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EXCAVATION OF A MIDDLE BRONZE AGE BURNT MOUND AND ASSOCIATED PIT AT BRYN CEFNI INDUSTRIAL PARK, LLANGEFNI, ANGLESEY 2001

Gwynedd Archaeological Trust: Project No. G1723

Report No. 463

Prepared for

Bowen Dann Knox
on behalf of
The Welsh Development Agency

by

George Smith

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Registered IFA Organisation

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Cover photo: Trough (pit 11) after excavation

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with contributions by D. Jenkins, P. Denne and Beta-Analytic Inc.

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1. Introduction

The following provides a summary of the results of an archaeological watching and recording brief at Bryn Cefni, Llangefni, centred on SH 469750. A programme of archaeological assessment and evaluation has been carried out by Gwynedd Archaeological Trust prior to development of an extension to the Bryn Cefni Industrial Park. The work was carried out as part of planning consent for Bowen Dann Knox on behalf of the Welsh Development Agency. A previous stage of the work focussed on the possible site of a large prehistoric cairn, which was removed in the 18th century as part of agricultural improvements. It was probable that some subsoil features such as burial pits might survive. The previous work, covering the whole of the projected development area involved desktop research, a watching brief, geophysical survey and trial trenching. The desktop research identified a suggested location for the cairn within the existing industrial estate and, within the new development area, a number of linear features, which were considered to be all post-medieval field ditches or cultivation features (GAT 1998a). Subsequently, a trial excavation was carried out on the possible site of the cairn but the results were inconclusive (GAT 1998b).

The watching brief was ongoing as development proceeded and in November 2001 a large area of burnt stones and charcoal was identified in the east part of the development area, after topsoil stripping of a car parking area for Plot 9. Excavations were carried out by J. Kenney who recorded a rectangular pit within the area of burning and the whole was interpreted as a possible 'burnt mound' with associated timber-lined trough, and of probable Bronze Age date. This was confirmed by a single radiocarbon date of 3050+/-70 BP (Beta-164490) calibrated to 1440 to 1100 BC, within the Middle Bronze Age. An assessment report (Kenney 2002) was then produced, which demonstrated the potential of the excavation results and recommended a further stage of post-excavation work comprising analysis, environmental study, dating and discussion, incorporated in a final report, provided here.

2. Project design

The aims of the post-excavation stage were to:

- Recover any environmental evidence present in the soils
- Provide a securer chronological dating sequence for the site
- Compile a report for archiving
- Compile a report for publication
- Archive the paper and digital record.

3. Methods and Techniques

- Large scale Ordnance Survey maps have been studied for information on topography and previous field boundary layout.
- The previous written reports, site records and photographs were studied.
- Soil samples were sieved through 2000 and 500 micron screens.
- Charcoal samples derived from sieving were submitted for macrobotanical identification of wood charcoal and seeds etc.
- Charcoal samples were then selected and submitted for radiocarbon dating to provide confirmation of dating and to provide answers to queries about relative chronology of certain features encountered.
- Stone samples were submitted for petrological study to answer questions about rock types and the origins of the rock material as well as about the likelihood of natural state or human modification of some of the rocks.

- New illustrations were produced to provide a summary of the results to a standard suitable for publication, if required.

- Evidence of comparable sites in Wales and elsewhere in Britain and Ireland was studied as an aid to interpretation.

4. Topographic and Archaeological Background (Fig. 1)

The site is located at SH 469750, to the south-east of the market town of Llangefni. It lies at an altitude of about 20m OD on a low promontory of carboniferous sandstone, overlooking the eastern end of Malltraeth Marsh. The name Bryn Cefni, that of the former farm here, means the hill of (the river) Cefni. This river, canalised in the 18th century, together with the River Ceint, comprise the two main tributaries running into Malltraeth Marsh. This occupies a broad low valley between ridges of harder rock, trending approximately south-west to north-east across Anglesey, another of which forms the Menai Straits to the south-east. The west end of the Cefni valley is a tidal estuary and in fact the whole of the marsh area is filled with marine alluvium and was once tidal salt marsh, as shown on a map of North Wales of 1795 (John Evans, Map of North Wales), just prior to building of a tidal barrier, river canalisation and drainage between about 1795 to 1812 (Jones 1972).

The hill promontory of Bryn Cefni protrudes some way into the valley, providing a vantage point as well as being close to a former high point of navigation. It may also have been important for its proximity to the first crossing place of the valley (prior to drainage). The first post road crossed slightly further to the north over Penmynydd but there was an earlier route which seems to have crossed the Afon Ceint via Bryn Cefni, from the south-east (Fig. 1). This has been suggested to have been a medieval route, supported by the survival of a *rhyd* or ford name, belonging to a house *Rhyd-yr-arian* - 'Ford of silver' (or 'money') (Carr 1982, 27). This crossing point (and perhaps the proximity of navigation) was probably relevant to the siting of a medieval moated settlement, the only such known on Anglesey, at the south edge of the Bryn Cefni area – Llwyn Ednyfed, formerly called Tregarnedd (PRN 2727), built probably in the 14th century (Carr 1992). It would similarly have been significant for communications in prehistory. The medieval township here was also called Tregarnedd and it was an area of potential for settlement at all periods because the soil here, a brown earth, has been described as one of the most fertile on the island (Roberts 1958, 41-2). However, despite this, there are no records of finds objects or other evidence of early occupation apart from the large chambered cairn of possible Neolithic date, from which Tregarnedd took its name, but which was removed as part of agricultural improvements in 1822 (Lewis 1833).

5. Description of results

The features were identified during topsoil removal by machine adjacent to Building plot 9, and these were then investigated by hand cleaning and excavation. They comprised four areas of burning, features F1 to F4. which were all interpreted as part of one fairly widespread area of activity. The conditions of the watching brief meant that areas of machine removal of topsoil and subsoil were observed on an occasional visit basis, without full-time presence or control of excavation. The results therefore derive from different areas and depths of exposure. Manual excavation focussed on particular areas with sample excavation of more extensive features.

Feature 1 was identified in Trench A (Fig. 2). It was a spread of dark grey silty sand containing about 30% small round stones along with some charcoal. The stones were reddened and disintegrating, as a result of either prolonged burning or natural weathering (Appendix 1). The stone spread continued beyond the exposed area but was greater than 3.5m in diameter and about 0.3m deep above yellowish clay subsoil.

Features 2, 3 and 4 were identified in Trench B (Fig. 2) cut to make the car-parking area for Building plot 9. The features were first visible as another area of burnt deposits consisting of both burnt stone and reddened clay. Feature 2 was initially visible as a large area of burnt deposits (Plate 1), which were revealed to be the fill of a rectangular pit. The pit (context 11) measured 3.8 x 2.2m, and was 0.5m in depth, including its weathered sides. It was aligned north-east to south-west, with fairly gently sloping upper edges leading into a vertically sided inner cut of trapezoidal plan, measuring 2.65 x 1.2m. The inner cut was well defined with sharp corners, though its vertical sides had slumped inwards in places (Plate 3). At the north-eastern end of this inner cut was a shallow, semi-circular hollow (context 20) (Fig. 4).

Some slight erosion of the sides of the pit resulted in a sandy deposit (context 18) building up on the base of the north-western and north-eastern sides. This erosion probably occurred soon after the digging of the pit. A grey clay layer (context 17) was then deposited along the base of the pit. This may also have been an erosion deposit, but it contained quantities of charcoal, including a charred timber measuring 0.38 x 0.09m (SF 02). This deposit may, therefore, be related to the use of the pit. Context 17 extended over cut 20, and from this area were recovered some fragments of cattle teeth (SF 01).

