

Pwllheli to Blaenau Ffestiniog Gas Pipeline

**Archaeological excavations carried out by
Gwynedd Archaeological Trust
for
Wales & West Utilities**



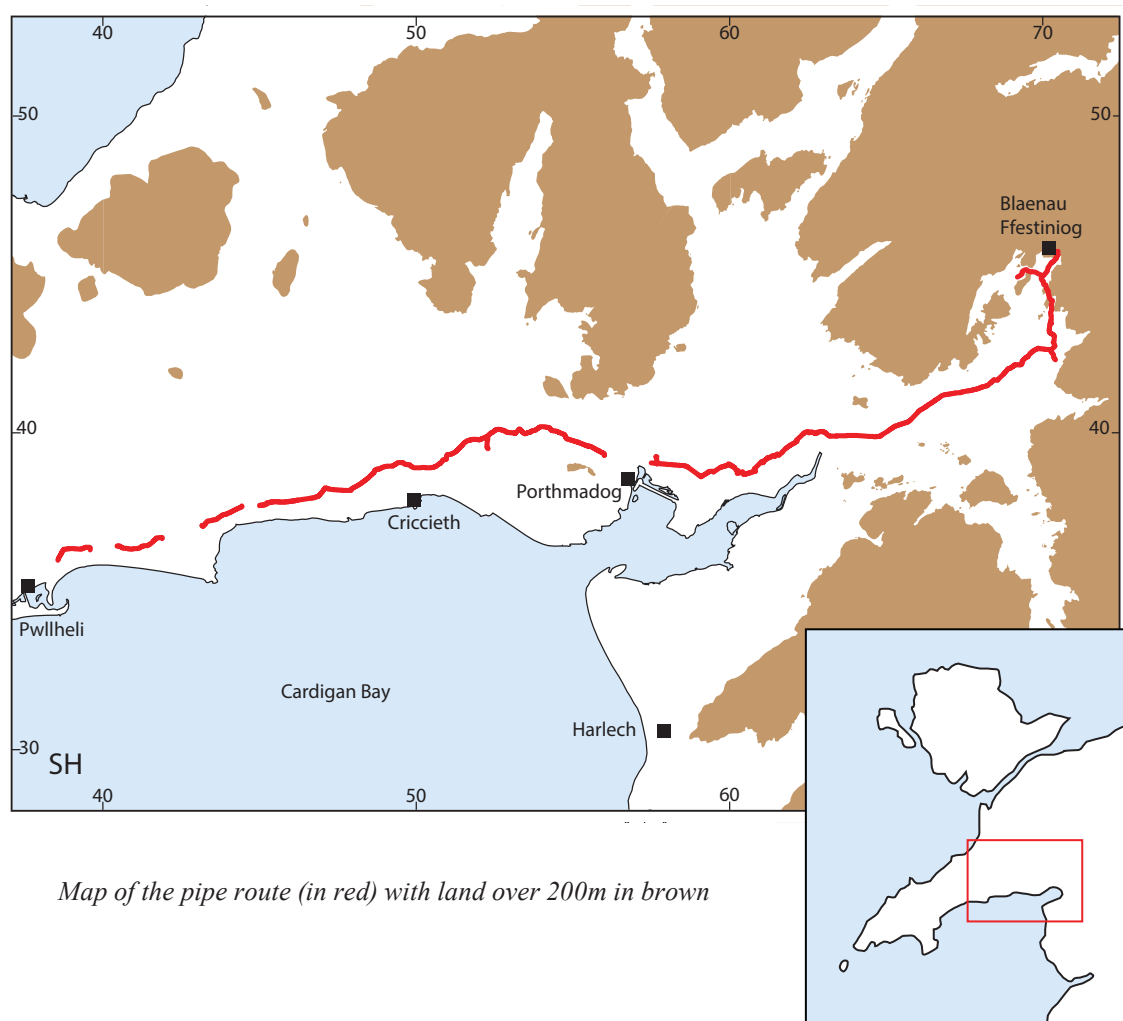
Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Introduction

In 2011 Wales & West Utilities replaced a major gas pipeline from Pwllheli to Blaenau Ffestiniog, Gwynedd, North Wales. As well as being an engineering project Wales & West Utilities had to mitigate any potential damage to archaeological sites along the route so it also became a significant archaeological project, with Gwynedd Archaeological Trust commissioned to carry out the archaeological work. The project revealed several burnt mounds dating from the late Neolithic to the early medieval periods. Other discoveries included a Bronze Age cremation burial; Iron Age pits, and an Iron Age shell midden; a medieval corn drier, a smithing site and a possible medieval causeway.

The western end of the route ran along the gently undulating land on the southern side of the Llŷn Peninsula. Then the route ran inland to the head of the western branch of Traeth Mawr, which was formerly the tidal estuary of the Afon Glaslyn. The mouth of this estuary was blocked in 1813 by an embankment, known as the Cob, so that the land behind the barrier could be drained and claimed for agriculture.

After the town of Porthmadog the pipe route crossed the Afon Glaslyn and over the spur of land on which Penrhyndeudraeth was built. The route descended on to the flood plain of the Afon Dwyryd and followed the flat, reclaimed farmland up the river valley past Maentwrog. Where the valley narrows to that of a mountain stream the pipe route headed north across quite steeply undulating upland country to Blaenau Ffestiniog, set in the heart of the mountains of Snowdonia.



