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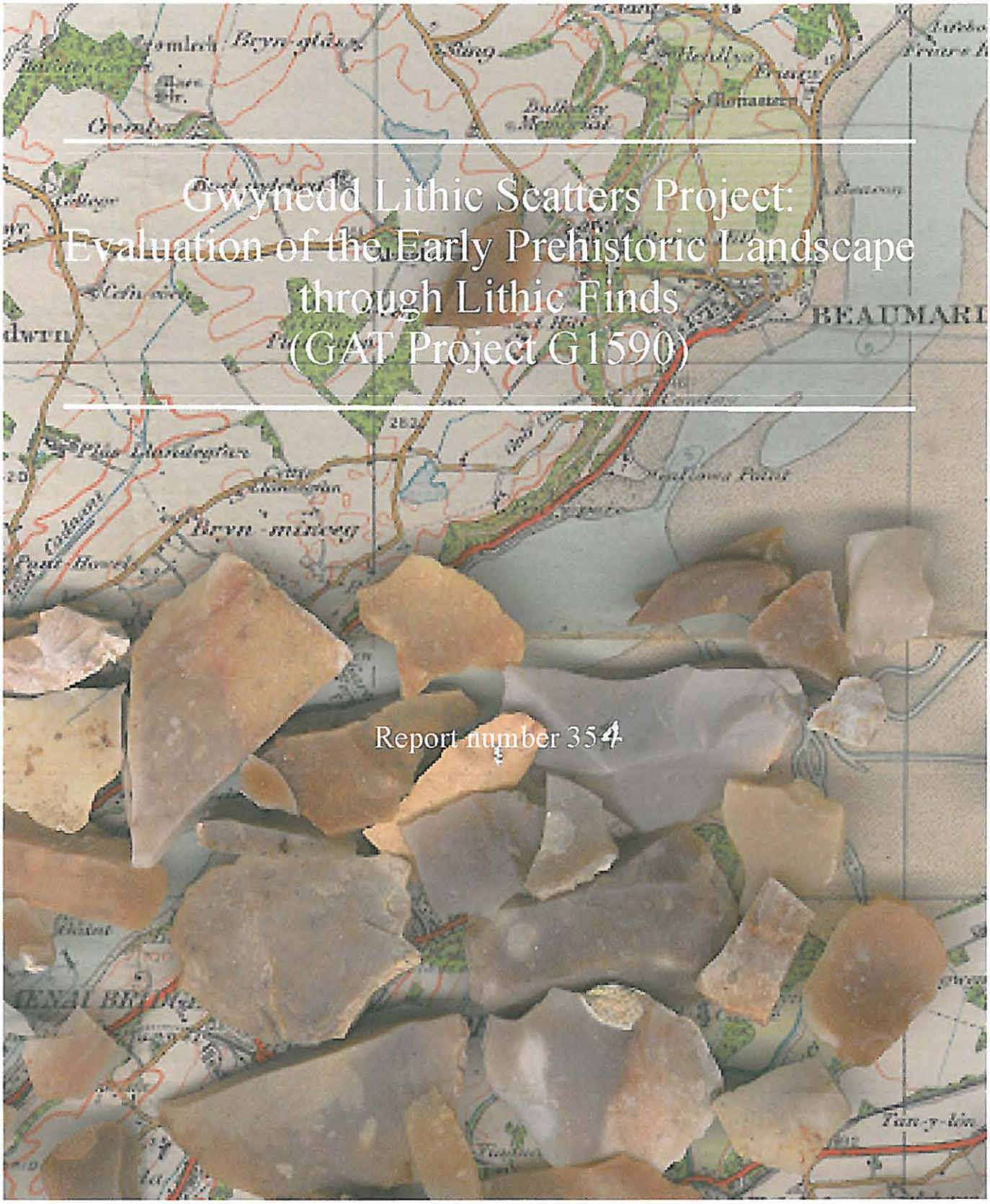

Gwynedd Lithic Scatters Project: Evaluation of the Early Prehistoric Landscape through Lithic Finds (GAT Project G1590)

Report number 354

Gwynedd Archaeological Trust
Ymddiriedolaeth Archaeolegol Gwynedd

North-West Wales Lithic Scatters Project: Evaluation of the Early Prehistoric Landscape through Lithic Finds

(GAT Project G1590)

Prepared for Cadw: Welsh Historic Monuments
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1. Project Background and introduction

1.1 Summary

This is a regional archaeology project, funded by Cadw: Welsh Historic Monuments. It is one of a number of monument type-specific projects within Wales, aiming to re-assess archaeological remains, improve their understanding, investigate their condition and prioritise areas in need of protection. The project investigated the records of occurrence of all lithic find sites within north-west Wales and assessed their value and potential. It also visited all the sites of greatest potential and produced a field assessment of their value. As a trial, three of these sites were also investigated by detailed surface evaluation including geophysical survey and soil sampling. A limited amount of new surface collection was also carried out in areas of Anglesey where there had been no previous work and the probability of occurrence of lithic scatters was unknown.

1.2 Introduction

The work had its origins in a paper, commissioned by Cadw, which assessed the overall archaeological resource in Wales, as represented by the regional Sites and Monuments Records, and provided some frameworks for future research priorities (Musson and Martin 1998). It identified cultural periods, site types and geographical areas where knowledge was lacking and others where statutory protection was unrepresentative. One of the priorities for future research was the identification of earlier prehistoric settlement and it was this requirement that was the aim of the present project. It was easily apparent that early prehistoric settlement or other activity left few surface remains other than lithic scatters and that such sites, lacking in earthworks, were poorly represented in terms of both research and statutory protection. Similar objectives had previously been identified by the Monuments Protection Programme (MPP) of English Heritage, endorsed in 1992 by the Ancient Monuments Advisory Committee, recommending that surface lithic scatters, as surface manifestations of prehistoric activity, were a neglected aspect of the archaeological resource and in need of assessment and possibly protection. It was recognised (Schofield 1994, Schofield and Humble 1995 and 1997) that the initial stage in the correction of this neglect would be the synthesis of existing data in order to:

- enable curatorial decision-making
- provide a database of research potential
- define future research priorities
- evaluate the methods of data collection and interpretation

The Cadw and English Heritage projects evolved partly as a response to a number of extensive and intensive surface collection projects carried out across Britain in recent years, such as the East Hampshire Survey (Shennan 1985) and Fenland Survey (Silvester 1991), and academic debate about such work (e.g. Hinchliffe and Schadla-Hall 1980, Hayfield 1980, Haselgrove *et al* 1985) as well as the development of new ideas about the interpretation of lithic finds in the landscape (Healy 1983, Schofield 1986, Edmonds *et al.* 1999). The MPP project was a pilot study in 1993-6, looking at four regions: Buckinghamshire, Cornwall, Oxfordshire and West Yorkshire. The project was restricted to a desk-top study of existing records, but this in itself was a major undertaking as a total of 3290 scatters and 1738 stray finds was eventually recorded. In comparison, North West Wales has only 340 recorded lithic finds of which 126 are of flint or chert making it feasible to do some field assessment of find locations and this formed part of the present project. Since the inception of the work in Wales the English Heritage project has resulted in the production of a guidance note for planning authorities - Managing Lithic Scatters (Schofield 2000).

1.3 History of lithic collecting and early prehistoric studies in North West Wales

The relative rarity of flint and chert finds in north-west Wales has meant that such finds have not figured largely in past antiquarian and archaeological work. Non-flint stone tools such as axes and hammers are more readily recognisable and suitable raw material sources for the manufacture of these are to be found as *in situ* rocks and, widely, as glacial erratics and a considerable number have been recorded from the 19th century onwards. Products from the Neolithic axe factory at Penmaenmawr were transported widely across Britain and the site itself was recognised and investigated as early as 1920 (Warren 1922). The Cambrian Archaeological Association was one of the earliest archaeological organisations in Britain, founded in 1847, and during the course of the 19th century the Rev. H. Rowlands, Rev. W. Wynn Williams and Rev. H. Pritchard all noted various finds and monuments. One of the earliest recorded finds of flints was from Llŷn Tegid, Bala, Meirionnydd, by the Rev. J. Peters (died 1877) reported by Ruddy (1898, 492). Other flints, from a 'stone circle' at Llanaber, Meirionnydd, were recorded by Evans (1897, 279). The Hon. W.O Stanley also carried out and published some exemplary excavations and made some of the earliest reports of flint finds, like the 'hoard' of possibly imported flint flakes from Cors Bodwrog, Anglesey (Stanley 1864, 168), and axes, flakes and a core from Cwm, near the Holyhead Mountain hut circle settlement (Stanley 1874, 296-7, 301).

In the early 20th century the most active field worker was Wilfred Hemp, who recorded a number of surface finds made as a result of his surveying work for the Royal Commission on Ancient and Historic Monuments. Prior to the Second World War, Harold Hughes and E. Neil Baynes were also active field workers and numerous finds were deposited in the National Museum of Wales, noted in the catalogue produced by Grimes (1951). Flint and chert finds were always few and confined mainly to those from well-trodden coastal areas like those collected by Hemp from the cliff path at Penmon, 1934 (Lynch 1991, 12 and fig. 2), and from the sand dunes of Newborough (Pape 1927 and 1928). One rare discovery from the pre-war period was a hoard of imported, mined flint flakes from the remote top of a large hill near Penmachno, discovered by a shepherd in 1928 (Davies 1939).

Since the Second World War, with the increase in knowledgeable holiday visitors, there have been quite a few scattered finds, again mainly in the coastal areas of Anglesey and Llŷn, including the first firm identification in the region of Early Mesolithic material, from the cliff headland of Pencilan, near Abersoch, Llŷn (PRN 4000). Surprisingly, the local archaeological societies have not figured greatly in the increase in knowledge, although finds were reported from Penllech Nest, Holyhead, (PRN 2506, now built over) and from Penrhos Bay, Holyhead (Williams 1950) (PRN 2505). Most finds have been reported by farmers, some found during ploughing, like the Early Mesolithic finds from Rhoscolyn, Anglesey (PRN 1654), during hedge bank removal, like Meinafron, Anglesey (PRN 3126), or during ditch digging like those from Cors Bodwrog, Anglesey (PRN 2141 (Stanley 1864, 168). Unfortunately the exact locations of several of these early finds were not identified and may never be relocated. Several find spots in Llŷn were identified by Mr J. Davies, Margaret Griffith and others in the 1980s, including several new Later Mesolithic sites, all duly reported in Archaeology in Wales. Numerous finds were also recorded in Anglesey by Harry Hooton, then of Benllech, who worked for the Ministry of Agriculture and collected and carefully noted the location of material during his farm visits in the 1950s and 60s (most reported in Lynch 1991). Something of a breakthrough came also through the collections of Judy and Robin Robbins in the Lledr Valley, Dolwyddelan, Conwy, identifying three new sites with both Later Mesolithic and Earlier Neolithic material. This area of the valleys of Snowdonia was one in which there had previously been no evidence of exploitation in those periods and showed what type of location should be sought for similar settlement elsewhere. Occasional collections have also been made by GAT during field assessments as part of other projects, for instance the Llŷn Cropmarks Project (Ward and Smith forthcoming) or during watching briefs and assessments that involve walking over specific areas such as pipeline easements. The most significant project specifically to include lithic collection was the Neolithic landscape survey begun in 1990-91 by Edmonds and Thomas (1991 and forthcoming). Recognising the relative infrequency of objects and the lack of regular exposure by ploughing, this project carried out large-scale gridded test-pit sampling, rather than surface collection, producing some 2000 lithic pieces.

Human occupation before the Later Palaeolithic has not been identified in north-west Wales and all evidence can be expected to have been destroyed by the final glaciation. In 1894, however, finds of marine

shells, pig's jaw and a tooth of a cave lion or bear were reported at about 6ft depth at Porth Diana, Trearddur Bay, Anglesey (Burton 1914), a site now built over. This location seems unlikely and is probably a case of misidentification. There are a few caves in the limited areas of carboniferous limestone (Fig. 3) and four of these, on the Great and Little Orme, have produced archaeological finds. Prehistoric and possibly Palaeolithic occupation had been suspected at Kendrick's Cave, Great Orme, as early as 1881 because of the presence of drilled teeth of cave bear (Anon. 1881 and Humphreys 1907-8). Excavations by local archaeologists T. Stone and M. Davies in the 1960s eventually produced typical Later Palaeolithic 'penknife point' flint artefacts and finds were also made at two caves on the Little Orme: Ogof Pant y Wennol and Ogof Tan y Bryn (Green 1989), all now protected monuments. These various finds and their associated contextual evidence have only been published piecemeal and await full study.

The first excavation of a Later Mesolithic site in this area was that carried out by Ridgway and Leach (1946) at Bryn Refail, Bwlchtocyn, near Abersoch, Llŷn (PRN 4007), a site that had first been located when flints were noted eroding out of the side of a road cutting, then collected from ploughed fields in the vicinity. The only other specific excavation of a Mesolithic site was that of Trwyn Du, Aberffraw (PRN 5055) by White (1978). This was an extensive working floor of Early Mesolithic date, discovered during the earlier excavation of a Bronze Age cairn (Houlder 1957). The only other purely lithic site investigated by excavation has been that of Ty'n Lon, Dothan, Anglesey (PRN 2447), which produced Neolithic and possibly Mesolithic material (Longley and Jones 1994). Syntheses and general research on lithic material in the region, apart from the stone axe factories, is confined to the papers of Wainwright (1963) and Jacobi (1980) and a full resume, for Anglesey, by Lynch (1991).

Occasional finds of Neolithic material have been made during the excavation of chambered tombs such as Bryn yr Hen Bobl, Plas Newydd, Anglesey (Hemp 1935) or the smaller assemblages from the Pant y Saer chambered tomb (Scott 1933) and Bryn Celli Ddu (Hemp 1930, 1931). The more recent excavations at Dyffryn Ardudwy (Powell 1973), Trefignath and Din Dryfol (Smith and Lynch 1987) have been reported in more detail and have produced some of the best documented lithics in the region. Both Trefignath and Din Dryfol also produced evidence of domestic activity prior to their construction. Evidence of Earlier Neolithic domestic activity was also found at the Llandegai henge excavation, Bangor (Houlder 1968), yet to be fully published, and at Capel Eithin, Gaerwen, Anglesey (White and Smith 1999).

The second millennium BC is represented mainly by scattered isolated finds of arrow-heads, for instance those in the vicinity of Tre'r Ceiri hillfort (PRN 2250, 2257), or finds close to known monuments such as standing stones, as at Cremlyn, Anglesey (PRN 2643) or Tir Gwyn, Llanfor, Llŷn (PRN 1534, 3651).

Other finds, generally undiagnostic of date, have come as residual finds from monuments of later date, for example the Iron Age and Romano-British hut groups of Din Lligwy (Baynes 1908), Pant y Saer (Philips 1934), Bryn Eryr (Longley 1998) and Graeanog (Fasham, Kelly and Mason 1999). The occurrence of occasional pieces at most excavations of sites of various periods by GAT suggest that flint is fairly widely scattered in the landscape, if at extremely low densities and so rarely recognised.

1.4 General aims of the project

The aims of the project were as follows:

1. ***Desktop database compilation and assessment***. To create a database of lithic scatter find sites, both as a necessary step in the project, as a useful management tool and of wider academic value.

2. ***Field visits and assessment***. To produce an overall assessment of these sites using criteria that have already been tested and refined and that will allow the development of appropriate curatorial management policies for this class of site.

3. ***Trial field evaluations***. To provide a directly verifiable test of the non-visible archaeological components of surface scatter sites.

4. ***Surface collection trials***. To provide a controlled experiment enquiring into the interpretation, validity and wider comparability of surface collection evidence in north-west Wales.

5. ***Recommendations for management and conservation***. To combine the two previous approaches to provide comparative data on which surface collection data generally can be assessed and incorporated in the curatorial process.

1.5 Project Design

Stage 1. Desk-top database compilation and assessment. Desk-top creation of a database of primary records from the SMR using discrimination criteria established, tested and refined in the English Heritage Lithic Scatters Project pilot studies in Cornwall, Buckinghamshire, Oxfordshire and West Yorkshire (Schofield and Humble 1997). Some checking of original material (e.g. in museum or private collections) to be carried out where necessary to allow completion of the evaluation record.

Criteria to be used in desk top assessment: Integrity, Scale of collection, Survival, Research status, Site function, Information sources, and Assemblage size.

Stage 2. Field visits and assessment. Actual find sites to be assessed in the field in cases where the finds seem to result from more than just isolated examples of casual loss. Field assessment to include such factors as slope, topography, soils and land use and to record condition and threats on defined scales. It should also include evaluation according to discrimination criteria that will be developed for the purpose.

Criteria to be used in field assessment: Potential, Period, Condition, Survival, Diversity of type, Diversity of features, Fragility.

Stage 3. Trial field evaluations. A focused programme of non-invasive scientific evaluation of a selection of three sites which suggest particular potential. These would be studied by further collection, if possible, by soil auguring to test soil types and depth, by soil sampling for phosphates and magnetic susceptibility and by geophysical survey. The results would aim to improve the understanding of the processes that created the scatters, of what the scatters signify in terms of sub-surface features and of what might be the true potential of such sites.

Stage 4. Surface collection trials. A small sample programme of controlled surface collection using a 20m grid, of about 10 fields, to encompass a sample area of about 100 acres (40 ha). All existing finds have been made by chance and where fieldwork has been fairly intensive, as in the work by M. Griffith in the western Llŷn Peninsula, or by R. and J. Robbins in the Lledr Valley, Dolwyddelan, Conwy, several new sites have been found. It is likely then that present knowledge is quite inadequate about the actual occurrence of lithic material in the landscape. There has been no controlled surface collection and so it is proposed that a small number of arable fields are studied, as available, and these will provide a reference point for estimation of occurrence generally. This work would be labour-intensive but would be carried out using voluntary assistance.

Stage 5. Recommendations for management and conservation. Analysis of the data and preparation of a report and recommendations.

1.6 Acknowledgements

Thanks must go to Irene Carruthers, Margaret Griffith, Frances Lynch and Judy and Robin Robbins for loan of material, to members of the Friends of GAT and to students of the Department of History, University of Wales, Bangor, for assistance with surface collection. Thanks are also due to several farmers for allowing access and particularly to the following for allowing survey and soil sampling: Boncyn Ddol: Mr Gwynros Jones of Nadog Uchaf, Roman Bridge, Dolwyddelan; Trefarthen: Mr J. Roberts of Plas Trefarthen, Brynsiencyn; Old Pier, Trefor: Mr D.H. Griffiths of Garth Meilio Farms, Llangwm, Corwen.

2. Stage 1: Desktop Assessment

2.1 Methods

The aim of this work was to produce a complete review and database of all relevant lithic finds in the SMR, excluding objects such as whetstones, weights, mortars, querns and carved stones, followed by a desktop assessment of the value of each find site. The original project design identified 277 lithic type records of which 78 were of flint or chert. However, 340 finds of lithic type were eventually recorded, of which 126 were of flint or chert. The additional sites were those that had been added to the SMR since the project was proposed plus lithic assemblages occurring in excavations of other monument or period types. By the end of the project several additional sites were also identified from museum or private collections that had not been recorded in the Gwynedd SMR.

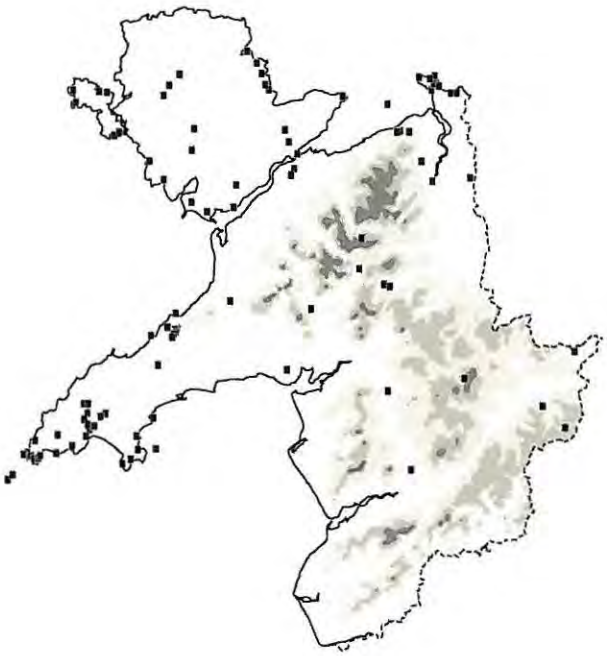
The survey aimed to look only at the flint and chert finds but an initial analysis of the SMR was made and all recorded lithic artefacts sorted into eight categories (Table 1). The flint and chert finds cover all periods whereas the stone axes are restricted to the Neolithic. The battle axes and axe-hammers are typically Bronze Age while the perforated pebbles/maceheads have been found in contexts from the Mesolithic to the Bronze Age. Grooved mauls form a rather separate category, being a specialised tool associated with ore extraction and metalworking, and may have been in use as late as the Romano-British period.

Table 1 Main artefact types of lithic collections

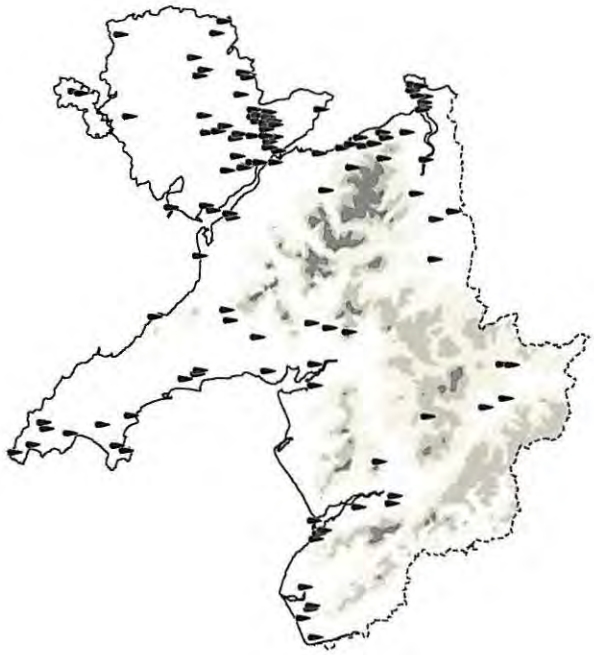
Code	*Type*	*Number*
1	Flint and chert	126
2	Stone axes and axe roughouts	123
3	Battle axes	4
4	Axe-hammers	34
5	Grooved maul/waisted pebble	13
6	Perforated hammers, unclass.	9
7	Perforated pebble/mace	25
10	Unknown type	6

Fig. 1 compares the general distributions of these categories of object. The distributions will be discussed later by period but it can be seen that the main influence is altitude, with land over 240m being largely blank. The flint finds are biased towards coastal locations, except in Anglesey, while stone axes occur in lowland rather than coastal locations with some notable foci in Anglesey and the Great Orme. The battle axes and axe-hammers, in contrast, are relatively evenly scattered over the lowland with no notable concentrations.

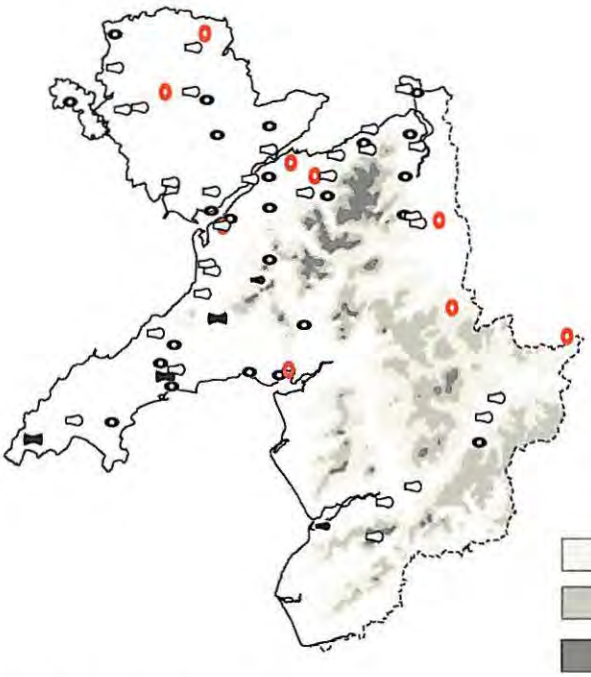
Descriptive and evaluation criteria were developed, based on those used by the MPP project and taking into account the recommendations resulting from that project (Schofield and Humble 1997). Discrimination criteria used in the MPP pilot studies that were found to be unhelpful and so were not retained were ***Clustering***, ***Environmental Association*** and ***Group Value (Association)***. The recording fields were defined in consultation with Martin Locock of Glamorgan-Gwent Archaeological Trust (GGAT) in order to ensure compatibility with a similar desktop project being carried out there. One extra descriptive field, ***Validation*** and one extra discrimination criterion, ***Diversity of Type***, were used by GGAT but not by GAT. ***Validation*** was a text field to identify the level at which the SMR entry had been checked against its original source. Subsequently, only occasionally was the SMR entry was found to be questionable and requiring checking



a . Type 1 - flint and chert finds

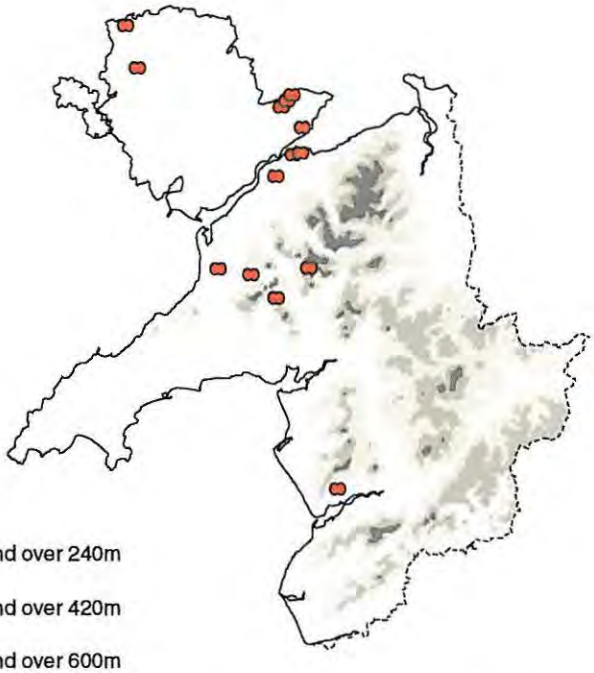


b . Type 2 - stone axes



land over 240m
land over 420m
land over 600m

c . Type 3 - Battle axes
Type 4 - Axe-hammers
Type 6 - Perforated hammers
Type 7 - Perforated pebble/macehead



d . Type 5 - Grooved maul/waisted pebble

Lithics Report - Fig 1. Categories of all lithic finds in Gwynedd and Anglesey

back to its source. ***Diversity of type*** was designed to award value to a collection according to presence of only one tool or material type as opposed to multiple tool or material types.