Further erosion of the pit sides had then occurred with part of the south-western side breaking off as a single block and falling into the base of the pit. Backfilling of the pit then took place, probably this was done deliberately, but it is possible that spoil heaps from the digging of the pit naturally eroded back into it. Whatever the cause of the backfilling, the first material redeposited into the pit was a stony clay containing very little charcoal (context 14). On top of this was a very charcoal rich stony deposit (context 06) covered at the north-eastern end by another stony layer lacking in charcoal (09). Some of the stones, especially in 06, had been burnt, but most seem to have originated from the natural fluvio-glacial deposit (26), through which pit 11 was cut.

Adjacent to the pit's south-western end the surface of the natural clay had been oxidised to a red colour (context 07), indicating that a fire had been lit directly on the clay (Plate 2). The fire and the pit appeared to have been used together as part of the same function. The fire had been set directly on the natural clay subsoil (05), showing that there had been no top soil or plough soil present when feature 2 was in use. This may have been deliberately removed prior to the construction of the feature. Stony, charcoal rich deposits (contexts 06 and 10) extended over the site of the fire (07).

The upper part of the north side of the pit merged into a shallow linear hollow (28, Fig. 4) which continued northwards and was filled with identical material (9b) to the upper fill of the rectangular pit 11, i.e. a layer of silty brown clay with *c.* 30% burnt stones, but no charcoal.

Feature 3 was a shallow linear feature, about 0.70m wide and 0.15m deep, running north-west to south-east along the western edge of the stony deposit (26) to the south-east of feature 2 (Fig. 4). It contained wood charcoal and burnt stones. A sample of charcoal from its fill was identified and radiocarbon dated (see Discussion below).

Feature 4 was another shallow linear feature in the surface of 26, similar to feature 3, to the north-west of feature 2 (Fig. 4). It was *c.* 0.5m wide and 0.10m deep and also contained charcoal and burnt stones. A sample of charcoal was submitted for identification and radiocarbon dating, to provide a comparison with those from features 2 and 3.

6. Interpretation of the evidence

The initial interpretation was made difficult by the lack of artefactual material and dating evidence. One fairly well preserved cattle tooth was found in layer 17, which accumulated soon after the abandonment of Feature 2. Since teeth generally do not survive in ancient soils in north Wales this suggests that the activity represented by the pit might be some small-scale post-medieval activity (Kenney 2002). In respect to the finding of a rectangular pit in association with large quantities of burnt stone the activity bears closest resemblance to a 'burnt mound' a type of site regarded as a cooking site and most frequently found to be of Bronze Age date, although a few examples of Medieval date have also been found. They occur quite frequently in the landscape and are easily identified during watching briefs because of the size of the mounds and characteristic dark burnt stony fill. However, the mounds are simply the residue of an activity and it is the associated troughs or pits that are the location of activity, cooking or otherwise and these are less frequently identified and so much more valuable than the mounds. These type of sites are clearly significant prehistoric features but those excavated have generally been found to be devoid of artefacts. They do not, therefore, attract as much attention as is needed in terms of full excavation, which might allow better understanding. This has led to as yet unresolved debate about their function, ideas about which have ranged from association with metal working to cooking of large joints of meat, to use as saunas or bathing places, cloth fulling and preparation of basket making materials. Knowledge about them in Wales comes mainly through chance discovery and small scale partial excavation during ditching or pipe trenching. Several similar sites have however been more fully excavated in Ireland and England although no definitive evidence about function has yet been reached .

A proven prehistoric date for the feature at Bryn Cefni would make it of regional importance and make it desirable to produce an academic publication. The charred timber from feature 2 was found on its base (see above). It was identified as of hazel (Appendix 1 below) and was radiocarbon dated to 3050 +/- 70 BP (Beta-164490). This was a substantial sample and the date was considered quite reliable, placing it securely in the Middle Bronze Age, proving beyond doubt that this was prehistoric feature and justifying further analysis. It was agreed that this should be carried out according to the project design outlined above.

Petrological analysis (Appendix 1)

This was carried out on four bulk samples with the following aims:

a. **Context 6, Sample 1**: Upper fill of rectangular pit 11, Dark sandy silt with 40% stones and 5% charcoal.

Context 17, Sample 3: Basal fill of rectangular pit 11, Dark sandy clay with 20% stones and 10% charcoal.

Is all the stone burnt? Is it likely to be stone collected at random from the local till or of selected type?

b. **Context 9b, Sample 4**: Fill of linear feature 28, adjoining the north-west side of pit 11, possibly the same as context 26. Either a natural fluvio-glacial channel or a man-made gully. Mid brown silty clay with 30% small stones including rotting red sandstone.

Context 26, Sample 5: Interpreted as a possibly natural fluvio-glacial deposit. Mid-brown to dark grey gritty clay with 50% stones and manganese. Compacted and partly concreted.

Are these contexts actually natural? ie is the stone mainly unburnt? Are the stone types different from those in the fill of the rectangular pit 11?

The study showed that the stone in all the samples was of a similar nature, being angular /sub-angular fragments of coarse or fine-grained sandstone derived from local Carboniferous exposures and not from fluvio-glacial deposits and was not a specially selected type of stone.

The stone types in linear feature 28 and in the stony deposit 26 were the same as those in pit 11 so could not be regarded as just a natural deposit but were all likely to derive from human activity.

However, the study showed that similar red or dark staining exhibited by most stones could result from either burning or natural weathering, so it was not possible to conclusively say that all the material was 'burnt mound' stone.

Macrobotanical evidence (Appendix 2)

Five samples of charcoal were submitted for species identification. The aims were, first to assess the type of timbers being used, which might represent special selection and could be compared to those used on similar sites elsewhere. Secondly, whether the range of species differed between different contexts, which might indicate that they represented different periods or origins. Thirdly, to allow selection of material for radiocarbon dating, for which complete pieces of fast growing species are best, to eliminate bias from possible inclusion of residual material and of high-aged wood.

The samples were as follows:

Sample 03, context 17, basal fill of trough, pit 11.
Sample 07, context 12, fill of linear feature 4 (context 13).
Sample 08, context 10, fill of small hollow in hearth 7.
Sample 09, context 6, upper fill of trough, pit 11.
Sample 10, context 16, fill of linear feature 3 (context 15).

The charcoal derived from hand sorting and from sieving. To make the process manageable, about 30 pieces were identified from each sample, as available. Four of the samples were predominantly hazel, two of which also had some holly. Only one sample differed, that from linear feature 4, which had more ash than hazel.

However it is only the occurrence that can be used for interpretation since the individual quantities depend on insignificant factors of fragmentation. The occurrences, however, provide some tentative association between the upper and lower fills of pit 11, the fills of features 13 and 15 and the fill of the hearth 7 adjoining pit 11. There was also some holly and ash but surprisingly no oak. Oak is normally the preponderant species amongst charcoal from archaeological sites of all periods. The lack of oak and the presence of ash probably reflect the underlying geology of the area and the basic nature of the brown earth soils. Most evident is that both hazel and ash are good coppicing species and suggest the presence of areas of managed woodland and that the activity on site may have been long term or repeated rather than more temporary activity associated with hunting, as has sometimes been proposed. Also, if the process was repeated, timber would have been required in fair quantities and requires a minimum of 6 months drying to reduce its moisture content to a suitable level to produce efficient heat output.

Wet sieved samples from the upper and lower fills of pit 11 were also scanned for other possible macrobotanical evidence such as seeds but only fragments of wood charcoal were seen. It was also a possibility that if this was a meat-cooking site then burnt bone fragments from butchered joints might be present. However, there were none and this might prove significant. Three possible fragments of bone from residues of wet sieving of a soil sample from context 6 were found to be calcite concretions on closer study.

Radiocarbon dating (Appendix 3)

The first sample to be dated was that of the timber in pit 11. This produced a determination of 3050 +/- 70 BP (Beta-164490), calibrated at 2 sigma (2 standard deviations of statistical accuracy) to cal BC 1440 to 1100.