Map of the pipe route (in red) with land over 200m in brown

Methodology

During the works GAT archaeologists monitored topsoil stripping along the pipeline easement, and the excavation of the pipe trench. Any potential archaeological features or deposits were identified and evaluated. Where these were significant they were fully excavated and recorded. Recording included photographs, scaled plans and detailed notes.

*Monitoring
topsoil
stripping*



*Initial
investigation
of potential
archaeology*



*Excavation
and
recording*



Once the fieldwork was completed the site records and finds were studied and a report written. The post-excavation study included analysis of charred plant remains, wood, stone artefacts and obtaining radiocarbon dates.



*Worked wood from
a burnt mound near
Pentrefelin*

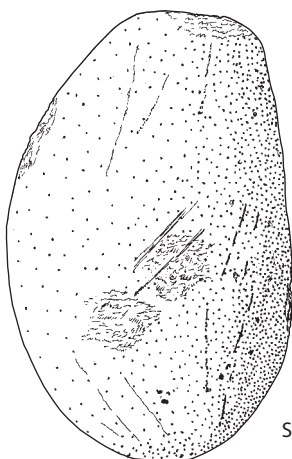
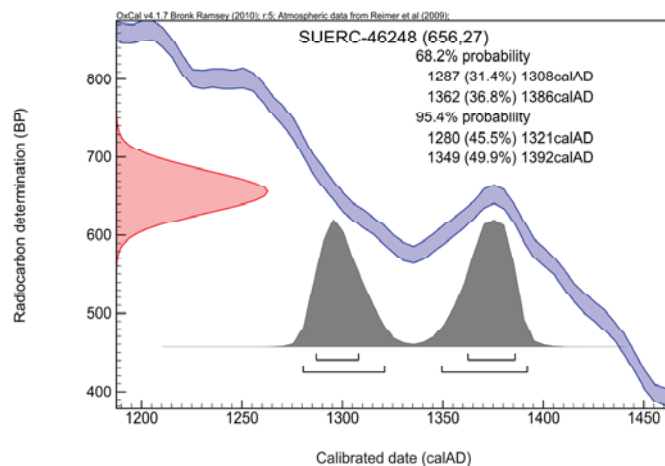
A full report has been produced with detailed descriptions and specialist reports and this is available for consultation at the Gwynedd Historic Environment Record and can be downloaded from the GAT website (www.heneb.co.uk).

The finds are held at Gwynedd Art Gallery and Museum, Bangor, and the digital and paper records are held by the Royal Commission on the Ancient and Historic Monuments of Wales, Aberystwyth.



*Two of the very few
worked flints found*

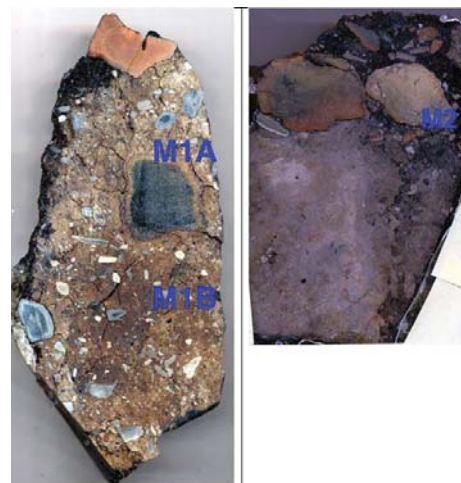
*Graph
showing the
calibration of
a radiocarbon
date*



0 50mm

Drawing of a utilized pebble

*Soil
micromorphology
samples*



Burnt Mounds

Burnt mounds are heaps of burnt, heat-cracked stone associated with pits for holding water. These sites are very common in north Wales but few were excavated in detail here before the present century. Excavation elsewhere has shown that they were used to heat large quantities of water by dropping hot stones into a pit of water. The reasons for heating water in this way are not known, though suggested uses for the hot water pits include cooking, bathing, saunas, dying, fulling and beer making.



Few burnt mounds were previously known from the Llŷn Peninsula because they have been levelled by ploughing and can only be found by excavation. This project found 11 burnt mounds or possible mounds, several concentrated around Pentrefelin.

The mounds are often assumed to be Bronze Age in date (2000-800 BC), but as finds are rare from these sites radiocarbon dates are needed. As more sites are dated it has become clear that they were used over a very long period.

An extensive dating programme was carried out on the mounds found in this project and it was discovered that many dated from

the end of the Neolithic period, about 2500 BC. One was used in the mid Bronze Age in about 1550 BC, but most surprisingly one site near Pentrefelin, was dated to the 7th century AD. Early medieval/Dark Age burnt mounds are very rare (or rarely sufficiently well-dated to be identified) and this is a remarkable piece of evidence that indicates the tradition continued for millennia.

