suggests a firing and removal together to the final depositional environment.

Acknowledgements
Kate Griffiths for the charcoal identifications and Dr A. T. Chamberlain for some confirmation and assistance on the human material.

Prepared by Dr Ros Coard
Department of Archaeology and Anthropology
University of Wales, Lampeter

References
Bass, W.M. 2003 *Human Osteology: A laboratory and field manual.* Missouri Archaeological Society, Special Publication No 2. Missouri, USA.

Hilson, S. 1990 *Teeth.* Cambridge: Cambridge University Press

Scheuer, L. and S. Black, 2000 *Developmental Juvenile Osteology.* London: Academic Press

Silver, I. A. 1969 The ageing of domestic animals. In (eds.) D. Brothwell and E. Higgs, *Science in Archaeology.* .London: Thames & Hudson. Pp 283-302

Shipman, P., Foster, G. and Schoeninger, M. 1984 Burnt bones and teeth: an experimental study of colour, morphology, crystal structure and shrinkage. *Journal of Archaeological Science* 11:307-325

Snodgrass, J.J. 2004 Sex differences and ageing of the vertebral column. Journal of Forensic Sciences 49(3): 258-463

Trotter, M. and Hixon, B. B 1974 Sequential changes in weight, density and percentage ash weight of human skeletons from an early fetal period through old age. *The Anatomical Record* 179: 1-18

Fan Foel: soil micromorphology

By
Richard I Macphail Institute of Archaeology, University College London, 31-34, Gordon Sq., London WC1H 0PY
October 2005

Introduction

Six Kubiena box monolith samples of the early Bronze Age round barrow deposits at Fan Foel (Mynydd Du; 781 m OD) were received from Astrid Caseldine (University of Wales, Lampeter) who had carried out all sampling. Of these, four Kubiena box samples had been subsampled from larger monolith samples collected from the site, while two Kubiena box samples had been taken directly in the field. A parallel palynological investigation was carried out by Astrid Caseldine on samples taken adjacent to two of the Kubiena box samples. The investigation was carried out on behalf of Gwilym Hughes (Cambria Archaeology).

Samples and methods

The Kubiena box samples were inspected, and after discussions with Astrid Caseldine and Gwilym Hughes, samples M1, M5 and M6 were selected for soil micromorphological study (Table 1). All six Kubiena samples were impregnated with a crystic resin mixture and cured (Goldberg and Macphail, 2006; Murphy, 1986). Samples M1, M5 and M6 were sent to Quality Thin Sections, Tucson, Arizona for thin section manufacture (Figs 1-2), whereas samples M2-M4 were archived. Thin sections were analysed under plane polarised light (PPL), crossed polarised light (XPL), oblique incident light (OIL) and using fluorescent microscopy (blue light – BL), at magnifications ranging from x1 to x200/400. Thin sections were described, ascribed soil microfabric types (MFTs) and microfacies types (MFTs), and counted according to established methods (Bullock *et al.*, 1985; Courty, 2001; Courty *et al.*, 1989; Goldberg and Macphail, 2006; Macphail and Cruise, 2001; Stoops, 2003). Interpretations of the microfabrics benefited from experimental studies of buried soils and turf stacks, and upland analogue sites (Bell *et al.*, 1996; Macphail, 1996; Macphail *et al.*, 2003; Smith *et al.*, 1996).

Results and discussion

Field photos received from Astrid Caseldine and Gwilym Hughes suggest that the site is located on typical humic gley soils (cf. Freni soil series – formerly Ynys soil series, Avery, 1990, 352-354), such as found at Brenig, near Denbigh for example. At Fan

Foel soil micromorphology shows that these soils are formed in a fine loamy, probable drift that includes much mica (see Figs 3-4). The soils are characterised by both iron depletion and mottling (see Figs 1, 2 and 5). Sample numbers, identified microstratigraphy (layers), ascribed MFTs and counted features are presented in Table 1 (see Figs 1-2). Descriptions and preliminary interpretations are given in Table 2.

The soil micromorphology is not simple, but nevertheless the three thin sections studied seem to have a consistent character which is composed of:

An upper part (microfacies type B – MFT B)(Figs 1-2) that is sand-dominated and strongly humic, with often only a small amount of charcoal, that appears to be representative of Ah horizon formation under acidic conditions (Mor humus-like)(Fig 8). This MFT B, which forms a marked contrast to the underlying MFT A1/A2 layers, is not uniform however. Upwards it can show layering and be rather less humic. This implies that MFT B does not represent homogeneous Ah horizon formation.

A lower part (microfacies type A1 and A2 – MFT A1 and A2) that is fine loamy (with much mica) compact, microlaminated, and characterised by textural pedofeatures, namely coarse and fine soil separations, pans and dusty clay void coatings (Figs 1-4, and 7). Although 'coarse' minerogenic layers are often separated from fine humic ones, fine and coarse charcoal are generally ubiquitous (MFT A2)(Fig 6). MFT A1 is generally similar although iron stained, through post-depositional iron impregnation of the fine fabric and roots, for example (Fig 5).

Interpretation of these materials, as transported soil forming a barrow mound, is not straight forward. Clearly these are not soils collected from 'naturally-formed' acidic turf, because these Fan Foel soils do not show a homogeneous mineralogy, organic/mineral character of Ah over Eag horizons (cf. Wareham Experimental Earthwork, Dorset and other acidic turf mounds; Macphail *et al.*, 2003). Instead, they represent the use of 'turf' from disturbed ground that had developed through time. The 'lower' soil (MFT A1 and A2) has formed by compaction of micro-colluvial deposits, trampling causing slaking and hence the abundance of textural pedofeatures. This compaction has caused poor drainage, and hence localised waterlogging and iron staining. The exact mechanisms forming separate minerogenic and fine/humic laminae are difficult to determine, but trampling and micro-colluviation are possibilities. Physical disturbance can arise from freeze-thaw and mass-movement associated with cold periods such as the Late Glacial, but the pedofeatures of this

natural process have been well-researched and are quite distinctively different from those found at Fan Foel, and moreover are only found in poorly weathered subsoils (Romans and Robertson, 1974; Smith *et al.*, 1996; Van Vliet-Lanoë, 1998; Van Vliet-Lanöe, 1985). In any case, the associated presence of charcoal would seemingly link the formation of MFT A1 and A2 to rather intensive/focused human activity. This implies use of the site and its close environs by humans, prior to construction of the cairn, but probably as part of the continuing use of the area (see discussion of MFT B, below). Finally, it can be suggested that trample-disturbance/compaction was probably dominantly by humans, rather than by stock (albeit there being some small traces of possible animal 'inputs', see below). In brief, stock trampling is usually accompanied by contamination of the soil by dung fragments and liquid waste. The last produces textural pedofeatures that can be distinctive (phosphatic, reddish and humic; Courty and Nornberg, 1985; Macphail, Forthcoming; Macphail *et al.*, 1998), compared to trampling by humans (Rentzel and Narten, 2000). As an analogue, at Carn Brea, Cornwall, cleared soils were trampled ahead of rampart construction, and the lack of the distinctive clay coatings suggested that this disturbance was chiefly by people (Courty *et al.*, 1989; Macphail, 1990). The rapid sedimentation of these supposed trampled laminae at Fan Foel indicates that they were formed rapidly over a short time period.

The dumped 'turves' also show ensuing disturbance-induced micro-colluviation became increasingly sand dominated and seems to show alternating humic/fine charcoal rich layers and clean sand deposition at the pre-barrow site (Fig 6). The origins of this can only speculated upon from the three thin section samples. Sandy colluviation continued but at least two periods of (likely short-lived) stasis seem to have occurred permitting Ah/turf formation in this material. Such humic laminae/turf formation periods have been observed elsewhere, such as down slope of a Bronze Age barrow field at West Heath, Surrey (Drewett, 1989). Generally, only small amounts of charcoal occur in this humic soil, indicating typical moorland/heathland background burning related to management by fire (Macphail *et al.*, 2003). As this humic horizon(s) formed '*in situ*' seemingly during the managed lifetime of the site (rather than being an Ah developed over thousands of years), 14C dating may well produce dates little affected by old humus residuality (Jenkinson and Rayner, 1977).

The barrow therefore seems to have been constructed of 'turf' from an area which had undergone a period(s) of disturbance followed by minor disturbance and moorland management. The construction itself caused minor soil disturbance and dusty clay inwash into voids (as for example found anomalously in humic MFT B), as commonly found in earth mounds (Romans and Robertson, 1983). On the other hand, there are rare examples of fine voids in MFT B being infilled with yellowish, possible iron phosphate, which may imply a phosphate input from anthropogenic activity (stock?, weathered ash, bone?). There is no evidence of this site ever having had an cultivation background as inferred for present-day podzols at Chysauster, Cornwall, or suggested for a number of clearance cairns in lowland but very wet south west Norway (Sageidet, 2005; Smith *et al.*, 1996).