Three additional samples were then selected for dating to test the help confirm the date for pit 11 and to see if the features 3 and 4 were related to pit 11.

The three samples were as follows:

1. Hand-picked charcoal from the fill (context 12) of the shallow linear feature 4 (context 13). This was dated by AMS because of the sample was too small for conventional dating. This produced a determination of 3050 +/- 40 BP (Beta-168011), calibrated at 2 sigma to cal BC 1410 to 1200.

2. Hand-picked charcoal from the fill (context 16) of linear feature 3 (Context 15). This produced a determination of 3210 +/- 60 BP (Beta-168012), calibrated at 2 sigma to cal BC 1620 to 1390.

3. Wet-sieved charcoal from the basal fill (context 17) of pit 11. This produced a determination of 3000 +/- 70 BP (Beta-168013), calibrated at 2 sigma to cal BC 1410 to 1010.

The latter is the same context as that of the charred timber previously dated. As all the pieces but one were also similarly of hazel they may even be parts of the same timber, or from the same tree. The two determinations are so close as to be statistically identical, proving their validity. The date from linear feature 4 (context 13) is also so close as to be statistically identical. However, the date from feature 15 is somewhat different and suggests that the activity may have taken place here over an extended period of perhaps two centuries, or have been re-used within that period.

7. Summary and conclusions

Pit 11 was a timber-lined trough, open to the north, uphill side. It lies on the side of what was originally a slight natural gully prior to post-medieval farming improvements and recent landscaping. The gully must have held a small stream, probably originating from where there is a well (Fig. 3). The trough appears to have been carefully positioned so that it could take water out of this gully by means of a shallow leat, feature 4 (context 13), while feature 3 (context 15) provided the equivalent drain on the downhill side. At the west side of the trough was a hearth on which stones would have been heated to be placed in the trough to heat the water in it. The efficacy of this process has been well demonstrated by experiment (O'Kelly 1954, 120-2). After repeated use the heated stones became fragmented and were discarded nearby. The features can be compared to Bronze Age burnt mounds found fairly widely in Britain and Ireland. The burnt mound itself here was well spread and of indefinite shape, compared to the most usual form of a crescentic shape around the trough but this can be explained by the effects of post-medieval ploughing and possibly deliberate levelling. The shape and size of the trough can be clearly paralleled with better preserved examples where timbers still survive, such as those of

Killeens 1, Co. Cork, Ireland (ibid, 128-32) and Willington, Derbyshire, England (ULAS 1999). The rounded extension (context 20) at the north-east end of the trough at Bryn Cefni can also be paralleled in similar features for example at Killeens 1, where a short length of oak plank lay in such an extension and was interpreted as a 'kneeler' for access to the trough (O Kelly 1954, 129). The outline of the side slots in the north side of the Bryn Cefni trough (Fig. 4) also shows that the timber end planks were tenon jointed into the longer side planks as at Killeens 1, where the actual timbers were preserved.

Burnt mounds are relatively numerous monuments in the landscape with about 100 known in north Wales as a whole. Most of them are found in the marginal areas of the uplands with only nine known on Anglesey. However, the lack of known sites in the lowlands may be simply a result of poor survival in an intensively cleared and farmed agricultural landscape. For instance, over 300 have been recorded in the undulating lowlands of south and south-west Wales (Williams *et al* 1987, 240). In north Wales, recent survey and excavation in advance of the A55 road scheme in Anglesey has identified six more burnt mounds and two others have been identified during pipeline schemes. These results have been summarised by Davidson (1998). Similar examples have been found in many parts of Britain, from the Orkneys to the Midlands and Norfolk in England as well as in Ireland although they are not found in some regions. This may be simply because of the absence of suitable stones in those areas or because cooking or water heating techniques varied. For instance, fire-cracked flint 'potboilers' are common finds on prehistoric settlements in flint rich areas of southern England.

The function of the troughs is still unproven but the heating of water is certain and cooking of large joints of meat has been shown to be effective by experiment and remains the most likely use (O'Kelly 1954, 122 and James 1986, 260-2), although this has still to be properly proven. The lack of animal bone debris from excavated sites has been noted as an argument against the cooking hypothesis (Barfield and Hodder 1987) but at the burnt mound site of Fahee South, County Clare, Ireland, deer, cattle and horse teeth and bones were found, some with butchery marks (O Drisceoil 1988, 675-7). Burnt bone fragments were specifically searched for during sieving of soil samples from Bryn Cefni but none were found. It has however been pointed out that the particular nature of the content of burnt mounds – their loose, porous nature and the chemical nature of the decaying stone – may make conditions where bone would not survive (ibid, 675). Documentary evidence from medieval texts has also been shown to suggest that both cooking and bathing may have taken place at burnt mounds (ibid, 673-4). The apparent length of some examples of troughs seems greater than would be necessary just for cooking. The size of troughs is somewhat variable but most commonly they are between 1.5 to 2.0m in length and 1.0 to 1.4m in width. Their depth is also quite similar in all cases, between 0.4 to 0.8m. The trapezoidal shape, as at Bryn Cefni seems typical although there are square and even circular examples.

Experimental studies have not only shown the efficiency of heating water in troughs but demonstrated how much hot stone was required. This allows some estimates of the amount of activity represented by burnt mounds, that is how many individual heatings could have been carried out. The estimates have varied widely, partly because a portion of the content of burnt mounds may be ash rather than stone. It was estimated that one dump at Carne, Fishguard, south-west Wales could have been produced by only 7 to 21 uses of the trough (James 1986, 262), implying probably quite short-term activity. More recent estimates, however (North Munster Discovery Programme 2002) based on studies of four mounds has suggest the number of individual usages to be between 100 to over 400, representing permanent or frequently re-used settlement. The extensive spread of burnt stone around Bryn Cefni would support the latter interpretation.

Burnt mounds have previously received insufficient attention because of their simple nature and lack of artefacts . However, more recent discoveries of well preserved examples, like one preserved in peat, along with bone evidence at Willington, Derbyshire (ULAS 1999) will be subject to the full range of scientific study, and should allow reliable interpretation. The gradual accumulation of radiocarbon dates for burnt mounds shows that many were in use in the late 2nd to early 1st millennium BC, providing the largest body of archaeological evidence for this period, one where settlement remains are generally few or absent. In some cases burnt mounds lie close to and very probably in association with undated settlement remains and excavation is needed to demonstrate their relationship. Understanding the burnt mounds and troughs themselves requires new approaches through scientific analysis. Identification of rocks is useful, as particular types of rock are needed to allow heating without shattering. Chemical analysis of deposits is also needed. For instance, cooking experiments in burnt mound troughs show that boiling of meat creates much fatty deposits. These might produce residues on discarded stones that could be identified just as food residues are now being identified on Bronze Age pottery. Samples of the Bryn Cefni stone have been retained for possible future analysis. Despite the levelling of the burnt mound at Bryn Cefni, the good survival of the trough itself is important. It is one of the best preserved examples of such a trough in north Wales, where burnt mound material is often identified

during fieldwork or watching briefs, but finer details of structure are often not revealed. In a wider sense, too, the discovery of the trough is significant, in that it shows that such features may survive when the burnt mounds themselves do not and similar isolated features may then be recognised in other contexts and their implications understood.