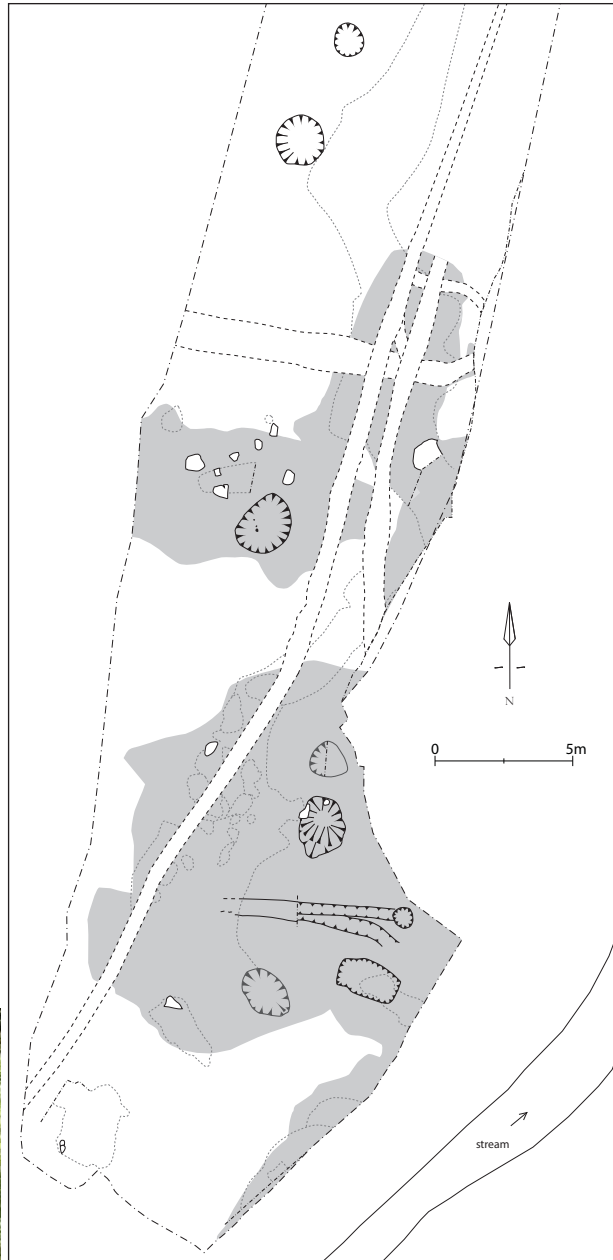
A burnt mound exposed near Pentrefelin (right) with the pit that was excavated beneath it (above). This site dated to the 7th century AD but looks just like the late Neolithic and Bronze Age mounds



Next to Pentrefelin was a large area covered with burnt stones. Under this were several pits. Most were simple rounded pits dug into the clay, but one was a rectangular trough that may have been lined with wood. All the pits are thought to have held water that was heated as hot stones were added. Two shallow gullies may have carried water over the site. Like many burnt mounds this site lay next to a stream where water could have been obtained.

The wood used to fuel the site was collected nearby and included alder that seems to have been left to season to help it burn better.

This site was used in the late Neolithic, from before 2500 BC, through to the early Bronze Age, until about 1900 BC. It would probably have been used in short episodes, each related to digging and using a pit. The site seems to have been abandoned for centuries then used again around 900 BC when the rectangular trough was used.



Ancient Arts

David Chapman of Ancient Arts reconstructing how beer might have been made in a burnt mound trough

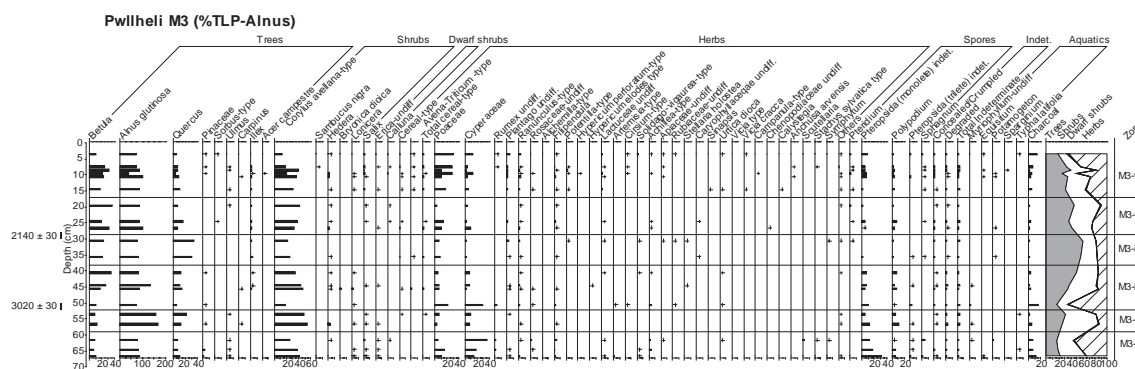
Site near Pentrefelin repeatedly used for burnt mounds. The grey represents the burnt mound spreads, which overlay natural channels (grey dashed lines); drains (black dashed lines) ran through the site.

It is not yet clear what the burnt mounds were used for. Certainly a lot of water must have been heated and probably kept boiling for some time. One suggestion is that food was cooked in the pits, but there is rarely any bone or other rubbish left on the sites. Bathing, washing clothes or fulling cloth have all been suggested but it is likely that the water was not very clean. Beer making has been a recent suggestion and this has been tested by experimental archaeologists.

Pollen Analysis

A column of peat was taken from a marsh next to the large burnt mound at Pentrefelin. Pollen grains are preserved in peat and can show what the vegetation was like in the past. By studying the species found in different layers of the peat it is possible to see how the vegetation changed over time. The pollen grains of each species are counted and presented in a pollen diagram (below).

Pollen diagram from Pentrefelin



The earliest part of the record probably dated to the late Neolithic when the burnt mound was being used and this showed a largely wooded landscape, with alder carr woodland along the adjacent stream, and a mixed deciduous woodland growing over the wider area. Over the next millennium there were occasional episodes of woodland clearance. These clearances were not large; some were for fields where cereals were grown and some were for pasture. The woodland grew back after each of these short episodes.

