DYFED ARCHAEOLOGICAL TRUST LTD

# REPORT ON THE ARCHAEOLOGICAL IMPLICATIONS OF THE PROPOSED FOUL WATER SEWER FROM BOW STREET SEWAGE TREATMENT WORKS TO THE NEW ABERYSTWYTH SEWAGE TREATMENT WORKS (CON 94/02), 1994

Client: Dwr Cymru

Project Officer: K Murphy

Report by: Richard Ramsey and K Murphy

Dated: 16th April 1994

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Annotated copy of engineer's plan (Drawing No. 2F 705-100) indicating areas of archaeological interest.

1.0 RECOMMENDATIONS (prepared by Curatorial Section)

This report on the archaeological implications of the proposed foul sewer from Bow Street sewage treatment works to the new Aberystwyth sewage treatment works has been forwarded to the curatorial section of the Dyfed Archaeological Trust for recommendations.

Your attention is drawn to the environs of the excavated Bronze Age burnt mound (D.A.T. ref no. 13053) indicated by the red hatched area marked 'A' on the plan accompanying this report. The archaeological potential of this area has been demonstrated by modern archaeological excavation (see appendix 4.1 to report) and consequently, any trenching which is contemplated within this area should be subject to an archaeological watching brief.

The other areas affected by the pipeline and considered in detail by this report do not demonstrate sufficient archaeological potential to justify further monitoring or any other archaeological work.

I would be happy to advise you further on the requirements and specifications for the proposed archaeological watching brief within area 'A' and provide you with details of potential archaeological contractors if necessary.

Mrs H.James
Principal Archaeological Officer (Curatorial)

Dated 18th April 1994

## 2.0 INTRODUCTION

Details of a proposed foul water sewer from Bow Street sewage treatment works to the new Aberystwyth sewage treatment works were forwarded by Dwr Cymru's Development Officer to the Dyfed Archaeological Trust for comment in March 1994.

Following an initial assessment of the scheme by the Curatorial Section of the Trust, Dwr Cymru were advised of the need for a detailed archaeological desk top assessment of the project to be prepared in order for detailed mitigatory measures to be drafted. Subsequently, in a letter dated 31 March 1994, Dwr Cymru confirmed that it wished the Trust to undertake the detailed assessment of the scheme.

This report, prepared by the Trust's Field Section, is intended to provide Dwr Cymru with sufficient information to assess the likely impact of the proposed works upon the archaeological resource and to take this into account as a material consideration in the determination of appropriate mitigatory measures.

The Trust's curatorial section provided a standard brief for this report and will advise Dwr Cymru on its findings and recommend further action if deemed necessary.

## 2.1 Methodology; content and scope of archaeological assessment

The primary stage of assessment of the archaeological implications of any scheme involves consultation of Dyfed Archaeological Trust's Sites and Monuments Record for the area to be affected by the proposed scheme.

Dyfed Archaeological Trust's Sites and Monuments Record is designated as a County Sites and Monuments Record in the Welsh Office Planning Policy Guidance Note: Archaeology and Planning (PPG 16).

Consultation of the Sites and Monuments Record will establish whether any known sites or monuments are affected by the scheme. However it is important to appreciate that the Record is not and cannot ever be a complete record of all traces of human activity in the landscape. It is rather a record of past archaeological work.

Consultation of the Record is therefore followed up by a rapid search of relevant map and documentary sources, both published and manuscript. All assessments carried out by Dyfed Archaeological Trust contain a full list of sources consulted.

All available aerial photographic collections held by the Trust are consulted and, if judged necessary, collections held by other bodies will be consulted. If sites or landscapes with special interest are affected the Trust would wish to consult the appropriate period or site type specialists or societies.

All desk top assessments involve a field visit to the scheme area by a professional archaeologist to check whether any previously unknown sites or monuments are affected by the scheme and to assess the overall landscape history of the area.

## 2.2 List of sources consulted

### unpublished

Dyfed Archaeological Trust's Sites and Monuments Record

Gogerddan Demesne Maps 1787 and 1836, National Library of Wales RM C22 and RM A122 respectively.

"The Parish of Llanbadarn Fawr" Tithe Map, 1845 and Apportionment, 1843.

### aerial photographs (vertical)

RAF 106G/UK 1457 3131-3132, 3145-3147, 3213 - 3215, 4073-4075, 2 May 1946, Scale 1:10,000 , copies held by RCAHMW, Aberystwyth.

RAF 541/515 4094-4095, 20th February 1951, Scale 1:10,000 , copies held by RCAHMW, Aberystwyth.

