



Final Archaeological Excavation Report Caherweelder 1 Co. Galway

Burnt Mound

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Client: Galway County Council and National Roads Authority

Project: N18 Oranmore to Gort

E No: **E3880**

Excavation Director: Enda O'Mahony

Written by: Enda O'Mahony & Finn Delaney

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iii Summary

The new road clipped the western edge of a burnt mound. The excavation revealed the presence of a large trough and a well. Both features were located below the remains of the burnt mound material. Two Late Bronze Age radiocarbon dates were obtained from basal fill of the trough (C.6) and the well (C.10).

Caherweelder
Killeely
Kiltartan
Galway
A045
E3880
GA103
144426/215719
28m O.D.
Burnt mound

Table 1: Site Location Details

iv Acknowledgements

The excavation director was Enda O'Mahony and the site supervisors were Mike Duffin and Ewellina Chrobak. The field crew included Thomas Conway, Cecelia Falkendal, Anna Marciniak, Mirek Mazurek, Anna Okoniewska, Izabela Polchlopek and Elaine Roche. The senior archaeologist was Finn Delaney and the post-excavation manager was Jacinta Kiely. Choryna Kiely, Fillip Debniak and Fiona Greene were involved with the administration of the project. Illustrations are by Ben Blakeman and Maurizio Toscano. Specialist analysis was carried out by Mary Dillon and the 14 Chrono Centre at Queen's University Belfast. Joseph O'Brien was the resident engineer for consultant engineers Hyder Tobins. The project was commissioned by Galway County Council and was funded by the National Roads Authority. The Project Archaeologist was Jerry O'Sullivan.

1 Introduction

This report constitutes the final excavation report on a burnt mound in the townland of Caherweelder, Co. Galway (Fig 1). The site was excavated as part of the archaeological excavation programme in advance of construction for N18 Gort to Oranmore road scheme. The site was found within the lands acquired for the scheme during phase 1 archaeological testing. The site consisted of the western extent of a burnt mound, a re-cut trough and a well.

2 Background to the scheme

The N18 Oranmore to Gort (Glenbrack to Rathmorrissey) national road scheme was approved by An Bórd Pleanála on 7 June 2007. The development will consist of approximately 27 km of dual carriageway, and all associated works. The area of archaeological investigations lies within the footprint of the proposed scheme as defined by the Compulsory Purchase Order (CPO) published by Galway County Council on 1 August 2006. Eachtra Archaeological Projects was commissioned by Galway County Council and the National Roads Authority to undertake Phase 1 archaeological testing and Phase 2 excavation of sites directly impacted by the proposed development.

3 Topography, geology and hydrology

The underlying geology in the surrounding area is Carboniferous limestone of the Burren and Tubber formations bordered by Namurian shales and sandstones to the west, in Co. Clare, and Devonian old red sandstone to the east, in the Slieve Aughty uplands. Glacial till overlies the bedrock to varying depths (0-5 m) and the soils derived from the till are generally deep well drained brown earths. The topsoils are characteristically deep and dry and, enriched by the limestone parent material, support moderately good grass pastures. There are boulder fields and expanses of bedrock exposure typical of karst limestone country.

Although a degree of soil variability higher than expected has been recorded on the landscape near the burnt mounds examined, Caherweelder 1, and the nearby Caherweelder 2 and Caherweelder 3, are located in a region of low soil variability (Fig 6). In an approximately 1 sq km area around these sites there is a prevalence of deep, well drained mineral soil, with a relative small percentage of shallow well drained soil (about 28%) and a very small percentage of deep, poorly drained mineral soil (about 1.5%) in the northern area.

Turloughs and swallow-holes are features of areas with an underlying limestone bedrock, which enables the ground water and water table to produce sometimes perplexing drainage systems. A turlough is shown on the first edition Ordnance Survey map 650 m on the north of the excavation site (Figs 3 and 6). This turlough appears to be fed by a spring marked as 'Toberawoneen pool'. Water features appear to be a characteristic of the surrounding landscape as a small spring marked as 'Poolbaun' is shown to the east of the site and two wells close to the turlough. The water resources in the vicinity of Caherweelder 1 are completed by a second turlough 750 m to the east and Tullaghnafrankagh Lough 1.1 km to the west (Fig 6).

Three wells are noted within the townland of Caherweelder, one of which, 'Peter's well' (GA103:084), is a Recorded Monument and is located within the lands acquired for the scheme and has been the subject of an excavation. Peter's Well is located to the south of the excavation area known as Caherweelder 5 (Figs 3 - 5).