By the Iron Age the woodland clearance became more extensive and permanent and cereals were being grown in fields in the area. From this time the landscape was dominated by grassland and arable fields rather than woodland and the presence of heather pollen shows that moorland was also expanding.

The uppermost part of the pollen diagram showed further expansion of grassland and heath, until woodland was only present in isolated stands, hedgerows and along streams, and the landscape was much as it is today. Some pine pollen represents the introduction of foreign trees in plantations from the 18th century onwards.



*Pollen grains seen under the microscope
(from the left: lime, alder, hazel, grass)
(Department of Geography, Royal
Holloway College)*

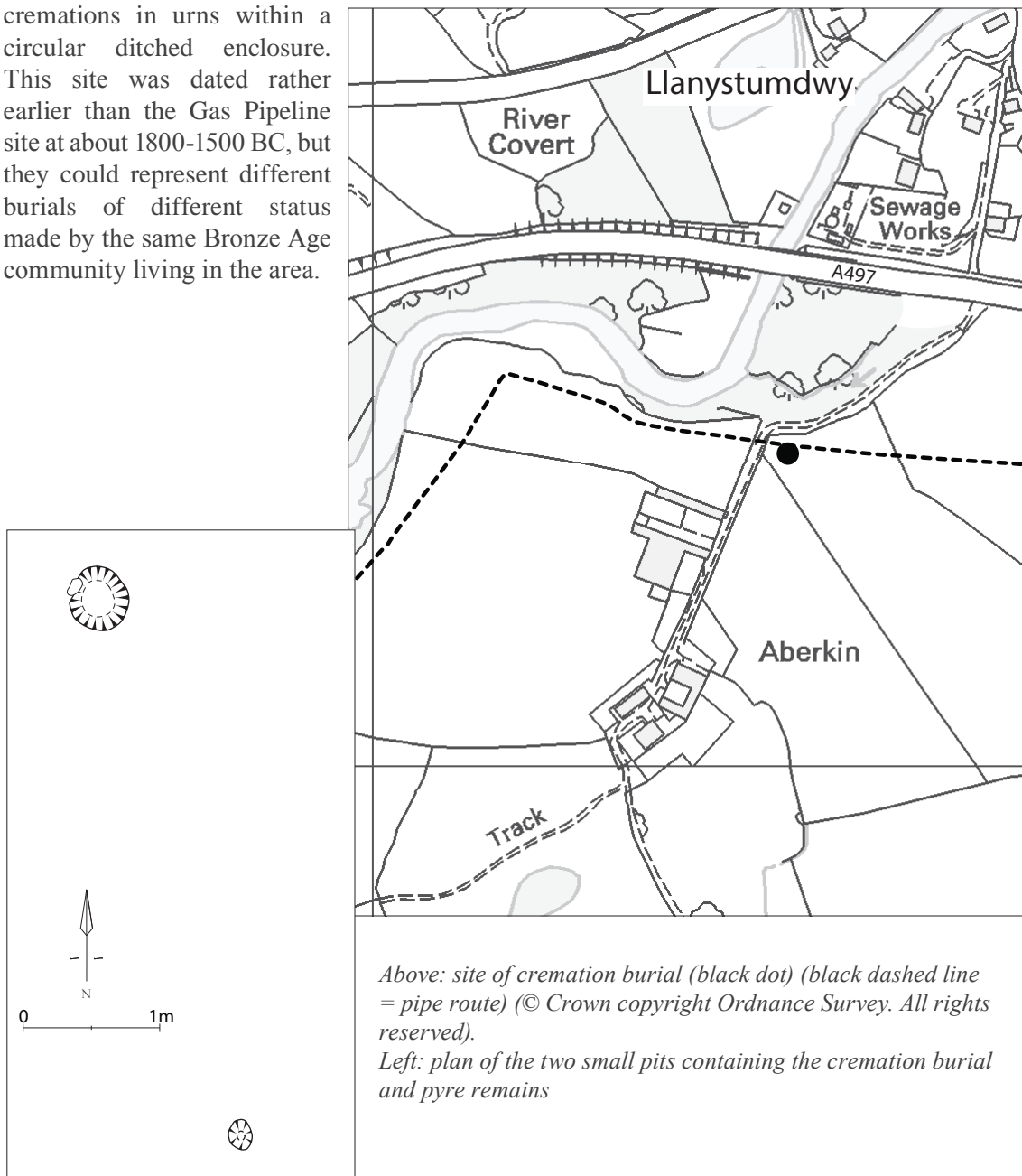
Bronze Age Cremation Burial

Two small pits were identified in a field south of Llanystumdwy. These contained fragments of burnt bone that proved to be human. These were the very fragmentary remains of an adult who had been cremated. One pit with most bone seems to have been the remains of the cremation and the other pit held some fragments from the pyre that the body was burnt on.

The charcoal recovered showed that only oak, mostly from heartwood, was used to fuel the pyre. Radiocarbon dates from the burnt bone showed that the cremation was middle Bronze Age (about 1500-1400 BC). Most burials of this period are in pottery urns or stone-lined graves known as cists, but there was no sign that these had been used on this site, nor that the burial had ever been marked with a mound.