Conclusions

The three thin section samples from the barrow at Fan Foel represent a complicated land use at the site and local area which pre-dated use of topsoils ('turf') for cairn construction. The three thin sections have a consistent soil micromorphology sequence. First, layered deposits of fine loamy soils containing fine charcoal were formed, probably through (human?) trampling and micro-colluviation in bare ground. Upwards, alternating sand and humic layers accumulated, again accompanied by the inclusion of charcoal, further indicating localised disturbance but with minor periods of stasis. Lastly, the dumped 'turves' contain humic horizons formed in colluvial sands implying a marked reduction in human impact, but continuing management of the area by fire and only occasional major disturbance and colluviation. Rare microfeatures within the last-formed humic turf may indicate very minor phosphate inputs, but from an unknown source. Clearly the site had been impacted upon for at least several years by human activity (burning and trampling), before the local soils were employed to construct the barrow. A ritual use of the site as proposed by Astrid Caseldine (pers. comm.) appears to be most appropriate from the soil micromorphology. It could be suggested that the site was rather intensively used first, and then activities slackened off before ritual activity culminated in barrow construction.

References

Avery, B.W., 1990, Soils of the British Isles: Wallingford, CAB International.

Bell, M., Fowler, M.J., and Hillson, S.W., 1996, *The Experimental Earthwork Project, 1960-1992.*: York, Council for British Archaeology.

Bullock, P., Fedoroff, N., Jongerius, A., Stoops, G., and Tursina, T., 1985, *Handbook for Soil Thin Section Description*: Wolverhampton, Waine Research Publications.

Courty, M.A., 2001, Microfacies analysis assisting archaeological stratigraphy, *in* P. Goldberg, Holliday, V.T., and Ferring, C.R., eds., Earth Sciences and Archaeology: New York, Kluwer, p. 205-239.

Courty, M.A., Goldberg, P., and Macphail, R.I., 1989, Soils and Micromorphology in Archaeology: Cambridge, Cambridge University Press.

Courty, M.A., and Nornberg, P., 1985, Comparison between buried uncultivated and cultivated Iron Age soils on the west coast of Jutland, Denmark, *in* Edgren, T., and Jungner, H., eds., Proceedings of the Third Nordic Conference on the Application of Scientific Methods in Archaeology: Helsinki, The Finnish Antiquarian Society, p. 57-69.

Drewett, P.L., 1989, Anthropogenic soil erosion in prehistoric Sussex: excavations at West Heath and Ferring, 1984: Sussex Archaeological Collections, v. 127, p. 11-29.

Goldberg, P., and Macphail, R.I., Forthcoming/2006, Theoretical and Practical Geoarchaeology: Oxford, Blackwell Science.

Jenkinson, D.S., and Rayner, J.H., 1977, The turnover of soil organic matter in some of the Rothamsted classical experiments: Soil Science, v. 123, p. 298-305.

Macphail, R.I., 1990, Soil report on Carn Brea, Redruth, Cornwall, with some reference to similar sites in Brittany, France: London, English Heritage.

—, 1996, Soil micromorphology, *in* Bell, M., Fowler, P.J., and Hillson, S.W., eds., The Experimental Earthwork Project 1960-1992, Volume Research Report 100: York, Council for British Archaeology, p. 214-216.

—, Forthcoming, Soil report on the Raunds Area Project: results from the prehistoric period, *in* Healy, F., and Harding, J., eds., Raunds Area Project. The Neolithic and Bronze Age landscapes of West Cotton, Stanwick and Irthlingborough, Northamptonshire: Newcastle, Department of Archaeology, University of Newcastle.

Macphail, R.I., Crowther, J., Acott, T.G., Bell, M.G., and Cruise, G.M., 2003, The Experimental Earthwork at Wareham, Dorset after 33 years: changes to the buried LFH and Ah horizon: Journal of Archaeological Science, v. 30, p. 77-93.

Macphail, R.I., and Cruise, G.M., 2001, The soil micromorphologist as team player: a multianalytical approach to the study of European microstratigraphy, *in* Goldberg, P., Holliday, V., and Ferring, R., eds., *Earth Science and Archaeology*: New York, Kluwer Academic/Plenum Publishers, p. 241-267.

Macphail, R.I., Cruise, G.M., Mellalieu, S.J., and Niblett, R., 1998, Micromorphological interpretation of a "Turf-filled" funerary shaft at St. Albans, United Kingdom: Geoarchaeology, v. 13, p. 617-644.

Murphy, C.P., 1986, Thin Section Preparation of Soils and Sediments: Berkhamsted, A B Academic Publishers.

Rentzel, P., and Narten, G.-B., 2000, Zur Entstehung von Gehniveaus in sandig-lehmigen Ablagerungen - Experimente und archäologische Befunde (Activity surfaces in sandy-loamy deposits - experiments and archaeological examples), Jahresbericht 1999: Basel, Archäologische Bodenforschung des Kantons Basel-Stadt, p. 107-27.

Romans, J.C.C., and Robertson, L., 1974, Some aspects of the genesis of alpine and upland soils in the British Isles, *in* Rutherford, G.K., ed., Soil Microscopy: Kingston, Ontario, The Limestone Press, p. 498-510.

—, 1983, The general effects of early agriculture on soil, *in* Maxwell, G.S., ed., The Impact of Aerial Reconnaissance on Archaeology, Volume Research Report No. 49: London, Council for British Archaeology, p. 136-41.

Sageidet, B.M. 2005. Sub-local differences in late Holocene land use at Orstad, Jæren in SW Norway, revealed by soil pollen stratigraphy. Environmental Archaeology, 10: 51-71.

Smith, G., Macphail, R.I., Mays, S.A., Nowakowski, J., Rose, P., Scaife, R.G., Sharpe, A., Tomalin, D.J., and Williams, D.F., 1996, Archaeology and environment of a Bronze Age Cairn and Romano-British field system at Chysauster, Gulval, near Penzance, Cornwall: Proceedings of the Prehistoric Society, v. 62, p. 167-219.

Stoops, G., 2003, Guidelines for Analysis and description of Soil and Regolith Thin Sections: Madison, Wisconsin, soil Science Society of America, Inc.

Van Vliet-Lanoë, B., 1998, Frost and soils: implications for paleosols, paleoclimates and stratigraphy: Catena, v. 34, p. 157-183.

Van Vliet-Lanõe, B., 1985, Frost effects in soils, *in* Boardman, J., ed., Soils and Quaternary Landscape Evolution: Chichester, John Wiley & Sons, p. 117-158.

Table 1: Fan Foel micromorphology - samples and counts

Sample No.	Relative Depth	Context	MFT	SMT	Voids	Coarse charcoal	Root trace	Textural Pedofeature	Iron Staining	Iron phosphate?	Phytoliths
M1	0-15 mm		B		3 20%	aaa	a*	aaa	aa	a*	a*
M1	15-75 mm		A2	1b	10% (50%)	a*	a	aaaaa	aaaa		a*
M5	0-20 mm		B		2 15-20%	a*	a*		a		a*
M5	20-75 mm		A1 and A2	1a/1b	15-20%	aaa	a*	aa	a(aaa)		a*
M6	0-30 mm		B		2 15-20%	aa	a		a*		a*
M6	30-60 mm		A2	1a	20%	aa	a	a	a*		a*
M6	60-75 mm		A1	1a	20%	aa	a	aaa	aaaa		a*

NB:
* - very few 0-5%, f - few 5-15%, ff - frequent 15-30%, fff - common 30-50%, ffff - dominant 50-70%, fffff - very dominant >70%
a - rare <2% (a*1%; a-1, single occurrence), aa - occasional 2-5%, aaa - many 5-10%, aaaa - abundant 10-20%,
aaaaa - very abundant >20%

Table 2: Fan Foel: soil micromorphology

Microfacies type (MFT)/Soil microfabric type (SMT)	Sample No.	Depth (relative depth within monolith) Soil Micromorphology (SM)	Preliminary Interpretation and Comments
MFT B (SMT 2b)	**M1**	0-15 mm SM: moderately heterogeneous and similar to MFT 2a (M6); *Microstructure*: massive and burrowed; 20% voids, fine open vughs, fine chambers and channels; *Coarse organic and anthropic components*: many very fine (100-200 µm) to fine (400-500 µm) charred woody plant fragments; rare traces of very fine (200 µm) probable root channels (lined with amorphous Fe?); *Fine fabric*: SMT 2b - dotted and speckled very dark brown (PPL), mainly moderately low interference colours (close porphyric, speckled b-fabric, XPL), darkish brown (OIL); abundant amorphous organic matter, tissue and organ fragments, with occasional fine charred organic matter; *Pedofeatures*: *Textural*: occasional very thin (<100 µm) dusty clay void coatings; many bands of intercalations/fabric separations towards the junction with layer below; *Amorphous*: occasional impregntive iron nodules; rare traces of very fine (200 µm) size amorphous Fe-P? (yellowish) void infills.	Upper part is similar to middle part of M6, with a fine charcoal-rich once-humic fabric with textural pedofeatures that develop into bands towards the layer below. This is occupation topsoil that developed in sandy colluvium over trampled occupation soil. The presence of possible rare traces of secondary phosphate infills, may possible indicate small inputs of phosphate (?? Weathering of ashes, bone, dung??)
MFT A (SMT 1b)		15-75 mm SM: heterogeneous (dominantly SMT 1b, but includes small inclusions of SMT 3); *Microstructure*: massive (banded) with coarse burrows; (50% voids due to large burrow), intepedal voids 10%, mainly closed very fine vughs and relict fine root channels; *Coarse Mineral*:	Iron mottled massive deposit with very abundant textural pedofeatures including pans. A probable cumulative deposit formed through trampling where organic matter - possibly mor humus/peaty material – was also deposited. (Weak possibility of