4 Archaeological and historical background

The townland name Caherweelder derives from the Irish *Cathair Mhaoilir*. The first part of the placename is easily resolved as stemming from *caher* or a 'stone fort' and the first edition Ordnance Survey map illustrates and names a stone fort as 'Caherweelder' at the centre of the townland. The second part of the placename *Maoilir* is less apparent. It could refer to a family name such as 'Mulder' which would translate as 'Mulder's stone fort'. *Maoil* in Irish means to overflow and could be related to the turlough at the centre of the townland. Another possibility is that it derives from *Maethail* meaning 'soft land' which would be equally apt or M*aol* meaning bald, as in bald/dilapidated structure (roof-less), land or even bald (hornless) cattle (Joyce 1913 Vol I, 395).

There seems to have been an extension of settlement from hillslopes and uplands into lower lying areas during the Bronze Age. There also seems to have been a trend away from communal funerary monuments to individual burial monument with associated grave goods. This would explain the relatively high concentration of barrows in lowland east Galway.

Barrows are burial monuments of the Bronze Age and Iron Age, which usually consist of a circular central area, which may be flat or slightly dished (a ring ditch), or domed (a ring barrow), and which is enclosed by a ditch and occasionally by an external bank). Bronze Age burials that have been excavated, either in recent times or during the last century, include some found in cists, pits lined with stone flags, and some in simple pits, some of which were accompanied by pottery or other grave goods. These can be placed in tumuli, cairns or barrows, but can also be set within 'natural' monuments, such as sand ridges, or can appear in so-called flat cemeteries, with no above ground marker at all.

These trends are also reflected in south Galway in the environs of the road scheme where stray finds of Bronze Age objects have been found in Toberbrackan and Lavally and a Bronze Age cist and 'food vessel urn' was found in Moyveela (O'Sullivan 2006).

There are no known house sites or settlements of the period in the area, but there are numerous examples of burnt mounds or *fulachta fiadh*. These mounds of burnt and shattered stone were the by-products of a favoured technique of immersing heated stones in pits filled with water, to boil it. Recorded examples occur on or near the proposed road scheme in Rathmorrissey, Toberroe and Caherweelder (GA103:083) and the present programme of excavation in advance of construction on the N18 Oranmore to Gort road scheme has added further to the numbers of burnt mound sites in the area.

The distribution map of prehistoric recorded monuments shows a concentration of ring barrows located to the south of Craughwell (Fig 2). This is known as the Dunkellin barrow group and has been studied by McCaffrey (1955). The Caherweelder burnt mound group is located just to the west of this concentration.

5 Site description

The excavated site is located towards the western edge of Caherweelder townland (NGR 144426/215715) (Fig 1–5). The burnt mound is situated along the rim of a natural depression which is subjected to annual flooding. The southern extent of the site is demarcated by a low, stone field boundary. Approximately 100 m to the south-east, a well named 'Pollbaun' on the first edition Ordnance Survey map for the area also sits within a natural depression. The field had been cleared of stones as a result of reclamation of the surround-ing land 20 years previously.

Two recorded burnt mounds (GA103:083 and GA103:081), one of which (Caherweelder 5) lay within the lands acquired for the scheme and was excavated, are located to the north of the site. A series of other excavation areas in Caherweelder townland including four other burnt mounds are located to the north and south of the site.

6 Methodology

An area measuring 300 sq m was topsoil stripped by a 20 tonne excavator using a toothless bucket to reveal the extents of the burnt mound and any associated features (Plate 1 and 2). The site was then subjected to an intensive hand clean and recorded using the single-context recording system with plans and sections being produced at a scale of 1:20 or 1:10 as appropriate. A complete photographic record was maintained throughout the excavation.

The soil samples taken during the excavation were sieved and the resultant flots were examined by Mary Dillon for plant remains and charcoal analysis. Two charcoal samples were sent for radiocarbon dating to Queen's University in Belfast.



Figure 1: Discovery series Ordnance Survey map showing the route of the new N18 Oranmore to Gort road and the location of all the excavation sites. The excavation site at Caherweelder 1 is highlighted.



Figure 2: A distribution map showing the location of prehistoric sites surrounding the site at Caherweelder 1. It is based on the RMP/SMR map GA103-12 data-set which has been overlaid on a digital elevation model.



Figure 3: The route of the new N18 Oranmore to Gort road overlaid on the 25 inch Ordnance Survey map (Sheet GA103-12). The excavation site at Caherweelder 1 is also highlighted.