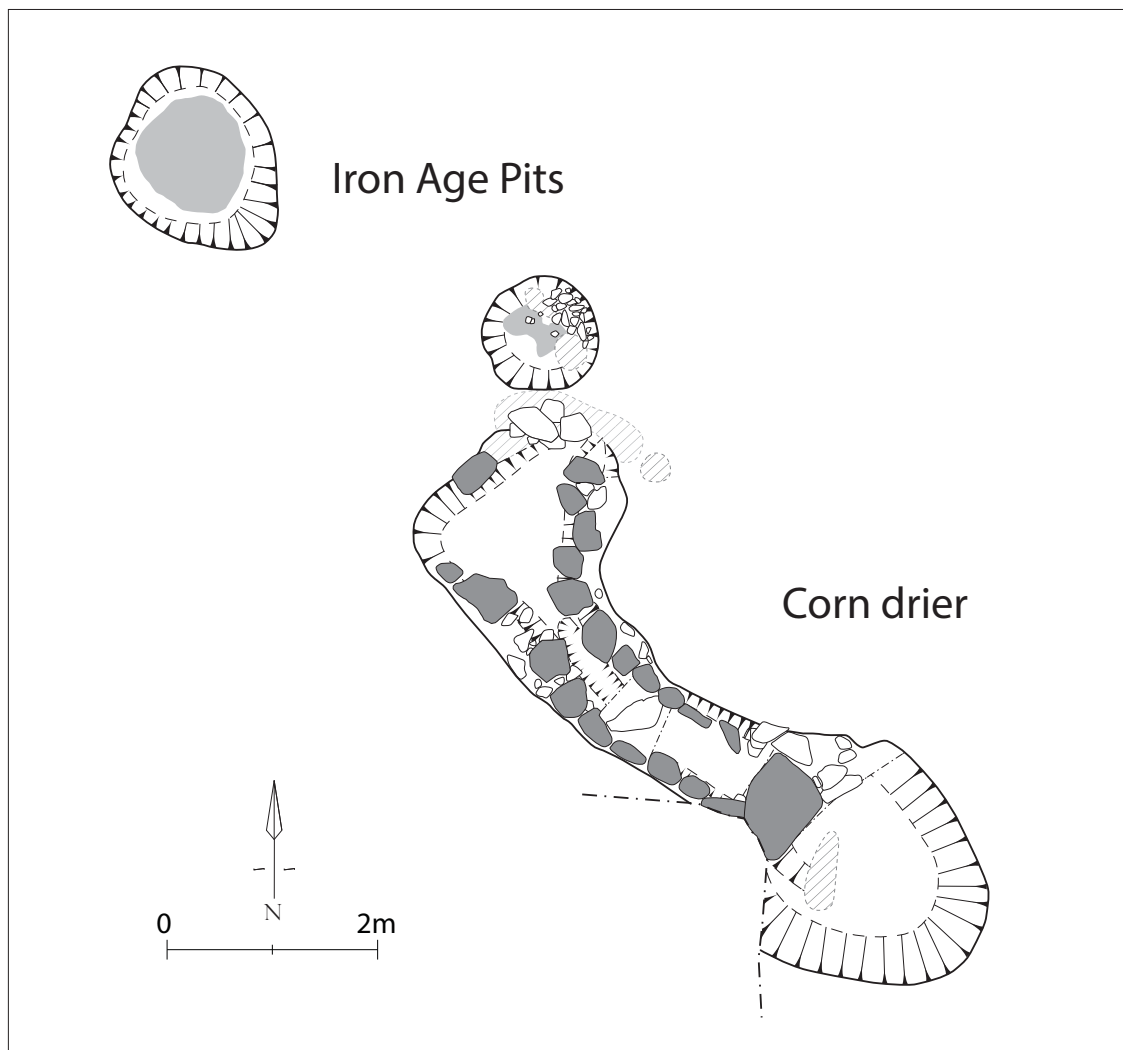
About 2.5km east, near Afon Wen, another Bronze Age cremation site was excavated in 2007.

On this site there were two cremations in urns within a circular ditched enclosure. This site was dated rather earlier than the Gas Pipeline site at about 1800-1500 BC, but they could represent different burials of different status made by the same Bronze Age community living in the area.



Iron Age Pits and a Medieval Corn Drier

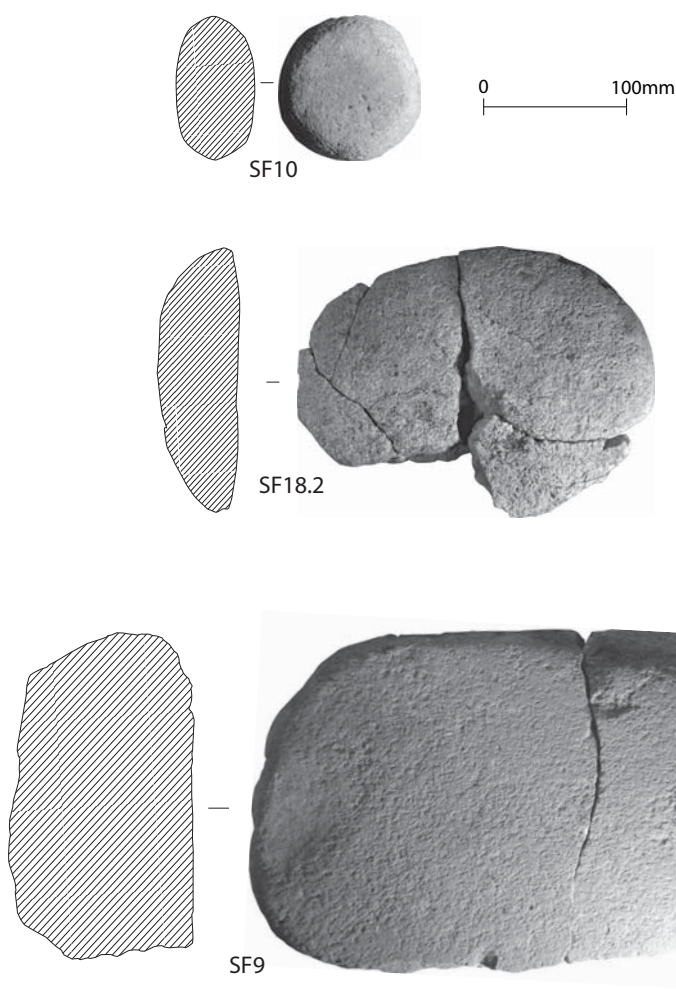
Near Glan Morfa Farm, west of the Hafan y Mor Holiday Park, two pits were found with an elongated feature revealed on excavation to be a corn drier. These were found right next to each other but radiocarbon dates showed that the pits were Iron Age (about 400-350 BC) and the corn drier was medieval (used sometime between the late 12th century and early 13th century AD).