		Coarse:Fine (limit at 10 µm), C:F, 35:65; as SMT 1a; *Coarse organic and anthropic components*: rare examples of coarse (4 mm) charcoal (in burrow, i.e., probably from above); rare relict iron replaced fine roots?; occasional coarse (1-3 mm) patches of totally iron replaced possible amorphous organic matter; *Fine fabric*: SMT 1b – speckled and dusty pale yellowish grey brown (PPL), moderately low interference colours (close porphyric, speckled b-fabric and weak grano-striate b-fabric, XPL), pale grey to pale orange (OIL); rare traces of very fine charcoal, occasional relict (iron replaced) fine probable amorphous organic matter; *Pedofeatures*: *Textural*: very abundant dusty clay intercalations, void coatings, thin horizontal void associated pans (100-150 µm), with major 2 mm thick pan; *Amorphous*: abundant impregnative and in places poorly pseudomorphic iron nodules; also picking out some pans.	dung being would have to be checked against pollen spectra/phosphate analysis)
MFT B/SMT 2a MFT A2/SMT 1a and 1b	**M5**	0-20 mm SM: As MFT B, as SMT 2a, becoming less humic upwards; rare fine charcoal. 20-75 mm SM: heterogeneous – layered; *Microstructure*: massive (banded throughout), bedded; coarse-fine (humic) and iron-stained laminae; 10-15% voids, both open and closed fine vughs; *Coarse organic and anthropic components*: many charred plant fragments including 0.7 mm size charred cross sections? and 2-3 mm size iron-replaced amorphous organic matter fragments?; *Fine fabric*: SMT 1a/1b; *Pedofeatures*: occasional intercalations and fabric separations/laminae/bedding;	Highly humic thin Ah 'turf' forms in sandy colluvium – implying a short period of stasis, followed by further sandy colluvium/inwash (indicated by rare textural pedofeatures) and less humic Ah formation (shorter period of stasis). Turf contains only rare charred organic fragments and organic layers (minor burning management), Over Little and strongly iron stained humic clayey silts, with patches of fine charcoal, which overall show a sloping bedding (with minor inclusion of amorphous organic

		Amorphous: occasional to many iron impregnations of amorphous organic matter – forming ironpan at around 25 mm.	matter fragments – mor humus material?) – now iron-replaced.
MFT B/SMT 2a Over MFT A2/SMT 1a	**M6**	0-75 mm SM: heterogeneous; *Microstructure*: massive (banded in lower part), cracked, with burrows; 15-20% voids, medium (1-2 mm) cracks, fine (300 μm) channels and vughs; medium (1 mm) size vertical root channels; *Coarse Mineral*: Coarse:Fine (limit at 10 μm), 0-30 mm: C:F, 40:60 (humic layers), 65:35 (minerogenic layers); moderately sorted fine and medium sand-size quartz, few mica; *Coarse organic and anthropic components*: occasional fine (200-300 μm) to medium (2 mm) charred woody plant fragments; rare examples of rooting (1 mm), rare ferruginised and other root traces; *Fine fabric*: common SMT 1 (see below) in lower half (ca 30-60 mm) as 4 mm thick humic and pale minerogenic bands; ca 0-30 mm, common SMT 2a: dotted very dark brown (PPL), isotic (close porphyric undifferentiated b-fabric, XPL), very dark brown (OIL); very abundant amorphous organic matter, tissue and organ fragments, with many charred fine material and organic layers; *Pedofeatures*: *Textural*: rare thin (30-50 μm) dusty clay void coatings (one example is wrong way-up) in SMT 1; *Amorphous*: rare traces of iron impregnation of fine roots, for example; *Fabric*: example of 5 mm wide, 20 mm long burrow at 15/20 mm depth.	Highly humic thin Ah 'turf' forms in sandy colluvium – implying a short period of stasis, followed by further sandy colluvium/inwash (indicated by rare textural pedofeatures) and less humic Ah formation (shorter period of stasis). Turf contains charred organic fragments and organic layers (burning management), Over Non-iron stained moderately poorly sorted humic banded clayey-silts – as below, with textural pedofeatures of slaking/ trampling/ wash.
MFT A1/SMT 1a		60-75 mm SM: heterogeneous; *Microstructure*: massive (banded) and cracked; 20% voids, medium (1-2 mm) cracks, fine	

		(300 µm) channels and vughs; *Coarse Mineral*: Coarse:Fine (limit at 10 µm), C:F, 65:35 (pale layers C:F 85:15), moderately poorly sorted silt, fine and medium sand-size quartz, with 2 subrounded coarse sand-size patchily iron-stained clay clasts; few mica; *Coarse organic and anthropic components*: occasional fine (200-300 µm) charred woody plant fragments – sections and longitudinal fragments; 1-3 mm thick layers of – now iron-replaced – amorphous organic matter, with rare probable fine root pseudomorphs; *Fine fabric*: SMT 1a: speckled and finely dotted brown to darkish brown (PPL), isotic to low interference colours (close porphyric, speckled b-fabric, XPL), darkish brown (OIL); many (pale layers) to very abundant amorphous organic matter; tissue residues, trace amounts of phytoliths, pollen and spores present (BL autofluorescent); occasional to many fine charcoal; *Pedofeatures*: *Textural*: many dusty clay to impure/silty very thin (20-30 µm) to thick (150 µm) grain coatings and laminated void infills, and forming 300-450 µm thick pan over topmost ironpan; *Depletion*: probable iron and fine fabric depletion of pale layers; *Amorphous*: abundant iron impregnation of 2-3 mm thick bands (ironpans) of – in some case – once humic (amorphous organic matter/fine roots) layers.	Moderately poorly sorted clayey silts-fine to medium sands, with fine charcoal-rich humic bands and thin amorphous organic matter-replaced iron pans. Many textural pedofeatures indicative of slaking and downwash; charred fine woody fragments, and examples of rubefied grains suggest burning. Trampling of wet ground formed in the Eag horizon of peaty gley/peaty gleyed podzol soils, and likely local burning.

Table 2: Fan Foel: soil micromorphology

Microfacies type (MFT)/Soil microfabric type (SMT)	Sample No.	Depth (relative depth within monolith) Soil Micromorphology (SM)	Preliminary Interpretation and Comments
MFT B (SMT 2b)	M1	0-15 mm SM: moderately heterogeneous and similar to MFT 2a (M6); *Microstructure*: massive and burrowed; 20% voids, fine open vughs, fine chambers and channels; *Coarse organic and anthropic components*: many very fine (100-200 μm) to fine (400-500 μm) charred woody plant fragments; rare traces of very fine (200 μm) probable root channels (lined with amorphous Fe?); *Fine fabric*: SMT 2b - dotted and speckled very dark brown (PPL), mainly moderately low interference colours (close porphyric, speckled b-fabric, XPL), darkish brown (OIL); abundant amorphous organic matter, tissue and organ fragments, with occasional fine charred organic matter; *Pedofeatures*: *Textural*: occasional very thin (<100 μm) dusty clay void coatings; many bands of intercalations/fabric separations towards the junction with layer below; *Amorphous*: occasional impregntive iron nodules; rare traces of very fine (200 μm) size amorphous Fe-P? (yellowish) void infills.	Upper part is similar to middle part of M6, with a fine charcoal-rich once-humic fabric with textural pedofeatures that develop into bands towards the layer below. This is occupation topsoil that developed in sandy colluvium over trampled occupation soil. The presence of possible rare traces of secondary phosphate infills, may possible indicate small inputs of phosphate (?? Weathering of ashes, bone, dung??)
MFT A (SMT 1b)		15-75 mm SM: heterogeneous (dominantly SMT 1b, but includes small inclusions of SMT 3); *Microstructure*: massive (banded) with coarse burrows; (50% voids due to large burrow), intepedal voids 10%, mainly closed very fine vughs and relict fine root channels; *Coarse Mineral*:	Iron mottled massive deposit with very abundant textural pedofeatures including pans. A probable cumulative deposit formed through trampling where organic matter - possibly mor humus/peaty material – was also deposited. (Weak possibility of