7 Results of excavation

The burnt mound was located within a natural hollow in a large field of reclaimed pasture. The site ran along the eastern edge of the footprint of the road project and the majority of the mound appears to lie beyond the new road line to the east. The mound was not visible prior to excavation due to field clearance and land reclamation. In association with the burnt mound material the remains of a large re-cut trough and a well were identified. The topsoil (C.1) was a light-brown silty clay with a low density of stone inclusions and reached a maximum depth of 0.30 m. The underlying subsoil (C.2) was a light yellow/ grey indurated, silty sand with a low density of small stones.

Mound area (m)	Trough/Pit	Shape	Dimensions (m)	Volume (m3)
10 x 6 x 0.3	C.8	rectangular	3.16 x 2.2 x 0.37	2.57
	C.12	rectangular	1.5 x 1.1 x 0.37	0.61
T 0 D;				

Table 2: Dimensions of mound and troughs at Caherweelder 1

The mound, troughs and well are the three main elements of the site and are functionally related. The well was dug to provide water for the trough and the mound formed both during the heating of stones and by the emptying of the filled troughs, after a boiling episode. Due to the absence of evidence for lining of the well, and its shape, it is hypothesized that it was not used as a boiling pit.



Plate 1: Looking north-east across the excavation area after topsoil stripping.



Figure 4: The route of the new N18 Oranmore to Gort road overlaid on the RMP/SMR map GA103-12 which is based on second edition Ordnance Survey map (Sheet GA103).



Figure 5: The route of the new N18 Oranmore to Gort road overlaid on the first edition Ordnance Survey map (Sheet GA103). The excavation site at Caherweelder 1 is also highlighted.



Figure 6: The soil type at Caherweelder 1 [data provided from Teagasc and Forest Service, Dept of Marine and Natural Resources, EPA]. The map shows the extent of the turloughs visible on the first edition Ordnance Survey map.

0.5 I Kilometres

145335

Lac Lake

Shallow, lithosolic-podzolic with peaty topsoil

143835

Deep well drained mineral Shallow well drained mineral

Deep poorly drained mineral

0

Turlough

116311

126912

10



Plate 2: Looking south across the excavation area after topsoil stripping and hand cleaning.



Plate 3: Looking south at the north-facing section through the trough (C.12/C.8). The east/west excavation baulk is still in place.



Plate 4: Looking south-east across the trough (C.12/C.8) after excavation

7.1 Burnt mound material

The burnt mound material (C.3) was composed of dark greyish brown silty clay with a high density of small, angular heat-affected stones; and moderate amounts of small to medium inclusions of charcoal (Plate 2). The excavated portion of the mound material measured 10 m x 6 m and was 0.3 m deep.

7.2 Trough

The trough consisted of two intercutting pits. The earliest portion of the trough (C.12) measured 1.50 m east to west by 1.10 m north to south and had a maximum depth of 0.37 m. It was steep-sided on three sides with a flat base, which gradually sloped upwards to the south-east. Located directly to the south was a rectangular trough (C.8), which appeared to cut the earlier feature (C.12). It measured 3.16 m north to south by 2.66 m east to west had a maximum depth of 0.37 m and had a maximum capacity of 2.57 cubic metres (2570 litres). Both troughs contained the same three fills (C.5, C.6 and C.7). The upper fill was a dark greyish brown silty clay (C.5) with a high density of small, angular heat-affected stones, and moderate small to medium inclusions of charcoal. This fill was the same as the burnt mound material (C.3) and reached a maximum depth of 0.24 m. The middle fill (C.7) of the trough (C.8) was a mid greyish brown silty clay without inclusions. The basal fill (C.6) was a light bluish grey fine silty sand with occasional inclusions



Plate 5: Looking south at the north-facing section through the pit (C.11), with the natural spring in its base

of charcoal flecks. A radiocarbon date acquired from hazel charcoal from this deposit returned a Late Bronze Age date.

Both the earlier and later trough contained the same fills, which would suggest that the larger trough superceded the earlier one within a short period of time. It is hypothesized that some kind of lining was present during trough use but that the timber, wood or stone material has been removed or somply has not survived. The lower fills consisted of finer materials which had settled along the bottom of the troughs during use, presumably as artefacts of the boiling episodes.

Alternatively, it is hypothesized that the troughs consisted of two interconnected, contemporary elements.