RAF 543/887 0030-0031, 29th April 1960, Scale 1:20,000 ,copies held by RCAHMW, Aberystwyth.

### published

Bowen, E.G., 1979 *A History of Llanbadarn Fawr.*

Caseldine, A.E. and Murphy, K.,"A Bronze Age Burnt Mound on Troedrhiwgwinau Farm, near Aberystwyth, Dyfed" in *Archaeology in Wales* Vol. 29, 1989.

Ordnance Survey, 1:2500 First and Second Editions, Cardiganshire, Sheets VI 6, VI 7, VI 10, VI 11, VI 14, and VI 15. [First Editions all published circa 1888. Second editions all published 1905].

Ordnance Survey, c.1855, *Index to Tithe Survey,* Old Series, Sheet 57 NE and 59 SE 1" to a mile.

Parkinson, A.J., 1983 "Mills in Cardiganshire, Part II", *Melin 7,Journal of the Welsh Mills Society.*

## 3.0 ARCHAEOLOGY

### 3.1 Summary

The proposed foul water sewer directly affects only two recognised archaeological sites (12772, 13053). One of these (13053) is definitely the site of a bronze age burnt mound. The other is probably of similar date and character. The two fields in which these sites are located contain further low, earthworks which possibly indicate the presence of further similar sites.

The various manuscript and printed maps consulted for this report indicate that the modern landscape of small, irregular fields and scattered farms was established by the late 18th century and has changed only in detail since then. Without further detailed research it is not possible to establish when the present landscape came into being.

3.2 Register of archaeological sites and areas of archaeological interest.

The reference numbers in the following catalogue are those allocated on Dyfed Archaeological Trust's Sites and Records. These numbers are shown on the following annotated engineer's maps.

19224. Pendre Woollen Factory. There is documentary evidence which indicates that this was also the same site as Felin-Fawr, a tucking mill, in 1827. The mill has since been demolished but its leat survives.

19235. Felin Person. A hip-roofed corn mill, formerly powered by undershot wheel from the same leat that powered the Pendre woollen factory. The three storey high building may be as early as the eighteenth century. The first known record of the mill is found in the 1597/8 Rent Roll, where it is referred to as "Melin y Person".

19233. Lodge. A post-mediaeval estate lodge.

19231. Fronfraith Lodge. This estate lodge dates to at least 1696, this being the date on a piece of rectangular slate removed from a hearth during building work some years ago.

20915. Fronfraith Mansion. The proposed pipeline will cut the track between the site of this mansion and lodge 19231.

13053. Troedrhiwgwinau. The site of a bronze age burnt mound. (see Appendix). This site was cut through during the construction of a gas pipeline in 1986 which allowed for a small-scale archaeological excavation. The proposed sewer will pass close to or re-section this site. The excavations confirmed the nature and date of the site and provided some important environmental information. Of relevance to the present study was the discovery that a thick layer of silt covers the bronze age land surface. This silt may mask further archaeological sites which will only be revealed when the sewer is constructed.

12772. Troedrhiwgwinau II. Aerial photographs and field observations reveal a possible burnt mound similar to 13053 above. The pipeline as proposed, would destroy this site.

17884. Wern Phillip. This farmhouse has an asymmetrically sited projecting end stack which suggests that it may be eighteenth century.

10065. Rhyd-Tir-Uchaf. This was formerly the bailiff's house for the Gogerddan Estate. The earliest recorded date for this building is 1744 but the size of the fireplace suggests a date of at least a few decades earlier.

## 4.0 APPENDIX

4.1 Copy of Caseldine, A.E. and Murphy, K.,"A Bronze Age Burnt Mound on Troedrhiwgwinau Farm, near Aberystwyth, Dyfed" in *Archaeology in Wales*, Vol. 29 1989.

# A Bronze Age Burnt Mound on Troedrhiwgwinau Farm, near Aberystwyth, Dyfed

A. E. Caseldine and K. Murphy

*Introduction*

During topsoil stripping for the construction of a gas pipe-line from Machynlleth to Aberystwyth in the summer of 1986 a mound of burnt stone and charcoal was noted on Troedrhiwgwinau Farm, Upper Vaenor parish, some 3.5km east of Aberystwyth (SN 6195 8237).