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APPENDIX 1

PETROLOGICAL STUDY

By Dr D. Jenkins, University of Wales Bangor

Comments on stone samples from Bryn Cefni Burnt Mound, Llangefni, Anglesey

Four composite samples , supplied by George Smith, GAT, have been examined and the following noted:

Context 9b Sample 4 (Fill of 28) comprises:
(a) 7 angular/subangular fragments of a massive, well sorted uniform coarse (1-5 mm) quartzose sandstone with white vein quartz and some lithic clasts, and showing patchy red, brown and grey-black stains
(b) 5 angular grained fragments of a massive, well sorted, fine grained (<1mm) light brownish grey (10YR6-7/2) sandstone with patchy colouration as above

Context 17 Sample 3 – similar lithology to Sample 4a/b above

Context 6 Sample 1 – gravel fraction + individual quartz clasts (as in sample 4 above)

Context 26 Sample 5 – similar lithology to sample 4a/b above

Comments:

The rock fragments are consistent with derivation from local exposures of Carboniferous basal sandstones (*e.g.* Greenly 1919 p.601), the angular shape implying very limited transport, if any, and any sub-rounding corresponding to disaggregation of weathered surfaces/edges rather than abrasion through transport..

Fractured stones sometimes show red/dark red (10R3-4/6), dark greyish brown (10YR4/4) and dark grey/black (10YR3-2/1) stains. The dark grey pigmentation tests positive for a manganese dioxide (with H_2O_2) and is indicative of oxidative weathering. Many of the finer grained clasts show a sub-surface colour profile with a pale (1-2mm) zone overlying a dark brown zone (2-3mm) fading inwards: this is characteristic of weathering in an acidic environment. Some stones also show a distinctive dark brown speckled mottling (*ca.* 2mm diameter) common in these rocks and presumed to derive from oxidation of disseminated pyrite grains.

The red stain on the stone fragments implies the presence of anhydrous ferric oxides, probably haematite αFe_2O_3; this might develop through dehydration of common hydrated forms in weathering products (*e.g.* goethite $\gamma FeOOH$) through heat treatment (*e.g.* a fire) but it may also sometimes be seen to occur naturally upon oxidation of pyrite (FeS_2) contained in sandstones. In these samples the red pigmentation may either be a surface effect (*ca.* 2mm deep) or extend right through the coarser samples with a speckled effect as described above. Both are consistent with effects of fire (*i.e.* a "burnt mound") but the possibility of them being an inherited weathering feature would need to be eliminated.

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APPENDIX 2

CHARCOAL IDENTIFICATION

by P. Denne, University of Wales Bangor

a. Sample identified in January 2002

Sample 06 (Context 17, SF no. 02) 25 fragments of wood were examined. All 25 were identified as *Corylus* spp (Hazel). (This was the timber plank, on which the radiocarbon determination Beta- 164490 was obtained).

b. Samples identified in May 2002

The identification was made difficult because of the very soft and crumbly nature of much of the charcoal, no doubt related to the site conditions.

Sample ID	hazel	holly	ash	total	comments
03, Context 17	38	1	0	39	Plus several pieces to soft and crumbly for ID
07, Context 12	8	0	10	18	Very fragile and distorted, some soil and small stones
08, Context 10	8 pieces probably hazel	0	0	8	Very fragile and distorted. Plus other pieces to fragmented for ID
09, Context 6	22	2	0	24	Some pieces very soft, others dry and splintery
10, Context 16	30	0	0	30	Very fragile

In addition wet sieved samples from two contexts were looked at for other possible macrobotanical remains, such as seeds. These were:

Sample 01, Context 6, residue from 2mm mesh and 500micron mesh
Sample 03, Context 17, residue from 2mm mesh and 500 micron mesh

No plant remains could be seen except more small pieces of charcoal, which appeared to be the same as those already identified.

This is the first group of charcoal samples from a North Wales site studied here where no oak at all has been found. More usually there is a high proportion of oak with hazel and holly in minor proportion. This may be because the site is in a limestone area and could explain the presence of ash rather than oak. However, it is possible that, for whatever purpose the trough was being used, hazel, holly and ash were selected specifically in preference to oak.

APPENDIX 3

RADIOCARBON REPORTS AND CALIBRATIONS

BETA ANALYTIC INC.
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UNIVERSITY BRANCH
4985 S.W. 74 COURT
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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Jane Kenney

Report Date: 2/8/02

Gwynedd Archaeological Trust

Material Received: 1/29/02

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 164490	3050 +/- 70 BP	-25.0* o/oo	3050 +/- 70* BP

SAMPLE : G1723/17/06
ANALYSIS : Radiometric-Advance delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal BC 1440 to 1100 (Cal BP 3390 to 3050)

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950A.D.). By International convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards.

Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-164490**

Conventional radiocarbon age[1]: **3050±70 BP**

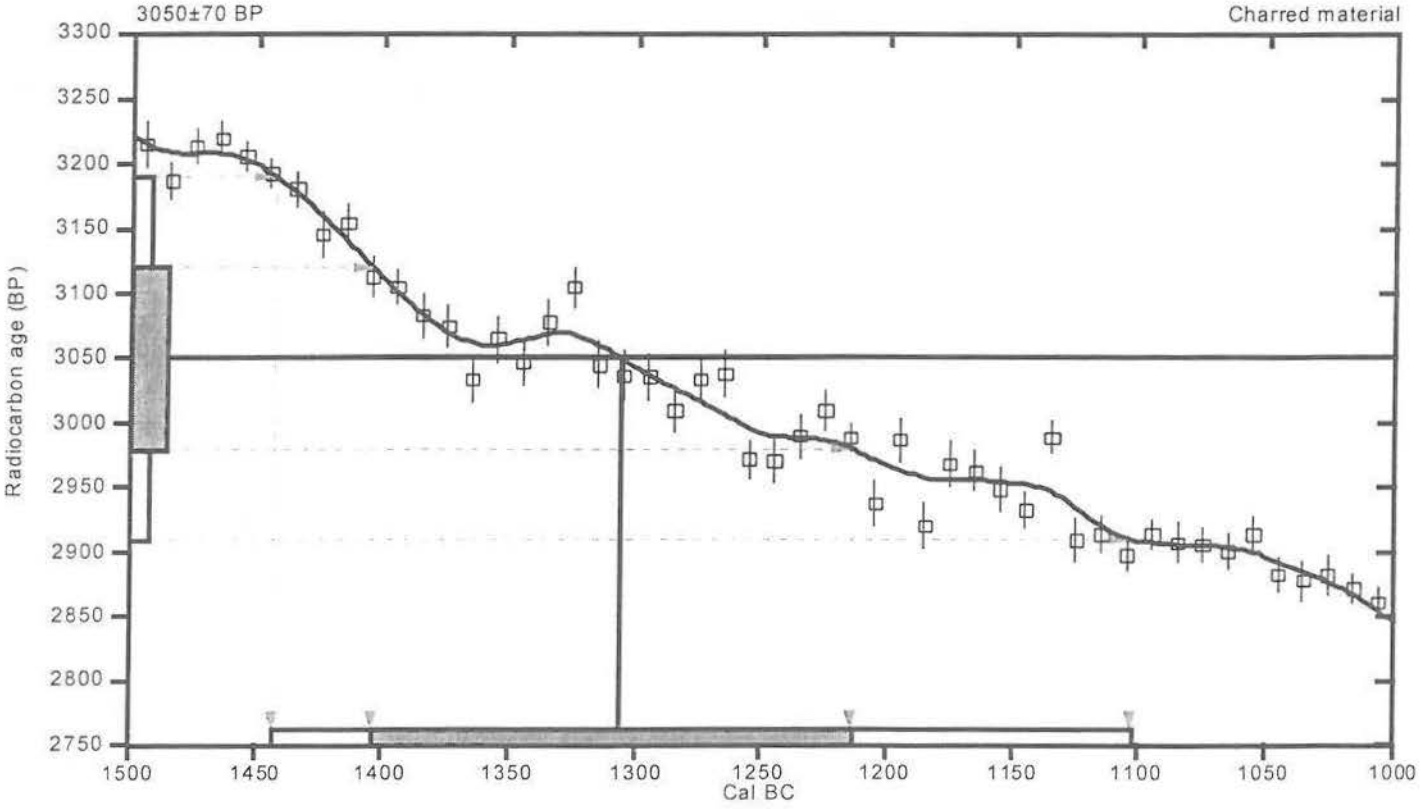
2 Sigma calibrated result: (95% probability) **Cal BC 1440 to 1100 (Cal BP 3390 to 3050)**