7.3 Well

Less then 0.5 m to the north of the troughs a roughly oval-shaped pit with a natural spring at its base was identified (C.11). It measured 3.30 m east to west by 2.74 m north to south and had a maximum depth of 0.67 m. The pit was steep-sided to the north and east and contained two fills (C.9 and C.10). The upper fill (C.9) was composed of dark-greyish brown silty clay with a high density of small angular heat-affected stones, and moderate small to medium inclusions of charcoal. This fill had a maximum depth of 0.60 m. The basal fill (C.10) was a layer of light-bluish grey silty sand with occasional





Plate 6: Looking east at the pit (C.11) with the natural spring in its base after excavation.

inclusions of charcoal flecks. A radiocarbon date acquired from hazel charcoal from this deposit returned a Late Bronze Age date. A natural spring occurred in the base of the pit which was partly undercut to the north east reflecting scooping out of water with some sort of vessel (probably wooden). The well was used as a water source to fill the nearby troughs, probably the larger trough of the two if not both.

8 Charred plant remains

The sieved flots from five of the Caherweelder 1 samples were examined by Mary Dillon. No charred seeds were found.

9 Charcoal

In all, 135 fragments of charcoal were analysed from five samples. The samples came from the burnt mound material (C.3), a trough (C.6 and C.5), and a pit/spring (C.10 and C.9). The samples were rich in charcoal. A wide range of trees were represented in the assemblage. The most common were hazel, oak and pomoideae (not fully identified but could include apple, pear, rowan, hawthorn). In all, eight wood types were identified.

Hazel, pomoideae, oak, ash and alder were the most common wood types identified at the Caherweelder burnt mounds. This would suggest that these were the most common



Plate 7: Looking south across the well (C.11) and the trough (C.8/C.12) after excavation



Plate 8: Looking north-west across the excavation area





trees growing in the area at the time. The fact that no two charcoal assemblages from the group had the very same results implies that the wood was selected on the basis of what was growing near-by and not on the basis of which wood or woods were culturally important. This point is relevant when we consider the clustering of sites and attempt to model changes in the Bronze Age landscape.

10 Radiocarbon dates

Radiocarbon analysis was carried out by the 14 Chrono Centre in Queen's University Belfast. Dates were calibrated using Calib Rev5.0.2 (©1986–2005 M.Stuiver & P.J. Reimer) and in conjunction with Stuiver & Reimer 1993 and Reimer et al. 2004.

Dates were obtained from hazel charcoal fragments from two deposits. Two Late Bronze Age dates were obtained from basal fill of the trough (C.6) and the pit containing the natural spring (C.10).

Lab. Code	Context	Sample	Material	Years BP	δ 13 C	1 sigma calibrat- ed date	2 sigma calibrat- ed date	Period
UB-11274	Fill of trough (C.8)	4	Charcoal: Hazel, 1 frag, 0.4g	2755±24 BP	-24.3	BC 921–890 880–844	BC 974–957 941–831	Later Bronze Age
UB-11275	Fill of well/ spring (C.10)	6	Charcoal: Hazel, 1 frag, 0.8g	2811± 26 BP	-28	BC 997–928	BC 1038– 1034 1028–901	Later Bronze Age

Table 3: Caherweelder 1 Radiocarbon dates

11 Discussion

Burnt mounds are the most common Bronze Age sites found in Ireland. Estimates suggest that at least 4,500 examples are known (Power et al. 1997) and this number is continuously growing as sites continue to be identified by archaeological field work. The characteristic site-type is found in low-lying and damp ground and consists of a mound of charcoal-rich black sediment that is packed with heat-shattered stones and forms a horseshoe shape around a pit or trough that filled with water. In many cases all that survives to the present day are black charcoal-rich deposits with fragments of shattered stones visible in ploughed fields.

These sites are associated with the process of roasting stones to heat water. The remains of these 'pyrolithic technologies' (terminology follows Ó Néill 2005) produce the tell-tale deposits rich in charcoal and heat-affected stone. Debate continues about their use, as hot water is required for many processes including cooking, brewing, washing, dyeing and, most recently, it has been argued that some burnt mounds were primarily used to boil and cure meat for long-term storage (Roycroft 2006).

Traditionally, these sites have been interpreted as ancient cooking places, where large stones were heated in fires and then added to the water-filled trough. The extreme heat of the stones eventually heated the water in the trough until it reached boiling point. Experimental cooking at reconstructed sites such as Ballyvourney (O'Kelly 1954) has demonstrated that meat wrapped in straw and placed into a boiling trough can be cooked quite effectively. The perceived lack of any animal bones from these excavated sites has been used as an argument against this theory. More recently, however, there is a growing corpus of sites which have produced animal bone (Tourunen 2008) and almost all of the burnt mound sites excavated during the N18 Oranmore to Gort project have produced animal bone, all be it in very small quantities; mirroring the discoveries of the recent pipeline to the west (Grogan et al. 2007) where animal bone was the most commonly found ecofact on burnt mounds.