The recording fields were coded to facilitate subsequent analysis and defined as follows.

Descriptive fields

Those taken directly from the SMR were:

PRN; Site name; NGR; OSMap; Parish.

New records for the use of the project were:

Topographic name; General site type; Period; Sources; Function; Size; Location of material; Comments.

Evaluation Criteria

Integrity; Scale; Survival; Archaeological record.

After selection of all relevant records the documentary evidence for each was consulted and copies made of any details that might assist in further assessment or field visits. A desktop recording form (Appendix 1) was completed using the above descriptive fields and discrimination criteria. The form was found to lack sufficient space for all recording necessary and would need to be redesigned if used again. An *ACCESS* database form was designed to make entry easier. Ideally the records would be entered directly by keyboard onto the database form without a paper intermediary.

2.2 Descriptive Recording Definitions

Topographic name:	Nearest mapped geographic name, nearest settlement
General site type:	**1**, Flint scatter; **2**, Ground axe/roughout, **3**, Battle axe; **4**, Axe-hammer; **5**, Grooved maul/waisted pebble; **6**, Perforated hammer, unspecified; **7**, Perforated pebble/mace-head; **8**, Flint scatter plus other lithic types; **9**, Perforated adze; **10**, Unknown type; **11**, Miniature axe.
Period:	**1**, Palaeolithic; **2**, Mesolithic; **3**, Neolithic; **4**, Bronze Age; **5**, Mixed; **6**, Unclassified.
Sources:	**1**, SMR; **2**, Published note; **3**, Publication, full.
Function:	**1**, Domestic; **2**, Industrial; **3**, Funerary/Ritual.
Size:	**1**, 1; **2**, 2-50; **3**, 50+.
Location:	**1**, Unknown; **2**, Private - individual; **3**, Private - commercial; **4**, Local museum; **5**, GAT; **6**, Approved area museum; **7**, National museum (BM or NMW); **8**, Other.
Validation:	**1**, Not available (for example artefacts lost or inaccessible); **2**, Artefacts not checked; **3**, Illustrative record checked; **4**, Artefacts checked.

Description: (Free text) Number of waste flakes/cores. Individual description of retouched pieces. The quantities were mostly small and so tabularisation of artefact categories was not justified.

Comments: (Free text).

2.3 Evaluation Criteria Definitions

Integrity: The horizontal surface definition of the scatter, that is, whether it has identifiable boundaries. This has to be taken rather broadly. A discrete scatter has been taken to be one that appears to come from a single identifiable concentration. A non-discrete scatter is one where finds have come from several locations within the same topographic location.

1, Unknown; **2**, Non-discrete; **3**, Partially discrete/discrete.

Scale: The intensity of the collection: whether it was a casual find or a large area landscape collection or a detailed collection from a single location.

0, Unknown; **1**, Non-systematic; **2**, Extensive survey; **3**, Intensive survey/test pitting; **4**, Excavation

Survival: The extent to which the scatter survives, whether destroyed, reduced by removal of objects by collection or still largely intact.

1, Destroyed, **2**, Reduced; **3**, Single collection.

Archaeological record: A record of the level of additional work carried out on scatter sites. This can be expected to give the site additional value by producing greater depth of understanding or illustrating potential, for instance by showing the existence of stratigraphy, retrieving datable material.

1, None; **2**, Test pit/ non-intrusive; **3**, Excavation.

Diversity, type: **0**, Unknown; **1**, Flakes/frags only; **2**: Only one diagnostic type; **3**: Two types; **4**: Three types; **5**: More than 3 types; **6**: Identifications inadequate.

The records were entered on an *ACCESS* database to correspond with the GGAT work, and Appendix 2 provides a catalogue of this database.

2.4 Descriptive results

2.4.1 Period

This was a relatively straightforward field to apply and most collections could be identified according to diagnostic artefact types (Table 2). Of the unclassified collections some are those with only undiagnostic waste pieces and some are older collections which cannot be classified because they are unavailable for study.

Table 2 Main archaeological period of collections

Code	*Period*	*Number*
1	Upper Palaeolithic	2
2	Mesolithic	23
3	Neolithic	42
4	Bronze Age	14
5	Mixed	2
6	Unclassified	43

2.4.2 Size

Period is best looked at in conjunction with size of assemblage (Table 3). Those with only a single find must be regarded as isolated stray finds which do not indicate a site of much value although their location and distribution is informative. There remains a considerable number of collections (81) that required further attention. Many of these might represent a settlement or significant activity area, a significant fact when compared to the previous identification of only two Early Mesolithic sites and no Later Mesolithic sites in our area (Jacobi 1990) and of the present record of only four areas of Neolithic settlement and one area of Bronze Age settlement.

Table 3 Size of collections

Code	*Size*	*Number*
1	1	45
2	1-50	60
3	50+	21

2.4.3 Sources

The majority of collections, 46, were documented only on the SMR, although most single finds now receive a published note. 63 had a brief published note while only 17 had received full publication. Most of these consist of excavated material, not surface collections and some are old publications without any proper analysis of the lithic objects.

2.4.4 Location

The present locations of objects are quite scattered, the majority held in private hands although the more significant collections are mainly held by the National Museum of Wales, Cardiff, the Bangor Museum or the Oriel Ynys Mon (Table 4). A small proportion is held at other museums, including the British Museum and museums at Llandudno, Prestatyn and Manchester. The individual museum name is recorded in the *Comments* field. A few collections have some material separated in a second museum; the main holder is recorded. The collections presently held by GAT will all eventually go to the relevant area museum. Some

collected material, belonging to the Hooton collection is due to be handed to Oriel Ynys Mon, while the eventual fate of several others is uncertain. Some made and noted earlier in the century cannot now be located, like those of Pape from near Newborough, Anglesey, although the pottery found at the same time is in Bangor Museum. The collections of J. Davies were reported to have been destroyed by vandals (Houlder 1972). It is, unfortunately, very likely that only a small proportion of flint finds by visitors, holiday makers and landowners is notified to GAT or a museum compared with larger and more impressive objects like axes. The large number of items held by individuals is problematic as it is difficult for specialists to view these and there is a high likelihood that they may be lost or dispersed. This suggests that a systematic effort should be made to invite those known private individuals to donate or loan their collections to a suitable museum. This would have a greater possibility of success if such an exercise was carried out as part of an officially sponsored programme, with accompanying leaflet, similar to that for portable antiquities.

Table 4 Location of collected material

Code	*Location*	*Number*
1	Unknown	13
2	Private - individual	38
3	Private - commercial	2
4	Local museum	0
5	GAT	13
6	Approved area museum	14
7	National museum	40
8	Other	6

2.5 Evaluation results

Criteria that were regarded by the MPP pilot studies as useful for evaluation were Integrity, Scale, Survival and Archaeological Record.

2.5.1 Integrity

This criterion proved to have low relevance here (Table 5) because it was originally designed to apply to controlled surface collections, the distributions of which can be plotted and interpreted. The collections here derive from a great variety of chance exposures that cannot have defined boundaries. Some come from deliberate field collection but only one in controlled conditions. In order to apply the criterion, collections that came from relatively tightly grouped locations were regarded as partially discrete. However, the results are not of much interpretative value.

Table 5 Integrity of collections

Code	*Integrity*	*Number*
1	Not known	21
2	Non-discrete	41
3	Discrete/excavated	64

2.5.2 Scale

This criterion has no useful application here because of the near absence of systematic surface collections (Table 6).

Table 6 Scale of collections

Code	*Scale*	*Number*
1	Non-systematic	90
2	Extensive survey	1
3	Intensive survey	2
4	Excavated collection	33

2.5.3 Survival

The relevance of this criterion has been affected by the scarcity of finds sites and by the small amounts of material found. It is also influenced by the infrequency of exposures, for instance in the case where pasture fields are only ploughed very infrequently. Most find spots are therefore 'one off' chance finds that may not be visited or become available again (Table 7). Experimental work has shown that finds exposed on the surface of a ploughed field comprise only around 2% of the total material within that soil (Crowther 1983) and so removal of surface material in most cases causes little reduction in the value of a site. A very few sites are in well-visited coastal locations and have been re-visited or re-discovered by several people, for example those around the cove of Pared Llechymenyn, near Aberdaron (PRNs 1224 and 1741, see 3.6, below). Similarly, well-visited locations also tend to produce a number of isolated finds, such as those from Bardsey, around Tre'r Ceiri hillfort and around the Great Orme. Where sites are easily found it is possible that multiple collections can be a problem, for instance the site at Old Pier, Trefor (PRN 1477) has been collected from by at least six individuals and the owner of one large collection of material has not been traced. Fortunately, in this case the material derives from ancient colluvium and the activity or settlement area itself is not affected by collection. Most other repeated collections also derive from very limited exposures and so the small amounts of material removed have not reduced the value of the sites.

Table 7 Survival of scatters

Code	*Survival*	*Number*
1	Destroyed	8
2	Reduced	37
3	Single collection episode	81

2.5.4 Archaeological record

It was clear from the outset that very little research had been done on flint scatter sites in this area and the majority of finds have had no further work (Table 8). The two sites investigated by test pit are Ty'n Ddol, (PRN 2566) and Boncyn Ddol, (PRN 3450), both at Roman Bridge, Dolwyddelan, Conwy. Of those

excavated, three are actually the result of specific investigation of lithic scatters (Trwyn Du, PRN 5055, Anglesey, Bryn Refail, PRN 4007, near Abersoch, Llŷn Peninsula and Ty'n Lon, PRN 2447, Anglesey). The remainder are collections deriving from excavations of extant monuments. Of the latter, 14 are now scheduled ancient monuments while of the former, none are scheduled monuments.

Table 8 Archaeological Record

Code	*Archaeological Record*	*Number*
1	None	91
2	Test pit/ non-intrusive	2
3	Excavation	33

2.6 Overall monument evaluation results

After completion of the recording it was found that the four discrimination criteria were all very weak, and it was obvious that they did not provide a useful discrimination of value between different sites that could be used to select sites for the second stage of the project. The main reason was that lithic collections in North West Wales have very varied origins and very few can be considered as typical 'surface scatters' as recognised in the arable fields of England. A further discrimination criterion of ***Potential*** was therefore added to provide a simple overall measure of monument value, based on definable characteristics, not just a professional judgement, as follows:

1. Nil. Findspot cannot be identified or site has been destroyed by excavation or otherwise.
2. Low. Single isolated find, particularly if a projectile point that could be a hunting loss or a find from a funerary or other confined site.
3. Medium. Small collection from an area no longer accessible or from other period excavation of which the surrounding area may still have some potential.
4. High. Small-large collection of which more must still survive and still be accessible.
5. Very high. Large collection in accessible area with some stratigraphy or with high/in progress threat value.
6. Area of collection with protected status (scheduled monument) e.g. cave sites, settlements, funerary sites.
7. Small-large collection of which the potential cannot be assessed without further investigation, particularly where the findspot needs to be properly identified or where there is a possibility of association with an existing monument e.g. a standing stone.

Table 9 Lithic collection sites classified according to the criterion of *Potential* compared to the sum of monument evaluation criteria values for *Integrity*, *Scale*, *Survival* and *Archaeological record* (excluding values for excavated sites). Range of possible values, 4-12.

Code	*Potential*	*Number*	*Mean sum of criteria values*
1	Nil	3	7
2	Low	42	7
3	Medium	16	8
4	High	35	7
5	Very High	2	8
6	Scheduled site	16	7
7	Further evaluation needed	12	7

The occurrence of these ***Potential*** classes is shown in Table 9. The results are rather uneven with relatively few sites in the 'Medium' category, whereas a normal curve of distribution might be expected. This is simply a result of the way the classes were defined, since the Low class includes all the single isolated finds. It should also be asked whether the potential is valid in terms of the values assigned for the four evaluation criteria. The table compares the mean sum of these four values for each class of potential, excluding those collections from excavated sites. It shows that there is no increase in sum of criteria values with higher assigned potential or even any discernible difference between them. This could mean that the criteria values are of no help in discrimination or that the assigned potential classes are wrong. Table 10 therefore shows the occurrence of individual sum criteria values, excluding that of potential, and in this case something like a normal distribution is shown. Since the occurrences within the individual criteria are heavily skewed (Tables 5 to 8 above) this shows that within each class of potential the criteria values are very mixed, with high values in one criteria cancelling out low scores in another, resulting in similar mean sum values between the classes. The classes of potential, therefore, although crudely defined, provide a more useful guide for assessment than the criteria, in this case, and this measure of potential was used as the basis of selection for stage 2 of the project.

Table 10 Distribution of sum criteria values

Sum of criteria values	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***
Number of occurrences	-	11	19	41	29	2	1	2	-

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3. STAGE 2: FIELD ASSESSMENT

3.1 Initial selection process

Using the criterion of ***Potential*** assigned in the desktop study 50 sites were selected as of sufficient value to warrant a field assessment. All those with Potential recorded as Medium, High, Very High or Requiring further assessment were selected for field visits. Of these several could not be assessed, for instance those that derived from excavations or were old collection sites that could not be located. Old collection sites that had not been located but which provided some topographic pointers to location were included and it proved possible to re-identify some locations. Those find sites on Bardsey and St Tudwal's Island were also left out of the survey for reasons of inaccessibility. The selected sites were well spread and did not seem to be biased geographically (Fig. 2) any more than the overall distribution itself. 36 sites were selected as suitable for assessment in the field. The final total in the database will be slightly greater because of the inclusion of 'new' sites identified after the initial analysis was carried out.

The field visits were very productive because, unlike many standing monuments, most of these sites had never been assessed in any way and many had not been visited since first discovered, some over 60 years previously. Even those discovered in quite recent years were, in the main, reported by casual visitors or farmers with no information about context and often with only a general description of location. In several cases, new *in situ* material was found that allowed the find spots to be identified exactly. In other cases it was possible to identify the locations by visiting the site and comparing the descriptions with the local topography or by contacting the original collectors for further information. It was the availability of soil exposures that largely determined the ability to understand each site. The least productive locations were actually those that best fitted the expectation of a 'surface scatter', that is from a ploughed field. This was because all these areas were under grass pasture when visited. They had been identified when pasture fields had been ploughed for reseeding, something which occurs only every few years.

3.2 Recording fields and definitions

Thirteen descriptive fields and three monument evaluation criteria were defined and a field recording form designed (Appendix 3). Records were made as text descriptions to allow presentation (Appendix 4) and as codes to simplify database analysis.

3.2.1 Monument description

Accuracy of locatione: 1, Nil/unknown; 2, General area, e.g. district; 3, Locale e.g. parish/km square; 4, Field or topographic area e.g. hilltop; 5, Exact findspot identified on ground.

Exposure: 1, Footpath; 2, Ploughing; 3, Natural erosion (regular); 4, Natural erosion (episodic); 5, Wheel traffic; 6, As a by-product of archaeological excavation; 7, Other, specify (e.g. construction, ditch digging).

Extent: 0, Unknown; 1, Individual find spot only; 2, 10-50m; 3, 50-100m; 3, 100-200m; 4, 200m +.

Slope class: 0, Level; 1, Little slope; 2, Gentle slope; 3, Medium slope; 4, Significant slope; 5, Steep slope.

Aspect: N, NW, W, SW etc.

Topographic type: 1.Hill/ridge top/promontory; 2. Hill slope; 3. Valley floor; 4. Upland plateau/gentle slope; 5. Lowland plateau/gentle slope; 6. Coastal fringe.

Land use:	1, Arable; 2, Improved pasture; 3, Rough Grazing; 4, Woodland/Scrub; 5, Forestry; 6, Other.
Vegetation:	1, Grass; 2, Bracken; 3, Heath; 4, Brambles; 5, Scrub woodland; 6, Standard deciduous woodland; 7, Conifer woodland.
Distance to fresh water:	Metres
Threat type:	1, Ploughing; 2, Animal trampling; 3, Wheel traffic; 4, Natural erosion; 5, Building development; 6, Other (specify).
Threat value:	1, Negligible; 2, Slight; 3, Medium; 4, High; 5, Very high, total destruction likely.
Threat occurrence:	1, Continuous; 2, Annual; 3, Sporadic; 4, Very occasional; 5, Unique.
Colluvial value:	1, Extensive depletion; 2, Slight depletion; 3, Stable; 4, Slight aggradation; 5, Extensive aggradation.
Descriptive text:	General site location and comments

3.2.2 Monument evaluation criteria

Condition:	1, Very good: Never cultivated and probably with deeper stratigraphy; 2, Good: Never cultivated; 3, Fair: Cultivated only in past; 4, Poor: Improved pasture; 5, Very poor: Regularly cultivated.
Vulnerability:	Same as Threat Value.
Potential:	0, Unknown; 1, Nil; 2, Slight; 3, Medium; 4, High; 5, Very high.
Summary:	Summary of area, site value and dating.
Management text:	Written assessment of criteria, potential and suggested response.

3.3 Descriptive assessment

3.3.1 *Topographic type*

Of the sites visited the majority, 23 (64%), were in coastal locations (Table 11). Although this could be a result of collection bias, its significance is underlined when the smaller actual land area of coastal locations is compared to that of inland.

Table 11 Topographic type

Topographic type	*No.*
Hill, ridge, promontory	2
Hill slope	1
Valley floor	4
Lowland plateau	6
Coastal fringe	23

3.3.2 *Exposure type*

The majority of sites had been exposed as a result of natural erosion, 15 (42%) or ploughing, 14 (39%) (Table 12).

Table 12 Exposure type

Exposure type	*No.*
Footpath	1
Ploughing	14
Natural erosion, regular	12
Natural erosion, episodic	3
Wheeled traffic	-
Archaeological excavation	4
Other	2

3.3.3 *Threats*

Threat type. Where more than one threat is present only the most significant was recorded. Ploughing presents the predominant threat overall (Table 13). Natural erosion is mainly on a small scale and very localised. The threats presented to a site are in most cases the reason for the exposure in the first place and so cannot be viewed just in a negative light. In several cases sites originally exposed by ploughing are now grassed over and no longer identifiable. Further ploughing must still present a threat but, with the decline in income from stock farming, such sites may never be exposed again. Exposures by natural erosion are often continuing, creating the possibility of further collections being made.

Table 13 Threat type and Threat value

			Threat type			
Threat Value	*Ploughing*	*Animals*	*Wheels*	*Natural*	*Building*	*Other*
Negligible	-	-	-	-	-	1
Slight	1	2	1	3	-	-
Medium	18	-	1	5	-	-
High	-	-	-	-	1	2
Very high	-	-	-	-	1	-

Threat value was defined as the potential degree of damage expected at a site, rather than the likelihood of a threat happening. A separate field - ***Threat Occurrence*** - was used to assess the latter. Most threats can be recognised and their occurrence foreseen and assessed. A few threat types (Type 5) are unique occurrences and threaten complete destruction rather than gradual deterioration. These comprise threats such as building development or bulldozing for clearance and their likelihood must be based on a personal judgement of the circumstances in each case. Threats can also be rare (Type 4) but still have a high threat value because they are certain to happen and be very damaging. This is the case with forestry felling. The effects of these types of threat mean that a quick response is needed whereas the effects of cultivation can be met by longer-term management.

Threats are therefore a combination of severity of effect and likelihood of occurrence. If these two are compared, the majority of sites, 24 (67%), have a medium threat value and this is mostly the result of ploughing (Table 14). Only four sites have a high or very high threat value and these will be discussed with the management recommendations, below.

Table 14 Threat occurrence and Threat value

	Threat occurrence				
Threat Value	*Continuous*	*Annual*	*Sporadic*	*Occasional*	*Unique*
Negligible	-	-	1	-	-
Slight	5	-	1	1	-
Medium	5	2	9	8	-
High	-	-	-	2	1
Very high	-	-	-	-	1

3.4 Monument evaluation

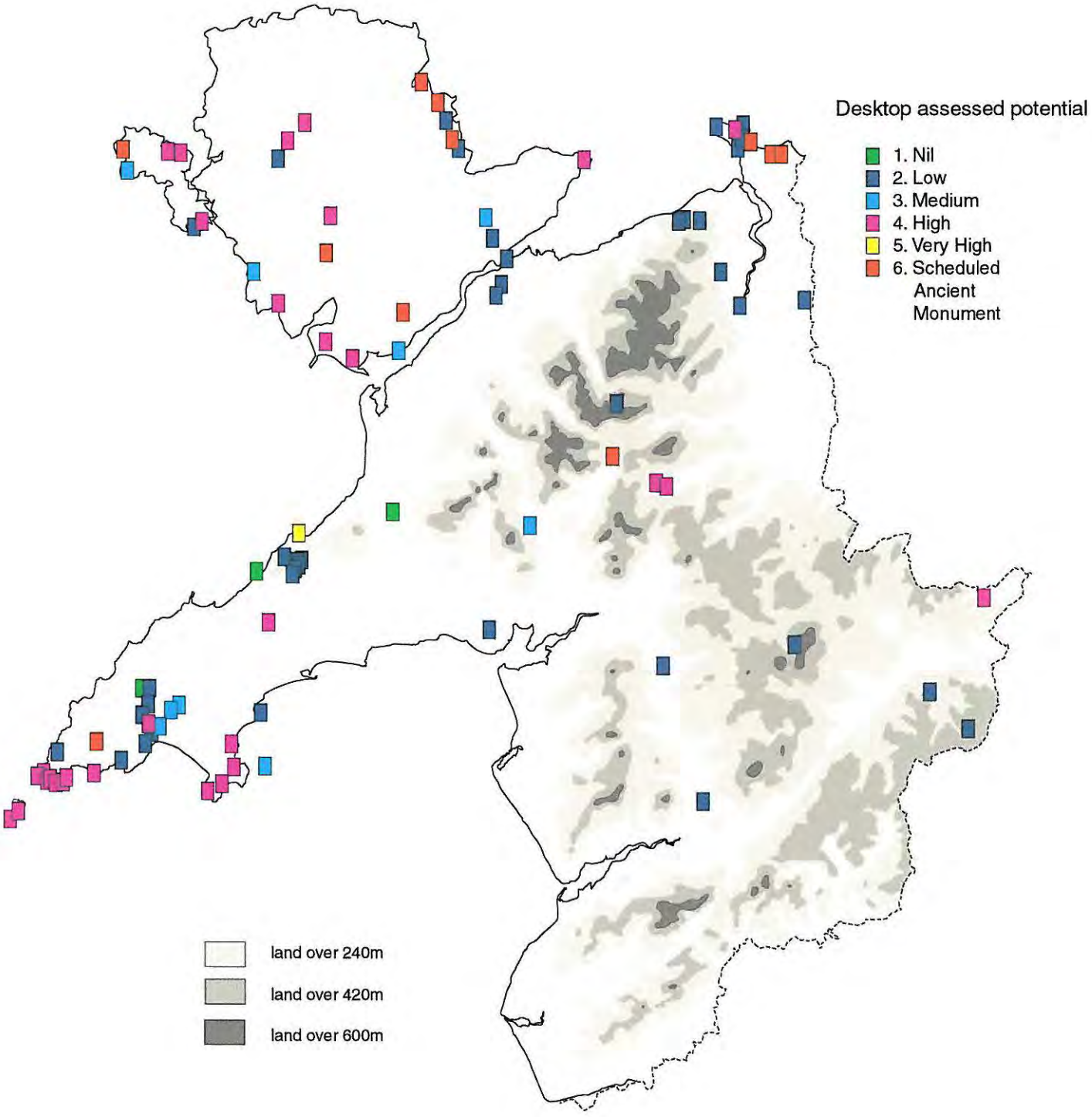
Condition was assessed in terms of the type of land use, where the main controlling factor was taken to be the intensity of cultivation that had taken place on each site since this would determine the level of deterioration. The largest number of sites, 16 (44%) lay in improved pasture and so were assessed as in poor condition because of the probable effects of repeated ploughing. 11 (31%) were recorded as of Good or Very Good condition. None of these had ever been cultivated and those that also probably had deeper stratigraphy were recorded as of Very Good condition.

Vulnerability was recorded as equivalent to the threat value, described above.

Potential was difficult to evaluate, partly because all the sites had been selected in the first place because they had been assessed as of medium or higher potential in terms of the desk-top study so all the sites could be expected to be of significant value. However, the field survey could hope to produce a better evaluation, using a more verifiable range of criteria. These were difficult to define, because of the lack of upstanding remains to study although the criteria used should still be the same. These should include:

- Period - generally all lithic sites would be valuable on this criterion but the Mesolithic period is the least well known.
- Size of the assemblage.
- Extent of the scatter.
- Condition of the remains - depending on land use.
- The possibility of deeper stratigraphy.
- The possibility of associated environmental evidence.
- The possibility of associated monuments nearby.