		Coarse:Fine (limit at 10 μm), C:F, 35:65; as SMT 1a; *Coarse organic and anthropic components*: rare examples of coarse (4 mm) charcoal (in burrow, i.e., probably from above); rare relict iron replaced fine roots?; occasional coarse (1-3 mm) patches of totally iron replaced possible amorphous organic matter; *Fine fabric*: SMT 1b – speckled and dusty pale yellowish grey brown (PPL), moderately low interference colours (close porphyric, speckled b-fabric and weak grano-striate b-fabric, XPL), pale grey to pale orange (OIL); rare traces of very fine charcoal, occasional relict (iron replaced) fine probable amorphous organic matter; *Pedofeatures*: *Textural*: very abundant dusty clay intercalations, void coatings, thin horizontal void associated pans (100-150 μm), with major 2 mm thick pan; *Amorphous*: abundant impregnative and in places poorly pseudomorphic iron nodules; also picking out some pans.	dung being would have to be checked against pollen spectra/phosphate analysis)
MFT B/SMT 2a MFT A2/SMT 1a and 1b	**M5**	0-20 mm SM: As MFT B, as SMT 2a, becoming less humic upwards; rare fine charcoal. 20-75 mm SM: heterogeneous – layered; *Microstructure*: massive (banded throughout), bedded; coarse-fine (humic) and iron-stained laminae; 10-15% voids, both open and closed fine vughs; *Coarse organic and anthropic components*: many charred plant fragments including 0.7 mm size charred cross sections? and 2-3 mm size iron-replaced amorphous organic matter fragments?; *Fine fabric*: SMT 1a/1b; *Pedofeatures*: occasional intercalations and fabric separations/laminae/bedding;	Highly humic thin Ah 'turf' forms in sandy colluvium – implying a short period of stasis, followed by further sandy colluvium/inwash (indicated by rare textural pedofeatures) and less humic Ah formation (shorter period of stasis). Turf contains only rare charred organic fragments and organic layers (minor burning management), Over Little and strongly iron stained humic clayey silts, with patches of fine charcoal, which overall show a sloping bedding (with minor inclusion of amorphous organic

		Amorphous: occasional to many iron impregnations of amorphous organic matter – forming ironpan at around 25 mm.	matter fragments – mor humus material?) – now iron-replaced.
MFT B/SMT 2a Over MFT A2/SMT 1a MFT A1/SMT 1a	**M6**	0-75 mm SM: heterogeneous; *Microstructure*: massive (banded in lower part), cracked, with burrows; 15-20% voids, medium (1-2 mm) cracks, fine (300 µm) channels and vughs; medium (1 mm) size vertical root channels; *Coarse Mineral*: Coarse:Fine (limit at 10 µm), 0-30 mm: C:F, 40:60 (humic layers), 65:35 (minerogenic layers); moderately sorted fine and medium sand-size quartz, few mica; *Coarse organic and anthropic components*: occasional fine (200-300 µm) to medium (2 mm) charred woody plant fragments; rare examples of rooting (1 mm), rare ferruginised and other root traces; *Fine fabric*: common SMT 1 (see below) in lower half (ca 30-60 mm) as 4 mm thick humic and pale minerogenic bands; ca 0-30 mm, common SMT 2a: dotted very dark brown (PPL), isotic (close porphyric undifferentiated b-fabric, XPL), very dark brown (OIL); very abundant amorphous organic matter, tissue and organ fragments, with many charred fine material and organic layers; *Pedofeatures*: *Textural*: rare thin (30-50 µm) dusty clay void coatings (one example is wrong way-up) in SMT 1; *Amorphous*: rare traces of iron impregnation of fine roots, for example; *Fabric*: example of 5 mm wide, 20 mm long burrow at 15/20 mm depth. 60-75 mm SM: heterogeneous; *Microstructure*: massive (banded) and cracked; 20% voids, medium (1-2 mm) cracks, fine	Highly humic thin Ah 'turf' forms in sandy colluvium – implying a short period of stasis, followed by further sandy colluvium/inwash (indicated by rare textural pedofeatures) and less humic Ah formation (shorter period of stasis). Turf contains charred organic fragments and organic layers (burning management), Over Non-iron stained moderately poorly sorted humic banded clayey-silts – as below, with textural pedofeatures of slaking/ trampling/ wash.

		(300 µm) channels and vughs; *Coarse Mineral*: Coarse:Fine (limit at 10 µm), C:F, 65:35 (pale layers C:F 85:15), moderately poorly sorted silt, fine and medium sand-size quartz, with 2 subrounded coarse sand-size patchily iron-stained clay clasts; few mica; *Coarse organic and anthropic components*: occasional fine (200-300 µm) charred woody plant fragments – sections and longitudinal fragments; 1-3 mm thick layers of – now iron-replaced – amorphous organic matter, with rare probable fine root pseudomorphs; *Fine fabric*: SMT 1a: speckled and finely dotted brown to darkish brown (PPL), isotic to low interference colours (close porphyric, speckled b-fabric, XPL), darkish brown (OIL); many (pale layers) to very abundant amorphous organic matter; tissue residues, trace amounts of phytoliths, pollen and spores present (BL autofluorescent); occasional to many fine charcoal; *Pedofeatures*: *Textural*: many dusty clay to impure/silty very thin (20-30 µm) to thick (150 µm) grain coatings and laminated void infills, and forming 300-450 µm thick pan over topmost ironpan; *Depletion*: probable iron and fine fabric depletion of pale layers; *Amorphous*: abundant iron impregnation of 2-3 mm thick bands (ironpans) of – in some case – once humic (amorphous organic matter/fine roots) layers.	Moderately poorly sorted clayey silts-fine to medium sands, with fine charcoal-rich humic bands and thin amorphous organic matter-replaced iron pans. Many textural pedofeatures indicative of slaking and downwash; charred fine woody fragments, and examples of rubefied grains suggest burning. Trampling of wet ground formed in the Eag horizon of peaty gley/peaty gleyed podzol soils, and likely local burning.

Fan Foel: soil micromorphology: Figures 1-8

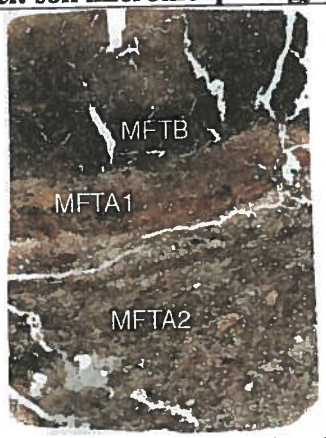


Fig 1: Scan of M5 showing microfacies types – from the bottom upwards: MFT A2, iron-stained MFT A1, and an uppermost humic layer – MFT B. Frame width is ~4.5 mm.

Fig 2: Scan of M6 showing layers – from the bottom upwards: iron-stained MFT A1, MFT A2, and an uppermost humic layer – MFT B. Frame width is ~4.5 mm.

Fig 3: Photomicrograph of M1 showing compact microfabric and voids (V) coated and partially infilled with dusty clay. Plane polarised light (PPL), frame width is ~0.45 mm.

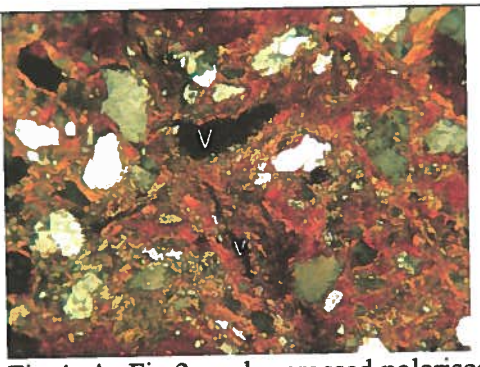


Fig 4: As Fig 3, under crossed polarised light (XPL). Note birefringent void (V) coatings and speckled (e.g., from mica) and weakly grano-striate b-fabrics.

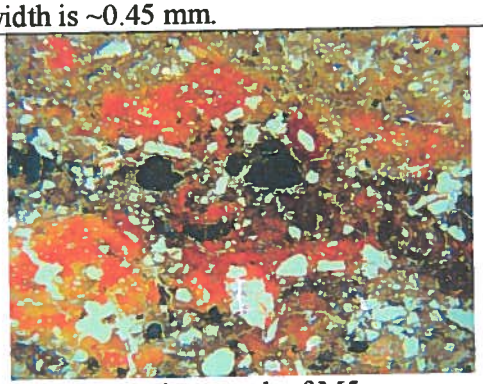


Fig 5: Photomicrograph of M5 illustrating MFT A1, layered humic fine loam containing charcoal, and characterised by secondary iron staining of fine fabric (orange) and root (red). Oblique incident light (OIL), frame width is ~4.5 mm.