Burnt mounds are characterised by large quantities of shattered, heat-reddened stones in a charcoal-rich soil and by their proximity to a water supply (Hedges 1974-5, James 1986). When excavated they are often found to be associated with hearths and pits that are lined with clay or wood, presumably to hold water (O'Kelly 1954, Hurley 1985). At the 1988 Dublin conference of the International Burnt Mound Study Group the distribution, function and date of these sites were described and discussed. Generally, it was discovered that burnt mounds are found in large numbers across western and northern Britain, Ireland, Scandinavia and northern Europe, and occasionally occur in parts of England and other regions of Europe. Across the whole of Europe it appears that the main period of use of this type of site was in the 2nd millennium BC, although in Ireland there is also convincing archaeological and literary evidence for their use in the 1st and 2nd millennia AD (O'Kelly 1954). There are numerous hypotheses concerning the function of burnt mounds. A recent paper (Barfield and Hodder 1987) suggested they were the sites of saunas or hot baths. It is, however, widely accepted, and has been since the last century, that they were either permanent or temporary cooking places.

Whatever the original function of burnt mounds, it seems likely that they represent the only readily recognisable sites of Bronze Age settlement in west Wales. It was therefore decided to undertake a small excavation on the Troedrhiwgwinau site with the intention of obtaining dating material and environmental and economic evidence. No more than limited investigation was possible as the excavations were constrained by the tight schedule of the gas pipe-line construction and were hindered by the dreadfully wet weather of late August 1986.

The burnt mound lay at 43m OD, on land that gently sloped to the east. An unnamed stream now flows in a ditch to the north of the mound, adjacent to a hedgebank; formerly, prior to drainage operations, the stream probably ran close to the south of the mound. The modern draining of the field has not been entirely successful and areas of marshy ground are still in existence, especially along-side the Aberystwyth to Machynlleth railway line, which acts as a partial dam (Fig. 1).

The surface geology of the area, as exposed in the gas pipeline trench to a maximum depth of 1.5m below the surface of the topsoil, is of relatively recent origin. Below the 20 - 30cm thick ploughsoil was a c. 40cm thick layer of very stiff orange-brown silty-clay (9). It was initially considered that the burnt mound had been deposited on this silty-clay layer, but on further investigation this was found clearly to post-date the mound. Beneath this silty-clay layer the horizons became confused and changed rapidly over short distances; generally there was a mixed clay and gravel layer (12) with lenses of organic material (7), the organic content of the layer increasing with depth. At the bottom of the trench, 1.5m below the present ground surface branches of wood and tree trunks up to 40cm in diameter had been preserved *in situ*. Beneath the burnt mound and overlying the gravelly clay and organic layer was a 15cm thick grey silty-clay (5). This layer was not preserved outside the limits of the burnt mound, but was evident beneath a small outlier to the main mound 5m to the west.

The mound itself (1) was some 12m in diameter and at its maximum 1.2m thick. It was formed from a mass of charcoal and shattered, angular, burnt stones on average 5 x 5 x 5cm. Midway down the mound an iron-pan had formed. Above this the charcoal and stones had concreted into a tarmacadam like substance; below, the mound make-up was looser but waterlogged. From the section it appears that the weight of the mound had compressed the underlying loosely packed subsoil. It is apparent from the section (Fig. 1), drawn after the removal of the topsoil, that both ends of the mound have been disturbed; the eastern end during pipe-line construction, the west at some time in the past.

No features contemporary with the mound were observed during the excavation or in the gas pipe trench in the vicinity, although two shallow, charcoal filled ditches were seen sealed by the silty-clay (9) some 60m to the west.

*Radiocarbon Determination*

Charcoal from c. 10cm above the base of the mound adjacent to monolith H was submitted to Dr Q. Dresser, University College, Cardiff, and resulted in a radiocarbon date of 3270 ± 70 BP (CAR 1046). Run through a computer programme incorporating the data published by Pearson and Stuiver (1986) this calibrates at a 1 sigma range to 1685 - 1459 Cal. BC and at a 2 sigma range to 1740 - 1412 Cal. BC.

*Environmental Analyses*

Samples for pollen analysis were selected from approximately the bottom 50cm of a monolith (H) taken through the mound and into the underlying deposits. The stratigraphy of the monolith was as follows:

0-65cm: (1) Burnt mound material composed of abundant burnt angular stones and charcoal forming a hard concretion above an iron pan (2.5 YR 4/6) c.22-33cm. Below the iron pan burnt stone and charcoal fragments in a black (2.5 YR 2.5/0) organic matrix.

65-83cm: (5) Greyish-brown (10 YR 4/2) slightly sandy silty-clay. Burnt stone and charcoal present 65-73cm. Occasional roots and wood fragments. Increasingly organic downwards.