No attempt was made to score each scatter site individually on all these points but a judgement was made, bearing in mind the criteria. Each location was placed on a five-point scale of potential from Negligible to Very high. Although it may be difficult to grade one site in isolation it was found relatively straightforward to grade all the sites when seen in relation to each other. A summary of the evaluation criteria results is shown in Table 15.



Lithics Report - Fig 2. Distribution of lithics assessed by potential

Table 15 Field assessment summary

Potential	*PRN*	*Vulnerability*	*Condition*	*Name*
Low	2133	Medium	Poor	Glan Llyn, Bodfordd, Anglesey
	3041	Medium	Poor	Near Barcloddiad y Gawres, Llanfaelog
	6578	High	Very poor	Viaduct Covert, Llandegai, Bangor
Medium	1224	Low	Good	Pared Llechymenyn cliff, Uwchmynydd
	1538	Medium	Very poor	Trefarthen, Brynsiencyn, Anglesey
	1749	Low	Good	Porth Ruffydd, Penrhosfeilw, Holy Island
	3126	Medium	Poor	Meinafron, Llangeinwen, Anglesey
	3296	Very high	Good	Parwyd, Uwchmynydd
	3297	Medium	Medium	Porth y Pistyll, Uwchmynydd
	3316	Low	Medium	Mynydd Rhiw, east slopes
	3451	Medium	Medium	Ty'n Ddol Quarry, Roman Bridge
	3598	Medium	Poor	Porth Forllwyd, Moelfre, Anglesey
	4349	Medium	Poor	Hen Borth, Uwchmynydd
	4602	High	Very good	Great Orme, North-west, Llandudno
	5046	Medium	Poor	Porth Ceiriad, Llanengan
	7870	Medium	Medium	Fridd-carw, Minfordd, Bangor
	7972	Medium	Poor	Glan-y-gors, Llanfaelog, Anglesey
High	1225	Medium	Good	St Mary's Cove, Uwchmynydd
	1534	Medium	Poor	Tir Gwyn, Llannor
	1634	Very high	Poor	Trefarthen quarry field, Brynsiencyn,
	1654	Medium	Poor	Pentre Gwyddel, Rhoscolyn, Holy Island
	1741	High	Poor	Pared Llechymenyn field, Uwchmynydd
	2447	Low	Poor	Ty-n Lon, Dothan, Anglesey
	2566	Medium	Poor	Ty'n Ddol, Roman Bridge, Dolwyddelan
	3029	High	Poor	Bryn Llwyd, Newborough Forest, Anglesey
	3080	High	Medium	Newborough Warren, Newborough Forest,
	3294	Medium	Poor	Trwyn y Penrhyn, Aberdaron Bay
	3450	Low	Medium	Boncyn-ddol, Roman Bridge
	4000	Medium	Good	Pencilan Head, Llanengan
	4007	High	Medium	Bryn Refail, Bwlchtocyn, nr Abersoch
	5055	Low	Very good	Trwyn Du, Aberffraw, Anglesey
	7895	Low	Very good	Brynglas, Penrhos Bay, Holyhead
Very high	1232	Very low	Very good	Mynydd Rhiw axe factory (SAM)
	1477	High	Very good	Old Pier, Trefor, nr Clynnog Fawr

Only three sites were recorded as of less than Medium potential and these were small scatters which had been heavily ploughed and showed no other evidence of likelihood of greater extent or survival.

The fourteen sites of Medium potential are, generally, either those locations where the potential is still unproven or where ploughing may have reduced the condition.

There are fifteen sites of High and two of Very high potential. Of the latter one is already a protected ancient monument. A case could be made for most of the sites of High or Very high potential as being of national importance.

3.5 Management recommendations

- All the 31 locations recorded as of medium or higher potential can be argued to be worthy of care. One of these, Mynydd Rhiw axe factory site, is a scheduled ancient monument. To some extent curation will be taken care of as the results of this study are incorporated into the SMR and subsequently referred to in the Development Control process or in curatorial work as part of contacts with Forestry

departments, Unitary Authorities or Utility companies. Individual cases will be discussed in the Stage 5 section of the report.

- Seven of the sites of medium potential have been ploughed and are in poor condition and most need direct field evaluation to ascertain the extent and limits of the scatters and the possibility of *in situ* preservation.

- Most of the sites of high potential have been identified from minor exposures or by casual collection and need further evaluation. Three sites have already been chosen for further evaluation: PRN 1477, Old Pier, Trefor; PRN 1634, Trefarthen quarry field and PRN 3450, Boncyn Ddol, and these results are described in the Stage 3 report, below. Two sites of high potential, PRN 1224, Pared Llechymenyn, and PRN 7895, Brynglas, are described in more detail as case studies to illustrate the results of field visits, below.

- More direct management involves firstly, care of any locations that are especially vulnerable and secondly, of any that are regarded as of particular value, apart from any that are protected ancient monuments.

1. Four locations were identified as especially vulnerable, that is with a high or very high threat value. These, with their threats, were:

PRN 3029, Bryn Llwyd, Newborough Forest, Anglesey. Beaker finds. Forestry operations.
PRN 3080, Newborough Warren, Newborough Forest, Anglesey. Later Mesolithic. Forestry operations.
PRN 4007, Bryn Refail, Bwlchtocyn, near Abersoch. Later Mesolithic. Building development.
PRN 4602, Great Orme, north-west, Llandudno. Neolithic. Utility construction.

2. Four locations were recorded as of particular value:

PRN 1477, Old Pier, Trefor, near Clynnog Fawr. Earlier? Neolithic.
PRN 4007, Bryn Refail, Bwlchtocyn, near Abersoch. Later Mesolithic.
PRN 5055, Trwyn Du, Aberffraw, Anglesey. Early Mesolithic sealed by Bronze Age cairn.
PRN 7895, Brynglas, Penrhos Bay, Holyhead, Anglesey. Earlier Neolithic.

Note that one of these sites, Bryn Refail, is identified as of both particular value and risk and therefore most in need of attention.

3.6 Field visit case studies

Coastal sites formed a predominant part of the total (Table 16) and a significant result of the field visits related to this topographic location.

Table 16 Topographic location and period

Topographic type	*Mesolithic*	*Neolithic*	*Bronze Age*	*Mixed*	*Unclassified*	*No.*
Hill, ridge, promontory	1	1	-	-	-	2
Hill slope	-	1	-	-	-	1
Valley floor	3	-	1	-	-	4
Upland plateau	-	-	-	-	-	-
Lowland plateau	-	3	-	-	3	6
Coastal fringe	12	7	-	1	3	23

A number of these coastal sites were re-located by the finding of further exposures of *in situ* material and this allowed new understanding of where the activity must have taken place and of the local environment. Sites where new *in situ* material was found were:

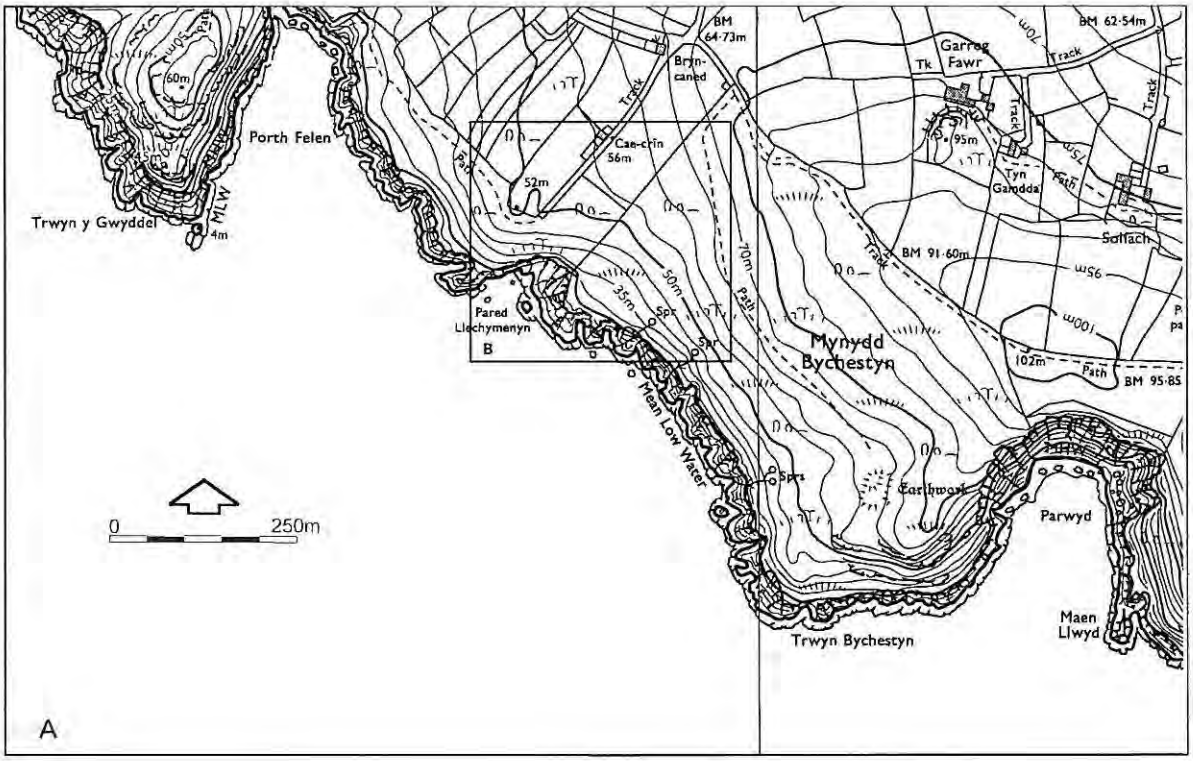
PRN	1224	Pared Llechymenyn cliff, Uwchmynydd. Eroding colluvium in terracettes.
	1225	St Mary's Cove, Uwchmynydd. Eroding colluvium in terracettes.
	1477	Old Pier, Trefor, near Clynnog Fawr. Eroding colluvium in coast edge mining adit.
	3294	Trwyn y Penrhyn, Aberdaron Bay. Eroding colluvium in terracettes.
	3296	Parwyd, Uwchmynydd. Eroding out of till cliff edge.
	3297	Porth y Pistyll, Uwchmynydd. Topsoil at edge of ploughed and re-seeded field.
	3316	Mynydd Rhiw, east slopes. Hillside churned by forestry felling machinery.
	3598	Porth Forllwyd, Moelfre, Anglesey. Coastal footpath eroding colluvium or till.
	4000	Pencilan Head, Llanengan. Eroding colluvium in terracettes.
	7895	Brynglas, Penrhos Bay, Holyhead. Eroding colluvium in cliff face.

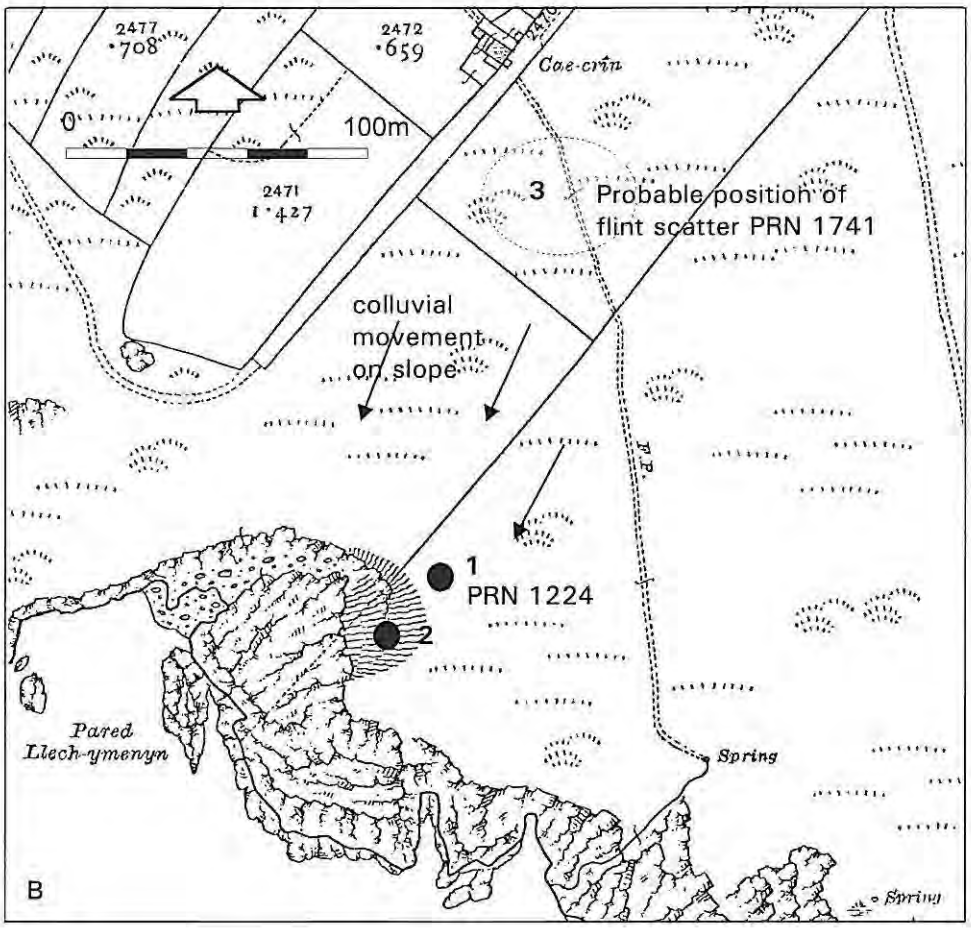
Interest in these sites was first raised by the observation of the flint site at Trefor, during the Coastal Survey of 1993 (GAT 1993). This observed that a significant amount of lithic material was eroding out of a quite steeply sloping face in the side of an old mining trial level. The steepness of slope of the layer and the varied angle of the flints within it showed that they must have moved down slope, presumably from a working area on more level ground on the ridge further up hill. The occurrence of the flints in this colluvial layer was taken to be the result of a localised environmental erosion event such as might occur due to winter storms close to the sea edge. However, in the course of the present survey, new lithic material was found in very similar contexts at several of the above sites both in Llŷn and Anglesey. A similar situation was found at sites that have produced Later Mesolithic material and at one site that has produced Neolithic material. The implication is that all these sites, which are now well grassed over, apart from occasional terracettes, have, at some time in the past, suffered from a period of major vegetation and soil denudation. The occurrence of such an episode would be significant for dating and for the effects on the sites themselves. It may be possible to identify this episode by environmental study of coastal deposits, such as the submerged intertidal peats or other peats near to the coast edge. If it was a widespread episode then it has implications for the survival of early sites and explains the quite numerous coastal finds, because many of these colluvial deposits have minor coast-edge exposures in terracettes or retreating cliff edges. Two of these sites will be described as case studies to illustrate the results: PRN 1741, Pared Llechymenyn, Aberdaron, Llŷn and PRN 7895, Brynglas, Penrhos Bay, Holyhead, Anglesey.

3.6.1 Case Study 1: Pared Llechymenyn, Uwchmynydd, near Aberdaron, PRN 1224 and PRN 1741

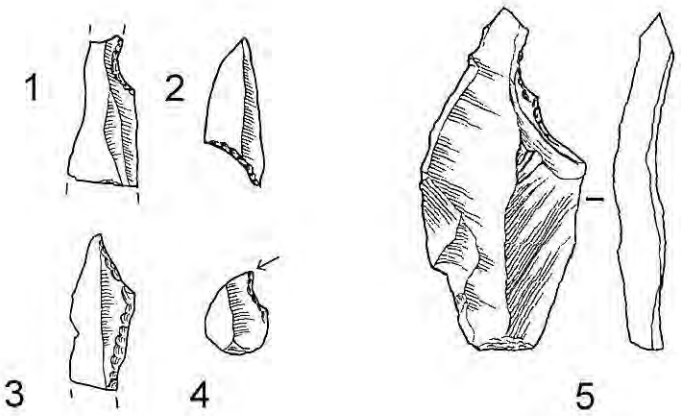
Location (Fig. 3A). Pared Llechymenyn is a small, exposed rocky cove on the south-west facing coast of the Llŷn peninsula. It is backed by high, sheer cliffs but the shore is accessible down steep, grassed-over slopes that probably derive from periglacial erosion during the last glaciation. The coastal plateau strip is well grassed but supports only rough grazing although there are several earthworks within it showing that it was occupied during the Later Prehistoric or Romano-British period and in the Medieval period. The sea-bed shelves quite steeply here compared to much of north-west Wales so the coastline would have been quite similar even during the earlier post-glacial period of lower sea-levels.

Description. Several small collections have been made here in the past (Maltby, Oakley and Howarth 1938, Griffith *pers. com.*, GAT SMR PRN 1741). The finds made by M. Griffith have been identified by Dr Stephen Aldhouse-Green and includes pieces indicating a Later Mesolithic date for the collection. Most of the material is patinated to a light creamy grey. The pieces available for inspection include a scalene triangle microlith, two notched distal blade segments, a microburin and a notched flake (Fig. 4, nos 1-5).





Lithics Report Fig. 3. Later Mesolithic site at Pared Llechymenyn, Uwchmynydd PRN 1224 and PRN 1741



Lithics Report Fig. 4. Pared Llechymenyn. 1-2, Notched blades; 3, Microlith, scalene triangle; 4, Proximal microburin; 5, Notched flake. Scale 1:1.

Table 17 Pared Llechymenyn, Uwchmynydd, nr Aberdaron: flint assemblage summary

Maltby coll. 1938

Type	*No.*
Blade/flake	2
Core	1
Microlith, unidentified	1

Burton, Dearden coll. 1980/81 (PRN 1741)

Type	*No.*
Blade/flake	14
Core	2
Hammer-stone, granite	1

Griffith coll. 1982

Type	*No.*
Blade/flake	36
Irregular frag/chunk/chip/spall	48
Microburin, proximal	1
Microlith, scalene triangle	1
Distally notched blades	2
Notched flake	1
Notched serrated flake	1
Core reject, chert	1

The finds come from the exposed faces of terracettes on steep, sloping coast edge above cliffs at the south-east side of the cove (Fig 3B, 1). Several new pieces were found in 1999, some in the eroded material of the terracettes, some washed out onto the surface, even on the turf, lower down the slope (Fig. 3B, 2), and two *in situ* in the terracette faces, amongst stony colluvium. This shows they may have originated further up the slope, possibly from the adjoining field from which a separate collection has been made when it happened to be observed after ploughing - PRN 1741. There is a somewhat more level area at the lower end of the field and this is likely to be the actual occupation or activity area from which all the finds derive (Fig. 3B, 3). The area concerned cannot be properly determined on present evidence but appears to be fairly localised, possibly as a result of the way the colluvium has collected, in a shallow erosion channel.

Management. The area where most of the material has been collected is probably not part of the original occupation area so is of only medium potential but is still valuable because of the scarcity of sites of this period. The area of PRN 1741 is now under permanent grass and so cannot be relocated or studied further without trial excavation. Damage from future ploughing for reseeding could perhaps be forestalled by a suitable management agreement. The cliff edge site is within an area belonging to the National Trust and is fairly remote. The main threat is wind and rain erosion that needs to be monitored in conjunction with the National Trust archaeologist or warden.

3.6.2 Case Study 2: Brynglas, Penrhos Bay, Holyhead, PRN 7895

Location (Fig. 5A). Penrhos Bay is a wide, sheltered, gently sloping and mainly sandy beach. Its north-west side has an indented rocky foreshore while at the south-east is the small projecting low rocky headland of Brynglas. It lies at the entrance to the strait separating Holy Island from Anglesey. The sea around this area is all very shallow so large intertidal areas are exposed at low tides. When sea-levels were still below that of the present, up to the Later Neolithic, these coastal areas may have been rich wetlands and these, with the intertidal area, would have provided a significant food resource for a hunting and collecting economy. The area just to the south-east of the bay is a nature reserve managed by Ynys Mon Council.

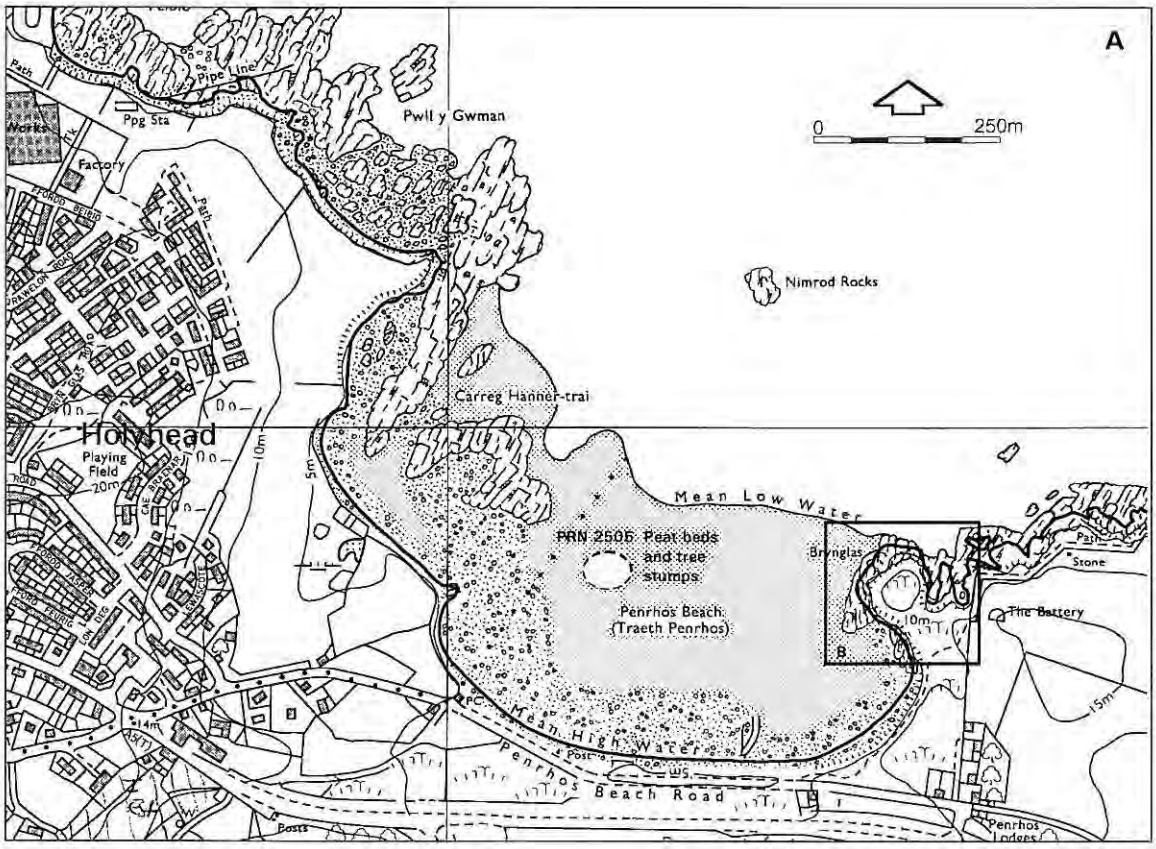
Description. There are two lithic find locations here, the first somewhere in the bay itself, and the second on and around the headland of Brynglas (Fig. 5A). The first (PRN 2505) was found in 1949 during sand quarrying on the beach when submerged peat beds were exposed. Flints, pieces of quartz, a sharpened piece of horn and two human skulls were found (Williams 1950). The flints were described as including microliths although the collection, which was donated to the Anglesey Antiquarian Society, has not yet been relocated for study, nor is it known exactly where these finds were made although fragments of peat beds with two tree stumps are visible on the centre of the beach near low water. It seems likely that the skulls and flints are not related. However, there is a record of a red deer antler, dredged up, presumably from a submerged land surface, off Holyhead harbour and a perforated antler hammer and other red deer antlers and bones have been found in intertidal submerged peat beds off the coast of Meirionnydd (Guilbert 1981, Kelly 1982) so survival of skeletal material in these situations is possible.

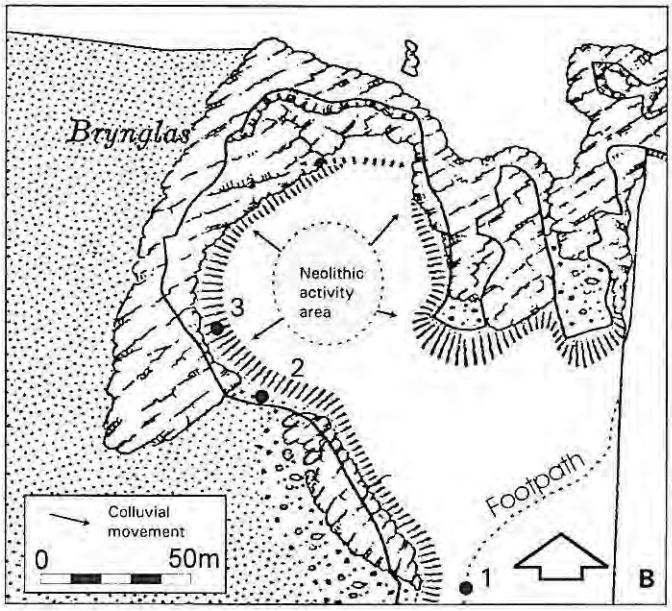
The second lithic location (PRN 7895) comes from the cliff headland, Brynglas, at the east side of the bay where a number of flints have been collected and reported to the SMR by Irene Carruthers, a local historian and fieldworker. Fortunately, it was possible to visit the site with her and to identify the exact find spot. This was a small exposure near to the top of the cliff face at the west side of the headland (Fig. 5B, 3). A few more waste pieces were found in situ, showing the exact stratigraphic context of the finds. This was a colluvial layer of mixed silt and small rock fragments sealed beneath a layer of wind-blown sand (Fig, 5C).