[1] *C13/C12 ratio estimated*

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 1310 (Cal BP 3260)

1 Sigma calibrated result: (68% probability) Cal BC 1400 to 1210 (Cal BP 3350 to 3160)



References:

Database used

Calibration Database
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INTCAL98 Radiocarbon Age Calibration
Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083
Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Jane Kenney

Report Date: 7/8/02

Gwynedd Archaeological Trust

Material Received: 6/10/02

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 168011	3060 +/- 40 BP	-25.7 o/oo	3050 +/- 40 BP
SAMPLE : G1723 CONTEXT 12 SAMPLE 7			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 1410 to 1200 (Cal BP 3360 to 3150)			
Beta - 168012	3210 +/- 60 BP	-25.0* o/oo	3210 +/- 60* BP
SAMPLE : G1723 CONTEXT 16 SAMPLE 10			
ANALYSIS : Radiometric-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 1620 to 1390 (Cal BP 3570 to 3340)			
Beta - 168013	3000 +/- 70 BP	-25.0* o/oo	3000 +/- 70* BP
SAMPLE : G1723 17 03			
ANALYSIS : Radiometric-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 1410 to 1010 (Cal BP 3360 to 2960)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950A.D.). By International convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards.

Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.7:lab. mult=1)

Laboratory number: **Beta-168011**

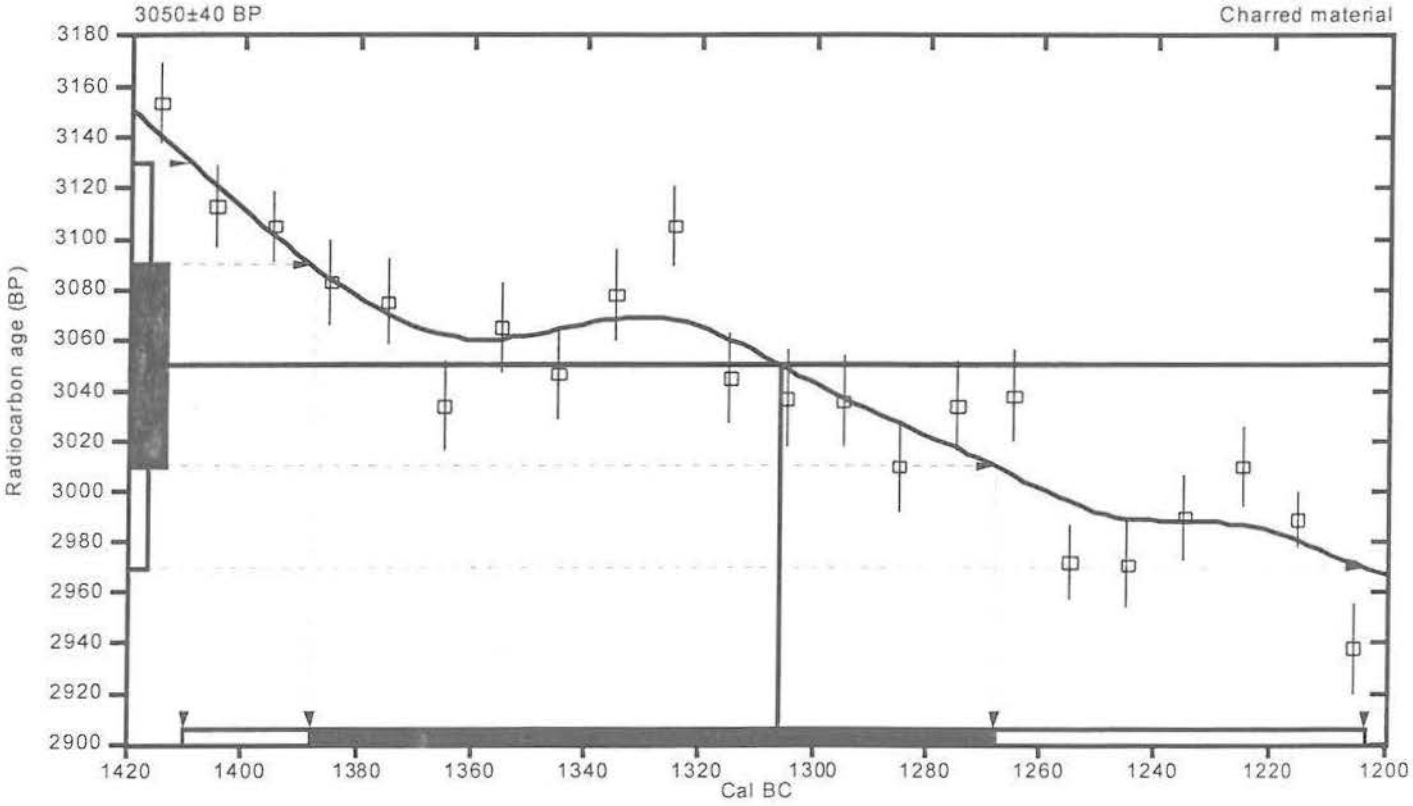
Conventional radiocarbon age: **3050±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 1410 to 1200 (Cal BP 3360 to 3150)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 1310 (Cal BP 3260)

1 Sigma calibrated result: (68% probability) Cal BC 1390 to 1270 (Cal BP 3340 to 3220)



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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-168012**

Conventional radiocarbon age[1]: **3210±60 BP**

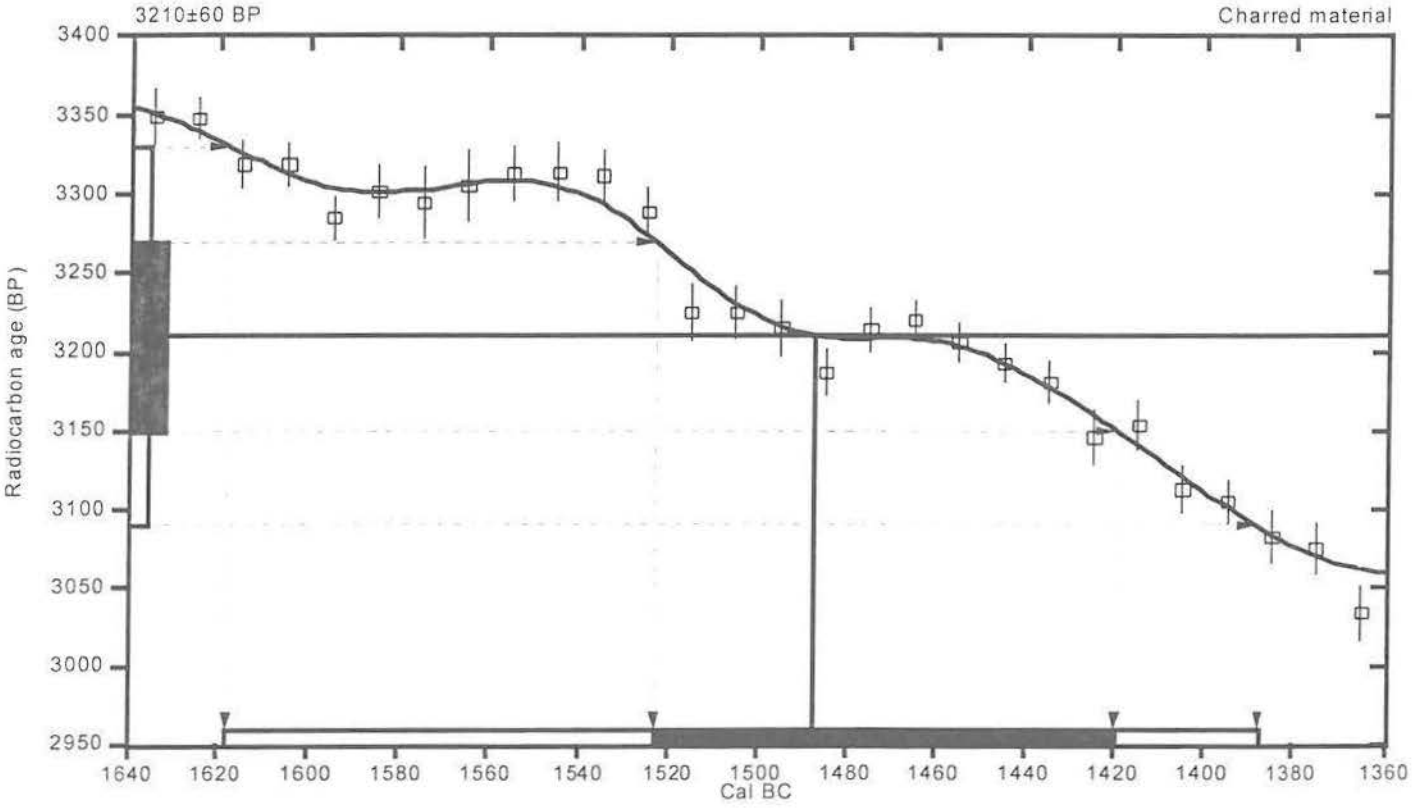
2 Sigma calibrated result: (95% probability) **Cal BC 1620 to 1390 (Cal BP 3570 to 3340)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 1490 (Cal BP 3440)