83-94cm: (7) Brown (7.5 YR 4/2) organic silty-clay, slightly sandy. Occasional small stones. Frequent wood fragments, leaves and roots.

94-100cm: (12) Grey (5 Y 5/1) clay with sand and gravel. Occasional wood fragments, leaves and hazel nuts.

Samples were also taken from monolith H and from G, a monolith from the sequence of deposits to the west of the mound, for loss on ignition measurements, which indicate the weight loss after heating or burning at high temperatures. Provided the temperature is kept between 400 and 450° the weight loss is largely attributable to the burning of organic matter. In addition a bulk sample was taken from the burnt mound and floated for the recovery of charred plant remains. A 100gm subsample of mound matrix material was also wet-sieved in the laboratory to examine the composition of the matrix. A large piece of wood (sample E) from the section of the excavation was identified, as were some wood fragments in the lower deposits of monolith H.

*Pollen Analysis*

The samples were prepared following standard procedures (Moore and Webb 1978). At least 500 dry land pollen grains were counted at each level. In Fig. 2, 0 is 58 cm in the above profile description. All pollen data are expressed as a percentage of

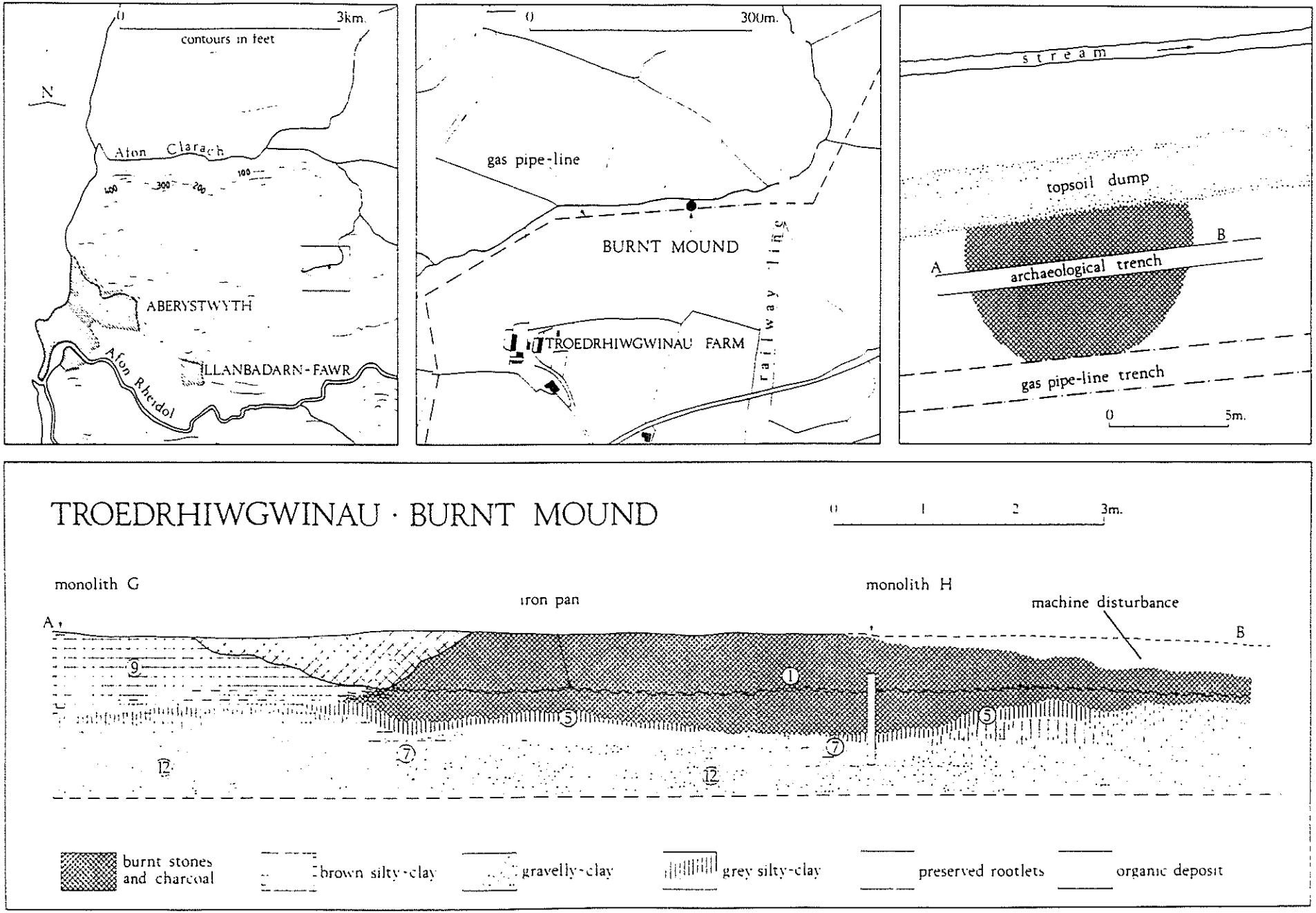


*Fig. 1 Troedrhiwgwinau Burnt Mound, location plans and section*

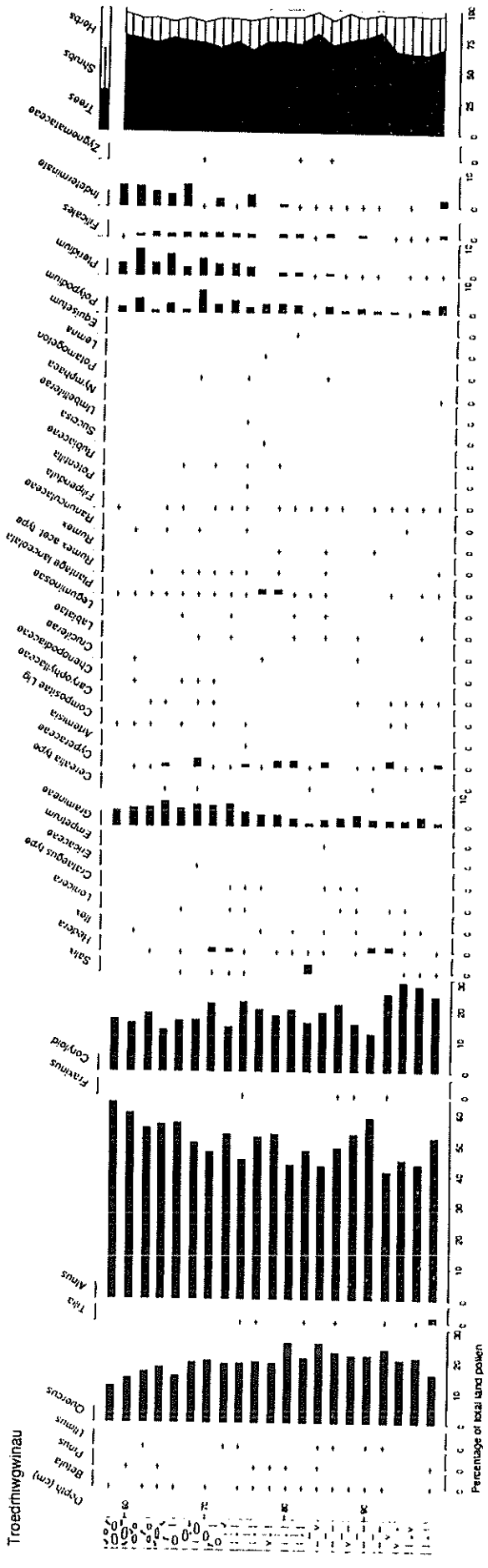


*Fig. 2 Monolith H pollen diagram*

total dry land pollen excluding aquatics and spores.

Essentially only one pollen assemblage zone can be recognised, although minor changes in the frequency of the taxa represented do occur. The pollen assemblage is dominated by arboreal pollen, in particular *Alnus* (alder) which reaches values of between 40-60%. *Quercus* (oak) percentages are marginally higher in the first half of the zone but decline towards the end of the zone. *Tilia* (lime) and *Fraxinus* (ash) are present initially but absent from the latter part of the zone. Coryloid values are slightly higher at first with values attaining about 30%, while later values vary between c. 15-25%. Gramineae pollen increases in frequency and *Plantago lanceolata* is consistently represented during the latter half of the zone. Other weed taxa indicative of agriculture are also present and cereal type pollen occurs occasionally.

*Loss on ignition*

The highest values were obtained from samples from the burnt mound (Fig. 3), reflecting the incorporation of organic material within the make-up of the mound itself. The samples from below the mound showed an increase downwards, with the highest values being obtained from the organic silty-clay (7), followed by a sharp fall in value for the sample from the clay beneath. The highest values from monolith G were obtained from those samples nearest the surface, reflecting the action of pedogenic processes. All the samples from the upper orangey-brown silty-clay unit (9) gave values higher than the underlying grey silty-clay unit (5).