The traditional perception of burnt mound site is that they are isolated places in the landscape situated on marginal ground away from settlement. Recent studies however are requiring a re-evaluation of this perception. Excavations along the route of the N25 Kilmacthomas realignment in Co. Waterford produced evidence for a burnt mound site (Ahanglogh) which was repeatedly used in the Early Bronze Age. Some Early Bronze Age dates from a nearby settlement site suggest that there may have been an overlap in occupation. (Johnston et al. 2008). A similar discovery was made at Cloghers II, Co. Kerry where Beaker settlement was found in close proximity to an Early Bronze Age burnt mound (Kiely and Dunne 2005). The recent publication on the archaeology of Clare Island has also established the intimate relationship between burnt mounds and settlement areas (Gosling 2007). Surveys on Clare Island highlighted the spatial association of the identified burnt mounds with enclosures, houses and huts and boundary walls.

Up to recently comparatively few burnt mound sites had been excavated in County Galway. The excavations data-set listed only 18 excavations of burnt mounds/fulachta fiadh in the county prior to 2006 (Bennett 1970-2003). The published archaeological inventories for the county record only six examples from the west of the county and 17 in the north. Large scale archaeological works such as those associated with the N6 Galway to Ballinasloe road scheme suggest that the numbers recorded are under representative: the N6 archaeological works identified thirteen burnt mound sites. However, work associated with the gas pipeline to the west revealed only 1 new burnt mound site in Co. Galway (Grogan et al. 2007). The archaeological inventory for the south of the county is not yet published but a look at the distribution map based on the RMP data would suggest that the numbers are significantly higher in the southern portion of the county. Archaeological investigations on the N18 from Oranmore to Gort and from Gort to Crusheen bear out this impression of under representation. A total of 12 burnt mounds including Caherweelder 1 were excavated on the Gort to Oranmore section while 27 burnt mound sites were excavated on the N18 Gort to Crusheen section by Irish Archaeological Consultancy Ltd.

Site Name	E No.	Radiocarbon date (2 sigma) cal BC	Period
Ballinillaun 1	E3888	1260–1228 1220–1108 1105–1055	MBA
Ballinillaun 2	E3886	1912–1876 1842–1821 1797–1781	EBA
Ballyglass west	E3870	1411–1290 1280–1270	MBA
		1687–1602 1591–1532	EBA
		1740–1703 1699–1618	EBA
		1125 – 978	MBA
Caherweelder 1	E3880	974–957 941–831	LBA
		1038–1034 1028–901	LBA
Caherweelder 2	E3890	1192–1174 1164–1143 1132–1005	MBA
		1294–1124	MBA
Caherweelder 3	E3889	1668–1501	EBA
		1448–1370 1351–1316	MBA
Caherweelder 5	E3866	1125–976 952–947	MBA
		1944–1865 1849–1773	EBA
Caherweelder 6	E3871	2195–2174 2145– 2119 2096–2040	EBA
Coldwood	E3887		Unknown

Site Name	E No.	Radiocarbon date (2 sigma) cal BC	Period
Moyveela 1	E3883	731–691 660–652 544–406	LBA
Moyveela 2	E3884	1010-909	LBA
		894–873 846–798	LBA
Roevehagh 1	E3885	976–952 948–832	LBA

Table 4: Table of radiocarbon dates from the burnt mound sites on the N18 Gort to Oranmore

The burnt mound site known as Caherweelder 1 is located on low ground on the western edge of an area of improved rough pasture. The surrounding area is prone to flooding. A turlough lies just to the north-east and a small pool named Pollbaun is located to the south-east. A preference for wetland margins has been consistently noted by other commentators (Gowen et al. 2007). Grogan (2007) states that in the 'Mooghaun area of south-east Clare the majority of fulachta fiadh occur along the margins of turloughs, bogs and marshy areas'. The burnt mound sites at Moyveela (to the north) which were excavated as part of the same programme of excavations had a similar location on slightly raised ground on the edge of a turlough.

Clustering of burnt mound sites is also a feature of this type site which has been described by many commentators (Grogan 2007, Waddell 2000 and Gosling 2007). This clustering of burnt mound sites along with the large size of some examples has led Waddell (2000) to believe that 'they were an integrated part of a wider settlement pattern. The five excavated burnt mounds in Caherweelder along with the previously recorded example (GA103:081) located outside the CPO reveal a small cluster of these sites along the western edge of a turlough and in low-lying rough pasture prone to flooding. A similar cluster of burnt mound sites was also revealed in Moyveela townland to the north. The Dunkellin Bronze Age barrow concentration is located on slightly higher ground just to the east of the Caherweelder burnt mound concentration which is reflective of significant Bronze Age activity in the general area and would appear to substantiate the theory of these sites forming part of an integrated settlement pattern.