1 Sigma calibrated result: (68% probability) Cal BC 1520 to 1420 (Cal BP 3470 to 3370)



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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-168013**

Conventional radiocarbon age[1]: **3000±70 BP**

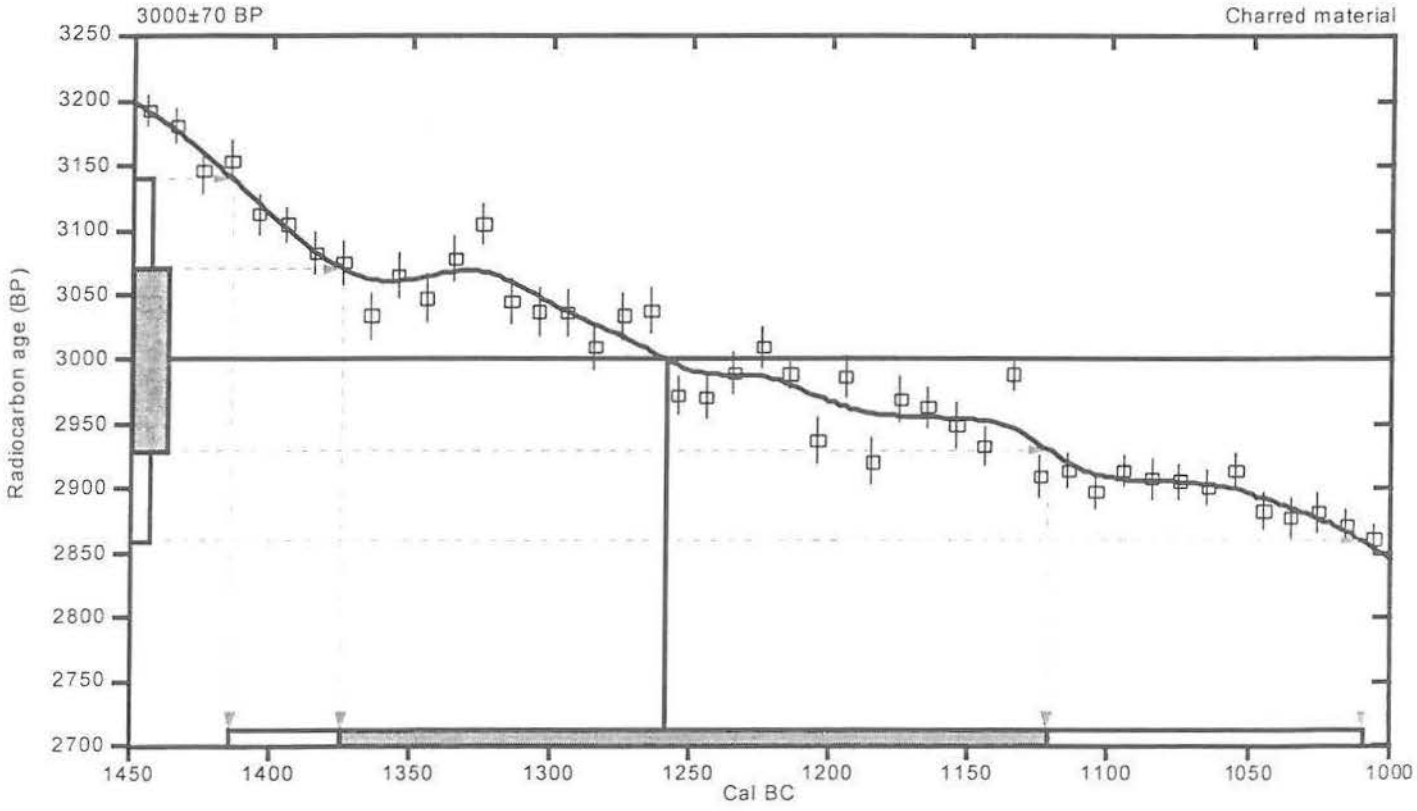
2 Sigma calibrated result: (95% probability) **Cal BC 1410 to 1010 (Cal BP 3360 to 2960)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 1260 (Cal BP 3210)

1 Sigma calibrated result: (68% probability) Cal BC 1380 to 1120 (Cal BP 3320 to 3070)



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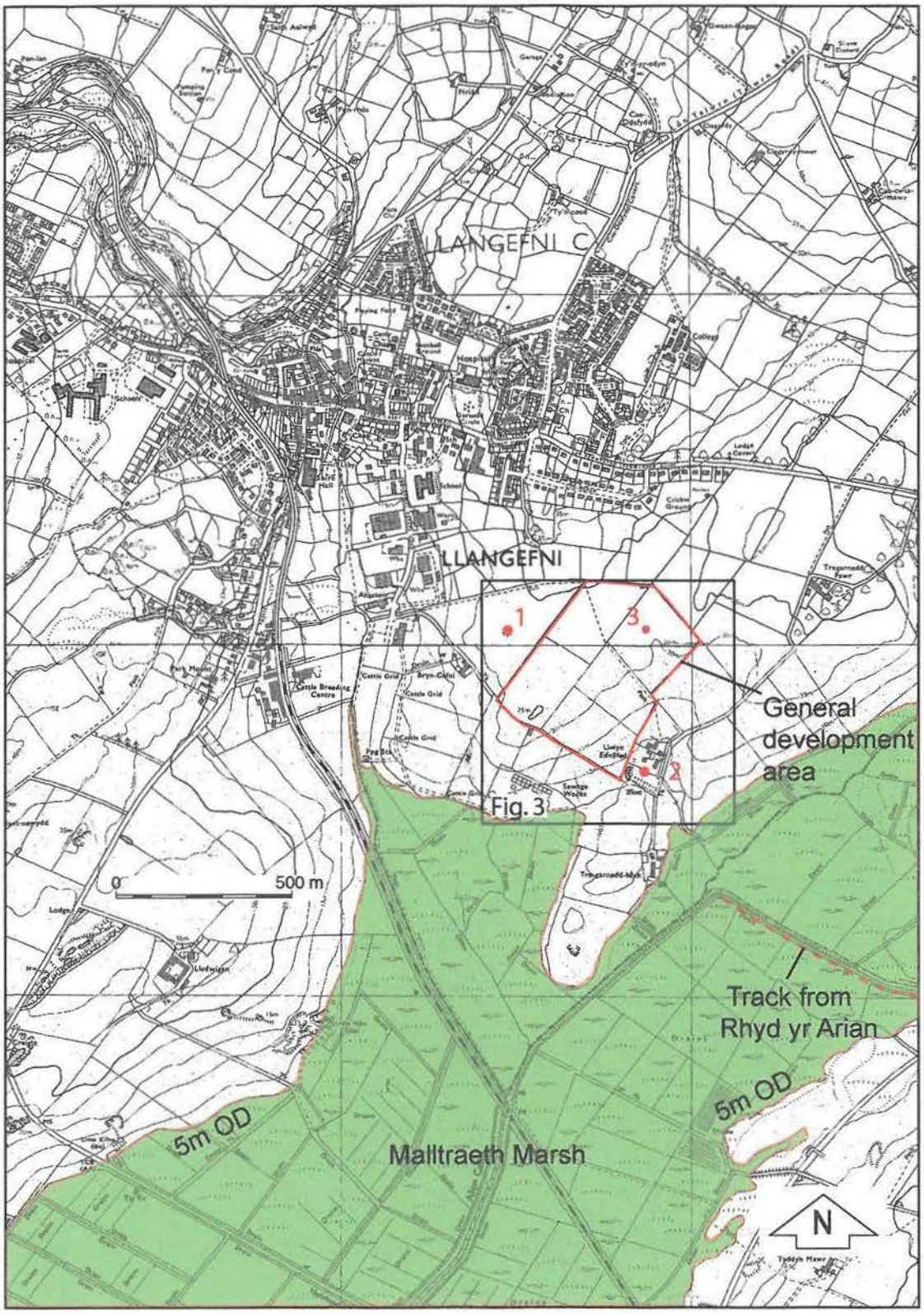