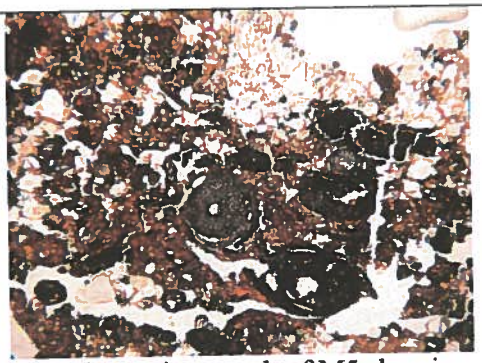


Fig 6: Photomicrograph of M5 showing MFT A2, alternate layers of fine sand and sandy humic soil containing charcoal. PPL, frame width is ~2.3 mm.

Fig 7: Detail of MFT A2 in M5 showing dusty, fine charcoal-rich matrix, and associated dusty clay void coating. PPL, frame width is ~0.45 mm.

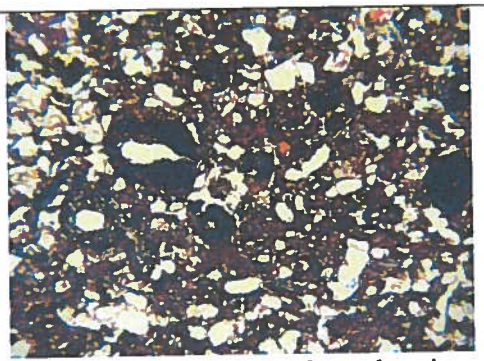


Fig 8: Photomicrograph of M6; humic and sandy MFT B, with charred inclusions. PPL, frame width is ~2.3 mm.

The Bronze Age Pottery from Fan Foel, Carmarthenshire, Wales

REPORT No. 85

6th July 2005

Alex Gibson
15 Alexandra Crescent
Ilkley
West Yorkshire
LS29 9ER

01943 609271
alex_gibson@talk21.com

The Bronze Age Pottery from Fan Foel, Carmarthenshire, Wales

Alex Gibson

Introduction

In June 2005 the pottery from the Fan Foel, Carmarthenshire, was submitted to the writer for report following partial reconstruction of the vessels. Two vessels were present: one Food Vessel and one Collared Urn. These vessels are dealt with separately below. The Food Vessel comprised a partially reconstructed upper portion plus 59 other sherds with a combined total weight of 622g. The Collared Urn comprised a portion of reconstructed rim plus 255 sherds (plus 2 stones) with a combined total weight of 830g.

The Food Vessel

Typology

The Food Vessel is tripartite with a well defined neck and belly and a broad cavetto at the shoulder. As reconstructed, the rim is circular with a diameter of 165mm and the base diameter is in the region of 75-80mm. No profile is reconstructable but given the body angle and the base diameter, a height of *c.*190mm might be estimated.

The rim has a slightly sloping internal bevel averaging 12mm wide. The rim itself is rounded and slightly expanded externally. The neck is upright but concave and measures some 50mm deep. The shoulder is occupied by a cavetto zone defined by two rounded carinations which seem to have been raised rather than applied. The cavetto zone is in the region of 25mm deep. The body appears to be relatively straight sided and slopes inwards towards the base, the angle of which is upright for a depth of *c.*10mm, probably corresponding to the thickness of the disc from which it was formed.

Technology

The fabric is soft and poorly fired. It is friable and averages some 9mm thick. The outer surface varies from light brown to a light greyish brown in places with patches of darker brown. The inner surface tends to be light grey though there are also brown patches. The core of the fabric is black and the surface colouration barely penetrates the fabric (rarely more than 2mm). These surface colour variations and the dense black core are indicative of a short and therefore economical open firing.

The fabric contains both angular and rounded stone inclusions. Some of these break the surfaces of the pot giving the fabric a speckled appearance and measure up to 8mm across. There are also traces of pinkish grog inclusions, up to 5mm across, which also break the surface on occasion and add to the speckled effect.

The vessel has almost certainly been coil, ring or strap built but the rings have been well bonded and distinctive coil breaks can rarely be detected with the naked eye. One possible join void is visible on one of the base sherds, and another towards the upper part of the neck of the reconstructed portion. A finishing facet is clearly visible on the inside edge of the bevel, possibly formed by a tool or the potter's fingernail.

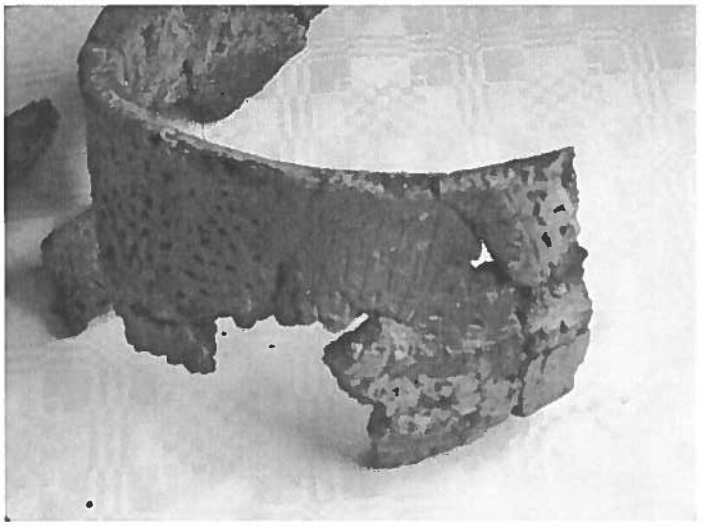
Conservators were only able to partially reconstruct the neck and upper portion of the belly of the vessel and although there are two base fragments, total reconstruction would have required substantial infilling. From the reconstruction and the remaining available sherds, it is obvious that the vessel is incomplete.

Decoration

It would appear that the whole of the vessel has been decorated as some oblique incised lines are visible on the wall of the base sherds. The decoration is profuse but carelessly executed.

The rim bevel is decorated with a single row of semicircular pits formed by stabbing a rounded implement at an angle into the clay. Similar 'D'-shaped impressions decorate the neck but are divided into triangular zones by single incised lines. The stabs penetrate some 2-3mm into the clay.

The lightly incised or scored lines which form the neck triangles are carelessly executed and the lines do not always meet at precise points. On one section of the neck, there is an apparent breakdown of the decoration where there is a single triangle filled with near vertical incised lines rather than stabs.



The shoulders defining the cavetto are each highlighted with a single row of D-shaped stabs or possibly fingernail impressions while the cavetto zone itself is decorated with incised diagonal lines.

The decoration below the cavetto zone is more difficult to determine due to the damage to the lower part of the vessel. However it is clear that it has been incised with deep bold and crude lines. There are also some stabs on the reconstructed portion of the vessel. Most likely the decorative scheme on the belly has consisted of incised filled triangles.

The base itself is undecorated as is the interior.

Discussion

With a rim diameter of 165mm and an estimated height of 190mm, the vessel falls short of the size range for Food Vessel Urns also known as Enlarged Food Vessels (eg. Fox 1927), Food Urns (eg Tomalin 1984) and Vase Urns (eg Sheridan 2003) but at the higher end of the size range for Food Vessels (Cowie 1978, fig.2). The tripartite shape can be paralleled at many sites in Wales, England and Scotland both amongst Food Vessels and Food Vessel Urns and is in itself unremarkable. The decorative scheme is, however, profuse and unusual in that. The crescentic impressions that accentuate the ridges at the top and bottom of the cavetto zone are very similar to those found on the otherwise undecorated Food Vessel Urn 2 from Simondstown while the slashes in the cavetto zone of the Fan Foel pot are paralleled on the associated Simondstown Urn No1 (Fox 1959, fig.51). Deep dot impressions as found on the upper body are similar to those on a bipartite vase Food Vessel from Rhydwen (Fox 1959, fig.24) though they are much more profuse on the Fan Foel pot. Nevertheless the combination of both stabs and bold oblique incision is noteworthy as is the decoration of the entire outer surface. Dot stabs are also used to decorate the collar and internal bevel of a Collared Urn from Abergwynolwyn, Gwynedd (Savory 1980, fig. 61). A ridged vase Food Vessel from Trelystan is decorated with stabs though they are rather more sparse than on the present vessel (Britnell 1982, P19).

The use of filled triangles is more difficult to parallel within Wales. Whipped cord chevrons are found on a vessel from Satlemartin, Pembrokeshire (Savory 1980, fig.56) and crude incised herringbone and oblique lines are found on a fragmentary bowl Food vessel from Mumbles, Glamorgan (Savory 1980, fig.57). Further afield, filled triangle motif on the lower part of the vessel has been noted on a vase Food Vessel from Haugh Head, Northumberland (Gibson 1978 No.56) and a Food Vessel Urn from Bamborough in the same county (ibid No.90) but the triangles are rather better executed on these pots than on the Fan Foel vessel.