A statistical cluster analysis has been applied to the entire set of burnt mounds recorded in a study area around the N18 Oranmore to Gort road project and the results show a multiscalar high level of clustering for this type of site. Caherweelder 1 belongs to one of the clusters with the most number of sites identified in the area. The cluster is composed of nine sites, four previously known Recorded Monuments and five newly recorded. At a larger scale an additional level of clustering is apparent, showing three groups of two or three sites (Fig 7).

Cluster	Site quantity	Area enclosed	Density per sq. km.	Sites mean distance	Minimum distance	Maximum distance
2	9	2.2 sq. km.	4	1.2 km.	20 m.	3.4 km.
2a	3			179 m.	78 m.	268 m.
2b	3	0.002 sq. km.		96 m.	48 m.	132 m.
2c	2			20 m.		

Table 5: Summary of cluster analysis

The burnt mound at Caherweelder 1 lay mostly outside the footprint of the road project, however, it was clear that the burnt mound had been levelled due to land reclamation work. The use of a natural spring as a water source for the "pyrolithic" technologies has been attested to at other sites in fact all eighteen of the troughs excavated at burnt mound sites along the route of the N25 Kilmacthomas realignment were recorded as being self-filling (Johnston et al. 2008).

Two Late Bronze Age dates were obtained from basal fill of the trough (C.6) and the pit containing the natural spring (C.10). Most dated burnt mound sites have a focus of activity in the Middle to Late Bronze Age (Brindley and Lanting 1990; and see graph of dates in Ó Néill 2004). In all, 20 radiocarbon dates were obtained from the burnt mound sites, on this route, ranging from the Early Bronze Age (cal 1740–1703 BC at Ballyglass West) to the Later Bronze Age (cal 731--406 BC at Moyvella 1).

Charcoal analysis revealed that the most common wood types identified were hazel, oak and pomoideae (apple, pear, rowan, hawthorn type). In all, eight wood types were identified. Hazel, pomoideae, oak, ash and alder were the most common wood types identified at the Caherweelder burnt mound sites. This suggests that these were the most common trees growing in the area at the time. The fact that no two charcoal assemblages from the group had the very same results implies that the wood was selected on the basis of what was growing nearby and not on the basis of which wood or woods were culturally important.

The site of Caherweelder 1 and the other excavated and recorded burnt mound sites in the townland highlights the Bronze Age activity in the area and taken in conjunction with the Dunkellin barrow concentration on the higher ground to the east reflects an intensive use of the area by Bronze Age groups. It also provides another element in the growing *corpus* of excavated burnt mound sites in Co. Galway.

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Appendix 1 Context register

Please see attached CD for Context Register.

Appendix 2 Stratigraphic matrix

Caherweelder 1 Matrix



Appendix 3 Groups and subgroups

Natural Deposits – Group 1

Topsoil – Subgroup 1001 Context Numbers – C.1

Description

This was a light-brown silty clay with a low density of stone inclusions and had a maximum depth of 0.30 m.

Interpretation This represented the topsoil which had formed across the excavation area.

Subsoil – Subgroup 1002

Context Number - C.1

Description

This was a light yellowish grey indurated, silty sand with a low density of small stones most of which showed signs of decay.

Interpretation This was the underlying subsoil which extends across the excavation area.

Burnt Mound material – Group 2

Context Numbers - C.3

Description

The burnt mound material was composed of dark greyish brown silty clay with a high density of small, angular heat-affected stones; and moderate amounts of small to medium inclusions of charcoal and had a maximum depth of 0.31 m. The mound material measured 10m x 6m and was 0.3 m deep.

Interpretation

This deposit represented the disturbed remains of a burnt mound. The accumulated material was probably the discarded by product of a technology which used hot stones to heat water.

Trough - Group 3

Context Numbers - C.12, C.8, C.5, C.6 and C.7

Description

The earliest portion of the trough (C.12) measured 1.50 m east to west by 1.10 m north to south and had a maximum depth of 0.37 m. It was steep-sided on three sides with a flat base which gradually sloped upwards to the south-east and was also not lined with any material. Located directly to the south was the rectangular shaped trough (C.8), which appeared to cut the earlier feature (C.8). It measured 3.16 m north to south by 2.66 m east to west and had a maximum depth of 0.37 m.