*Fig. 3 Monoliths H and G, loss on ignition*

*Macrofossil Plant Remains*

The flot from the large bulk sample floated for the recovery of charred plant remains was examined and appeared to comprise only of wood charcoal. A sub-sample of the charcoal was randomly selected for identification and the results were as follows: *Alnus* = 28; *Quercus* = 9; *Corylus* = 3.

The absence of carbonised plant remains indicative of arable agriculture is in keeping with the results obtained by Milles at Felin Fulbrook (Williams and others 1987) and Carne (James 1986).

The residue from the mound matrix sample sieved in the laboratory also consisted primarily of finely comminuted charcoal. An examination of matrix material from Carne by Hillman gave similar results (James 1986)

The larger piece of waterlogged wood (sample E) was identified as *Corylus avellana* (hazel) and wood fragments from monolith H were identified as *Corylus* and *Alnus*. Hazel nuts were also present at the interface between the gravelly clay and overlying organic deposit.

*Discussion*

The radiocarbon determination obtained from charcoal from Troedrhiwgwinau of 3270 ± 70 BP calibrates to between 1740

- 1412 Cal. BC at 2 sigma, and is in broad agreement with prehistoric dates from similar sites across Britain and Ireland (Hedges 1974-5, 75-77). All the radiocarbon dates quoted in this paper are calibrated to a 2 sigma range using a computer programme based on a curve devised by Pearson and Stuiver (1986). But, as the determinations were derived from wood charcoal it is likely that the occasion of combustion was, on average, 100 - 150 years later than the quoted dates. In Dyfed burnt mounds have been excavated at Morfa Mawr, Carne, Felin Fulbrook, Stackpole and Llawhaden. The Morfa Mawr burnt mounds, 18km to the south of Aberystwyth, were found to be of early Medieval date (Williams 1985). A radiocarbon assay at Felin Fulbrook produced a date earlier than that from Troedrhiwgwinau at 2497 - 2140 Cal. BC (3875 ± 70 BP; Williams and others 1987), while the four prehistoric radiocarbon dates (3205 ± 70 BP, 3400 ± 70 BP, 3710 ± 65 BP and 3960 ± 65 BP) from Carne (James 1986) calibrate at 2 sigma to over a thousand year range, 2497 - 1322 Cal. BC. The two radiocarbon determinations (2710 ± 70 BP and 2770 ± 60 BP) from Stackpole (G. Williams, pers. comm.) average out when calibrated to 1047 - 810 Cal. BC, clearly indicating this burnt mound post-dated the one at Troedrhiwgwinau. The Llawhaden mound, also excavated by Williams (pers. comm.) is even later, dating to 355 Cal. BC - Cal. AD 54 (2080 ± 65 BP).

The deposits beneath the Troedrhiwgwinau mound basically reflect an alluvial environment. Hence the pollen results must be treated with a certain degree of caution. The radiocarbon determination of 3270 ± 70 BP from charcoal from the mound provides an approximate date for the end of the pollen sequence. The high alder values, only sporadic occurrences of elm and lime, and the presence of weeds indicative of clearance activity suggest that all the pollen is sub-boreal in date.

The pollen evidence indicates that the local vegetation was dominated by alder carr surrounded by mixed deciduous woodland, mainly of oak but with some elm, lime and ash and with an understorey of hazel and other shrubs. Coryloid pollen values are marginally higher in the basal deposits, a gravelly clay, than later in the profile, and together with the presence of *Corylus* wood and hazel nuts suggest that initially hazel was more abundant locally prior to an expansion in *Alnus*. The latter is accompanied by a stratigraphic change to an organic deposit. The presence of weed taxa pollen such as *Plantago lanceolata* (plantain) and *Rumex acetosa* type (sorrels) in the lower levels suggests that there was already some disturbance of the forest cover and agricultural activity in the area from the beginning of the pollen record. Interference with the forest cover would have increased run off, leading to wetter conditions on the valley floor which might have promoted the development of alder woodland.

The organic deposit probably represents a backswamp or abandoned channel deposit with deposition taking place under comparatively quiet conditions. The overlying silty clay possibly represents an overbank flood deposit on which, ultimately, the burnt mound was constructed. *Plantago lanceolata* is consistently present throughout this silty clay, suggesting predominantly pastoral activity in the area. An increase in diversity of pollen taxa coincides with the appearance of mound material in the stratigraphy and probably reflects the environmental conditions immediately prior to and contemporary with construction of the mound. Gramineae pollen and *Pteridium spores* also increase at this time. Cereal type pollen and pollen of Chenopodiaceae and *Artemisia*, taxa frequently found in association with cereal crops, suggest that cultivation was taking place as well as pastoralism.