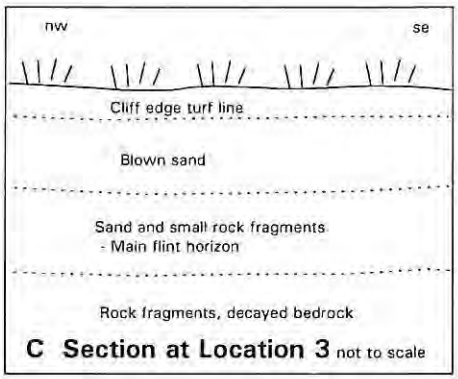
The headland forms a small gently rounded knoll which is covered by some depth of glacial till, allowing it to support a good growth of grass which must have been grazed in the past because there are remains of a field bank around the cliff edge. The grass cover is fairly continuous and there are few soil exposures. However, a search of the area produced two other finds of flint, one from the coastal footpath where it is eroding into the till (Fig. 5B, 1) and the other from the foot of the cliffs on the west side where there are occasional small exposures of colluvium because of erosion by wind and rain (Fig. 5B, 2). The finds from the main exposure (Table 18) include four retouched pieces - a bifacial, leaf-shaped arrowhead, a denticulate, a notched flake and a truncated flake (Fig. 6). There are also four cores, which are all small, from 25-40mm long, each different in character. One is squat with a single platform, one is flat with two perpendicular platforms, one is flat with two opposed platforms and the other is flat, 'tortoise-shaped', and worked around the perimeter. The notched flake (not a microburin) may suggest a Later Mesolithic element.

Table 18 Brynglas, Penrhos Bay: flint assemblage summary

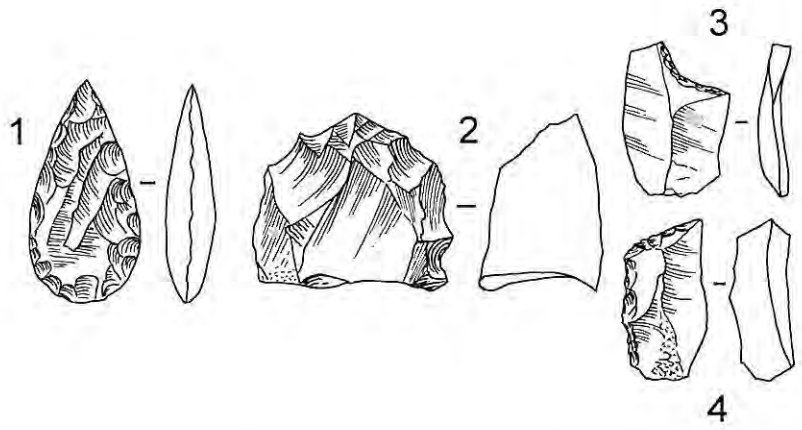
Type	No.
Primary flakes	1
Secondary flakes	7
Tertiary flakes	32
Irregular frags	9
Burnt pieces	6
Unworked pebbles	2
Cores	4
Retouched pieces	4







Lithics Report Fig. 5. Neolithic site at Brynglas, Penrhos Bay, Holyhead, PRN 7895.



Lithics Report Fig. 6. Brynglas, Penrhos Bay, 1, Arrow-head; 2, Denticulate, 3, Notched blade; 4, Truncated blade. Scale 1:1.

Management. The finds and their location suggest that there is significant Earlier Neolithic activity area on the headland and that some major erosion event in the past has caused material to be transported down the slopes. Considering the amount of material collected from a very small exposure there is likely to be an extensive scatter on the headland as a whole and the cover of blown sand means that there may be some preservation of subsoil features. Geophysical survey is not feasible because of the heavy vegetation cover and uneven surface so only trial excavation can hope to produce further information. The lack of present or past cultivation or other disturbance and the quantity of material from a small area indicates that this is a valuable site. It is given added value by the presence of possibly related environmental evidence nearby in the form of submerged forest and peat beds with associated flint finds in Penrhos Bay. These all show that this site is of high research potential which is given further value by the amenity aspects, because of its proximity to the outskirts of Holyhead and to the nature reserve of Penrhos, into which it could be incorporated. Although its full potential can only be understood by some kind of trial excavation and evaluation, this appears to be the only complete and well-preserved site of the earlier Neolithic known in North West Wales and its value needs to be recognised. The low level of threat and the location in an area with leisure interests suggests that it could be kept safe by monitoring of footpath and cliff erosion and it could be successfully merged into the management and interpretation of the Penrhos Country Park.

4. Period synthesis and research objectives

The aim of this section is to provide an overview of present knowledge of the periods to which lithic collections are relevant and to suggest general directions and areas for future research.

4.1 Later Upper Palaeolithic (Fig. 7)

The typical site locations for this period in Britain are caves and surface lithic scatters. Some of the Later Palaeolithic industries known from Europe are missing from Britain, suggesting a relatively late re-occupation. The typical artefacts of the industries represented in Britain are angle and trapezoidal backed points, shouldered and truncated pieces and convex backed pieces (penknife points), in association with convex scrapers, burins and awls (Jacobi 1980). In Wales these are known chiefly from cave sites mainly on the Gower and around Milford Haven, in north-east Wales from Plas yn Cefn Cave, St Asaph and from north-west Wales from Upper Kendrick's Cave on the Great Orme and Ogof Tan-y-bryn on the Little Orme. Britain was part of the European land mass throughout this period because sea levels were as much as 50m lower (Fig. 3) and so, culturally, North West Wales was a rather distant fringe of re-occupation, which expanded from the warmer southern part of the continent in the Mediterranean area where full glacial conditions were never experienced. Nevertheless, we know that there was some occupation because of the evidence from the caves on the Great and Little Orme.

All sites of this period are of particular significance because of their rarity. Artefactual material has been found in the caves by accident, by robbing and by extensive amateur excavation. This material is of great value and includes a number of decorated artefacts (Sieveking 1960). Some of this material has gone astray in private hands while some has remained in scattered museum collections or has been dispersed. It has never been fully assessed by specialists or published. As a result of the potential of the caves and the threat from damage, robbing or excavation, a desk-top assessment was carried out by Dr H. S. Aldhouse-Green and R. S. Kelly in 1980. This identified thirteen cave sites on the Orme, most of which had been dug into by amateur excavators and of which only one, Kendrick's Cave, was already scheduled (SAM C191). The report identified three caves with significant remaining archaeological deposits - Upper Kendrick's, Pant-y-wennol and Tan-y-bryn, and recommended their protection. Subsequently, these three were scheduled as Ancient Monuments. These caves have also been re-assessed as part of a national desk-top study (Barton and Colcutt 1986).

Research questions relate mainly to the known sites on the Great Orme and Little Orme but some of the priorities for the Mesolithic (below) are also relevant.

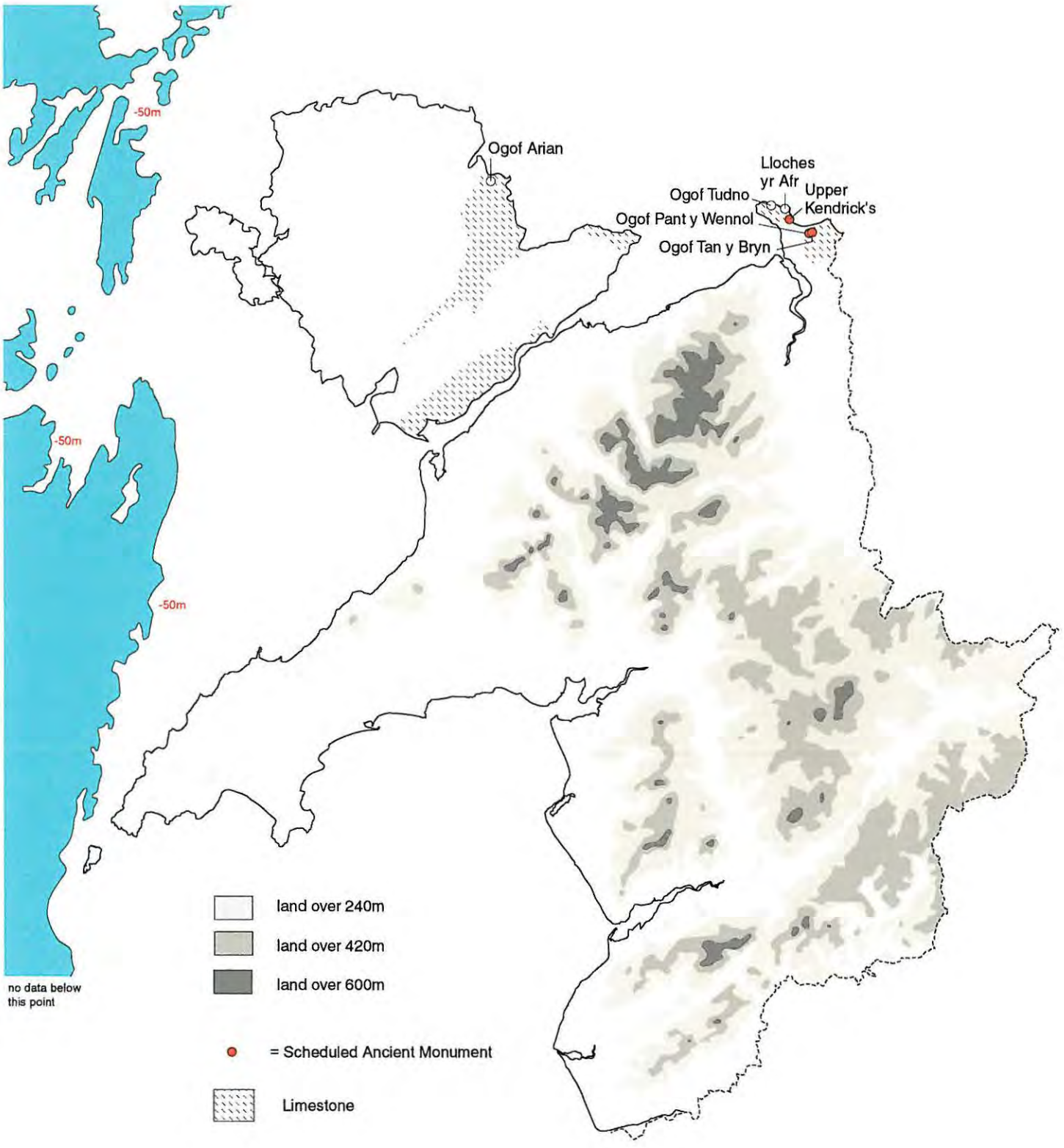
a. Following upon the desk top survey undertaken in 1980, the caves themselves need re-examination and survey and the results of the various unreported excavations there in recent years need publication with re-assessment and the application of scientific analysis and dating.

b. The artefactual material, published and unpublished, is urgently in need of proper assessment by specialists and such work has already been proposed by Dr R. M. Jacobi.

c. Detailed study of other lithic collections might identify other Palaeolithic artefacts.

d. The other areas of limestone, in north Conwy, north-east Anglesey and Ynys Seiriol (Puffin Island), with caves or potential buried or hidden caves could be assessed (Fig. 7).

e. Consideration of any of these sites should also take into account their general scientific value as geological or palaeontological records, whether or not they include evidence of human occupation. They might also be suitable for protection as Sites of Special Scientific Interest as well as being of archaeological value.



Lithics Report - Fig. 7. Upper Palaeolithic and other cave sites in Gwynedd.
Submarine contour of -50m indicates approximate coastline.

4.2 Mesolithic

4.2.1 Earlier Mesolithic (Fig. 8)

The only known site types for this period are surface scatters of flint, apart from use of caves. The characteristic artefact type is the 'broad blade microlith' - obliquely blunted points and large triangles made on sizeable flakes of flint or chert. However, there are other associated flake tools, including serrated flakes, scrapers, awls, burins, punches and ground-edge pieces as well as core adzes.

Jacobi (1980) has pointed out that most caves in use during the Later Upper Palaeolithic of the late glacial were also used in the Early Mesolithic. However, there is a great difference in the much larger number of known find spots in the Early Mesolithic and most of these are 'open' sites often with relatively large numbers of artefacts compared with the Upper Palaeolithic. These are also characterised by a wide range of tool types although dominated by microlith points. Sites identified in north Wales are at Rhuddlan, Clwyd, at Trwyn Du, Anglesey and at Pencilan Head, Gwynedd. Radiocarbon dates from Trwyn Du and Rhuddlan centre around 6500-6600 BC uncalibrated, about a millennium later than dates for comparable material in northern England and overlapping with dates there for Later Mesolithic material (Jacobi 1980, 146), suggesting that the change from Early to Late Mesolithic technology was very prolonged or regionally variable.

In this period Britain was still part of the European land mass and under the influence of a 'continental' climate (pollen zones V-early VIIa). The dates for the Early Mesolithic assemblages from north Wales suggest colonisation may have only occurred late in this stage. Sea levels, although rising, were still about 20m below present day levels (Tooley 1974) and there were extensive areas of coastal lowlands (Fig. 8). A full 'boreal' forest cover had developed by this time, dominated by hazel and birch, with pine dominant in the uplands (Taylor 1980b, 111 and Fig. 3.5). There must have been an extensive browse resource, supporting a large population of aurochs, deer and pig. The sites known know from this period, such as Trwyn Du (Aberffraw), Pencilan Head (Abersoch) and Pant-y-wennol cave (Llandudno), lie on coastal promontories now, but were then some way inland, presumably exploiting the animals of the coastal plain, shown by the predominance of projectile points amongst the assemblages.

To some extent the infrequency of find spots of this period in North West Wales can be put down to a lack of raw materials, with flint and chert available only as scattered pebbles in the glacial drift. The absence of lithic materials does not necessarily mean that occupation was also absent since organic materials can be used for most comparable tasks. Rather, the actual occurrence of sites should be multiplied by a factor according to the availability of raw materials, thus hinting at an actual presence perhaps some five times greater than that represented by find spots. The available record is also slight because of the small amount of ploughed land, which lowers the chance of surface discovery, by the small amount of fieldwork in a poorly populated area and by the disappearance of much of the relevant lowland area by submergence of the coastline. The research needed is therefore mainly of a primary, data collection, nature:

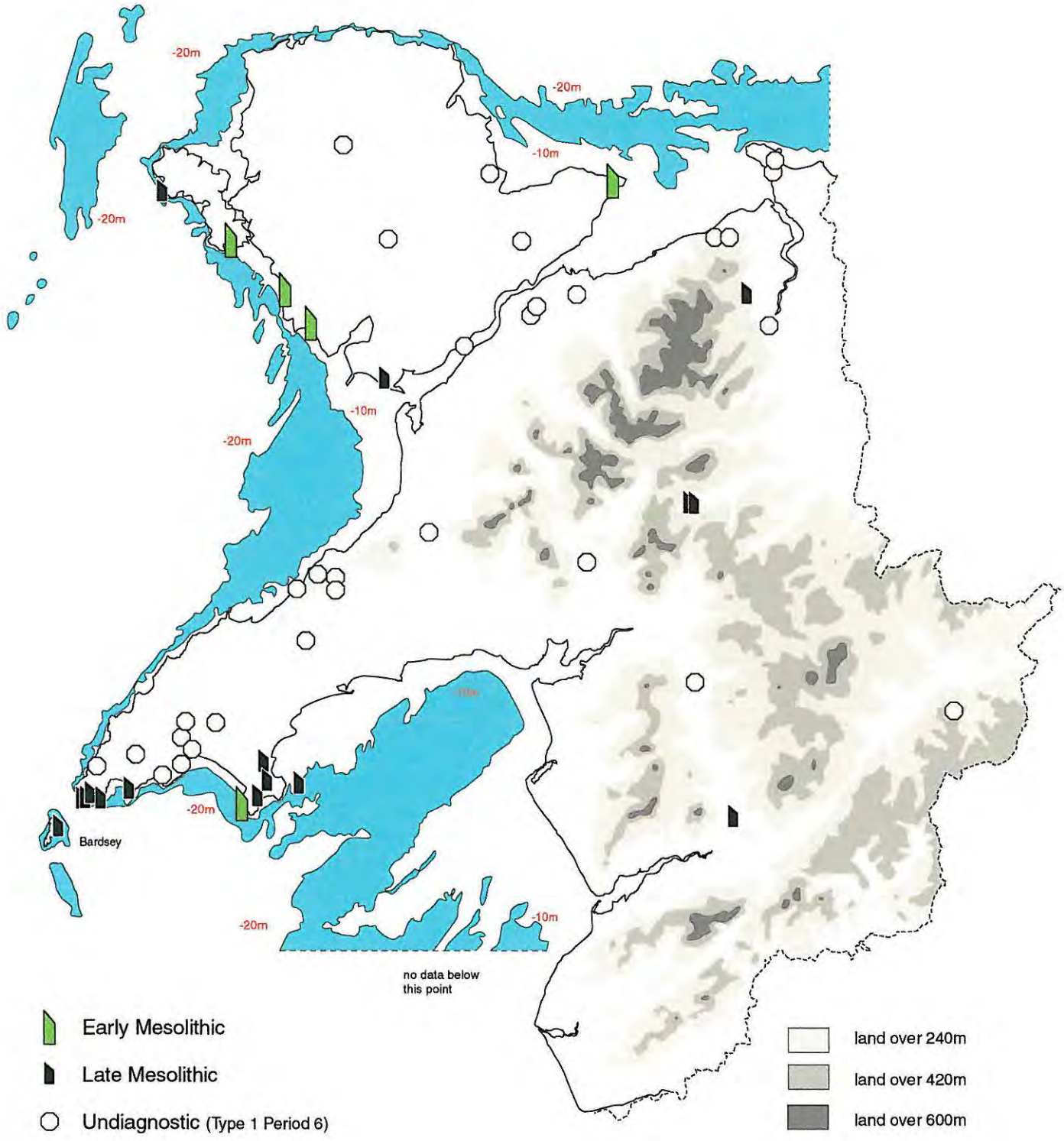
a. Survey, by surface collection, to look for sites in similar topographic situations to those already known, that is, coastal promontories overlooking now-submerged lowlands.

b. Survey of other possible inland locations, for instance caves and exposures around present or former wetland areas, such as bogs, river margins and lakes.

c. Detailed study of existing flint collections and unassigned scatters.

4.2.2 Later Mesolithic (Fig. 8)

The typical sites of this period are surface lithic scatters, peat exposures and submerged land surfaces. Lithic assemblages are again dominated by microliths, which occur in a number of fairly standard geometric forms across Britain. Associated with the production of these is a particular type of microlithic



Lithics Report - Fig. 8 Mesolithic flint and chert finds in Gwynedd.
Submarine contours at -20 and -10m indicate approximate Early and Late Mesolithic coastlines respectively.

waste or debitage, of microburins, notched pieces and small flat or prismatic cores. Assemblages include a range of flake tools including denticulates, scrapers, awls and truncated and notched flakes as well as casually retouched flakes. Also characteristic, but not yet found in this area, are bevelled-end pebbles, probably used as skin dressing tools, part ground axes and spatulas of bone or antler. In north Wales the microlithic assemblage is mainly of simple, steeply retouched pieces whereas in south Wales, northern England and elsewhere a more varied assemblage is found, with scalene 'micro-triangles' and straight-sided 'rod' like pieces being typical (Jacobi, 1980, 177).

In this period, the start of the 'Atlantic' period, the climate became milder and wetter and the birch/hazel forest was succeeded by mixed oak/alder woodland along with elm, lime and ash, although pine continued to dominate the uplands. The period from *c.* 5800 - 3400 BC was that of the post-glacial 'climatic optimum', with temperatures about 2°C above present day (Simmons, Dimbleby and Grigson 1981, 89-90), with a faunal population maximum and the time when the 'wildwood' forest reached its maximum extent and altitude, probably as high as 600m (2000ft). Over this period sea-level rose quite rapidly from about 10m to 5m below present levels (Fig. 9), after which it rose only very gradually (Tooley 1974). The coastal lowlands became flooded, producing increased wetland and estuarine areas, increasing the possibilities for fishing and fowling. In the few areas of steeper coastal slope, for instance, western Llŷn, the coast edge would have been quite close to that of today, probably explaining the predominantly coastal distribution of later Mesolithic sites here, as in south Wales and Cornwall. This suggests a greater emphasis on exploitation of coastal resources. However, it has been suggested (Jacobi 1980, 191-8) that these coastal sites may have simply been winter base camps, while the interior and uplands were exploited in the summer in a more extensive and nomadic fashion. There is a considerable number of these inland sites recorded from the Welsh Marches but only quite recently have examples been identified from north Wales, from Brenig, Denbighshire and Dolwyddelan, Conwy. There is a clear contrast with the Pennines, for instance, where many Later Mesolithic scatters are known but much of this can be put down to the poorer soils and greater altitude of north-west Wales, which provided fewer food resources, compared with the limestone soils of the Pennines.

Over 70 examples of sites of this period are known from Wales but there are no major collections or excavated sites from North West Wales, the nearest being those in north-east Wales at Brenig, Prestatyn and Ffrith. The same qualification as regards estimating the total must be made as for the Earlier Mesolithic, because of the poor availability of raw materials. However, following the present study, there are now at least 15 recognised sites, a great increase compared with the number previously recorded (Wymer and Bonsall 1977 and Jacobi 1980). The topographic location in western, coastal situations, mirrors what would be expected when compared with the more widespread occurrence of such sites in south-west Wales.

The rapid rise in sea-level in this period probably accounts for the existence of 'submerged forests' on relatively level areas around the North West Wales coast, of which at least seventeen are known (Fig. 9). These probably represent a fairly continuous ancient land surface because some areas are hidden underneath sand. This old land surface is of great environmental and archaeological value but one that is continually eroding. The submerged forests consist of stumps of mature trees set amongst peat beds and it is only the cohesive nature of the peat that has allowed them to survive. Mature oak forest would be expected to have a brown-earth soil, so the peat probably formed as the woodland became drowned and killed off by a rapidly rising sea-level. Timbers from two of these submerged forests have been radiocarbon dated (Fig. 9, 1 and 2) showing that both dated to within the Later Mesolithic period. One was an oak tree stump from Landdwyn, Anglesey with a date of 4975 +/- 90 uncal BC (SRR-5265). The other was an alder tree stump from Llandudno, with a date of 5035 +/- 45 uncal BC (SRR-5266).

Areas of submerged land surface, including peat and forest beds, exist around much of the North West Wales coastline and constitute a neglected resource for knowledge. Flint artefacts (undiagnostic of date) were found in 1949 from one exposure in Anglesey (Williams 1950), although the location has not been re-identified, and a single struck flint was found from another exposure in Porth Neigwl, on the Llŷn peninsula (Griffith *pers. com.)*. Such submerged areas are also threatened generally by coastal erosion and occasionally locally by coastal and harbour works. For instance, an inter-tidal project in the Solent, at Wooton Creek, off the Isle of Wight was commissioned after the identification of prehistoric lithic and

organic artefacts eroding out of old land surfaces on the shore as a result of the wash from an increasing volume of higher speed shipping (Tomalin 2000), and similar effects may be occurring around the Holyhead ferry port. Recent work in the Severn Estuary has also shown the potential of such areas by finding wooden structures, artefacts and even Mesolithic footprints. Work on the inter-tidal area has been sparse and a separate survey is really needed, accompanied by surface collection, mapping, scientific sampling, analysis and dating.

Research priorities for this period include some that have been proposed by a national working party (Prehistoric Society 1999).

a. Provenancing of lithic raw materials. A survey of the distribution and availability of different materials.

b. Production of a new GIS database as part of an updated national database to replace the existing one (Wymer and Bonsall 1977).

c. Assess the general potential for the existence of Pleistocene and Holocene deposits by study of drift geology and topography as well as of alluvial and coastal deposits.

d. Develop geophysical techniques to help identify buried sites.

e. Re-assess existing surface collection assemblages and evaluate locations of particular collections by controlled surface collection and sampling.

f. Carry out surface collection programmes to allow estimates of distribution of settlement activity.

g. Target reservoir edges as of great potential for identification of upland activity in this period (Jenkins, 1990).

j. Record and evaluate the inter-tidal submerged land surfaces, possibly in parallel with similar work elsewhere in Wales and possibly in association with other university scientific projects such as the alluvial archaeology project at the University of Aberystwyth (The River Dynamics, Hydrology and Environmental Change Research Group).

k. Identify possible inland areas of buried land surface potential, for example valley and blanket peat beds, and within these the topographic areas which on past evidence of site location, for instance Star Carr, are of highest potential: riverside and lakeside locations.