Both troughs contained three fills (C.5, C.6 and C.7), the upper fill was a dark greyish brown silty clay (C.5) with a high density of small, angular heat-affected stones, and moderate small to medium inclusions of charcoal. This fill was the same as the burnt mound material (C.3) and reached a maximum depth of 0.24 m. The middle fill (C.7) of the trough (C.8) was a mid greyish brown silty clay without inclusions. The basal fill (C.6) was a light bluish grey fine silty sand with occasional inclusions of charcoal flecks.

Interpretation

The troughs were located under the denuded mound material. Both the earliest and latest trough contained the same fills which would suggest that both were open and or in use at the same time. The lower fills consisted of finer materials which had settled along the bottom of the troughs during use.

Pit and Natural Spring - Group 4

Context Numbers - C11, C.9 and C.10

Description

Less then 0.5 m to the north of the troughs a roughly oval-shaped pit with a natural spring at its base was identified (C.11). It measured 3.30 m east to west by 2.74 m north to south and had a maximum depth of 0.67 m. The pit was steep-sided to the north and east and contained two fills (C.9 and C.10). The upper fill (C.9) was composed of dark-greyish brown silty clay with a high density of small angular heat-affected stones, and moderate small to medium inclusions of charcoal. This fill had a maximum depth of 0.60 m. The basal fill (C.10) was a layer of light-bluish grey silty sand with occasional inclusions of charcoal flecks. A natural spring occurred in the base of the pit which was partly undercut to the north east.

Interpretation

A naturally occurring spring was used to form a self filling pit. The spring and pit were used as water source and was probably used to fill the nearby trough. Water was an essential part of the hot stone technology which resulted in the formation of the burnt mound material.

Appendix 4 Charcoal analysis

By Mary Dillon

Introduction

This report gives the results of the analysis of charcoal from samples taken during excavation at Caherweelder 1 (E3880) in Co. Galway. The excavation found a burnt mound site. There were four other burnt mound sites from Caherweelder. The samples came from the burnt mound material, fill of a trough and fill of a spring. The samples from this site contained charcoal and land **molluscs**. Charcoal was frequent in most samples.

Methodology

Bulk soil samples were collected on site and were processed by the client. All charcoal fragments that measured 2 mm or greater in the transverse section were identified. Each fragment was prepared for microscopic examination by fracturing it by hand and thereby exposing a clean surface along transverse, radial and tangential planes. All three planes were examined at a range of magnifications. For reference literature Schweingruber (1990) was consulted. The number and weight of fragments were recorded for each wood type.

Results

In all, 135 fragments of charcoal were analysed from five samples. All five samples had charcoal that was suitable for AMS dating. If hazel was present in the samples this is recommended, and marked as suitable, for submitting for dating as it has a lifespan of just 80 years.

In Figs. 1 and 2 percentage frequencies of the various wood types, based on fragment count and dry weight respectively, are shown. The most common wood types based on fragment count were hazel (42%), oak (13%), and pomoideae (13%; see Fig. 1, Table 1). Alder (10%), ash (10%), birch (6%), willow/aspen (4%) and *Prunus* (2%;) were also identified.

When the results of percentage weight are taken into account the results change slightly (Fig. 2, Table 2.).

Discussion

The samples came from the burnt mound material (1 sample), a trough (2 samples), and a spring (2 samples). There are no distinct differences between the charcoal assemblages from the different feature types, indicating that the charcoal probably originated from the same source. Nearly all the samples consisted of several wood types. The wide variety of woods identified suggesting that there was a broad range of trees growing in the area.



Fig. 1. Percentage fragment frequency



Fig. 2. Percentage weight

Corylus (hazel; *C. avellana*). The charcoal data shows that hazel was the most commonly used wood. It accounts for 42% of all charcoal fragments identified. It was present in all the samples. Hazel was widely exploited in both prehistory and historical times for its nutritious nuts and supple rods which were widely used for building. Its coppice-like growth form makes it relatively easy to cut and there are normally substantial quantities of dead wood available near ground level. Pollen analytical studies indicate that hazel was of great importance in Ireland for most of the Holocene. It is one of the more frequent native trees growing in south Co. Galway today. Hazel is commonly found on burnt mound

sites (O'Donnell 2007). It was the most common wood type identified in the samples from the nearby burnt mound sites Caherweelder 2, 5, and 6 (Dillon 2009b,d, and e).

Quercus (oak). Quercus makes up 13% of the assemblage. It was present in all but one of the samples. Oak is slow burning and gives out substantial heat as it burns which would have made it a natural choice for a fire. There are two native species of oak in Ireland, namely *Q. petraea* and *Q. robur*. Unfortunately, it is difficult to distinguish these species on the basis of wood anatomy (Grosser 1977). Oak is commonly found on burnt mound sites (*ibid*).