All over decoration on Food vessels is much more typical in Ireland than in Britain, and filled triangles are a common motif for example on vase Food Vessels from Tipper South, Co. Kildare and Enniscorthy, Co. Wexford (O'Riordain & Waddell 1993, Nos.529 & 572) where the incisions are deep and untidy to much finer decoration as on the tripartite vase Food Vessel from Kilmuckridge, Co. Wexford (O'Riordain & Waddell 1993, No.438).

The breakdown in the decorative scheme on the upper part of the vessel is a phenomenon that has been noted elsewhere, notably on Bronze Age cups from Scotland (Gibson 2004, 280-2), on a Beaker recently found at Ferrybridge, West Yorkshire (Gibson 2005) and on a Beaker from Monkton-Minster, Kent (Gibson 2002, 54 – 5 & plates 9 and 10). The reason for these imperfections in decoration are difficult to understand, particularly in the case of some highly decorated vessels. 'Shoddy' workmanship may be the simple cause but appears to be too simplistic when care is taken over other parts of the decorative scheme. Perhaps building in imperfections was considered necessary, perhaps it was a way of the potter identifying his/her personal works or objects (Tomalin 1995) or perhaps the decoration was rather less important than we like to believe. Certainly in the Fan Foel pot, it would have not been too difficult to have smoothed over what appears to have been an error and to have tried again had the potter thought it necessary. Equally, this digression from the major decorative motif or scheme may not have been 'careless' or an 'error' but may have been deliberate and may have had a meaning: the device may have communicated some special information, perhaps to do with family lineage or status. As in heraldry, symbols may be combined when families marry thus making a statement about their lineage. Perhaps, in the Bronze Age, motifs could be combined to convey some similar sociological information. This may be subjective but certainly the extent and frequency of this variety in decoration might warrant future study.

Food Vessels are rare in Wales (Lynch 2000) and Food Vessel-associated radiocarbon dates even rarer. A small undecorated vase from Sarn-y-bryn-caled, Powys, was dated to *c.*2200-1910 cal BC (3660±40BP – BM 2809 (Gibson 1994)) and which would appear to be at the earlier end of the Food Vessel period of currency. P9, a ridged vase from Trelystan has a probable date of 3750±70 BP (CAR-79) but is certainly older than 3645±70 BP (CAR-280) which is directly associated with a bipartite Food Vessel Urn as is the date of 3550±60 BP (CAR-283) (Britnell 1982). The English and Irish dates for Food Vessels have recently been summarised and compared with the new and re-evaluated Scottish dates by Alison Sheridan (2004) who concludes a period of currency for these vessels from *c.*2200 – 1500 cal BC.

The Collared Urn

Typology

The Urn is fragmentary and the fabric soft and friable. The rim has a diameter in the region of 210mm. The rim is flat with traces of a slight central groove. The Urn is tripartite. The collar appears to have been at least 60mm deep and well-defined. A neck zone below this is also approximately 60mm deep and ends in a rounded shoulder. No base remains have been certainly identified.

Technology

The fabric is quite friable and many sherds have lost one or other surface. The outer surface is quite well finished and a rich pinkish brown colour. The fabric is generally this colour throughout. Grog inclusions upto 3mm across are also visible.

Internally there are horizontal ridges formed by the potter's fingers during the finishing of the vessel. The fabric varies in thickness, but at the collar averages 10mm. Other body sherds from below the shoulder reach up to 12mm thick. Coil breaks are visible in a few of the sherds.

Decoration

A shallow intermittent groove on the top of the rim may be a result of finishing rather than an attempt at decoration. On the collar, the decoration is deeply incised and arranged in a rather

irregular filled triangle arrangement (Longworth motif group H). The decoration in the neck is also deeply incised and seems to have comprised at least 3 rows of opposed oblique incisions forming 1.5 rows of herring-bone. The vessel seems to have been undecorated below the shoulder.

Discussion

The incised filled triangle motif is common on the collars of Collared Urns in both incised and a variety of impressed techniques. The motif in twisted cord, for example, makes up part of the decorative schema on a Collared urn from Llangynidr, Powys (Savory 1980 fig 69) and completely fill the collars on Urns from Tredunock, W Glamorgan, the Kilpaison barrows, Pembrokeshire (Savory 1980, fig. 67) and Carneddau, Powys (Gibson 1993). An incised version of this motif, but with cross-hatching rather than herring-bone in the neck comes from Letterston in Pembrokeshire (Savory 1980, fig.66).

A Collared Urn, probably closely resembling the Fan Foel vessel was found at Hepple in Northumberland (Longworth 1984, Plate 172a). This vessel has cord impressed filled triangles on the collar, but the collar base is well-defined, there 2. rows of incised herring-bone in the neck and the shoulder is not well pronounced. A similar combination of motifs is found on a tripartite secondary series urn from Wharram Percy, N. Yorks (ibid plate 172) but again the triangles are cord impressed.

The flat rim, slightly concave collar and filled triangle motif might place the vessel in Longworth's secondary series (Longworth 1984), and the bold motifs, and the well defined, pinched out collar base might suggest a late urn according to Burgess' scheme (Burgess 1986). The absolute dating of Collared Urns is problematic. Some dates have margins of error too large to be useful. Others are on unidentified charcoal. In Wales, few dates have, as yet, been carried out on cremated bone, though work in Scotland is redressing this problem (Sheridan 2003). Dates for Scottish Collared Urns range between 2000 and 1500 cal BC and Sheridan, following Burgess (1986), suggests that they may have appeared slightly earlier in southern Britain, say around 2100 cal BC.

Burgess (1980) pointed out the clear Beaker – Food Vessel – Collared Urn sequence in many of the barrows of, particularly, Wessex and Yorkshire although he was at pains to point out that there was a period when all these vessel forms were in contemporary use. Burgess was dealing with very few radiocarbon dates, many from poorly considered samples, on which to base this observation which has now been confirmed by Sheridan (2004) dealing with a larger and more accurate radiocarbon database. Indeed the degrees of overlap in the periods of currency are considerable however Burgess's observation stands: that Collared Urns are never primary to Food Vessels when found in the same cairn or barrow. There must therefore be a sociological rather than chronological explanation or even one of personal preference to explain this relative sequencing. This observation is further upheld by the present site.

References

Britnell, W. 1982. The Excavation of Two Round Barrows at Trelystan, Powys. *Proceedings of the Prehistoric Society*, 48, 133-202.

Burgess, C.B. 1980. *The Age of Stonehenge*. London: Dent.

Burgess, C.B. 1986. Urnes of no Small Variety: Collared urns Reviewed. *Proceedings of the Prehistoric Society*, 52, 339-51.

Cowie, T.G. 1978. *Bronze Age Food Vessel Urns*. British Archaeological Reports 55. Oxford: British Archaeological Reports.

Fox, C. 1927. An Encrusted Urn of the Bronze Age from Wales with Notes on the Origin and Distribution of the Type. *Antiquaries Journal*, 7, 115 – 33.

Fox, C. 1959. *Life and Death in the Bronze Age*. London: Routledge, Keegan Paul.

Gibson, A.M. 1978. *Bronze Age Pottery in the North-east of England*. British Archjaeological Reports 56. Oxford: British Archaeological Reports.

Gibson, A.M. 1993. The Excavation of Two Cairns and Associated Features at Carneddau, Carno, Powys, 1989-90. *The Archaeological Journal*, 150, 1-45.

Gibson, A.M. 1994. Excavations at the Sarn-y-bryn-caled Cursus Complex, Welshpool, Powys, and the Timber Circles of Great Britain and Ireland. *Proceedings of the Prehistoric Society*, 60, 143-223.

Gibson, A.M. 2004. Small, But Perfectly Formed? Some Observations on the Bronze Age Cups of Scotland. In A. Gibson & A. Sheridan (eds), *From Sickles to Circles: Britain and Ireland at the Time of Stonehenge*, 270 – 88. Stroud: Tempus.

Gibson, A.M. 2002. *Prehistoric Pottery in Great Britain and Ireland*. Stroud: Tempus.

Gibson, A.M. 2005. *The Beaker Pottery from the A1 Darrington-Dishforth Improvements: Ferrybridge-Hookmooor.* Report No.84 for Oxford Archaeology North.

Longworth, I. H. 1984. *The Collared Urns of the Bronze Age in Great Britain and Ireland.* Cambridge: Cambridge University Press.

Lynch, F.M. 2000. The Later Neolithic and Earlier Bronze Age. In F.M. Lynch, S. Aldhouse-Green & J. L. Davies, *Prehistoric Wales,* 79-138. Stroud: Sutton Publishing.

O'Riordain, B. & Waddell, J. 1993. *The Funerary Bowls and Vases of the Irish Bronze Age.* Galway: Galway University Press.