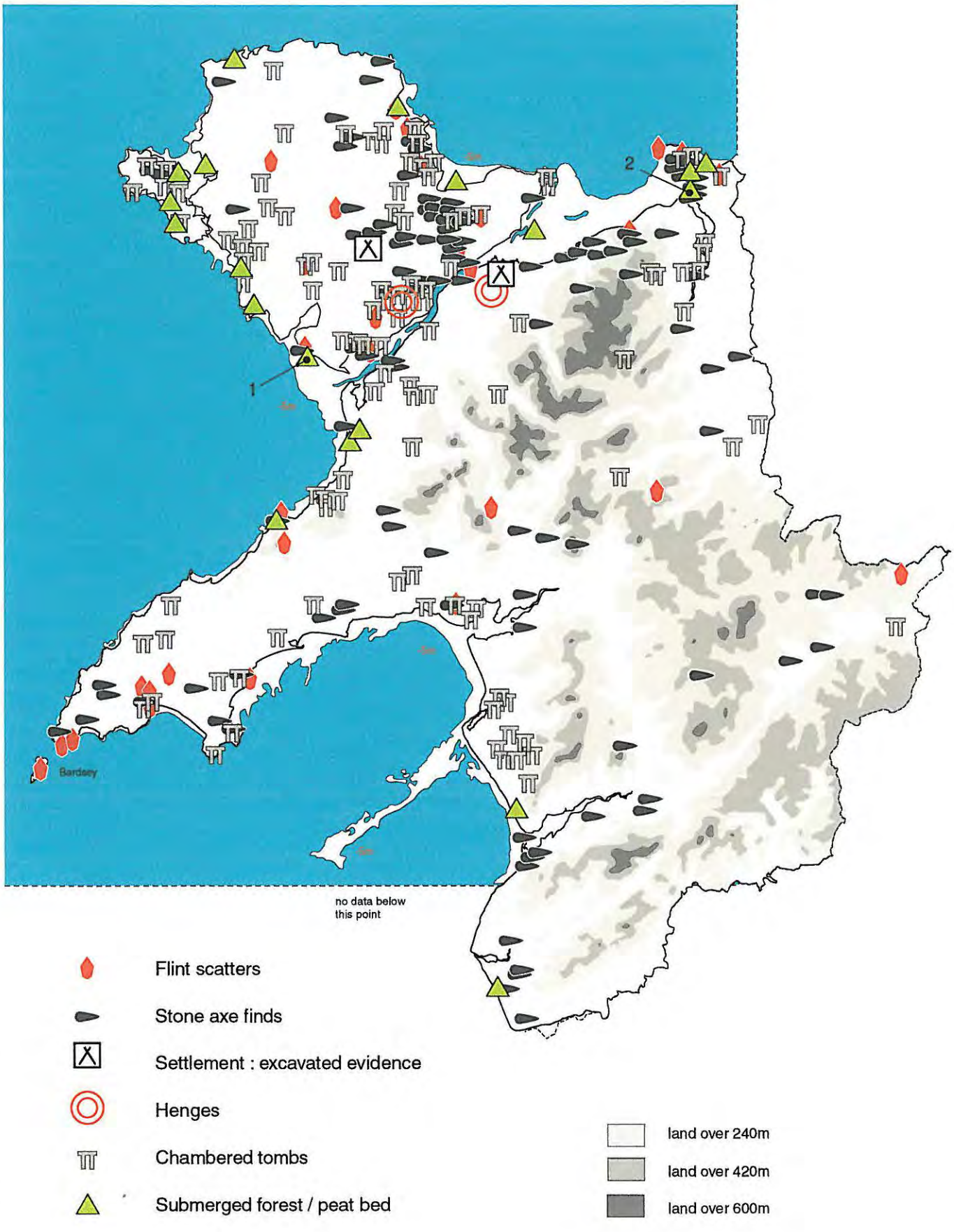
l. Survey natural lakes, in association with d., e. and f., and Neolithic research (below), to identify past lake levels, former shorelines, submerged surfaces and former lakes.

m. Incorporate Palaeolithic and Mesolithic sites in monument protection schemes and identify and protect environmentally important natural deposits for this period.

n. Incorporate the notion of potential for this period into Development Control work, for instance in looking at pipeline cuttings.

4.3 Neolithic (Fig. 9)

Despite the presence of numerous finds of stone axes there are relatively few flint finds from North West Wales that can be specifically assigned to this period and these are mainly stray finds of arrow-heads. Possibly most of the undiagnostic flint scatters (Fig. 8) belong to this period, since Mesolithic activity is more easily identifiable because of the presence of a characteristic, microlithic technology. However, despite the small number of finds it is worth comparing their distribution with those of axes and contemporary monuments.



Lithics Report - Fig. 9. Neolithic flint and stone finds and monuments in Gwynedd. Submarine contour at -5m indicates approximate coastline, with identified submerged forest / peat bed evidence.

4.3.1Early Neolithic

Characteristic lithic artefacts found include bifacially worked leaf-shaped arrowheads, ovates and knives, as well as fully ground stone axes. In areas of western Britain generally reliant on poor quality pebble flint an 'écaillé' (splintered) technology is often present, where pebbles are split by a hammer and anvil technique, producing small, irregular 'scalar' flakes which are then utilised or further shaped. The change from the finely worked flintwork of the Later Mesolithic may be because there were then better flint sources available on the beaches that were exposed when the sea-level was lower.

Although this period is typified by a whole range of distinctly new elements, the occurrence of surface lithic scatters and of scattered pits, often mixed with or in similar locations to Later Mesolithic material seems to show that the economy and lifestyle changed only gradually, and this is corroborated by evidence of a continuing but declining collecting/hunting subsistence base. The period remains poorly understood because of the lack of identified settlement sites. There must have been a continuation of the hunter-gatherer lifestyle represented by some of the flint surface scatters of mixed Mesolithic-Neolithic character, or of undiagnostic scatters that lack any datable tool types. These often occupy similar topographic situations to the Mesolithic sites, on promontories or knolls overlooking permanent streams or springs as at Trefor, near Clynnog Fawr and St. Mary's Well, near Aberdaron. At the same time agriculture-based settlement developed on the best of the low lying, but better-drained land, demonstrated by the distribution of megalithic tombs (Fig. 9). These settlements can be expected to have had substantial timber-built rectangular houses similar to that which preceded the henge at Llandegai and was dated to 3290 +/- 150 BC (NPL-323) (Savory 1980, 212). The settlements were established amongst well-wooded land as shown by pollen evidence from below the Trefignath (Holyhead) chambered tomb (Smith and Lynch 1987), but such woodland was subject to extensive clearance from this time on, probably accompanied by a deterioration in the quality of the soils.

No examples of causewayed camps have yet been identified in north Wales, but their function may have been fulfilled by some different type of monument, not yet recognised. Such sites are likely to exist where concentrations of chambered tombs indicate a major population presence. They are also relatively slight, compared to, for instance, Iron Age enclosures and, with chambered tombs lying mostly in arable areas, are likely to have suffered from plough erosion. They may well be located by aerial survey or by lithic surface collection in combination with geophysical survey. The latter approach has been used for the area around Bryn Celli Ddu, Anglesey, where a possible causewayed camp has been located (Edmonds and Thomas, 1991) and publication of the lithic scatter evidence is in progress.

4.3.2 Later Neolithic

The typical lithic artefacts for this period are asymmetric and chisel-shaped flint arrowheads, ground and polished flint knives and axes, perforated mace-heads and decorated stone objects. It is in this period that the stone axe quarries seem to have been at their most active with objects being distributed right across Britain from quarry factories in north-west Wales (Graig Llwyd), south - west Wales, the Lake District and Cornwall. The size and extent of the industry and trade involved was exceptional and so the quarry and axe factory at Graig Llwyd (Penmaenmawr) is a site of national importance. Over a hundred ground stone axes have been recorded as isolated surface finds in North West Wales and their distribution, together with that of scatters of waste flint (Fig. 9), gives some idea of the distribution of Neolithic activity and may point to areas of possible settlement. Most notable is the bias towards the coastal lowlands but with a wide distribution that contrasts with a more restricted distribution of Bronze Age lithic finds (Fig. 10). The dense grouping in east Anglesey may be because of collector bias (Lynch, pers. com.). The shortage of good quality local flint was supplemented in this period by the importation of better quality mined flint possibly as flake 'blanks' like those in a 'hoard' found on a hill-top near Penmachno (Davies 1939).

At the beginning of this period the sea level was about 5m below present levels. There were also at least two major phases when sea-level retreated again, the last at about 3000 BC, lasting for as much as 500

years before gradually rising again to, and for a while beyond, present levels before retreating to those seen today (Tooley 1974).

Future research needs to concentrate on the identification of settlement generally but particular areas requiring attention are:

a. Study of the Mesolithic/Neolithic transition: a few sites exist where Mesolithic and Neolithic artefacts are found in close association, such as Boncyn Ddol, Dolwyddelan (PRN 3450).
b. The submerged and raised coast edge.
c. Publication of Llandegai henge excavation material (Houlder 1968).

4.4 Bronze Age (Fig. 10)

There are very few lithic collections that can be assigned to this period, in part because use of flaked stone was declining anyway. The recorded collections are mainly of two types - either excavated collections or stray finds. The excavated material derives chiefly from burial monuments but includes that from the one excavated settlement of Meyllteyrn Uchaf, Llŷn (Ward and Smith forthcoming). The single isolated finds are mainly of barbed and tanged arrow-heads and probably just casual losses during hunting. Some of the undiagnostic collections (Fig. 8) may also be of this period. The only exception to the above are a plano-convex knife and waste flakes from an area between two standing stones at Tir Gwyn, Llannor, Llŷn (PRN 1534, 3651), suggesting some potential for further investigation. This was chosen for survey as part of stage 3 of the project but permission for access was refused.

The possibilities for future research in this period are limited by the lack of material and particularly of known areas of domestic or industrial activity. Considering that movement of bronze, gold and other objects of jet and amber became frequent in the second millennium, some movement of flint may have also occurred. Raw material study of flint in burial associations, for instance, might therefore be informative.

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5. Stage 3: Trial site evaluation

5.1 Objectives

1. To test the possibility that a small surface collection of lithic artefacts may indicate the presence of earlier prehistoric settlement. Evidence of such settlement has been almost absent from north-west Wales, despite the presence of numerous funerary and ritual monuments and widespread finds of stone axes.

2. To employ a variety of techniques to evaluate the location, both to help locate any activity area and to test the usefulness of the techniques themselves.

3. To assess what surface collections might represent in terms of survival of below ground remains and to what extent such remains might be at risk of erosion by cultivation.

5.2 Fieldwork design

This aimed to be a focused programme of scientific evaluation of a selection of three sites identified as of particular potential from the desktop study and field visits. The three sites would be studied by further collection, if possible, by soil auguring to test soil types and depth, by soil sampling for phosphates and magnetic susceptibility and by geophysical survey. The results aimed to provide an understanding of the processes that create scatters, of what scatters signify in terms of sub-surface features and of what is the true potential of such sites.

5.3 Boncyn Ddol, Roman Bridge, PRN 3450

5.3.1 Introduction

This collection site is one of three identified in the upper Lledr Valley, thanks to the observation of Judy and Robin Robbins of Garnedd, Roman Bridge. All three areas are in partly improved pasture and the finds were made piecemeal over several years by collections from molehills, river banks, ditch cuts and other minor exposures which have produced diagnostic pieces of later Mesolithic, earlier and later Neolithic date. Boncyn Ddol appears to be the most extensive area of activity, on a low knoll of better-drained land within the marshy floor of the valley. The other two are Ty'n Ddol Quarry, 400m to the west and Ty'n Ddol, 400m to the north-west (Fig. 11). The Ty'n Ddol Quarry collection comes from the summit of a prominent, grassed-over rocky knoll with prominent views over the valley. The knoll also has a well preserved medieval long-hut on its south side and traces of associated orthostatic wandering walls. The knoll was quarried for slate in the 19th century. The grassed area of the knoll has produced a small collection that includes a later Neolithic oblique arrowhead and a thumbnail scraper. Ty'n Ddol lies on a small meadow by the side of a small stream where it enters the valley floor. This area was evaluated by gridded trial pitting by GAT in 1990, prior to construction of a small turbine house on the stream bank (Boyle 1990). The surface collection and the excavation suggested that this was an unmixed later Mesolithic activity area.

Boncyn Ddol is part of the farm of Nadog Uchaf and thanks go to Mr Gwynrhos Jones for permission to carry out the evaluation work in 2000. The surveying work and illustrations were by L. A. Dutton and the geophysical survey by D. Hopewell.

5.3.2 Topographic background

The mound of Boncyn Ddol ('Meadow of the little cliff') lies at 180m OD and consists of a large rock outcrop sculpted and smoothed by the passage of a glacier down the valley, leaving a craggy summit on a lower, elongated ridge, following the line of the valley. This kind of ice-sculpted knoll is known as a 'roche moutonné'. The Ty'n ddol quarry site is on another similar knoll. The ridge provides a small area of relatively level but well-drained land, raised above the valley floor of reedy marsh to the north and east and by deep peat to the south. This peat, about 0.80m deep, overlies preserved woody remains and it has been suggested that it occupies the area of a former lake, *Llyn Dolathelan*, shown on the maps of Caernarvonshire of Saxton of 1578 (Fig. 11) and Speed of 1610. The position of the lake referred to cannot be in doubt because a second lake is shown to the east, the position of which is fixed because it is shown adjoining the medieval Dolwyddelan castle. However, there is no mention of such lakes in documentary descriptions such as the Gwydir papers and it seems likely that these were seasonally flooded lakes. They must have been drained in the 18th century for they are not shown on the 1st edition OS map of 1840 or John Evans map of 1795. The topographic possibility of a lake near Boncyn Ddol is shown by the relatively level valley floor at this point, the river also has circuitous meanders, while there are numerous drains and it is clear that the river has been straightened. 1km to the east the river enters narrows at Bertheos and a small amount of engineering work could have helped drain the upper valley. The peat bed also has well defined edges with a break of slope, where it approaches Boncyn Ddol. This matches closely with the 180m contour line. This has been plotted to indicate the probable outline of the former lake, compared to Saxton's depiction of it (Fig. 11).

The higher area of the Boncyn Ddol would have been a small promontory in the lake, an attractive location for early settlement - well drained, close to the river and lake. Nearly all the flint finds have come from this ridge, although partly because only here are the moles active, providing exposures. The ridge is also traversed by the remains of an old track way, shown on the OS map of 1840. This is still visible in places here and further up the valley as a laid stony surface with slab edging. It formerly provided the main route up the valley before the road along the valley side was constructed with the opening of the Ty'n Ddol quarry in 1871. The older road may well have been in use as early as the 12th and 13th century AD, when the long hut on Ty'n Ddol was probably occupied and Dolwyddelan castle provided a focus for settlement. Boncyn Ddol has not been ploughed in living memory but was once a hay meadow and coarse pottery,

table-ware, glass and coal from the mole-hills shows that it must have been manured and ploughed in the 19th century.

5.3.3 Project Background

After their discoveries the Robbins had invited several people to comment, including Frank Jowett, archaeologist with the Great Orme Mines, Rob Gritten, ecologist with the National Park and Peter Crew. A short note on the finds was made for Cadw in 1993 and a longer account by Mr Robbins in 1994 was also submitted to Cadw. The significance of the finds was accepted because of their rarity, considering the almost complete absence of finds of Mesolithic or Neolithic date from the whole of Snowdonia apart from a very few isolated single finds. Existing evidence, if it was representative, suggested that in these periods settlement was confined to the lowland coastal strip of Caernarfonshire and Anglesey. Nothing else could be done about these finds at the time because they fell outside the remit of Cadw, not being upstanding structures and not directly threatened in any way. However, because of the potential value of the finds, four 1m square trial trenches were excavated at the east end of the ridge, as a private investigation, in 1996 and four more in 1997. These aimed to:

- Demonstrate the actual occurrence of lithic material below ground.
- Investigate whether such material derived from intact stratified levels.
- Produce an adequate sized assemblage for analysis.
- Show the horizontal distribution of lithic material

The results of these excavations will be presented after the description of the 2000 survey, below.

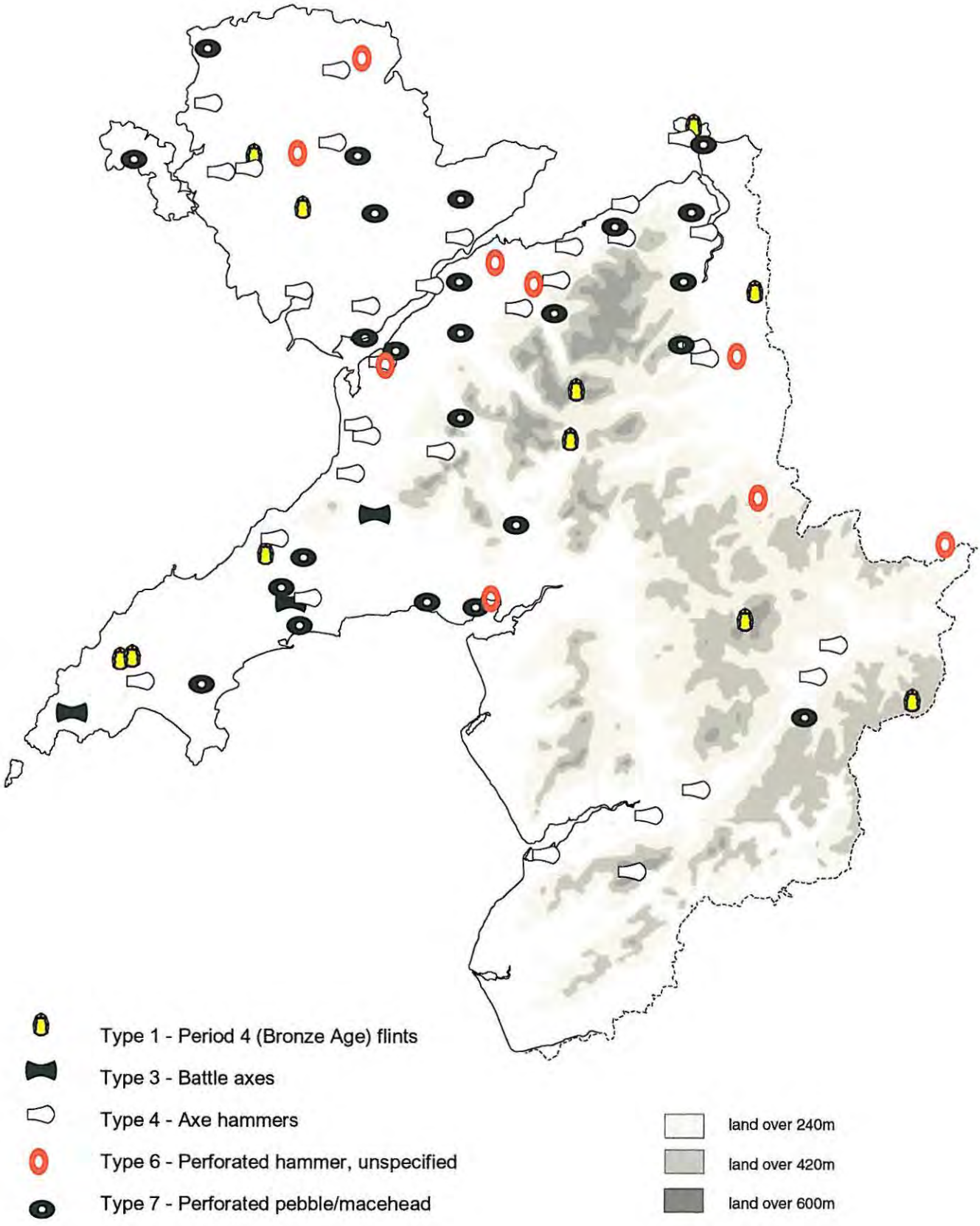
5.3.4 The Survey

This was designed to evaluate the whole ridge of Boncyn Ddol from which occasional lithic surface finds were widespread and using the basic approach that had been designed for the project as a whole. A grid of 20m squares was laid out and 12 of these squares were surveyed by magnetometer. The topsoil of area was also sampled for phosphates and magnetic susceptibility on a 10m grid. An additional area of 20m by 60m was also sampled to provide control samples. The area was also trial pitted in 14 places to record topsoil type and depth. At the same time a detailed topographic survey of the immediate area was carried out to locate the sampling grid and to relate the resulting information to the contours (Fig. 12).

The topographic survey shows the gentle contours of the ridge. Although not evident on the survey, the western summit of the ridge is slightly higher and might be expected to be a focus of settlement although the majority of the scattered surface finds have come from the eastern summit, where the eight trial trenches were excavated. The contours clearly show a break in the slope where the valley bottom peat begins and this supports the documentary evidence that there was once a lake here. The most recent, machine-cut drainage ditches in the peat are shown, where timbers and brushwood were exposed beneath the peat. However, there are numerous other, silted and grown-over drainage cuts in the same area. The rocky outcrop on the higher summit of the area has been truncated by quarrying on its south side where there are also a ruined 19th century barn or cattle shed and a yard. On the east side of the mound is a small, irregular, sub-circular enclosure defined by a grassed-over stony bank. This lies on a significant slope with no attempt at levelling the interior and so must have been just a small fold or pen, perhaps contemporary with the Medieval (?) long hut at Ty'n Ddol quarry.

5.3.5 The Geophysical Survey

This produced satisfactory results considering that it was feared that the presence of outcropping and possibly magnetic rock might produce too much natural background interference. However, despite the reasonable measurements attained and the use of as the maximum density of measurements, no archaeological features could be recognised (Fig. 12). The absence of substantial cut features was to be



Lithics Report - Fig.10. Bronze Age lithic finds in Gwynedd

expected for the Mesolithic occupation but it was possible that substantial occupation might be marked by areas of pitting or burning while for the Neolithic occupation some sort of ditched enclosure would be a possibility although it might be fairly shallow and intermittent. Two small sub-soil features were found in one of the 1997 trial trenches but the largest was only *c.* 0.45m dia. and 0.25m deep and although other features can be expected in the same area no geophysical anomalies were recorded there. Only one anomaly shows on the survey, a large linear disturbance along the line of the ridge top at the east end. This might represent the remains of the former trackway that followed the ridge, but it may also just represent a line of outcropping bedrock.

5.3.6 The Soil Survey

The soil sampling design was developed after discussion with Dr David Jenkins and Dr Ian Kelsoe of the University of Wales, Bangor who suggested a sample size of about 250gm. A grid spacing of 10m was chosen to provide the most reasonable results combining the area that needed to be covered with the likely costs of analysis. There was also an allowance that the sampling should cover about a third more than the main area of investigation, in order to provide background control samples. This was carried out for the phosphate and magnetic susceptibility samples.

a. The soil depth pits were intended primarily to show whether colluvial processes had been active on the site as if so these may have affected the distribution of surface material and might be relevant to the results of the soil analysis. It was at first thought that the soil depth data would also come from each of the sampling pits on the 10m grid. However, in many cases the soil profile was deep and sampling at this density would have entailed too great an expenditure of time. Soil pits were therefore dug at 10m spacing along one direction of the grid but only at 20m spacing in the other direction. With 'staggering' of the soil pits this gave an overall coverage of every 14.14m. These pits were dug to what was regarded as the base of the topsoil, i.e. until some kind of natural subsoil was reached. The depth was recorded and the soil and subsoil were also briefly described. The soil samples were given the site grid co-ordinates while the soil depth pits were also individually numbered.

The test pitting (Fig. 12) showed only surprisingly small variation in the topsoil depth across the area, from a minimum of about 200mm on the top of the ridge to 300mm off the edge of the ridge, in the marshy area to the north. In one place (Pit 10), close to the trial trenches, outcropping rock was reached at a depth of 120mm. The soil development did not appear to have been affected by colluvial movement by natural means or ploughing and so seems unlikely to have affected the distribution of archaeological material. Similarly it shows that there is little chance of better preservation because of colluvial accumulation within the soil sampled area although the valley bottom peat to the south provides significant potential, discussed further below. Despite being ploughed in the past no cultivation features were identified in the geophysical survey. This is probably because the depth of topsoil was insufficient to allow the formation of slight subsoil features.

The soil survey showed that the development of soils in the area of investigation was quite varied and helped to show the special qualities of Boncyn Ddol that made it attractive for early prehistoric settlement, There were four main soil types evident:

1. Pit 11. At the south-east corner the area extended into the deep, undisturbed valley bottom peat.
2. Pit 13. On the slopes of the main rock outcrop of Boncyn Ddol. Dark brown silty loam developed over stony subsoil.
3. Pits 2 and 3. Dark brown silty humic loam developed over gleyed stony clay till.
4. Pits 1, 4, 5, 6, 7, 9, and 12. Orange-brown silty loam with about 20% rock fragments developed over fine, red-brown till. Pits 8 and 14. Similar to 4 but overlying shale bedrock.

Soil type 4 is the predominant soil of the ridge and very localised to it. It is relatively fine, friable and free draining. Its substrate is also quite friable and shows that the ridge is not just of rock but has a cover of till, possibly some kind of moraine since it seems quite different to the sub-soils just off the ridge. The valley bottom peat lies over clayey stony subsoil that does not look like lake sediment. At its base is also a variety

of preserved organic remains including possible tree roots and brushwood suggesting that perhaps reed peat developed over swampy carr woodland. It is possible that the peat developed as a lake deposit but botanical analysis is needed to explain it. Close to the edge of the peat and at its nearest point to the ridge (Fig. 12) several oak (?) timbers are exposed in the side of a recent drainage ditch, two horizontal, one vertical. It is possible that these are contemporary with the flint scatter and if so would give it greatly increased value. Only radiocarbon or dendrochronological dating, together with the botanical analysis can help to explain how and when the peat developed.

Pit no.	Depth of topsoil (mm)	Comments
1	300	
2	250	
3	300	
4	220	
5	210	
6	240	
7	200	
8	200	
9	280	
10	120	
11	>700	Valley peat
12	280	
13	240	
14	200	

b. The 91 samples for chemical and magnetic susceptibility analysis were taken from about 15cm depth, immediately below the modern turf-line. The results may indicate areas of prehistoric settlement activity by enhancement of phosphate values due to organic residues or by enhancement of magnetic susceptibility values due to residues of burning. These kind of surveys have been widely used on later prehistoric sites but have so far only been used experimentally on lithic scatter sites (e.g. Entwhistle and Richards 1987).

Additional comments, June 2001.