Pomoideae - *Sorbus/Crataegus* (rowan/whitebeam/hawthorn/crabapple). This charcoal type made up 13% of the assemblage and was present in all the samples. Woodlands and woodland-related environments are the normal habitats for the various woody plants that may be represented in this charcoal type. An important habitat, especially for hawthorn (*Crataegus*), is on the edge of woodlands (cf. Wilmanns and Brun-Hool 1982).

Fraxinus (ash; *F. excelsior*). Ash made up 10% of the assemblage. Ash makes great fuel, burned green or dead. Ash is commonly found on burnt mound sites (O'Donnell 2007).

Alnus (alder; *A. glutinosa*). *Alnus* is represented at 10%. Alder was probably largely confined to damp/wet areas. It should be noted, however, that alder wood does not burn well but is commonly found in samples from burnt mound sites (*ibid*).

Birch (*Betula*). Birch charcoal accounted for only 6% of the assemblage. *B. pendula* (silver birch) and *B. pubescens* (hairy birch) are the two native birches. It is not possible to distinguish the wood from these two species. Silver birch likes dry soil while hairy birch likes wet soil. *Betula* has excellent qualities as firewood but burns quickly.

Salix/Populus (willow/aspen). Willow/aspen charcoal was also recorded at 4% of the assemblage. *Populus* is seldom recorded in Irish pollen diagrams and then mainly in the early Holocene. It is assumed that willow (one or more of several possible willow species) is mainly or probably exclusively represented here.

Prunus spp. includes wild cherry (*P. avium*), bird cherry (*P. padus*) and blackthorn (*P. spinosa*)). *Prunus* charcoal had low representation (2%). Blackthorn may have been common in scrub vegetation while wild cherry would be expected to occur in the woodlands. Bird cherry may also have been represented. Today, it is largely confined to the northern part of Ireland (Preston *et al.* 2002). Webb *et al.* (1996) regard it as introduced though this view is not universally accepted. Therefore, it is likely that blackthorn or wild cherry are represented here.

Comparative studies

Burnt mounds are a common feature of the Irish landscape. Charcoal analysis from burnt mounds excavated along the Gas Pipeline to the West demonstrates that a range of trees were gathered as fuel, particularly alder, hazel, oak and ash (O'Donnell 2007). O'Donnell's studies suggest the same wood types were utilized as fuel in burnt mound sites across the country, and she suggests that a selection process of some kind was in place.

At other Co. Galway burnt mound sites, e.g. Cooltymurraghy, Urraghy and Barnacragh, the charcoal results were similar to those from O'Donnell's studies (Dillon 2007a, 2007b, 2007c). However, not all burnt mound sites produce the same results. At nearby Ballyglass West, on the N18 route, the burnt mound samples did not display the typical hazel/alder/ash and oak combination (Dillon, 2008). Rather, there was a larger array of trees represented including pomoideae, *Prunus*, yew, willow and birch. Hazel, oak, ash and alder were the most common wood types identified at the Caherweelder burnt mound sites. This would suggest that these were the most common trees growing in the area at the time. The fact that no two charcoal assemblages from the group had the very same results implies that the wood was selected on the basis of what was growing near-by and not on the basis of which wood or woods were culturally important.

Conclusion

The samples from Caherweelder 1 burnt mound site were rich in charcoal. A wide range of trees were represented in the assemblage. The most common were hazel, oak and pomoideae. In all, at least eight wood types were identified.

Context and sample	Hazel	Oak	Pomoideae	Birch	Alder	Prunus	Ash	Willow/ aspen
C6, S4	7	2	5	1				
C10, S6	11	7	4		4	1	3	
C3, S1	9	7	4		5	1	2	2
C9, S2	15		1	7	5	1	1	
C5, S3	15	1	3				7	4

Table 1. Charcoal fragments sorted by sample and wood type

Context and sample	Hazel	Oak	Pomoideae	Birch	Alder	Prunus	Ash	Willow/ aspen
C6, S4	0.4	0.1	0.2	0.05				
C10, S6	0.7	0.3	0.4		0.2	0.15	0.15	
C3, S1	0.5	0.7	0.4		0.4	0.2	0.1	0.05
C9, S2	1.3		0.05	0.6	0.2	0.05	0.2	
C5, S3	0.7	0.05	0.2				0.4	0.3

Table 2. Charcoal weight sorted by sample and wood type

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