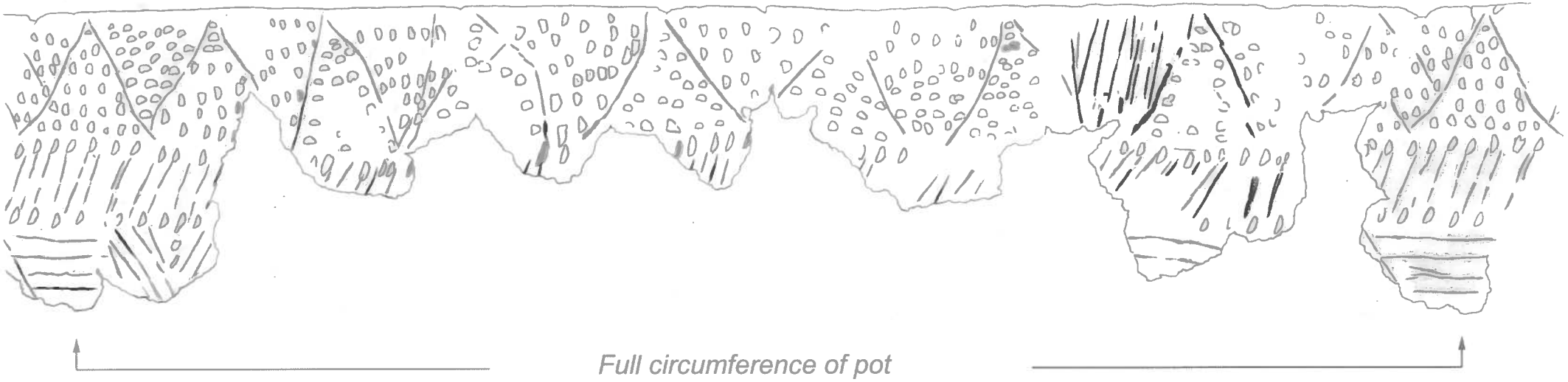
Savory, H.N. 1980. *Guide Catalogue of the Bronze Age Collections.* Cardiff: National Museum of Wales.

Sheridan, A. 2003. New Dates for Scottish Bronze Age Cinerary Urns: Results from the National Museums of Scotland Dating Cremated Bones Project. In A. Gibson (ed), *Prehistoric Pottery: People, Pattern and Purpose*, 201-26. British Archaeological Reports S1156. Oxford: Archaeopress.

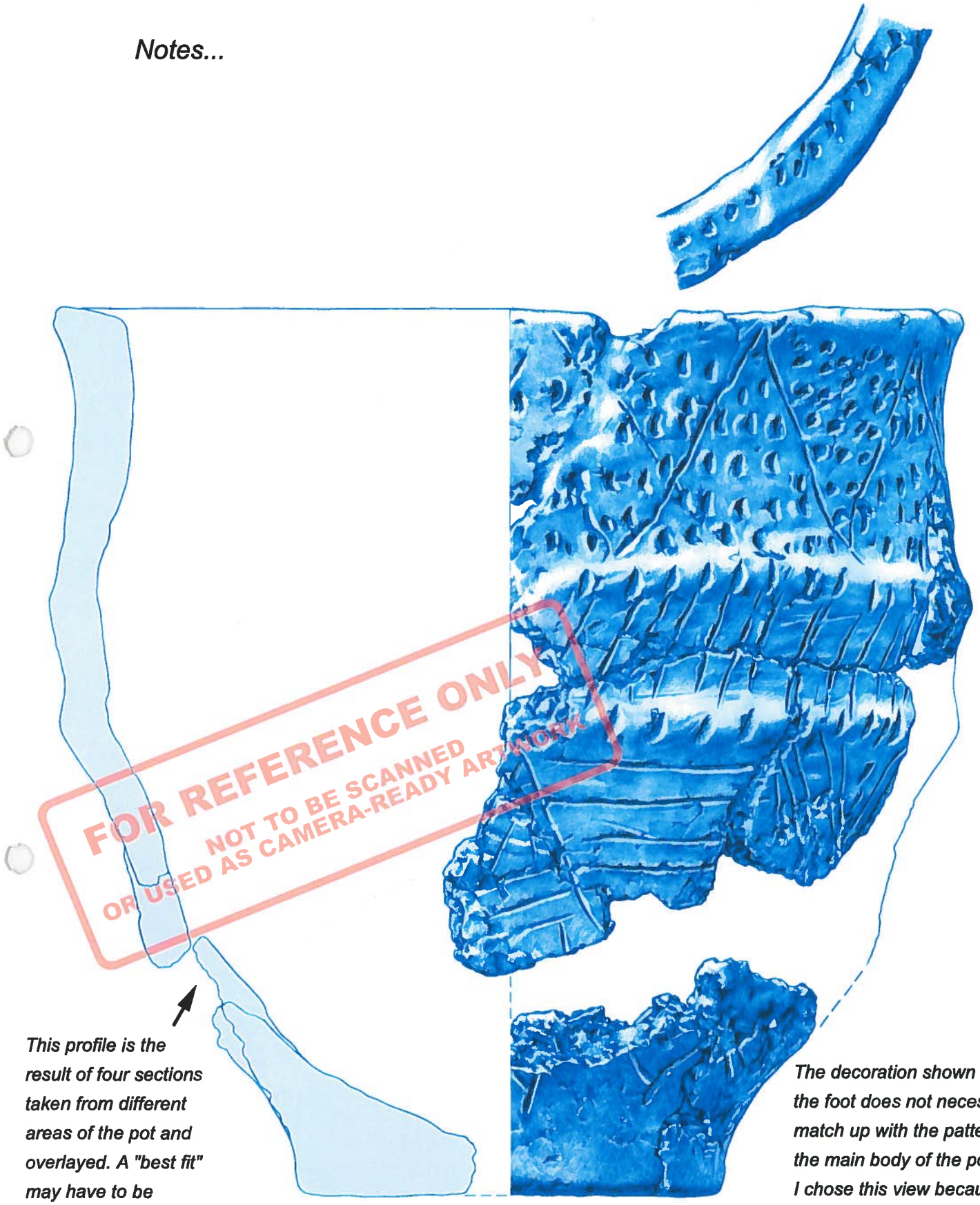
Sheridan, A. 2004. Scottish Food Vessel Chronology Revisited. In A. Gibson & A. Sheridan (eds), *From Sickles to Circles: Britain and Ireland at the Time of Stonehenge*, 243 – 69. Stroud: Tempus.

Tomalin, D. 1984. *british Biconical Urns: Their Character and chronology and Their Relationship with Indigenous Early Bronze Age Ceramics.* Unpublished PhD Thesis, University of Southampton.

Tomalin, D. 1995. Cognition, ethnicity and some implications for linguistics in the perception and perpetration of 'Collared Urn art'. In I. Kinnes & G. Varndell (eds), *Unbaked Urns of Rudely Shape. Essays on British and Irish Pottery for Ian Longworth*, 101-12. Oxford: Oxbow Books.


Full circumference of pot

Notes...



This profile is the result of four sections taken from different areas of the pot and overlayed. A "best fit" may have to be chosen.

The decoration shown on the foot does not necessarily match up with the pattern on the main body of the pot. I chose this view because it showed as much decoration as possible in one go.

0 Cms 5

Fan Foel, Food Vessel.

Fan Foel

Flints Finds

Lawrence Barfield

There are five items of flint and chert.

1. Plano-convex knife. Blade shaped tool with rounded tip and plano convex cross-section. Broken into three parts by heat with one part - the proximal end - missing. The original length can be estimated at about 7 cm. Made of a cryptocrytalline rock, identified as chert (see appendix). The blank for the tool shows no clear signs of conchoidal fracturing on the ventral surface and may have been created by splitting the rock along a fault line in the original block of material, rather than by percussion. Secondary working has, however, been carried out with invasive, soft- hammer 'conchoidal' flaking.
Part of the original 'cortex' of the material, consisting of a thin, compact black layer is preserved on the dorsal surface. Because of the compact nature of this cortex layer it could be observed that the retouch flake removals break off in low step-fractures where they meet the cortex. Normally on a material like flint such retouch would follow through the cortex as a continuing, feather-ending scar.
From these observations we can see that the raw material reacted technically and had perhaps been treated in different ways to flint.
The secondary flaking on the dorsal surface is bilateral, regular and invasive, executed with a soft hammer, producing the typical convex dorsal profile. Part of the dorsal surface, however, remains unworked. There is also unilateral, invasive flaking on the ventral side. This appears to have been applied to produce a final, symmetrical shape to the tool.
The object had been heavily burnt and the burning of the object produced transverse cracks, totally different from the effect found on burnt flint. The breakage of the tool took place along these lines of cracking.
1031 (3) and 1033 (7).