The results of the soil analysis by John Crowther of Lampeter University are set out in full in Appendix 7. A summary is provided here:

- The peaty soils at the north and south-east were excluded because of the likelihood of spurious readings.
- The magnetic susceptibility readings were consistently high and all significantly higher in the 'lithics site' samples than in the control area. They show a clear concentration of high values along the ridge to the west of the main area of lithic finds.
- The phosphate readings showed no significant difference between the 'site' readings and the controls. There was area of significant pH enhancement at the east end of the area suggesting that it continued beyond. The strength of the readings suggested that they were unlikely to result just from post-medieval agriculture since the readings would then be more evenly distributed.
- The results as a whole suggest that the site has potential for further work.

5.3.7 The Robbins Surface Collection

This collection is made up of a large number of pieces, collected over several years, mainly as isolated single finds from mole workings. The pieces also come from a wide area around the Boncyn Ddol ridge. Most come from the ridge itself but a number from the field to the east and from exposures in the stream bank to the west. Because of the way that the collection accumulated it is not possible to plot its

distribution. Generally the largest number came from the area at the west end of the ridge which was sampled by 8 test pits. There was also a group of microliths at the north-east edge of the ridge, a group of crystal quartz pieces from the western summit of the ridge and a small, isolated knapping cluster by the side of a small rock outcrop in the adjoining field to the east (Fig. 12).

The raw material is almost entirely flint. There are three pieces of banded chert and one piece of black chert. There are also several pieces of crystal quartz, both complete crystals, flakes and one retouched piece. The flint is of reasonable quality and predominantly of different shades of a rather matt, reddish-buff colour, most quite fresh and uncorticated. The few pieces of unused raw material are of small, sub-rounded pebbles, up to 80mm long, which must derive from glacial deposits, not being as rolled as that found on beaches. There are a few pieces of very dark grey-black shiny flint, some with a thin, nodular cortex, which could be derived from a different source.

The collection (Table 19) is typified by the number of quite small neat blades and blade segments. These may have been made for use in their own right as there is almost a complete absence of notched blades or of microburins to show that the blades were a by-product of microlith manufacture. There are relatively few cores and all are of the same general type - small, conical, single platform, the largest only 40mm long.

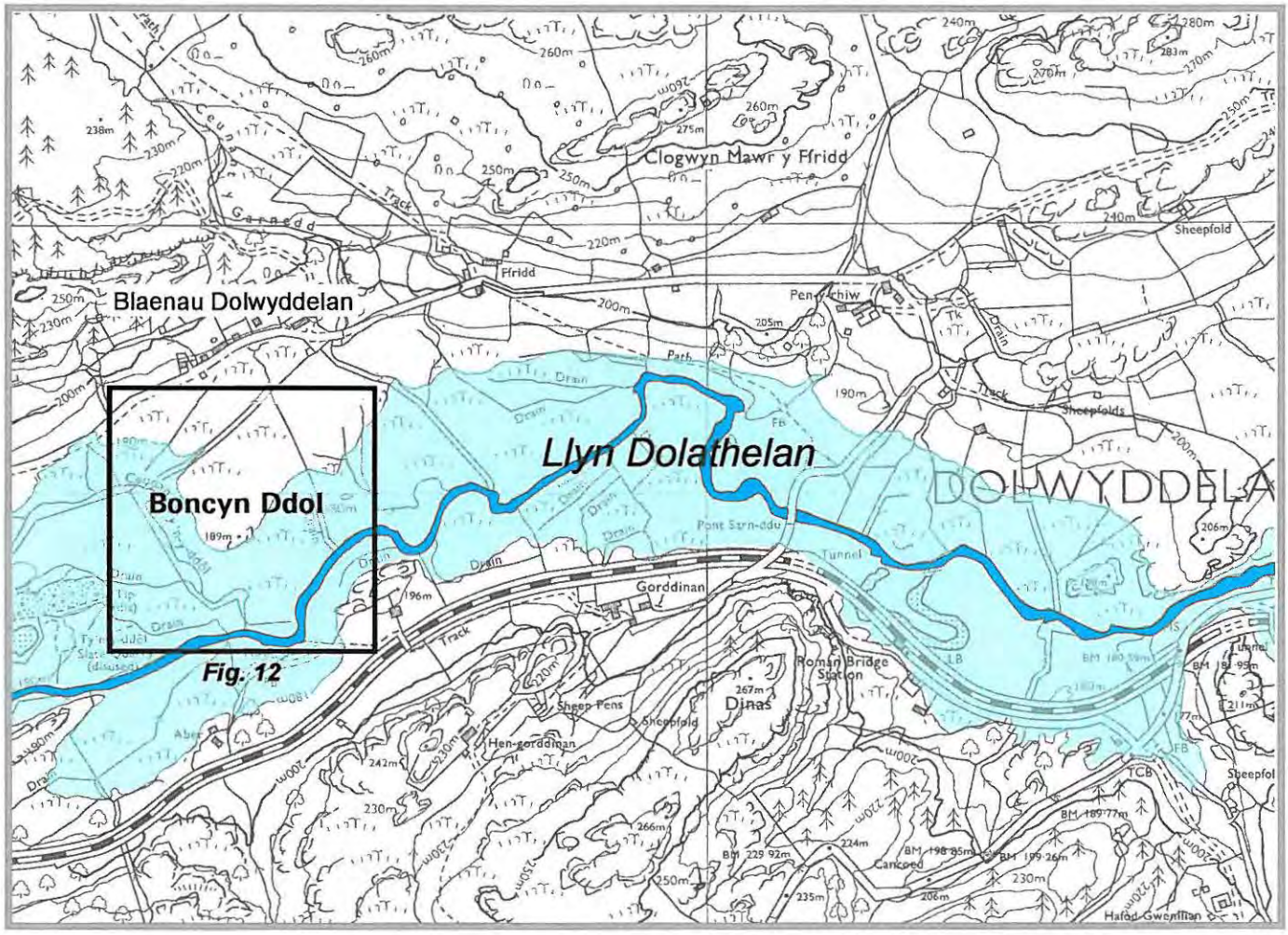
The larger retouched pieces are very few, comprising 3 convex end scrapers, a spurred piece on a backed blade, an unclassified impact fragment and a fragment of a leaf-shaped arrowhead (Fig. 13, no. 2). One of the scrapers is large and of the better quality black flint and is probably of Neolithic date (no. 1). The microliths include two broad-blade pieces of Early Mesolithic type (nos 3 and 4), one a triangle, the other convex-backed. The remainder (e.g. nos 5-11) are narrow-blade pieces of Later Mesolithic type, including scalene triangles, straight-backed, convex-backed and lanceolate pieces.

Table 19 Boncyn Ddol, Robbins surface collection, summary of assemblage

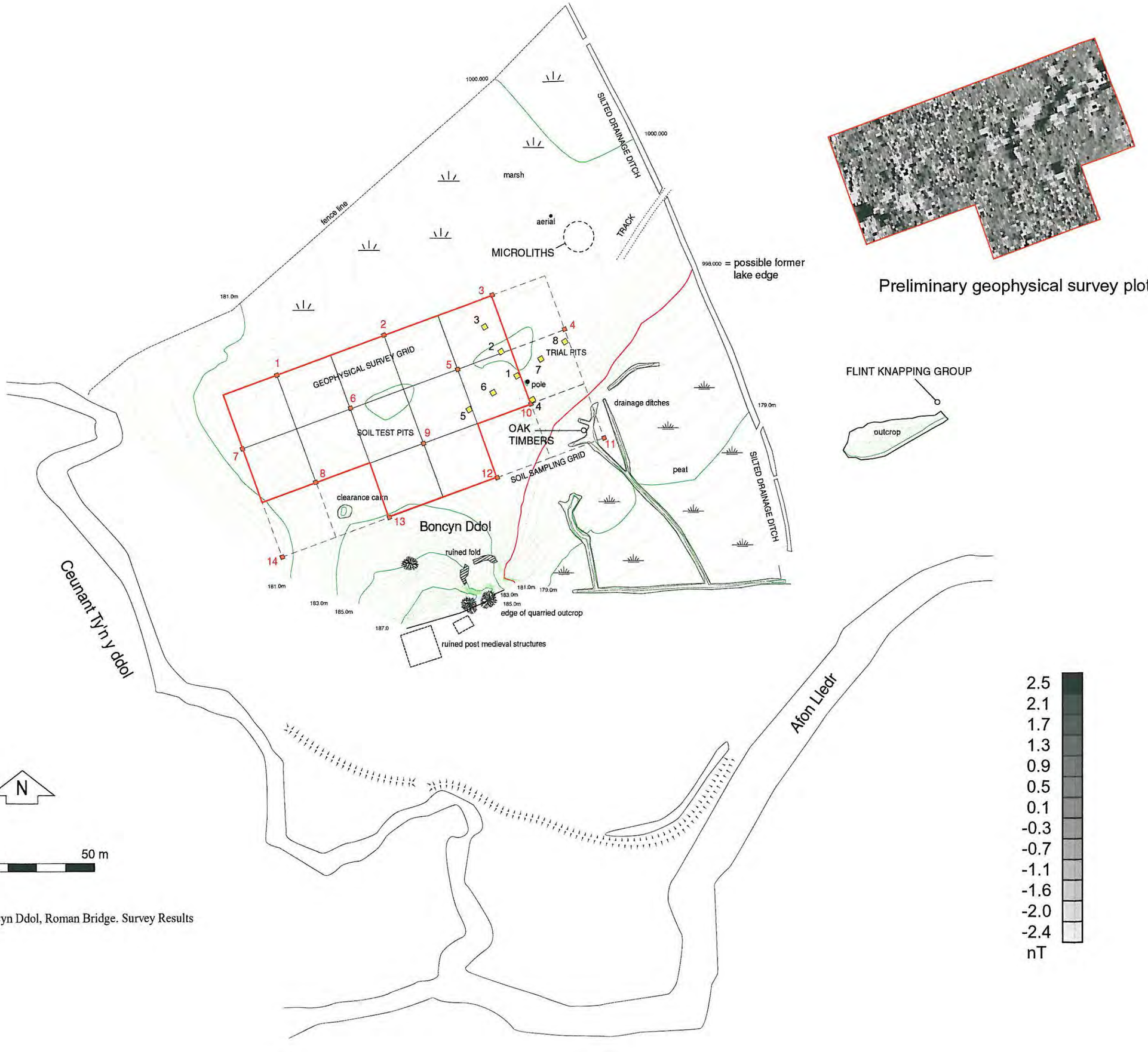
A. General area

Crystal quartz	***No.***
Flakes, frags	14
Casually retouched piece	1
Flint/chert	
Blade, blade segment, blade core trimming piece	100
Flake/fragment	331
Irregular fragment	38
Microblade/spall	8
Core	10
Burnt piece	3
Unworked chunk	7
Retouched piece	7
Casually retouched piece	8
Microlith	10
Microburin	2
Split pebble	1
Microlith? impact spall	1

Lithics Report Fig. 11a . Extract from Saxton's 1578 map showing location of Llyn Dolathelan

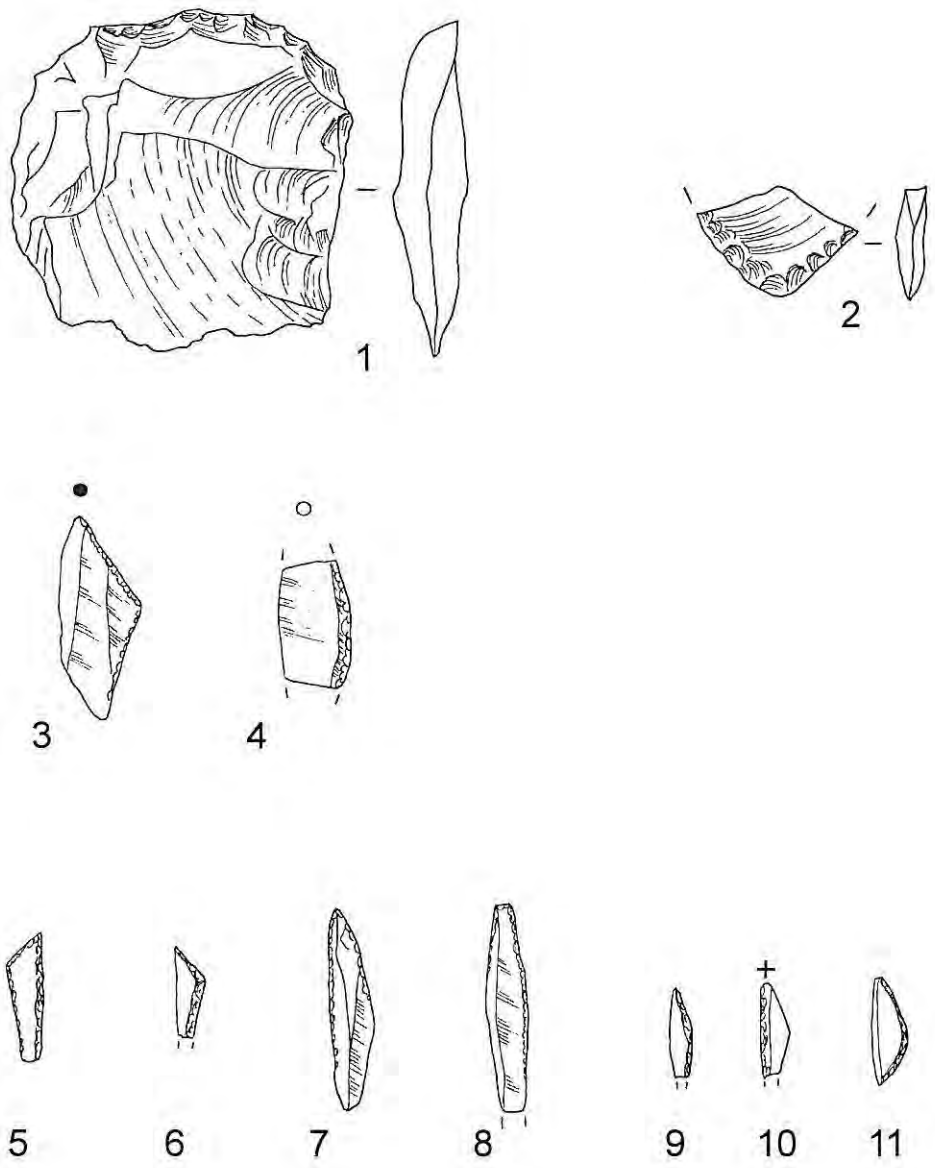


Lithics report Fig 11b . Location of Boncyn Ddol, Blaenau Dolwyddelan, showing possible extent of Llyn Dolathelan



Preliminary geophysical survey plot

Lithics Report - Fig.12. Boncyn Ddol, Roman Bridge. Survey Results



Lithics Report, Fig. 13. Boncyn Ddol, Surface collection,
+ Bulb of percussion present. ● Direction of missing bulb.
○ Probable direction of missing bulb. Scale 1:1.

B. Eastern outcrop, knapping cluster

Flint	*No.*
Blade/fragment	7
Flake/fragment	16
Microblade/spall	20
Microblade fragment with retouched notch	1

C. Retouched pieces

Flint	*No.*
Convex scraper	3
Heavy scraper	1
Spurred piece on a backed blade	1
Leaf-shaped arrowhead fragment	1
Unclassified impact fragment	1

D. Microliths

Flint	*No.*
Scalene, broad-blade	1
Convex-backed, broad-blade	1
Scalene, narrow-blade	3
Lanceolate, narrow-blade	2
Straight-backed, narrow blade	2
Convex-backed, narrow-blade	1
Microburin, tip	1
Microburin, butt	1

E. Cores

Flint	*No.*
Conical, single platform	8
Flat, single platform	1
Irregular, single platform	1

Overall the collection shows that Boncyn Ddol was used over several millennia, from probably the seventh millennium BC. The diagnostic artefacts, though few, are dominated by projectile points suggesting that the occupation consisted of repeated seasonal visits for hunting. This is supported by the small number of scrapers present, because these are usually taken to imply processing and more domestic activity. In addition, there is a complete absence of other kinds of processing equipment such as choppers, hammerstones, rubbers or other utilised pebble tools. There is, however, a spread of burnt stone over the ridge.

5.3.8 The trial excavation: summary

Eight 1m square pits were excavated at 8m intervals across the east end of the ridge where the greatest concentration of flint finds had been made (Fig. 12, Trenches 1-8). These showed immediately that the area must have been ploughed in the past because of the well-mixed nature of the topsoil and the presence of fragments of 19th century pottery fragments. The soil depth averaged 250mm and the ploughing had therefore cut down to the sub-soil surface, so there appeared little chance of any surviving prehistoric horizons.

In five of the trenches, 1, 2, 4, 5 and 6, the topsoil overlay a natural yellow-brown silty sub-soil with numerous water-worn slate fragments. This became firmer and more cemented with depth. In trenches 7 and 8 shattered shale bedrock outcropped while in trench 3 were two large rock slabs, probably glacial erratics.

The plough soil in all trenches produced some struck worked flint and there was also some worked crystal quartz and pieces of burnt stone, probably dolerite. Parts of three features were identified, cut into the sub-soil. One was in trench 8, possibly circular, *c.* 0.60m dia. Two were in trench 5, one *c.* 0.20m dia. possibly a post-hole, the other *c.* 0.45m dia. Only the latter was excavated, showing it to have a rounded base and *c.* 0.25m deep below the subsoil surface. In the fill were a number of burnt stones, a fragment of burnt clay and some charcoal. A grant was gratefully received from the Cambrian Archaeological Association for dating and a radiocarbon determination for the charcoal was 3340 $\pm$ 70 BP (Beta-128500), cal BC 1765 to 1450 at 2 sigma (Stuiver 1998).

Table 20 Boncyn Ddol, trial excavation: Summary of assemblage

Category	*Tr 1*	*Tr 2*	*Tr 3*	*Tr 4*	*Tr 5*	*Tr 6*	*Tr 7*	*Tr 8*
Flint flake/frag	15	11	5	6	6	7	7	3
Flint irregular frag	1	-	-	-	-	-	1	1
Flint core/frag	3	-	-	-	-	1	-	-
Flint retouched piece	1	1	-	-	-	-	1	-
Flint, thumbnail scraper	-	2	-	-	-	-	1	-
Flint utilised piece	-	1	-	1	2	-	-	1
Flint burnt piece	1	-	-	-	-	-	-	-
Flint natural? fragment	-	1	-	-	-	-	-	-
Crystal quartz flake/frag	1	-	-	5	1	-	-	-
Quartzite core	-	-	-	-	1	-	-	-

5.3.9 Discussion

The surface collection shows evidence of activity over a very long timespan here, certainly several millennia, including typical artefacts of the earlier and later Mesolithic as well as earlier Neolithic. The trial trenches produced no clearly diagnostically datable artefacts (Table 20). The thumbnail scraper is a type most typical of Beaker period assemblages but in an area where only small pebble flint is available could be of any period. However, the radiocarbon date falls within the Early Bronze Age and, although it was only indirectly associated with the flint scraper, activity here in the earlier second millennium seems certain. It has also been suggested that the radiocarbon determination may have been affected by ground water contamination of the charcoal with radioisotopes from Chernobyl, which happened to affect this particular area. These could shorten the carbon half-life and produce a 'younger' date than was really the case. It may be possible to calculate the bias of the determination and this is being considered.

The surface area here has not been exposed by ploughing and the surface collection was only achieved by scattered finds over a long period. The variety of diagnostic lithics and their distribution shows that the ridge was used over a long time span. In Jacobi's interpretation of Mesolithic economic activity (Jacobi 1990, 191-8), there would be more permanent winter base camps in the lowlands, close to the coast and more temporary summer camps in the interior and at greater altitudes, exploiting a variety of resources. Boncyn Ddol, Ty'n Ddol Quarry and Ty'n Ddol could be seen as summer camps and the river, and perhaps lake, would have provided an easily exploited food source. For instance, salmon and eels have been cited as possible important resources in post-glacial Ireland (Woodman 1978, 362-3). The salmon move upstream in spring and early summer and may have been easily collected in the autumn if the lake was a spawning ground. The eels run downstream in the autumn. Boncyn Ddol would also have provided a base for hunting/collecting expeditions in the uplands and forests. The particularly high potential productivity of edible plant products in wetland locations has also previously been highlighted (Clarke 1978, 20-1) suggesting that fishing may have not been the prime reason for their occupation. As a very favoured location it would not be surprising if Boncyn Ddol continued to be visited on a seasonal basis into the second millennium. The distribution of surface finds suggests that it may be possible to distinguish some chronological patterning and so to identify different foci of activity for different periods. It was hoped that this would be supported by additional information from the soil analysis.

5.3.10 Recommendations for future work

The soil survey indicates areas of different activity but the results are quite general and could only be interpreted if followed up by trial excavation (see below). There are no clear geophysical features and the surface finds are very scattered. Presuming that the site was seasonally occupied, areas of use may have shifted. If the whole area was excavated some foci of activity would no doubt be perceivable. Using the presently available information there is some grouping of finds that may indicate areas of use in different periods. There is a small area of waste pieces with later Mesolithic microliths at the north-east of the area. The only diagnostic Neolithic pieces have come from the south-west part of the area. The eastern summit in contrast, although investigated by trial trenching, has produced no diagnostically Neolithic or Mesolithic pieces, but a radiocarbon date suggests activity in the second millennium, so a further period and area of activity is suggested.

Further information could be achieved by more widespread test pit excavation or by excavation of a larger area where the work has shown the presence of sub-soil features. Neither of those options is likely to be viable. It is hoped that the soil survey will be productive. If it were to suggest particular areas of activity then more detailed investigation could be carried out with limited, targeted areas of more intensive sampling and possibly test pitting to provide samples of artefacts and dating material.

The greatest research asset of the location is the presence of the deep valley peat. This provides the possibility of providing a dated environmental sequence for the area and, because of its proximity to the actual occupation area, the possibility of associated preserved organic remains. As a first step, column sampling of the peat is needed for dating and pollen analysis. The value and relevance of timbers within the peat sequence to the prehistoric archaeology could then be understood and be considered for excavation and dendrochronology. For instance, the higher timbers might be post-medieval while the basal deposits might be early post-glacial. As yet, no flints have been found in situ in any of the peat exposures to prove their worth although one group of flints appeared during machining of a ditch by the eastern outlying outcrop, suggesting that the flints were at some depth. Exploration of the valley bottom peat could take the form of cleaning and recording of drainage ditch sides, a technique that proved very successful at Flag Fen, Peterborough.

The field of Boncyn Ddol is under permanent pasture and is not presently at risk although future improvement by ploughing and reseeding must always be a possibility. Use of modern machinery might be much more deleterious to shallow sub-soil features than was the horse-drawn equipment of the 19th century. The peat deposits are slightly more at risk because of continued drainage machining although the ditches excavated about 5 years previously are now silting in and the lower levels, at least, are probably not going to dry out.

5.3.11 Additional comments, June 2001

a. Soil study, Summary comments on the soil report by Dr J. Crowther (Appendix 7)

Following completion of the soil analysis the full results have been included as Appendix 7 and summarised above. The analysis produced significant results that are useful for interpretation. They indicate an area of high magnetic susceptibility values on the ridge at the west of the study area. This can be seen to coincide with a diffuse oval feature, about 60 by 40m, possibly an enclosure, occupying the west-facing slope of the Boncyn knoll (Fig. 12). The phosphate results on the other hand show an area of high values at the east of the study area, so far unexplained. These results are encouraging enough to support further work. The recommendations by John Crowther are:

1. To extend the sampling survey to delimit the area of phosphate enrichment.
2. To carry out trial excavation work in the areas of high magnetic and phosphate values to test their interpretation.
3. To investigate the chemical and magnetic properties of a profile through the adjacent peat deposits to establish whether traces of human activity can be identified. This is being pursued, see below.

The inverse 'complementary' results of the phosphate and magnetic results have been noted elsewhere. One suggestion to help understand the meaning of the magnetic results would be to carry out a sampling survey of burnt stone distribution.

b. Environmental analysis: Summary comments on pollen studies by A. Caseldine (forthcoming)

Since the original survey, permission was attained to include the project in the Cadw scientific programme. Two columns were cut through the peat in the possible former lake bed just to the south of the site, by Astrid Caseldine. It was not known at this stage to what period the possible former lake and the peat within it might belong. It was possible that the 'lake' and its peat might be purely an early post-glacial phenomenon or the peat might be a relatively recent growth, neither with relevance to the Mesolithic/Neolithic activity. The full results are not yet available but preliminary study suggests that the peat may be relevant to the period/s of lithic deposition and Astrid Caseldine has offered the following comments.

Both diagrams are dominated by alder pollen. This suggest that they are both post alder rise, say post *c.* 7000 BP.

The lower part of the column further to the south of the survey area has more pine pollen in the base of the diagram.

Elm and oak are well represented in both diagrams.

In the column closest to the survey area a small piece of flint was discovered at -68cm. This was about the point where there was a drop in the elm count, followed by recovery. There was also one *plantago* grain at this point. Preliminary radiocarbon determinations from the column show that this point dates to about 3500-4000 cal BC (interpolated).

The results suggest that the peat development may belong to a late Mesolithic/Neolithic horizon. Preliminary radiocarbon determinations show that the relevant part of the peat column formed between 4620-4320 and 2880-2560 cal BC. The peat therefore was forming during the periods relevant to the flint scatters and can provide directly relevant environmental information so further work is justified.

5.4 Old Pier, Trefor, Llanaelhaearn, PRN 1470

5.4.1 Introduction

This site was only discovered about ten years ago as a result of a casual find from a coastal footpath. It was then visited as part of the Coastal Erosion Survey, G39, in 1993 when the site was identified as of high potential and further evaluation was recommended.