However, although there is evidence of increased agricultural activity, arboreal pollen values remain high, and the wet immediate area probably continued to be wooded. Interpretation of the pollen spectra from the mound itself is complicated by the uncertainty of the origin of the pollen. The maintenance of high arboreal pollen values and the slight increase in *Alnus* may be partially attributable to pollen being brought on to the site with the wood that was to be burnt, as reflected in the charcoal record, as well as a result of local alder woodland. The latter may also have had a filtering effect, masking any larger scale clearance.

The results from Troedrhiwgwinau appear to be in line with the general picture of the Bronze Age landscape presented by other pollen sites in west central Wales, i.e. large areas still well wooded and relatively small scale clearance activity (Moore 1973, Moore and Chater 1969). Further evidence for Bronze Age clearance activity and agriculture in the area is provided by the pollen records from two soil profiles, Penrhyncoch and Penbont, c. 5.5km and 5km respectively from Troedrhiwgwinau (Taylor 1973, Smith and Taylor 1969). At Penrhyncoch an increase in *Pteridium* spores and *Plantago lanceolata* and Gramineae pollen occurs towards the surface of the buried soil beneath an early Bronze Age barrow, and is interpreted as representing clearance activity. It is also proposed that a reduction in tree and shrub pollen and rise in Gramineae and *Plantago lanceolata* pollen recorded at the base of the Penbont diagram is compatible with a Bronze Age date.

Later environmental changes at Troedrhiwgwinau are indicated by the silty clay deposits (Monolith G) abutting and partially overlying the mound. It has been argued that such material marks a change in agricultural practice, such as increased ploughing resulting in heavier soil erosion and increase sedimentation (Shotton 1978).

The sequence of deposits recorded at Troedrhiwgwinau is broadly in keeping with the basic model of alluvial deposition, a superficial inorganic unit overlying organic sediments above a coarse gravel, commonly found elsewhere in lowland Britain (Brown 1983, 1982; Bell 1982; Limbrey 1983; Shotton 1978). A second or possibly a third millennium date for the underlying organic deposits is consistent with other dates from such deposits in Britain (Limbrey 1983). The evidence from Troedrhiwgwinau also supports the suggestion of Limbrey that burnt mounds can be correlated with evidence of soil erosion and sedimentation in stream valleys. A similar sequence to that at Troedrhiwgwinau was obtained by Barfield and Hodder (1981) at Cob Lane, on Griffin's Brook, where a burnt mound overlay a deposit of silty clay, which in turn overlay organic deposits and gravel. Equally at Felin Fulbrook, Tregaron Bog, (Williams and others 1987) the burnt mound material was deposited on silts which continued to build up on its lee side after it was no longer in use.

The mound at Felin Fulbrook is earlier in date than that at Troedrhiwgwinau and a shorter environmental record is available prior to deposition. However, as at Troedrhiwgwinau the mound at Felin Fulbrook appears to have been constructed in a woodland environment, but predominantly of alder and hazel with less evidence for oak and other tree species. *Pteridium* and *Plantago lanceolata* are present in the level immediately below the mound, but evidence for cereal cultivation is discernible only in levels from the mound and immediately above.

Some evidence for the activities associated with the mound at Troedrhiwgwinau is indicated by the charred plant remains. Identification of the charcoal from the bulk samples demonstrates that the local alder valley woodland represented in the pollen record was the principal source of wood being exploited. The absence of any carbonised grain or chaff perhaps tends to lend support to the view that some, if not all, burnt mounds were used for purposes other than cooking, or that if they were used for cooking they were temporary rather than permanent sites. It would seem not unreasonable to expect some carbonised grain or chaff even if the mound site was principally used in cooking meat, as apart from cereal grain being used as food, cereal waste is likely to have been used as fuel, particularly on a permanent site. Another explanation is that the site was a temporary cooking place used during hunting, in which case the likelihood of cereal waste having being used as a fuel is considerably less and the absence of carbonised grain and chaff is to be expected.

*Conclusion*

The radiocarbon determination from Troedrhiwgwinau is in accordance with data from other excavated burnt mounds across the west of Britain and Ireland, and reinforces the suggestion that the Early Bronze Age was the period in which many of these monuments were constructed.