The pits were full of heat-cracked stone and appeared to have been used as ovens. There were no other traces of settlement in the area but it seems likely that there was an Iron Age settlement somewhere nearby.

Above: plan of pits and corn drier

Left: pit with heat-cracked stones



The finds from the pits included quern stones and rubbers for grinding grain. The rubber (a small hand-held rounded stone) would have been rubbed over the grain placed on the surface of the larger quernstone to grind it down to flour. This produced a worn surface where the stones rubbed together. These stones had been broken by the heat of a fire. They must have been used in a nearby settlement.

The corn drier was lined with stones, which showed traces of heating, as a fire had been lit in one end. The heat would have passed through the stone-lined flue to the chamber at the other end over which a layer of branches would have been placed. On this would be a cloth containing the grain to be dried. The charred grains recovered from the soil samples showed that mostly oats were dried. These were often harvested slightly under ripe and required drying before they were ground into flour. Until well into the 20th century mills in north Wales dried the corn before milling but they

used specially designed buildings with floors of perforated tiles. Most medieval corn driers were like this one, dug into the ground and built in the corner of a field or near the farm.



Corn drier during excavation showing stone lining

Iron Age Shell Midden

When heaps of discarded sea shells are found they are usually assumed to date to the Mesolithic period (about 9000 to 4000 BC) when people in Wales lived by hunting game and gathering plants and shellfish. However throughout history shellfish would have been used as food or bait and radiocarbon dating can reveal this shell gathering activity from other periods. A small shell midden (rubbish dump) was found near Penamser, south-west of Tremadog. It was only 3m long but contained a high density of marine shells. These were mostly cockles, but also periwinkles, oyster and rough winkle (nearly 6 kilogrammes of shell were sorted from a 28 litre soil sample). These shells had built up against an outcrop of bedrock, and the natural deposits underneath were heat-reddened from a fire.

This was a shell processing site where the shells were probably boiled. It lay on the very edge of the former Traeth Mawr estuary, but plant remains and terrestrial snails recovered from a soil sample suggest that the site was within woodland.

A charcoal sample and a cockle shell from the deposit were radiocarbon dated, showing that the midden was in use in the middle Iron Age, about 600-300 BC. A small medieval shell midden was discovered recently near Minffordd and these sites show that even when agriculture was the main form of subsistence fishing and shellfish were still used, as they are today.