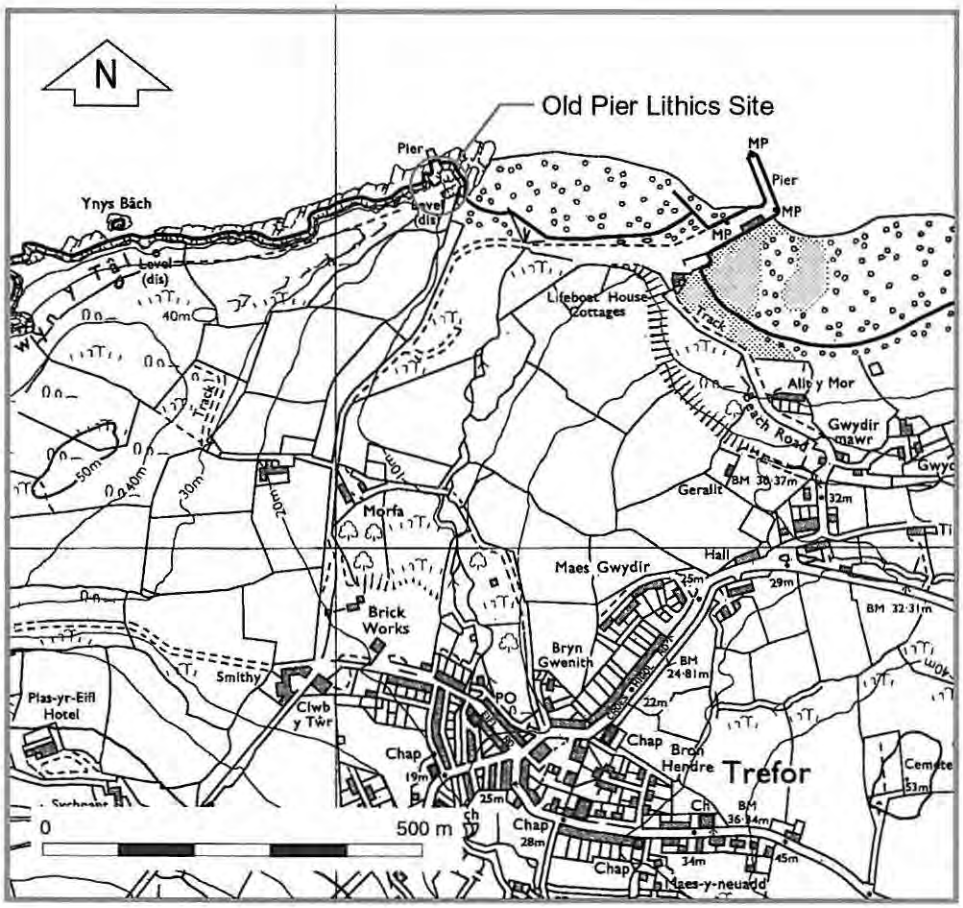
5.4.2 Location and summary of previous surface collections

It lies at 10-20m OD, on the end of a cliff edge promontory overlooking the mouth of a small valley (Fig. 14). The site has produced the largest purely surface collected assemblage of any in north-west Wales and several collections have been made by different visitors. Fortunately, it has been possible to view all but one of the known collections and these are combined and summarised in Table 21.

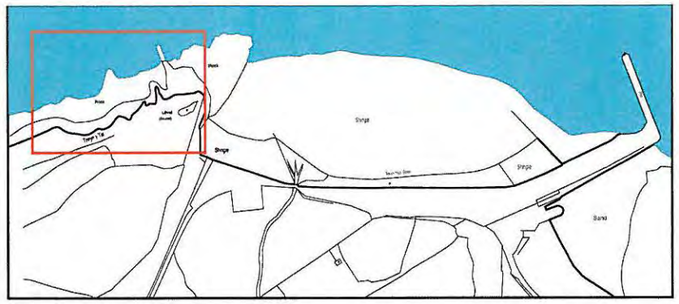
Table 21 Old Pier Trefor, Lithic assemblage summary

Category	*No.*
Retouched piece	1
Primary flake or frag	87
Secondary flake or frag	165
Tertiary flake or frag	97
Irregular frag	82
Burnt frag	4
Core, regular	14
Core, irreg. and partial	18
Split pebble	7

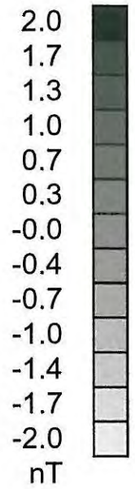
The most obvious features of this assemblage are its size compared to other surface collections in north-west Wales and that it consists almost entirely of waste material. It includes only one secondarily retouched piece, a small spurred piece (Fig. 16) and this provides no real clue to the date of the site. Initially, the presence of small, mainly single platform cores was taken to suggest a later Mesolithic date. However, despite careful collection there has been no evidence of microlith manufacture. Spurred pieces are regarded as typical of later Neolithic or Early Bronze Age assemblages but the piece here is not itself typical of such pieces and on its own cannot be regarded as diagnostic of date. The lack of microlithic material suggests that this may be a site of earlier Neolithic date and can be compared to coastal flint industries of South West Scotland of largely undiagnostic type but which include very occasional small ovates and bifacial, leaf-shaped arrowheads (e.g. Coles 1964). The high proportion of waste to retouched pieces suggests that main object of manufacture was just simple flakes. These could have been utilised without further working but the lack of signs of utilisation suggests that this was a kind of 'factory' site, producing flakes for use elsewhere. This is supported by the location of the working area on an exposed cliff spur, unsuitable for actual settlement and can be compared to several other coastal lithic sites in North West Wales, particularly those around the cliffs of southern Llŷn. The quantity of lithic pieces present shows that there must have been a good source of raw material close by. This could have come from the beach or from *in situ* drift deposits. Observation suggests that flint pebbles are rare on the beaches around here although it is possible that more beach material may have been available during a period of lower sea level. Occasional concentrations of flint pebbles can be found in the glacial drift and it seems likely that there was a substantial deposit of this type close by although no such deposit has been located. It could have been removed by coastal erosion as sea levels rose or have been masked by 19th century quarrying operations.

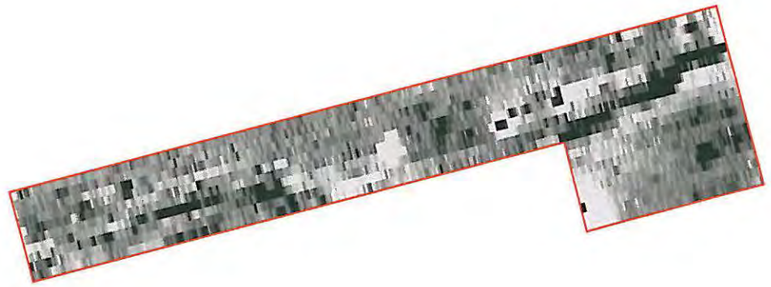


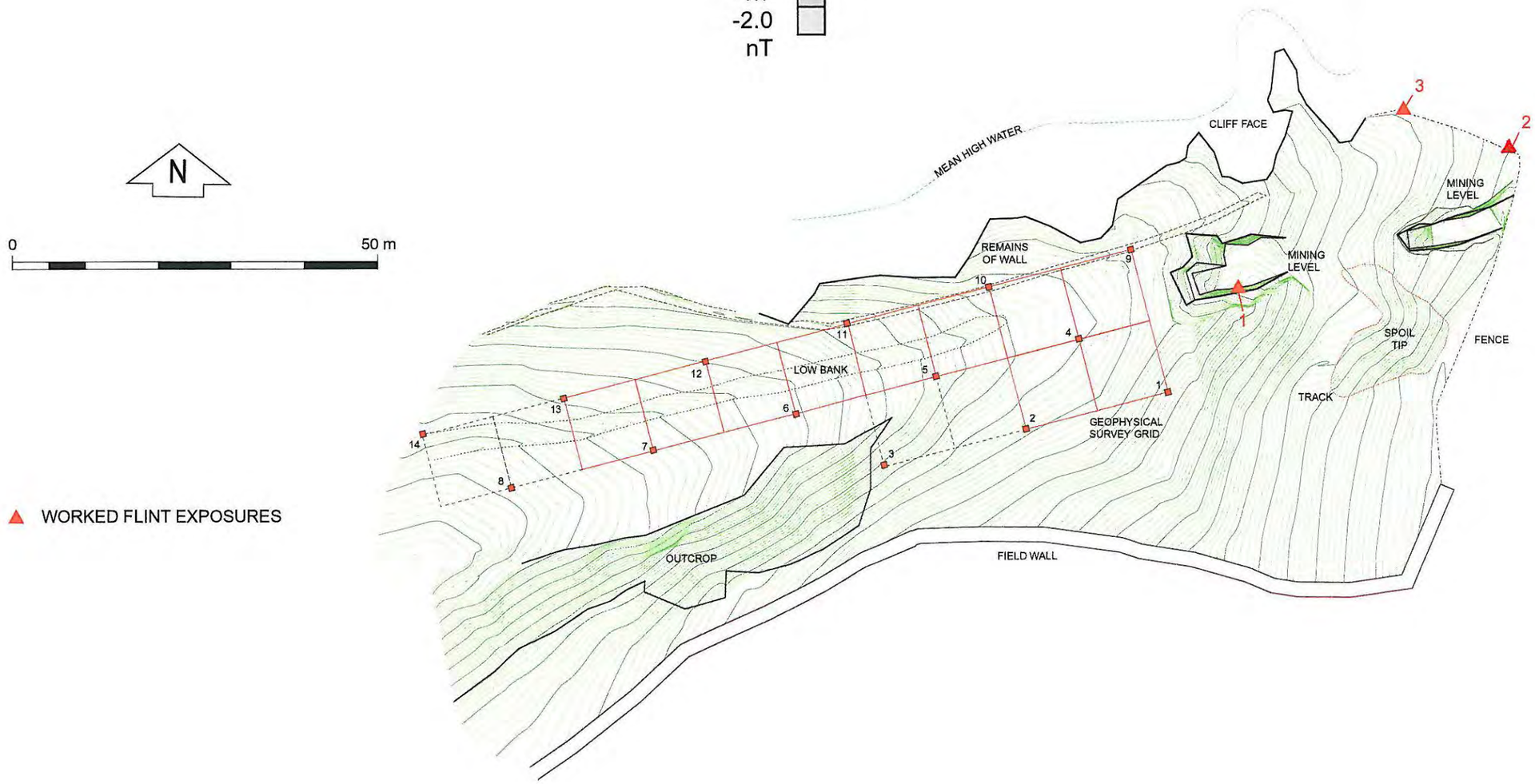
Lithics Report - Fig. 14. Old Pier, Trefor, Location. Scale 1:10,000.



SURVEY LOCATION







Lithics Report - Fig.15. Trefor, Old Pier - Survey results.

6.4.3 The Survey

The surface finds described above have come from the sloping end of a grassed-over rocky ridge that lies parallel to the sheer cliff edge here. The end of the ridge overlooks a small, shallow valley that has been partly infilled with rubble to provide a storage area for granite that was brought from the nearby quarry before being loaded on ships at the 'new' pier to the east of the valley. At an earlier and smaller scale phase of quarrying the stone was brought down on a tramway closer to the flint site and loaded onto smaller ships from a small pier at the west of the valley. The finds have come from three places within a small area: first from the rocky surface of the cliff edge, second from eroding colluvium at the foot of the slope and third, from eroding colluvium in the exposed section of an old mining trial level. When visited in 1993 it was thought that the latter colluvium was a buried deposit but it can now be seen that the burial may be just the result of upcast from the cutting of the mining level. The finds occur in a quite steeply sloping layer of colluvium and oriented at different angles, showing that the material must have derived from a working area further upslope where there is a slightly more level area that is likely to have been used.

The area was investigated by geophysics and soil sampling together with a detailed ground survey (Fig. 15). An area of 80m by 20m was investigated, although not all of this could be studied because the ridge was only just over 10m wide in places. Also, at the north side of the ridge were the remains of a narrow stone wall, alongside the cliff edge, and parallel to it, to the south, an earthen bank. The area between was slightly terraced and was probably a trackway leading to other mining levels further west along the ridge.

5.4.4 The Geophysical Survey

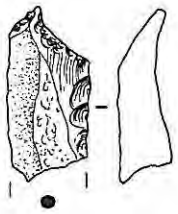
This work produced acceptable readings without serious interference from iron-rich rocks or from modern iron objects. Initially it was thought that there was only a low chance that the results would be productive because the soil cover over the bedrock was relatively thin. However, it was possible that some such feature as an area of hearths might show up. The results showed two obvious features (Fig. 15). One was a series of localised high readings, probably produced by modern iron objects that matched with a presumed iron stake and wire fence, with posts about 2m apart, of which the stump of one post was found still *in situ*. The other feature was a large curving linear feature oriented approximately along the line of the ridge and this was interpreted as either the line of the underlying bedrock or of the mineral vein that the mining level downslope had been trying to follow. An old field boundary bank, visible on the ground was also identifiable as a geophysical feature. The area with deeper soil over the blown sand at the south-east part of the area was also distinct although in general the background readings were relatively quiet even though the underlying rock was expected to be unsuitable because of the presence of mineral veins.

5.4.4 The Soil Survey

The site is a rocky promontory, and the area available for study was quite restricted and never cultivated and so there was relatively little depth, compared to that at Boncyn Ddol. At the south of the area, however, on the landward side of the promontory, the soil was deeper and developed over blown sand.

a. Soil type and depth: 14 soil test pits were dug (Fig. 15). All the soil was of dark brown sandy loam unless otherwise stated. Worked flint fragments were found quite widely scattered over the area. The depths to the subsoil were as follows:

Pit no.	Depth of topsoil (mm)	Description of subsoil
1	210	Pebbles
2	320 (not bottomed)	Sand/occasional pebbles
3	270	Rock fragments and flint
4	250	Pebbles
5	230	Pebbles over gravel
6	290	Rock + flint



Lithics Report, Fig. 16. Old Pier, Trefor, John Roberts' surface collection, Spurred piece. ● Direction of missing bulb. Scale 1:1.

7	150	Gravel + flint
8	170	Pebbles over gravel
9	140	Rock fragments
10	200	Gravel + flint
11	200	Gravel + flint
12	120	Gravel + flint
13	150	Gravel + flint
14	140	Gravel + flint

b. Soil analysis: Samples were taken at 10m intervals from a depth of about 15cm, just below the turf line. 56 samples were taken, to include sufficient area for control readings.

The following is a summary of the analysis carried out by Dr John Crowther of Lampeter University, the full results of which are presented in full in Appendix 7, and the recommendations of which are presented here.

There was marked variation between the loss on ignition of the control samples and the 'site' samples suggesting that the controls could not be used as such.

The general variability and lack of significant variation of magnetic susceptibility values by area fails to provide good evidence of any focus of activity although the highest readings did occur in the 'site' area.

There was not much enhancement of phosphate values but the most notable was in the control area and probably extending beyond, as at Boncyn Ddol.

The results here have probably been affected by soil movement. The best results were from further upslope on the top of the ridge. This suggests that it would be worthwhile to extend the sampling survey in that area and to do trial excavation in the same area to see if it was a focus of activity.

5.4.5 Discussion

The area of origin of the finds appears to have been a relatively small area of the ridge, an area hardly suitable for settlement and this supports the idea that this was a 'factory' site although there may have been more permanent settlement somewhere near by, possibly in the more sheltered valley, close to a supply of fresh water.

The context of the finds, when first seen, in a steeply sloping layer of colluvium was interpreted as probably the result of a localised, wind-blown coastal erosion event. However, as discussed previously, similar situations have been found at several other coastal lithic sites in Llŷn and on Anglesey. All suffered from vegetation decline and surface erosion, either as a result of the pressure of human use during their occupation or as a result of some period of unusual natural erosion. At Pared Llechymenyn, Llŷn, later Mesolithic material is found in colluvium on quite steep slopes. At Brynglas, Penrhos, Anglesey, earlier Neolithic material was found in a similar layer. If these all resulted from the same period of coastal deflation three possible periods can be suggested: First, the period of the Neolithic when sea levels briefly rose above present levels before retreating again (Tooley 1974). This might have destabilised the coast edge and caused sand blows. Secondly, at the start of the sub-Atlantic period, when climatic deterioration again might have caused decline in the coastal vegetation cover. Thirdly, the historically documented period in the 14th century AD when what must have been a brief period of exceptionally bad weather caused dramatic sand blows on Anglesey, which must have been accompanied by erosion of the coastal vegetation cover. Coastal environments do tend to be unstable and to suffer from seasonal and longer term cycles of storm erosion. However, what is significant about all the coastal flint finds is that none show repeated episodes of erosion, only a single episode in each case. What is needed is some separate evidence of the coastal environmental record, such as a suitable pollen column, that might identify a period or periods of erosion

5.5 Trefarthen quarry field, Brynsiencyn, Anglesey

5.5.1 Introduction

This site was selected because, although the original surface collection consisted of only a few flint flakes, it was given added potential because of the presence also of a polished axe, a flaked pick (Fig. 19) and a saddle quern. All were found by the farmer, Jack Roberts, in a relatively small area of a field during several ploughings and thanks are due to him for allowing access to his land for the survey work.

5.5.2 Location

Trefarthen lies at 15m OD, on a narrow band of carboniferous limestone, which forms a low ridge parallel to, and alongside the Menai Straits (Fig. 17). The soils are relatively rich and well drained for this area, able to support regular arable and their attraction for early farmers would be obvious, demonstrated by the presence of several Neolithic chambered tombs (Fig. 9). The area is also well known for the presence of the 'battle field', traditionally the location of the main battle fought when the Romans invaded and subdued Anglesey. The farm became part of the Vaynol estate in the 18th century and what was probably then a complicated pattern of small banked fields was replaced by a regular pattern of rectangular fields enclosed by quarried limestone walls, Evidence of the earlier field pattern survives in the irregular shape of the east boundary of the farm. In the 19th century two quarries were worked here for stone for the construction of Victoria Dock, Caernarfon, shipped from a small stone jetty some of which still survives.

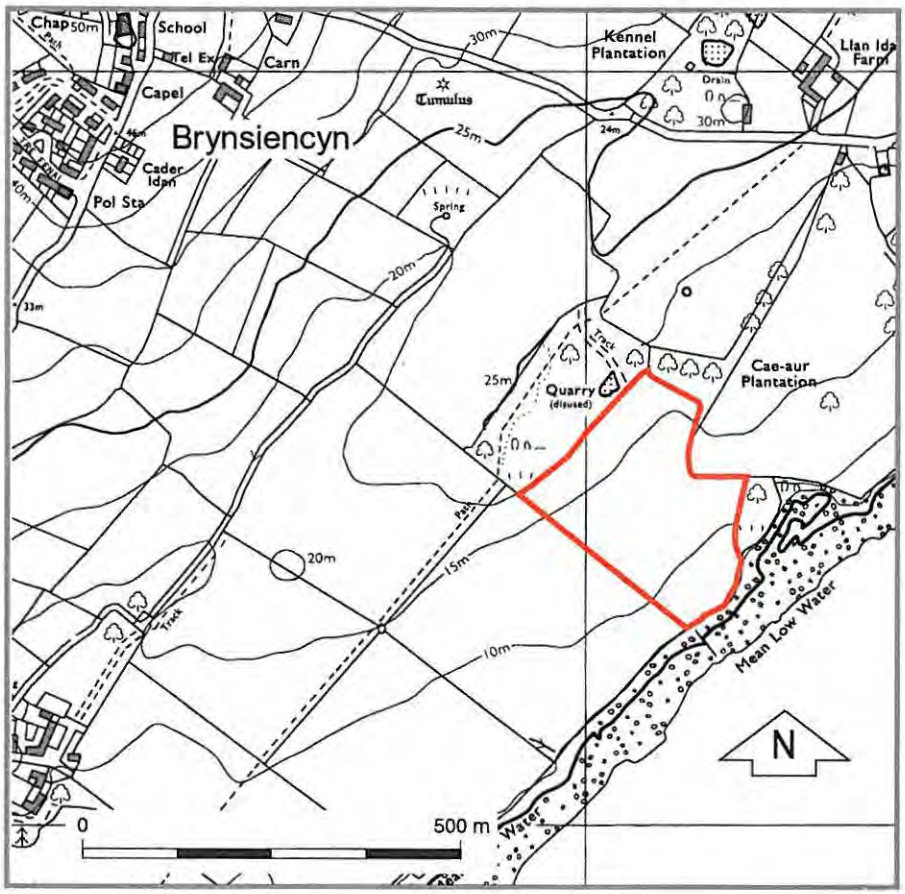
The group of finds here, made and reported by the farmer, has been noted previously (Lynch 1989) and recorded in the SMR as has that of a single flint flake found two fields further to the south-east. Conversation with the farmer showed that the main group of finds came from a small area, about 50m across, on the north-west side of a very slight prominence in the predominantly north-east to south-west ridge. The area indicated was surveyed in detail by EDM to allow ground modelling and laid out with a 20m grid. An area of 12 twenty-metre squares (0.48ha) was then surveyed by magnetometer. A larger area of 18 twenty-metre squares was sampled for phosphate and magnetic susceptibility at 10m intervals. Within the same area 14 soil test pits were dug to record the soil type and depth.

5.5.3 The Geophysical Survey (Fig. 18)

The geophysical survey was very successful because the limestone bedrock allowed good overall readings with no interference from natural anomalies. A maximum amount of detail was achieved using a 1m E-W spacing with N-S readings taken at the maximum density of 0.25m spacing. The results identified several features:

1. Part of a sub-circular enclosure at the east side of the field.
2. A possible sub-rectangular enclosure attached to the west side of 1.
3. Within the east side of this probable enclosure are two smaller curvilinear enclosures.
4. Approximately east-west across the area is a well-defined, narrow, straight feature with one angular change in alignment.
5. Across the whole of the area are traces of two phases of cultivation, one narrow-spaced, oriented south-east to north-west and one broad-spaced, oriented south-west to north-east.

The prominent sub-circular enclosure is situated just where the Neolithic material turned up after cultivation. On revisiting the site after plotting the geophysical results a slight raised linear feature could be seen around the southern arc of the enclosure and this slight feature was also picked up by the contour survey. On discussion with the farmer it was noted that this area had always been difficult to cultivate, turning up numerous stones. Some of these had been cleared and dumped on the field boundary. They are glacial cobbles *c.* 100-200mm dia. in contrast to the surrounding walls, which are built of limestone



Lithics Report - Fig.17. Trefarthen quarry field location.

bedrock. The sub-circular enclosure seems to have been defined by a substantial stony bank, about 3m wide, without any evidence of an associated ditch or entrance gap. The size of the bank helped it to survive frequent ploughing and the use of glacial cobbles suggests some antiquity as such material would have derived from field clearance while the present day soil is otherwise relatively stone-free. The attached sub-rectangular enclosure and smaller internal features are faint geophysical anomalies and seem likely to have been similar but less substantially banked structures than 1, although the better defined but narrower reading of the north side of 2 may suggest that it also had a ditch.

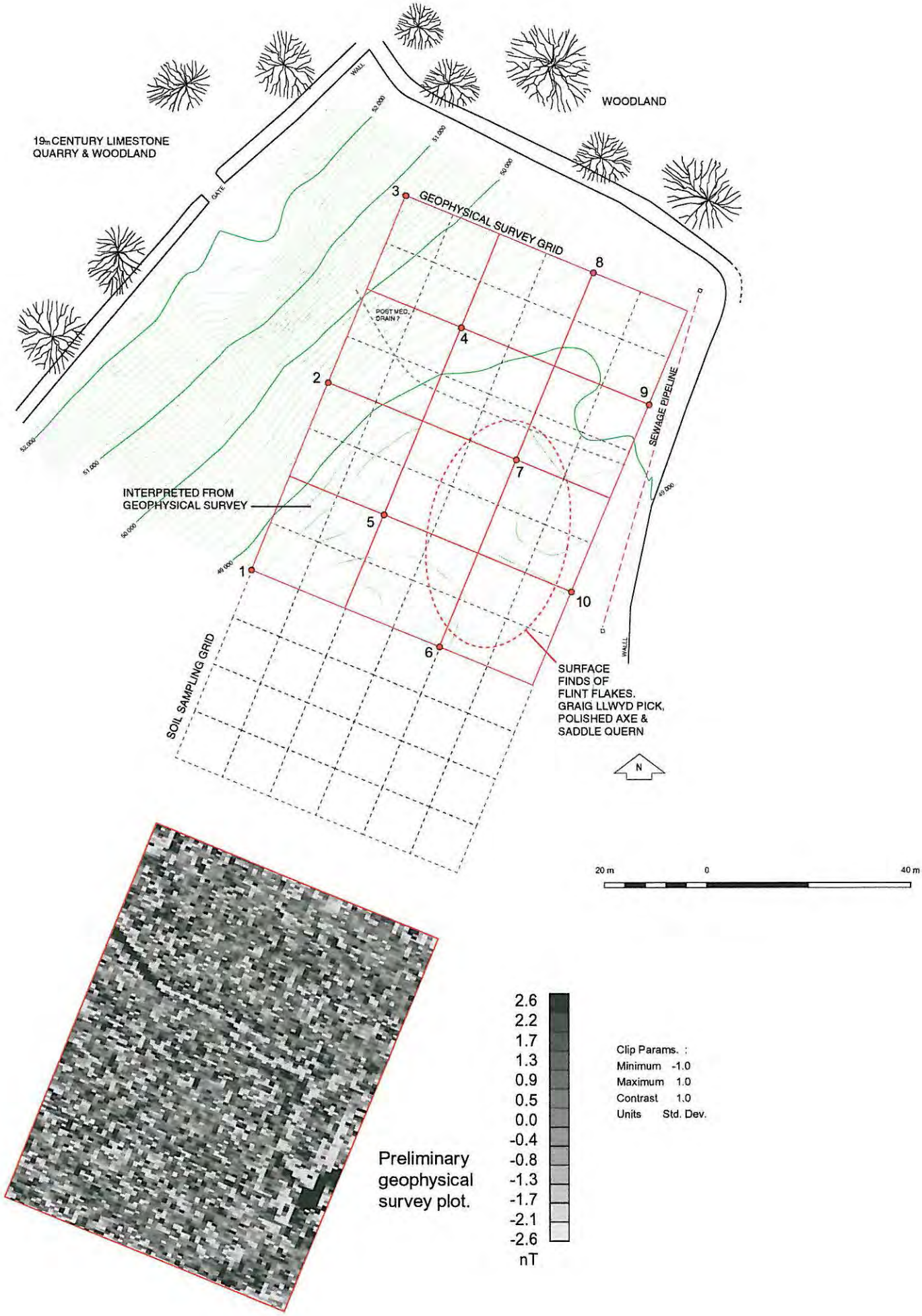
The sub-circular enclosure is *c.* 20m internal diameter, assuming it to be circular, when its east side would lie under the field boundary, although there is no evidence of a surviving bank beneath it. Unfortunately the east side of the enclosure, close to the field edge was recently cut by a foul water pipe trench from a treatment plant jut to the north. The trench was cut without archaeological observation because it had been thought that the Neolithic artefacts had been found in the adjoining field to the south. However, it was observed by the farmer who made no new finds. This part of the trench was cut without bulldozing an easement, so destruction would be limited to the width of the pipe trench.