2. Unifacially worked flint point, originally of triangular shape with a trapezoidal cross-section. It is fragmentary and broken by heat into two pieces. A third, proximal part is missing. Made on a robust blade-like flake showing a marked dorsal flake scar struck off in the same direction as the flake. Unifacially flaked by invasive soft hammer flaking. Heavily burnt.
1033 (4) and 1033 (5).

3. Small, bilaterally retouched blade. On a blade-like flake blank of creamy grey flint. A long 'blade-like' flake scar is, however, visible on the dorsal surface. The striking platform is absent due to the platform edge being heavily hammered prior to detachment. It has an unpronouced bulb of percussion and steep retouch along both edges. The

abrasion along the platform edge probably relates to the striking of the flake at a steep angle to produce a flake of greater length (Harding 1990)
1033 (6)

4. Pointed flake with marginal retouch. Strongly mottled brown and grey flint. This is a long triangular flake struck with a hard hammer from the corner of a core. It shows a wide remnant platform 0.5 cm across. A pronounced bulb of percussion and negative bulb scar are present on the ventral surface. It has unifacial and unilateral, marginal retouch along whole of left side, which does not alter the original shape of the flake.
1031.

5. Small flake of yellowish flint. Probably hard hammer struck and with multidirectional flake scars on the dorsal surface.
1020 (1)

Raw materials

The raw material and condition of each of the five pieces is different. The plano-convex knife is of chert, while the rest are of flint. Macroscopically, the three unburned pieces of flint suggest that material from different sources was used.
The material of the plano-convex knife cannot easily be described since it had been heavily burnt. However the coarse grain, technological features, nature of its heat fracturing and 'cortex' all point to a non-flint material. The geological analysis indicates chert (p.). Being of chert it can be assumed that the material is local to Wales and suggests that knives of this quality were not always a product traded in from English flint deposits. It can be compared with the chert dagger, probably Beaker in date, from Merther Mawr Warren, Candleston Castle, Glamorgan (Green et al. 1982, Grimes 1951 p, 168 fig 21, (1)) [1]. Other plano-convex knives in Wales, like the other finds from Fan Foel, are of flint (Green et al. 1982)
The flint of item 4 is of a distinctive grey and brown mottled flint. The size of the original core from which it has been struck suggests importation from a source outside Wales. The remaining cortex on the butt shows some degree of weathering which excludes mined flint.
The opaque, creamy flint of no. 3 and the yellow material of no 5 appear both different from each other, and from 4.

Plano-convex knives.
The plano-convex knife is a type that is now known to have been part of the British lithic repertoire from the Early Neolithic (Edmunds), when they appear to have been especially common (Nelis 2004) through into the Bronze Age and are thus not clearly distinctive of a specific period or culture. They also show considerable variation in

[1] Chert plano-convex knives are also known from Yorkshire, Gilling (Black Hill) (Kinnes and Longworth 1985,p. 110)

shape from pointed to asymmetrical forms [2]. In fact rather than a specific tool type we should perhaps rather see the plano-convex knife as the result of a simplified technical approach to tool production using bilateral unifacial retouch that becomes particularly evident during the early Bronze Age and at Fan Foel beside item 1 the point no 2 and the blade no 3 from Fan Foel are also made using this same basic approach.
It is, however, also clear that in the Early Bronze Age knives made with this technology were frequently selected for use as grave goods and as such were endowed with a certain social value which ' suggest a heightened concern with the definition of a clear and consistent type' (Edmonds 1995: 144-145). As a grave item the type in Britain parallels the role of the flint or metal dagger, that became established on the continent from late 5th millennium Copper Age onwards and is present in British Beaker contexts as stone and metal daggers. In fact in Britain the simple unifacial technology of the plano-convex knife replaces the bifacial technology of Beaker 'daggers'. Elevated to a grave item it it is characterisically associated with Food Vessel and less commonly with Cinerary Urn burials (Clark 1932).[3] This association is just as true of Wales where all associations are with food vessels and food vessel urns, with the exception of one found with a cremation and pygmy cup in a collared urns at Letterston, Pemb. (Savory 1980, p 36. (no. 316))

The inclusion of a specific type metal or stone blade in a burial is usually taken to reflect the 'social persona' of an individual such gender, age or status – not necessarily rank (Binford 1972). While in the past it could be suggested that food vessels burials were essentially female (Ashbee 1960 p. 138) more recently Edmunds has suggested an association of plano-convex knives mostly, with male graves (Edmonds 1995: 144-145). According to Simpson, on the other hand, the plano-convex knife is found equally in both male and female graves (Simpson 1968).
While associated with the 'social persona' of the dead we would suggest that, like many daggers and knives, rather than necessarily a weapon it would also have had a general purpose function[4].

Other types
Item 2, while best described as a point, also shares the basic plano-convex technology with the knife as indeed does item 3 in a more simplified form.
The retouched pointed flake (no 4), which combines a point with a blade edge, is argueably not a specific 'type' but rather an *ad hoc* tool. However, the fact the blank was selected for purpose, and imported, might equally suggest a deliberate type was intended or at least recognised. Similar pointed blade/flakes, with comparable unilateral marginal retouch are in fact also known from other burial contexts such as the Beaker burial at

---

[2] The stubby ended 'slug' form, while one of a number of variations, does seem to the typical of many of the Early Bronze Age burial associations. The folk term slug', or slug knife, might seem to be a more suitable morphological description than plano-convex knife were it not for the fact, as Clark points out, this term is also used, in certain locations, used for the 'fabricator' (Clark 1932)

[3] In northern Britain, Simpson confirmed its association with Food Vessels, especially the Yorkshire bowls (Simpson 1968).

[4] Simpson (1968) suggests their use in skin preparation , but this could have been just one function of many.

Wellington (Herefordshire) (Harrison et al. 1999) and the, probably, Beaker cist grave at Alderbury (Shropshire) (Shrewsbury Museum - unpublished)
While item 5 would be usually defined as a 'waste flake' in a flint poor context like Wales it could easily have been a utilised piece. It can be compared with a small flake found in the belt pouch of the Hauslabjoch Iceman (Egg and Spindler 1993, Abb 17 (3))

Contexts
Tools 1 and 2 have been heavily burnt, presumably with the cremation. Since both are incomplete it can be supposed that the missing fragments were left at the site of the pyre which in turn suggests that not all the pyre material had been transported to the burial site. Item 3 is not burnt even though found among the cremated bones and thus presumably had been included in the cremation deposits after the cremation had taken place.
The unburned retouched pointed blade-like flake, 4, had been placed next to the cremation deposit and may have been an offering or an object used at the cairn during the final stages of the funerary process. It is tempting even to suggest that it could have been used for the cutting of the meadow sweet found with the burial.
Item 5 was found in an unstratified context and may have no connection either with the cairn or indeed the Bronze Age.

Bibliography

P. Asbee 1960 The Bronze Age round barrow in Britain. Phoenix House, London

L. Binford 1972 Mortuary practices: their study and their potential. In L. Binford ed. An archaeological perspective. Seminar Press, London

J. G. D Clark 1932 The date of the plano-convex knife in England and Wales. Antiq. J. 12, 158-162

M. Edmonds 1995. Stone tools and society, Batsford, London

Ellis Davis 1939 Acta Camb)

M. Egg, and K. Spindler, 1993. Die Gletschermumie vom Ende der Steinzeit aus den Ötztaler Alpen, Jahrbuch des Römisch- Germanischen Zentralmuseums 1992, 39, Mainz: 1-128

H. S. Green, C.H. Houlder and L.H. Keeley 1982 A flint dagger from Ffair Rhos, Ceredifion, Dyfed, Wales. Proc. Prehist. Soc. 48, 492-501

W. F. Grimes 1951. The prehistory of Wales, National Museum of Wales, Cardiff

P. Harding 1990 The comparative analysis of four stratified flint assemblages and a knapping cluster. In: Richards, J. The Stonehenge environs project, English Heritage,

Archaeological Reports, 16, Historic Buildings and Monuments Commission for England, 213-225.

R. Harrison, R. Jackson and M. Napthan 1999 A rich bell beaker burial from Wellington Quarry, Marden, Herefordshire. Oxford Journal of Archaeology, 18, 1-16

I. A. Kinnes and I.H. Longworth 1985. Catalogue of the excavated prehistoric and Romano-British material in the Greenwell Collection. British Museum, London

E. Nelis, 2004. Neolithic flint-work from the north of Ireland. In: A Gibson and A. Sheridan eds. From sickles to stone circles, Tempus, Stroud

H.N. Savory, 1980. Guide Catalogue of the Bronze Age Collections, National Museum of Wales.

D. Simpson, 1968. Food vessels: associations and chronology. In J.M. Coles and D.D.A. Simpson eds. Studies in ancient Europe: Essays presented to Stuart Piggott, 197 – 211, Edinburgh.