Figure 1 Bryn Cefni: Site location.
1: Suggested site of chambered tomb.
2: Medieval moated site. 3: Burnt mound site.

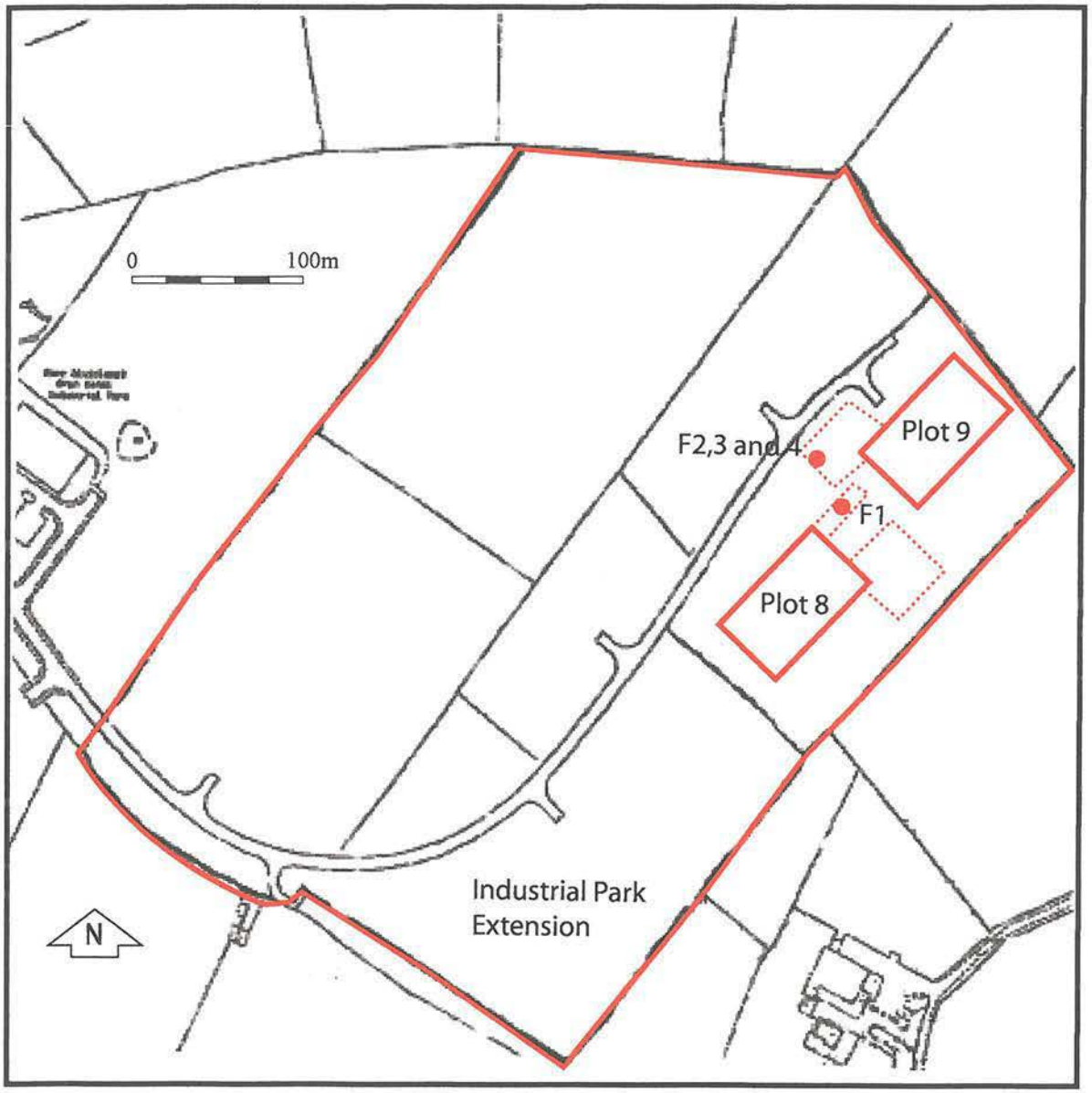

Fig. 2 Bryn Cefni: Location of excavated features within the area of the industrial park