Barfield and Hodder (1987) have recently reviewed the processes - cooking, bathing, brewing, and metalworking, to name but a few - that may have led to the formation of burnt mounds and associated features. However, the function of burnt mounds still remains elusive, though larger scale investigations than were possible at Troedrhiwgwinau coupled with extensive environmental analyses may shed light on their use.

Investigations of the deposits at Troedrhiwgwinau has confirmed the nature of the local environment. Although alder pollen, reflecting local alder woods, dominates the pollen spectra, clearance indicators suggest some deforestation and agricultural activity in the area prior to the construction of the mound.

*Acknowledgements*

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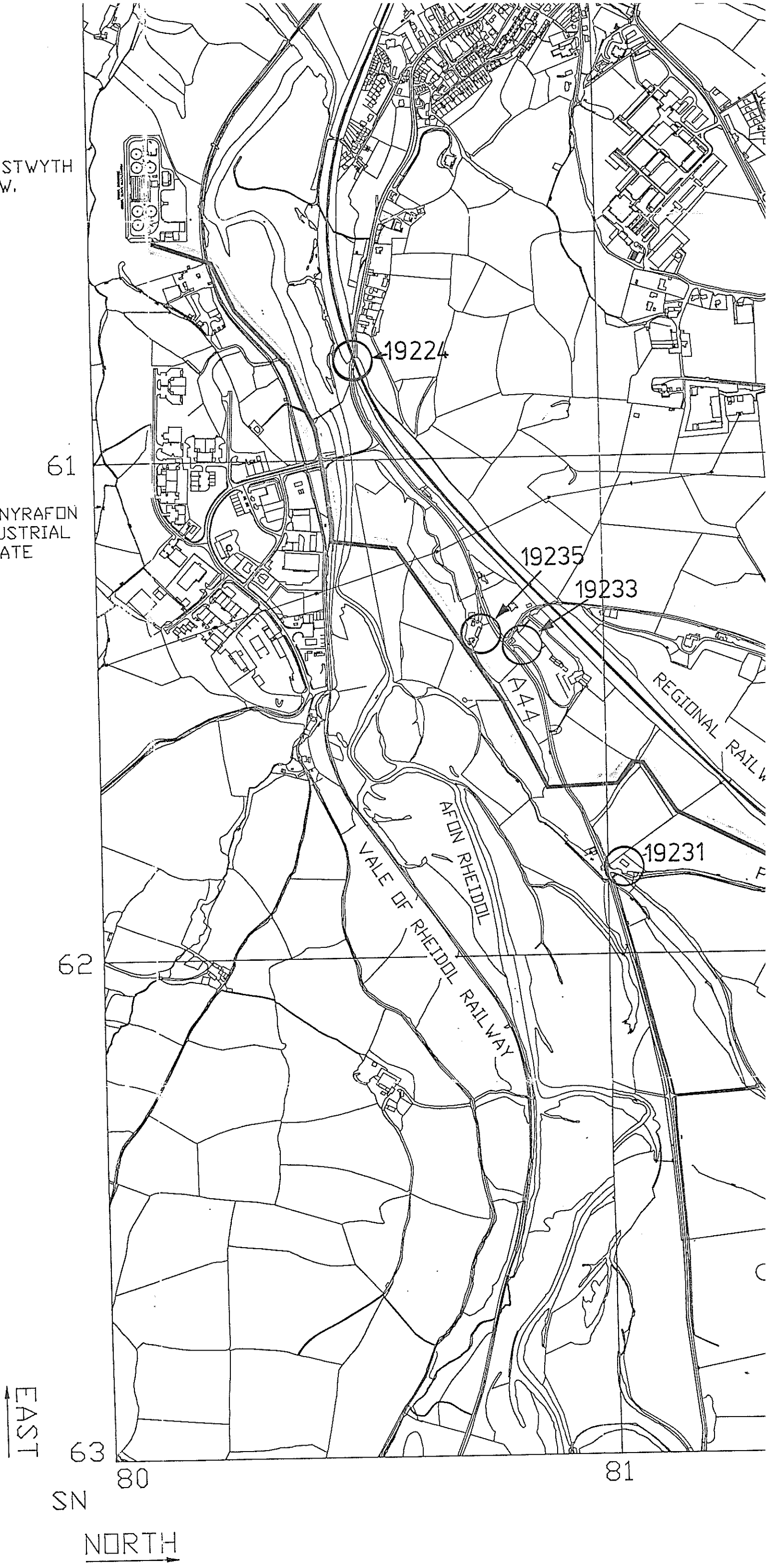
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