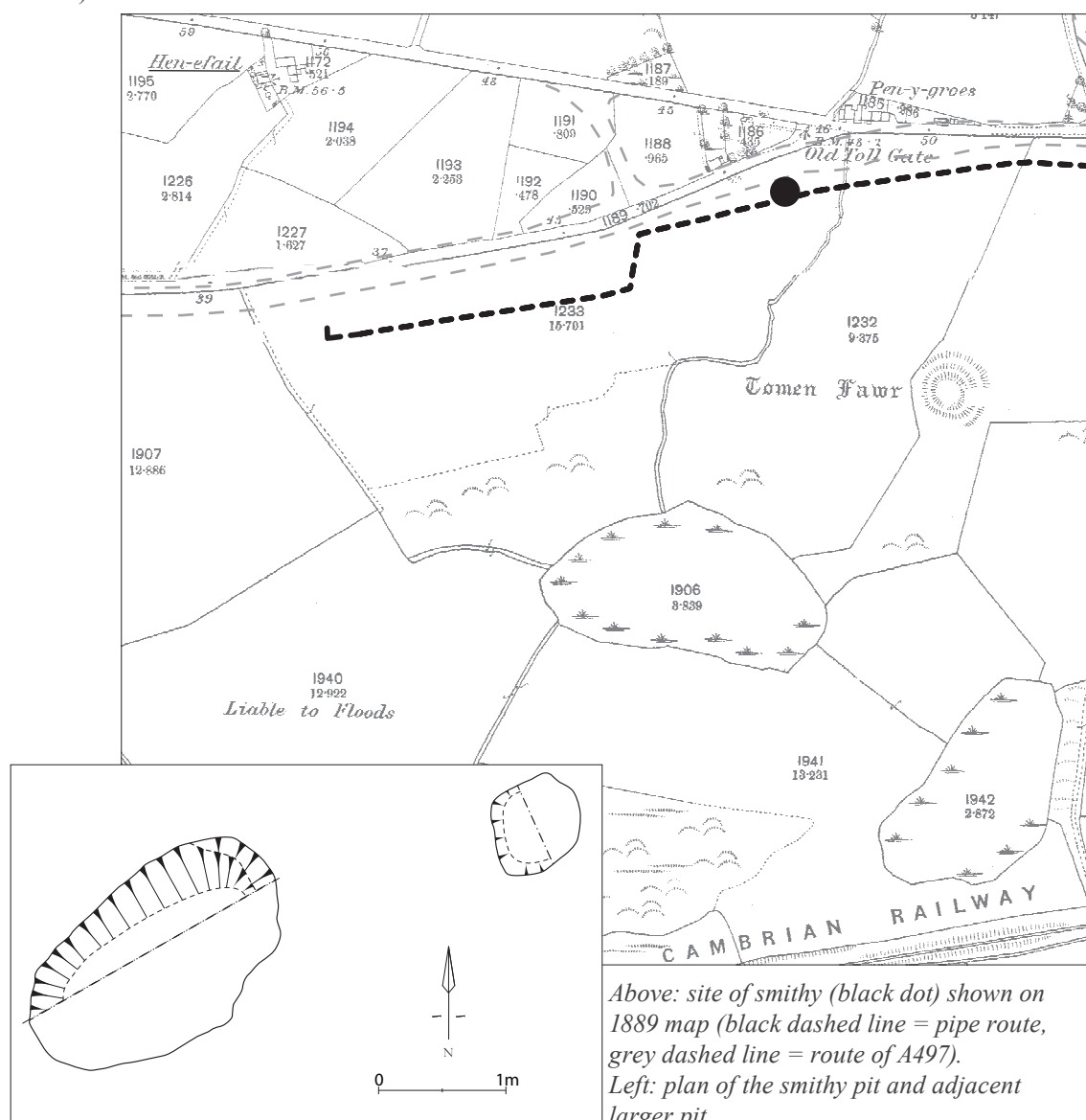


Shell midden deposit built up against a rock outcrop

Medieval Smithy

Just south of the A497 where it is joined by the Chwilog road (B4354) two pits were found. One measured 2.1m by 1.4m and 0.4m deep, but the other was an irregular hollow only 0.1m deep. However it was full of charcoal and metalworking debris including thousands of flakes of hammerscale, produced when iron is worked in a smithy. This shallow pit therefore seems to have been all that is left of the base of a small smithy and the adjacent larger pit must have been related. The charcoal recovered from a soil sample was all oak, of which most came from heartwood. This would have been the best wood to make charcoal, necessary to produce a hot controllable smithing hearth.

Radiocarbon dates showed that the smithy was used in the late 12th or early 13th century AD. The site lies not far from the medieval ringwork of Tomen Fawr, probably the home of the Lord of Eifionydd in the 12th century. This part of the township was known in medieval documents as Hen Efail (old smithy), and there is still a house nearby with the same name. The site would have been next to the main medieval road and would have been well-placed to provide for both the Lord of Eifionydd and the passing trade, including pilgrims travelling to Ynys Enlli (Bardsey Island).