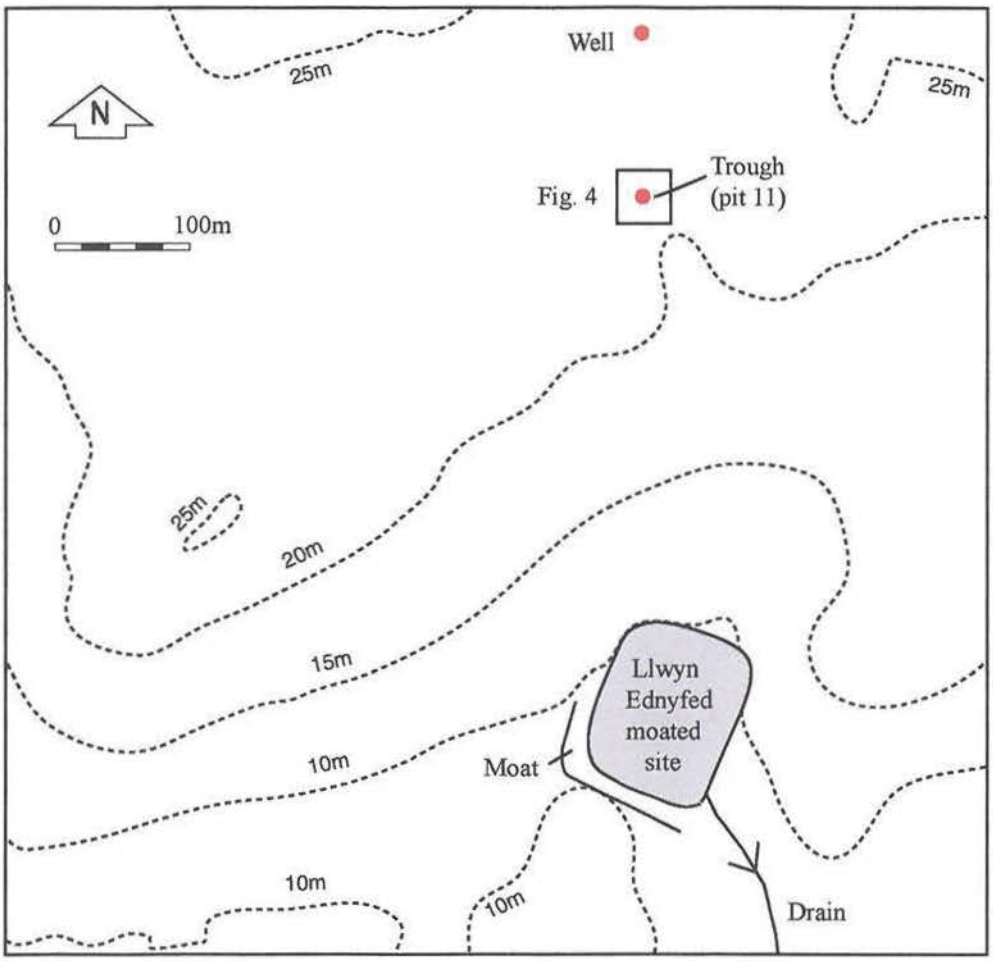

Fig. 3 Bryn Cefni: Topographic location of trough (pit 11) and burnt mound

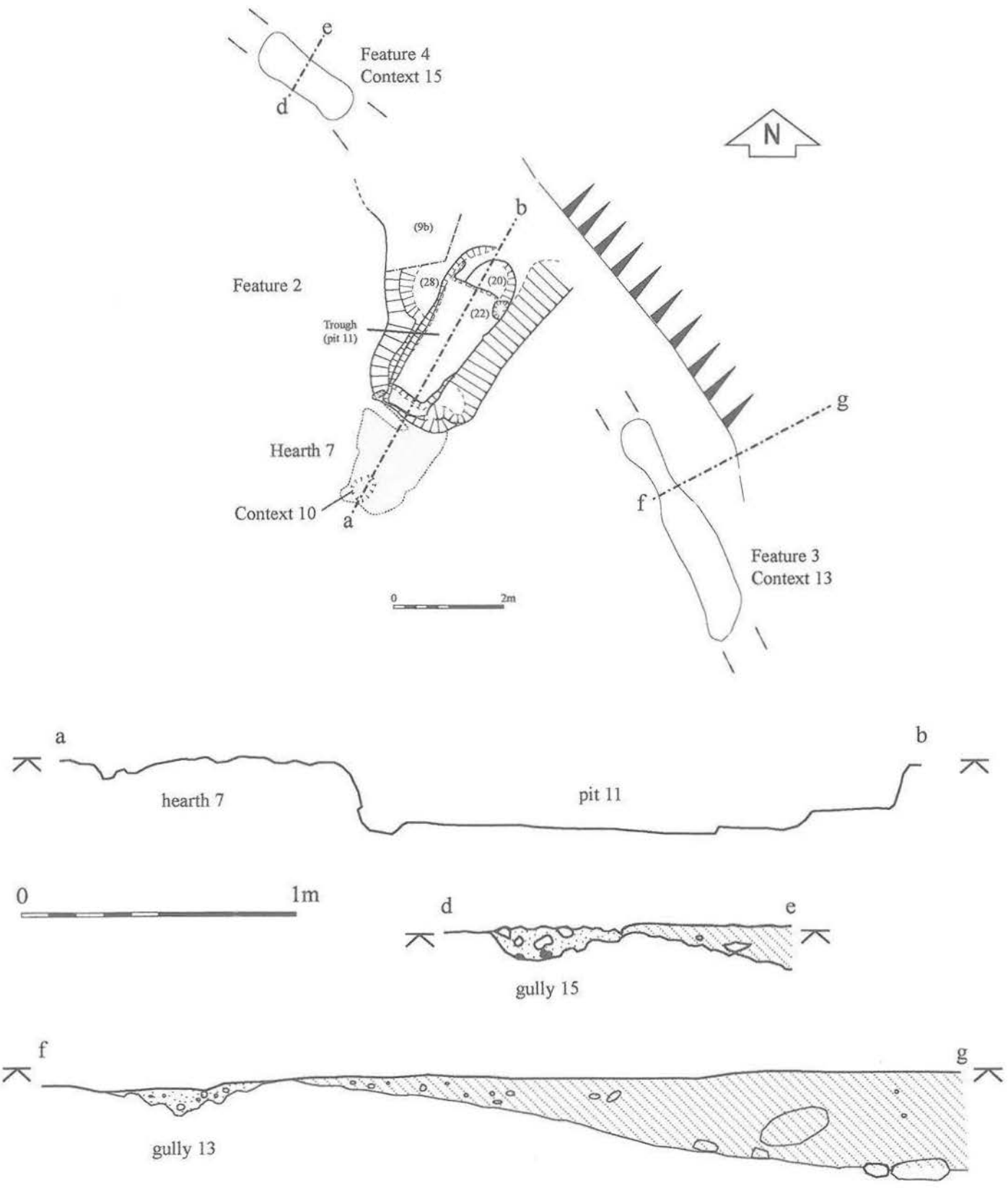

Fig. 4 Bryn Cefni: Plan and sections of trough (pit 11), hearth 7 and gullies 13 and 15

Plate 1 Bryn Cefni: Feature 2 after initial claening

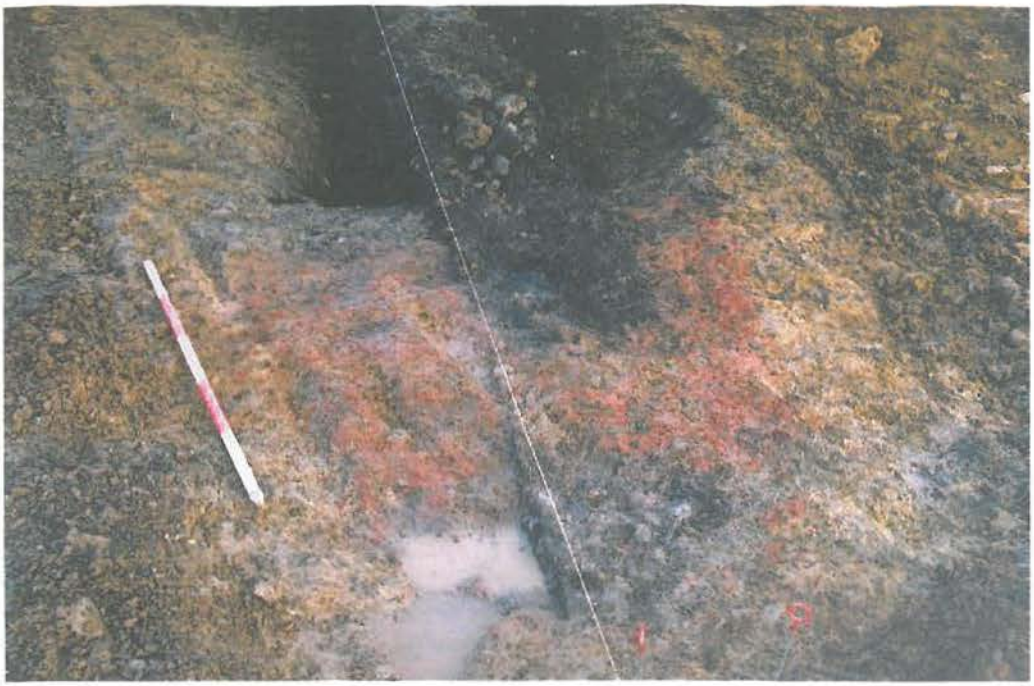

Plate 2 Bryn Cefni: The hearth, 7

Plate 3 Bryn Cefni: Pit 11 fully excavated, from the east