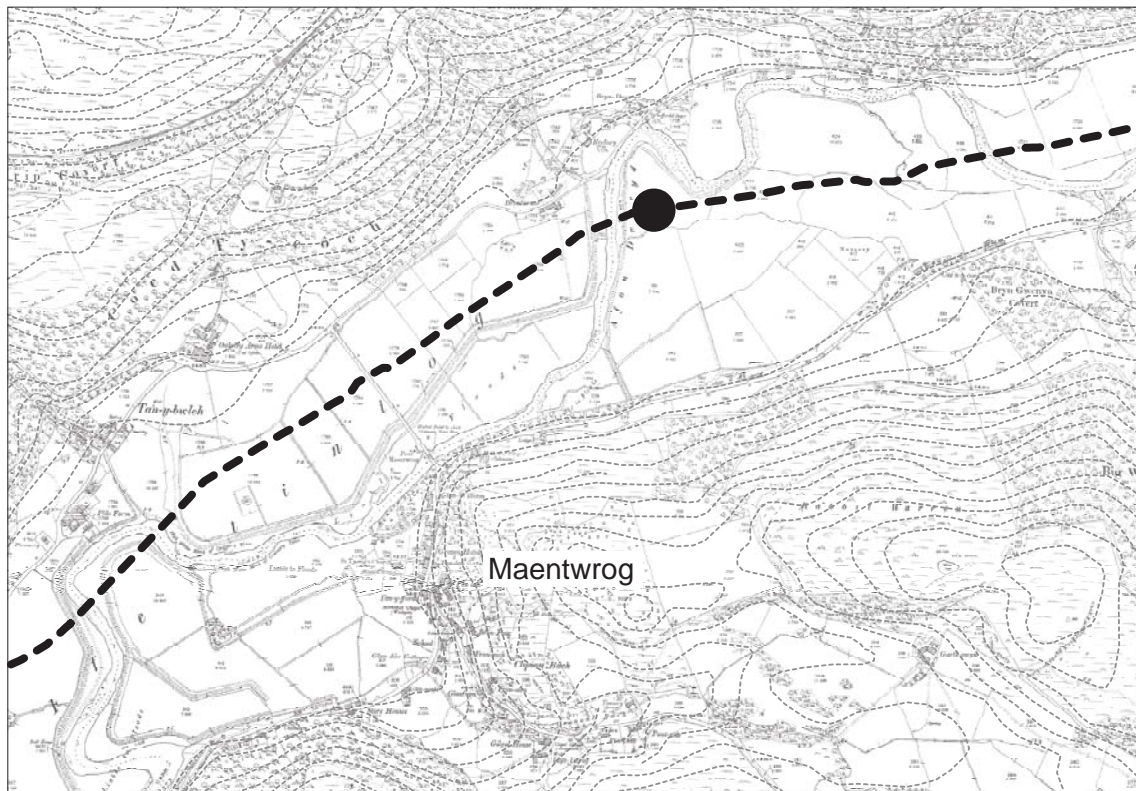




Medieval Causeway

A layer of wood and branches was found under about 1m of river silt north of Maentwrog. Much of the wood had been worked. There were cut branches and split larger timbers, many with toolmarks. The density of the deposit and the presence of smaller chips of wood suggests that this material had not

washed down the river but was largely in place and could represent the remains of a timber structure. An attempt to date the wood by dendrochronology failed so two pieces of bark were radiocarbon dated and this showed that the possible structure dated to the second half of the 14th century AD. It seems most likely that this was the remains of a causeway across the flood plain leading to a bridge over the river. A military campaign might be the most likely reason for building a causeway and bridge but the date obtained is too late for the conquest of Wales by Edward I and too early for wars of Owain Glyndŵr. Perhaps the causeway related to the general control of the country by the English, or this was the rebuilding of a structure constructed by the Princes of Gwynedd.



Location of possible causeway (black dot) on 1889 map (dashed line = pipe route).

Examples of worked wood from the site (above and right)



A Changing Landscape

During the excavations samples of soil were collected from archaeological features and these were carefully sieved in a flotation tank to recover even the smallest pieces of charred plant remains. This provided evidence about the vegetation and its use in different periods in the past.

The wood charcoal from the burnt mounds suggested there was no specific selection of fuel-wood, just the closest wood being used, including species such as alder, which are generally not considered very good for fuel. However if alder is left to season it is much more efficient as a fuel and it appears that the late Neolithic people may have planned ahead and cut their wood early enough to leave it to season. Insect holes in some of the wood would only have been made if the wood was left on the ground for a considerable time after cutting.



Oak leaves (above)

The smithing hearth showed that charcoal was being produced from oak woodlands in the medieval period and these must have been carefully managed for efficient charcoal production. Oak woods may also have been managed in the Bronze Age as the cremation burial showed that only oak was used for fuel on the pyre and it would have been necessary to ensure that there was enough wood of the right type to build the pyre.

Other plant remains survive if charred. Remains of cereals show that emmer wheat (a primitive variety) was grown in the Iron Age and oats became more common in the medieval period. Weed seeds can give an idea of the type of land the cereals were grown on and the farming regime. The Iron Age pits contained seeds showing that both dry ground and wetter areas were used for cereal growing and that the crops were probably sown in the spring.

In the medieval period charred weed seeds suggest that the oats were spring sown but some barley and wheat was also grown and other weeds suggest this was sown in autumn.

Oats (right)

(public domain images from Pixabay)





The archaeological work funded by Wales & West Utilities has meant that as well as up-grading the gas infrastructure the project has enabled us to find out much more about our past.



Acknowledgements

All the work involved in this project was funded by Wales & West Utilities. The project was overseen by RSK Environment Ltd, and managed on-site by Ken Owen, and Andrew Shobbrook supervised the excavations at Pentrefelin. GAT would like to thank Ken and his team of archaeologists for their dedicated work. GAT would also like to acknowledge the guidance and assistance provided by Ashley Batten, Gwynedd Archaeological Planning Services and John G Roberts, the Snowdonia National Parks Authority archaeologist. GAT would like to acknowledge the contribution made by the specialists; Martin R Bates, School of Archaeology, History and Anthropology, University of Wales Trinity Saint David (burnt stone); Jon Goodwin, Stoke-on-Trent Archaeology (pottery and metal artefacts); Fiona Grant, Ardea Palaeoenvironmental and Archaeological Services (pollen analysis); Gordon Cook and Derek Hamilton, SUERC Radiocarbon Laboratory (Radiocarbon measurement and statistical analysis); David Jenkins (petrological analysis); Tim Young, GeoArch (archaeometallurgical residues); James Rackham (animal bone); Jacqueline I. McKinley, Wessex Archaeology (cremated human bone); George Smith (lithics and stone objects), James Rackham, John A. Giorgi, Dana Challinor, The Environmental Archaeology Consultancy (processing and studying the charcoal and charred plant remains), and Nigel Naylor and Roderick Bale, University of Wales Lampeter Archaeological Services (wood analysis and recording); Dr Richard I Macphail, Institute of Archaeology, UCL (soil micromorphology). All the detailed specialist reports are available to download from the GAT website (www.heneb.co.uk).

This report was written by Jane Kenney of Gwynedd Archaeological Trust.
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Further Reading

The full excavation report is available on the Trust web site (www.heneb.co.uk), where it can be downloaded as a pdf file. A report will be published in *Archaeology in Wales*, the journal of the Council of British Archaeology (Wales). Other archaeological work in this area includes work in advance of the improvement of the A497 between Abererch and Chwillog and in advance of the construction of the Tremadog to Minffordd Bypass. Both are published in *Archaeology in Wales*, the first in 2007 (volume 47), and the second in the latest volume (2013).



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