It seems reasonable to assume that this enclosure is associated with the Neolithic finds but in character, because of its substantial bank, it fits better with some examples of enclosures of Romano-British date in North West Wales. Evidence from elsewhere such as Trelystan, Powys, suggests that Neolithic settlement would be unenclosed although there is a lack of comparative evidence from this region. It is possible that there are two periods of settlement represented with the circular enclosure built over much earlier features. For instance, the Neolithic finds could have been redeposited in the make-up of the enclosure bank. However, at present there are no other finds to suggest later prehistoric or Romano-British activity. Also, if the enclosure was of this later date it would be surprising if its bank had not partially survived and been incorporated within the field boundary which, as the property boundary probably retains the outline of medieval and possibly earlier property boundaries and field pattern. If the enclosure bank were already eroded to a nearly level state before these boundaries were defined it would have to be of great antiquity. However, another possibility is that even though the line of the property boundary retains the outline of earlier fields it may have been deliberately levelled during 18th century agricultural improvements and the building of the new boundary wall. This interpretation is supported by the fact that the north boundary of the field is not a free-standing limestone wall like the rest, but a massive stone-faced bank, about 3m wide. This may have been constructed as a 'linear cairn' to use up clearance material from the field.

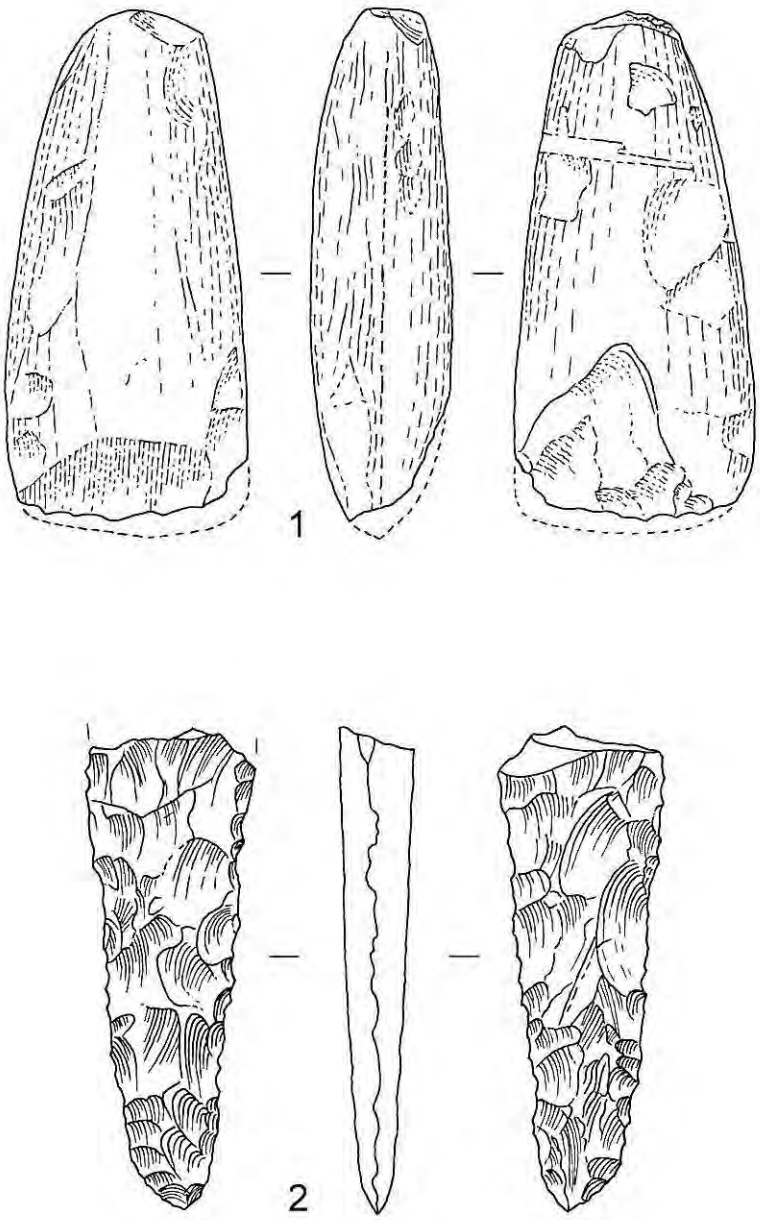
Gridded surface collection from the field (Stage 4, below) has helped to define the area of activity here but has not provided any further dating evidence. If the sub-circular enclosure is of Neolithic date then its importance for the region is considerable and it deserves some direct investigation to identify the extent and survival of the remains. No internal features are visible within the sub-circular enclosure, but at the east side the readings begin to be affected by the presence of the iron sewage pipe. The two smaller enclosures just to the south are about the right size for roundhouses: one is oval, the other circular, and both are about 10m across, internally. However, these features are only faintly visible on the survey and cannot be confirmed without excavation.

5.5.4 The Soil Survey (Fig. 18)

a. Soil depth: Ten regularly spaced test pits were dug across the area. The depth of the soil varied from 240mm to a maximum of 600mm corresponding to a broad, shallow 'dry valley' in the centre of the field where some colluvial build up could be expected. The deeper soil there may be masking and helping to preserve the prehistoric archaeology, so the possible sub-rectangular enclosure in that area may be better preserved than the geophysical survey suggests. The soil over all the area is a deep, red-brown silty loam. This was stonier at the east side, which was first ascribed to the disturbance from the pipeline trench excavation but can now be seen to be the remains of the ploughed-down enclosure bank. The soil pits were individually numbered and the topsoil depths were as follows:



Lithics Report - Fig.18. Trefarthen quarry, Brynsiencyn. Survey results



Lithics Report Fig. 19. Trefarthen, Quarry Field, Jack Roberts' Collection.
1, Axe, unidentified stone; 2, Pick, probably Graig Lwyd stone. Scale 1:2.

Pit no.	Depth of topsoil (mm)	Description of subsoil
1	600	
2	500	
3	250	
4	580	
5	360	
6	350	
7	430	
8	350	
9	240	
10	340	

b. Magnetic susceptibility and phosphate survey: Ninety one 250g samples were taken from the topsoil at a depth of approximately 200mm on a 10m grid. Sixty-three covered the area of the geophysical survey and the remainder taken to the west at the same spacing to provide background control readings.

The following is summary of the analysis carried out by Dr John Crowther of Lampeter University, the full results of which are presented in full in Appendix 7 and whose recommendations are presented here.

The loss on ignition was generally quite even over the area which should be an advantage but possibly just because of prolonged intensive cultivation producing mixing and colluviation, which could dilute and obscure any actual archaeological variations in soil properties.

The magnetic susceptibility was generally less variable than at Boncyn Ddol and Trefor and showed no clear patterns, actually higher in the control area beyond the 'site' identified by geophysics.

Phosphate values showed the clearest relation with loss on ignition. When this effect was controlled for there is some significant variation but the areas of concentration are outside the 'site' so the results are generally disappointing and no further work is recommended.

5.5.5 Discussion

The best evidence is provided by the geophysical survey. The magnetic susceptibility and phosphate results unfortunately do not help to define areas of activity or to suggest differences in function. For instance, if the sub-circular enclosure was a settlement area it may have raised magnetic susceptibility levels because of residues from burning. The larger possible sub-rectangular enclosure may have been a stock enclosure and so could have raised phosphate levels as a result of manure accumulation.

The evaluation has shown convincingly that quite small surface collections of lithic material can be useful pointers to earlier prehistoric sites of high value. In the case of Trefarthen the original collection consisted of only a few pieces of flint (not yet seen) and such a small scatter could represent no more than a transitory flint working area but its greater potential was indicated by the presence of the axe, pick and saddle quern which suggested a more permanent settlement. Geophysics happened to be very successful here, providing conclusive evidence. However, the limestone bedrock is particularly suitable and such good results cannot be expected in most areas. It remains to be seen whether the soil analysis might provide a separate indication of activity areas. Useful further information is provided by a gridded surface collection, carried out over the area in spring 2000 (see Stage 4, below).

5.7 References for Stage 3

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6. Stage 4: Surface collection trial

6.1 Objectives and methods

This was designed to carry out surface collection from a small sample of the Anglesey landscape in order to give some idea of the actual occurrence of lithic material in the landscape and to show whether such collection would be useful in this area of expected low density of material. All existing finds have been made by chance and where fieldwork has been fairly intensive, as in the work by M. Griffith in the western Llŷn Peninsula, or by J. and R. Robbins in Roman Bridge, Dolwyddelan, Conwy, several new sites have been found. The programme aimed to carry out a controlled surface collection using a 20m grid, of about 10 fields, to encompass a sample area of about 100 acres (40 ha). This was only a very small sample of the landscape of Anglesey, a trial programme to provide a reference point for future work.

This part of the project was carried out with the help of students of the Dept of History, University of Wales, Bangor and of Friends of GAT. It was planned to complete all the work in Autumn 1999 but partly because of a very wet season and partly because of the downturn in farming incomes very little ploughing for arable or for reseeding took place and it was difficult to find suitable fields for surface collection. Four half days field walking was completed with five fields were walked in November and a further field was walked in spring 2000. The total walked was 58 acres (23ha), less than the 100 acres it was estimated might be covered in the projected time.

The organisation of the field walking was complicated by the fact that collection could only take place on one day each week so the possible window for work on a particular field was tight and brief. That is, it was difficult to find a field that was in a suitable state for collection and attain permission for collection on a particular day. Because of the long term poor weather, whenever a dry spell occurred suitable fields were ploughed, harrowed and seeded as quickly as possible. No fields were ploughed and left to weather, as is often the custom in West Cornwall, for instance. It was unlikely that a field available one week would still be available in the following week. The week was very wet when the first field for which permission was received was available. When contacted again the following week to confirm access the farmer withdrew permission. This meant that it was important to complete a field in one day and to cover as much ground as possible in the available time. The first field, Cefn Poeth Farm, was begun using 20m grid, as proposed, but towards the end of the day only about half of the field had been covered so the rest of the field was walked more quickly using 10m spaced traverses. This meant a ground coverage of about 20% of the surface compared to 100% for the gridded walking. After this it was considered that because of the limited time available and the large size of most fields that it would be better to consider this as a 'rapid' survey of a reasonable sized area sample rather than a detailed collection from what would have ended up as a very limited area sample. If any concentration of artefacts was found it might obviously be possible to carry out a more intensive controlled collection from a small area in order to define an artefact distribution. Most collection was therefore carried out as 10m traverses. In fact, finds were very sparse from all the areas walked, as described below, and no significant concentrations of lithic material were found. Four areas were walked, all in south Anglesey: Cefn Poeth, on the north side of the ridge on which the multi-period site of Capel Eithin lies, Llanedwen, just south of the Neolithic chambered tomb of Bryn yr Hen Bobl, Rhuddgaer, the site of a probable high status Romano-British enclosed settlement and Trefarthen, the site of significant previous finds of Neolithic artefacts.

6.2 Field 1: Cefn Poeth, Penmynydd, Anglesey (Fig. 20)

6.2.1 Location and description

This was a large sub-rectangular field of 12 acres (4.8ha) lying at the foot and on the lower slopes of a prominent ridge that lies north-east to south-west across Anglesey. This local topography did not seem particularly suitable for any sort of prehistoric settlement, without any kind of focus, viewpoint or water supply. However, at the south end of the ridge lies the multi-period site of Capel Eithin and the whole of the ridge could have been well used both as an early route and for settlement.
The soil here is quite heavy and not obviously suitable for either early settlement or cultivation and can be expected to have been tree-covered until medieval times. The field pattern here is all of large, regular, sub-rectangular fields and so must be a post-medieval planned layout. The farmhouse of Cefn Poeth lies some 400m away, further up the slope. The name of the farm means Burnt Ridge, possibly deriving from traditional management of the grazing of the hill by burning of the heath and gorse. The same may apply to the name of the farm at the south end of the ridge, Cefn Du - Black Ridge. The nearest place name to the field is that of Allt-Ceint, the site of a former cottage in the adjoining field to the north, the name meaning Fair Hillside.

When walked the field had been ploughed but not harrowed and was dry but reasonably well weathered so had good visibility for collection. Part of the field was walked intensively with a 20m grid, the rest in 10m spaced parallel traverses.

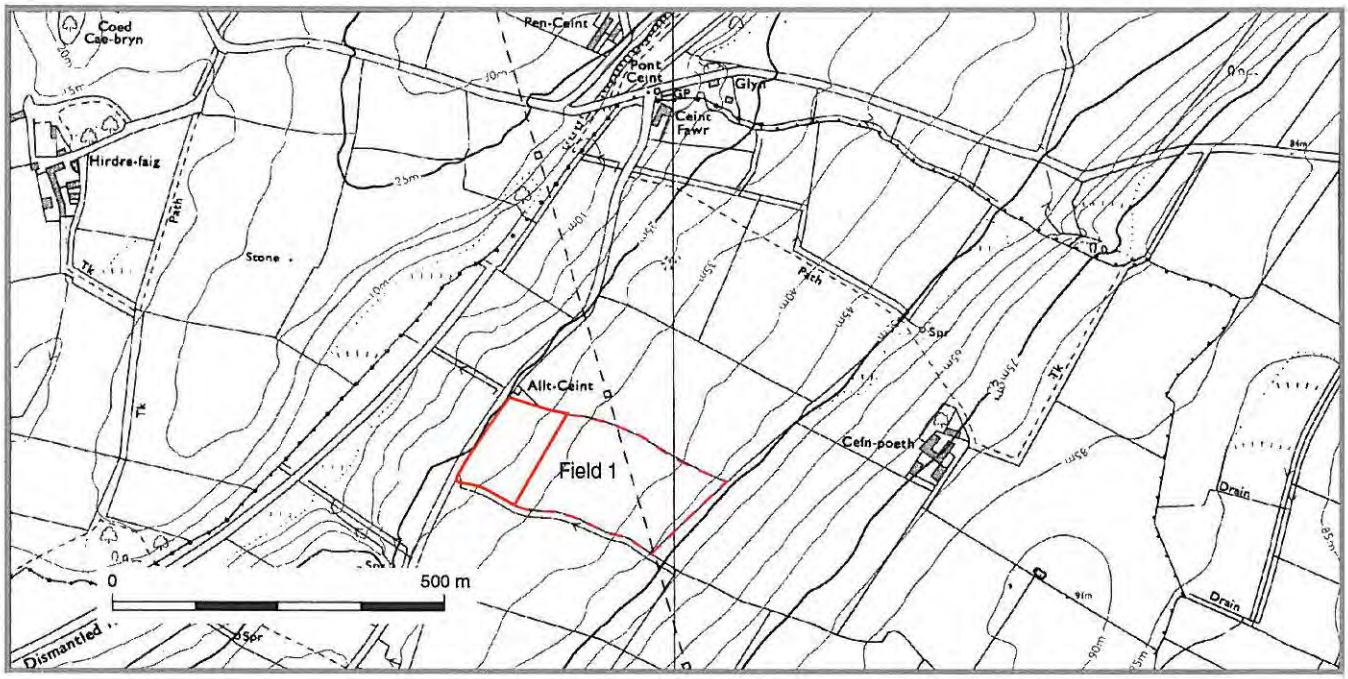
6.2.2 Results

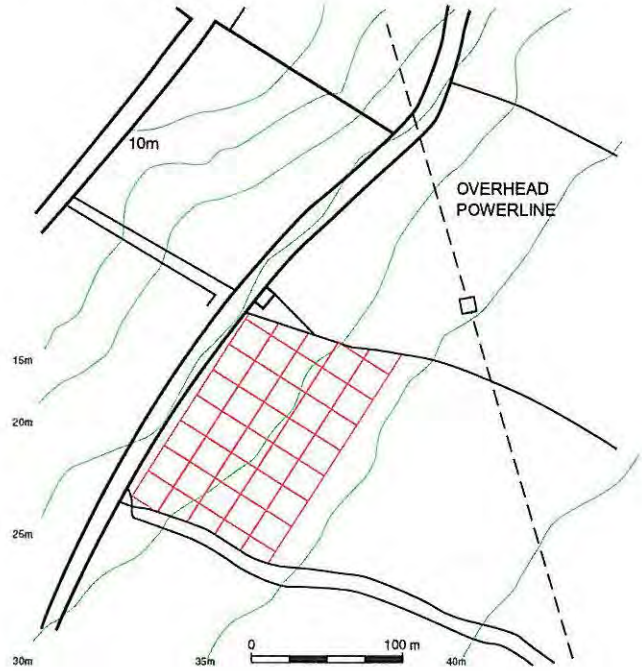
Table 22 Cefn Poeth, Field 1: Summary of collection

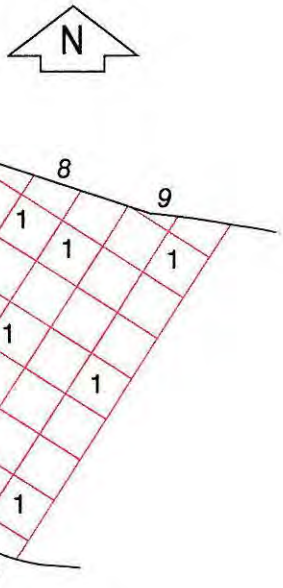
Category	*No.*
Flint flake fragment	6
Flint irregular fragment	12
Flint core	2
Flint core fragment	4
Burnt flint	4
Flint natural fragment	26
Gunflint	1
Flint thumbnail scraper	1
Flint pebble >30mm	4
Flint pebble <30mm	27
Quartz/other pebble <30mm	31
Other pebble >30mm	4
Pottery	3
Copper alloy waste? frag	1

The gridded collection produced 28 pieces of worked flint or chert from an area of *c.*15, 200 sq. m. (1.52ha) while the latter produced 2 pieces from an area of *c.* 33,000sq. m. (3.3ha). The gridded collection also recovered a number of pebbles and natural flint fragments as well as other finds. The gridded collection required about 14 man-hours, and meant a complete coverage of the field surface. The traverse collection required about 3.5 man-hours and meant a coverage of about 20% of the field surface (i.e. a 2m wide strip in every 10m).

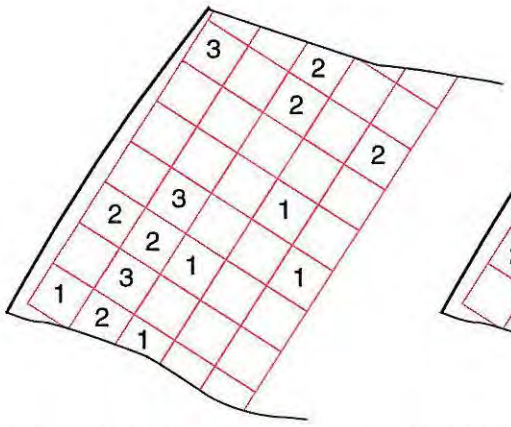
The number of worked pieces of flint or chert here is actually greater here than that found at Trefarthen, Field 6 (below) where there were other, more definite indications of settlement activity, in the form of



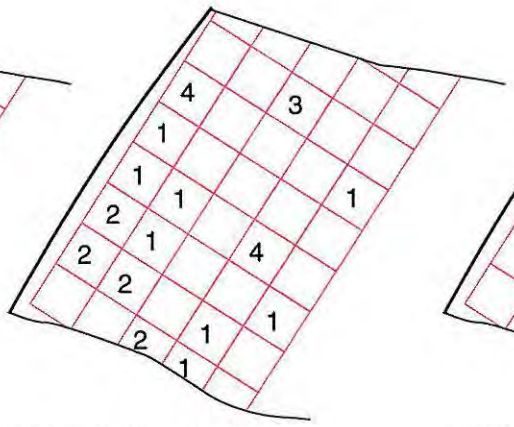




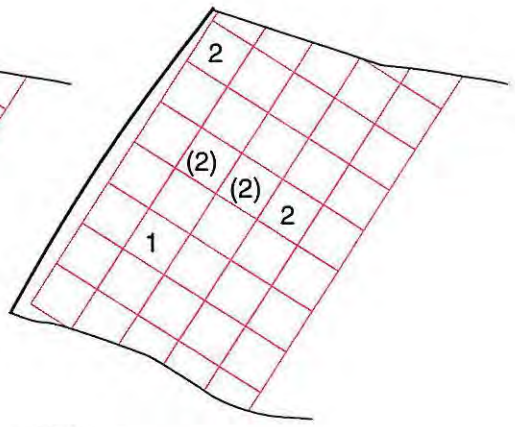
ALL WORKED FLINT & CHERT



FLINT & CHERT -
NATURAL FRAGMENTS



FLINT PEBBLES < 40mm



FLINT - 1
OTHER - (1)
PEBBLES > 40mm

Lithics Report - Fig.20. Field 1 : Cefn Poeth. Location and surface plots.

previous finds of two stone axes and a saddle quern as well as geophysical evidence of an enclosure (Stage 3 above). In the case of Cefn Poeth, however, there is no definite focus of distribution and an absence of adequate diagnostic retouched pieces. The only possible exception is the small group around the centre of the gridded area (grid 3/4). This group includes two flint flake fragments, one core fragment, one burnt flint, three flint pebbles over 30mm and two non-flint pebbles over 30mm as well the one retouched piece, the convex scraper.

The remainder of the worked flint is concentrated along the west edge of the field, which was also the bottom of the slope, where it levelled out into the terrace on which the modern road lay. This concentration of material could indicate an area of activity but a similar distribution occurs for that of the small pebbles of flint, chert, quartz and other stone. The pebbles classified as 'small' are those under 30mm, which are unlikely to have been collected to use as raw material and so probably are a natural component of the soil, derived from the glacial till. The distribution of worked flint may therefore result from some kind of natural process, such as colluvium accumulation at the foot of the slope although it includes one reasonable-sized chert core, that seems unlikely to have washed down the slope. Also, the distribution of natural, frost-shattered flint/chert fragments does not follow quite the same pattern. After this point the land drops off steeply into the adjoining small valley and in the same way that this terrace has been followed by the road, it may have been used in earlier prehistory resulting in a linear pattern of artefact scatter. There is also a spring, 200m to the south-west that could have provided a focus for early settlement.

The worked pieces of flint include a gunflint and a small 'thumbnail' pebble-backed scraper. The gunflint, in the northern part of the gridded area, is likely to be associated with the finds nearby of three pieces of Tudor pottery and a bronze fragment, all probably related to the adjoining former cottage of Allt-Ceint.

6.3 Fields 2-4: Rhuddgaer, Dwyran, Anglesey (Fig. 21)

This farm lies on the favoured agricultural coastal strip of south Anglesey bordering the Menai Straits. The estate lies at the end of a long, low ridge that terminates here, at the south-west corner of Anglesey. It is a prominent vantage point, opposite Caernarfon and the small inlet of the River Braint that flows around the north side of the ridge provides a sheltered access for boats. The position of the site makes it a possible focus for prehistoric settlement. Certainly it was an important focus in later times. The house of Rhuddgaer (Fort of the Ford or Crossing), which is situated on the summit of the ridge, lies within the remains of a large rectangular banked and ditched enclosure that has been interpreted as a Romano-British enclosed settlement (PRN 3075). If it was, it seems to have been a particularly large and important site. Its prominent position and the size of its enclosing bank and ditch make it seem more like a defended site than simply a settlement enclosure. Further signs of its status are the finding of traces of outlying roundhouses on the west side (PRN 3077) and of a rare decorated lead coffin (PRN 3074). In addition, its position, opposite Caernarfon and the Cadnant and Seiont Estuaries and the presence of the adjoining Braint estuary would make it a likely choice for communication between Segontium and Anglesey.

The land is very gently sloping with a well-drained silty loam over limestone bedrock and would probably be attractive to early farmers. The prominent position, close to the mouth of the Menai Straits and the river inlet would also make it attractive for hunter/gatherer use. Several fields had been ploughed, harrowed and sown so were only available for one collection episode. Three fields, comprising 25.77 acres (11.26ha) were covered in the one day using 10m spaced traverses. Two of the fields were on the gently sloping, north-facing side of the ridge and one on the nearly level plateau-top. The soil was dry but well-comminuted so visibility was good.

6.4 Rhuddgaer, Field 2

6.4.1 Description

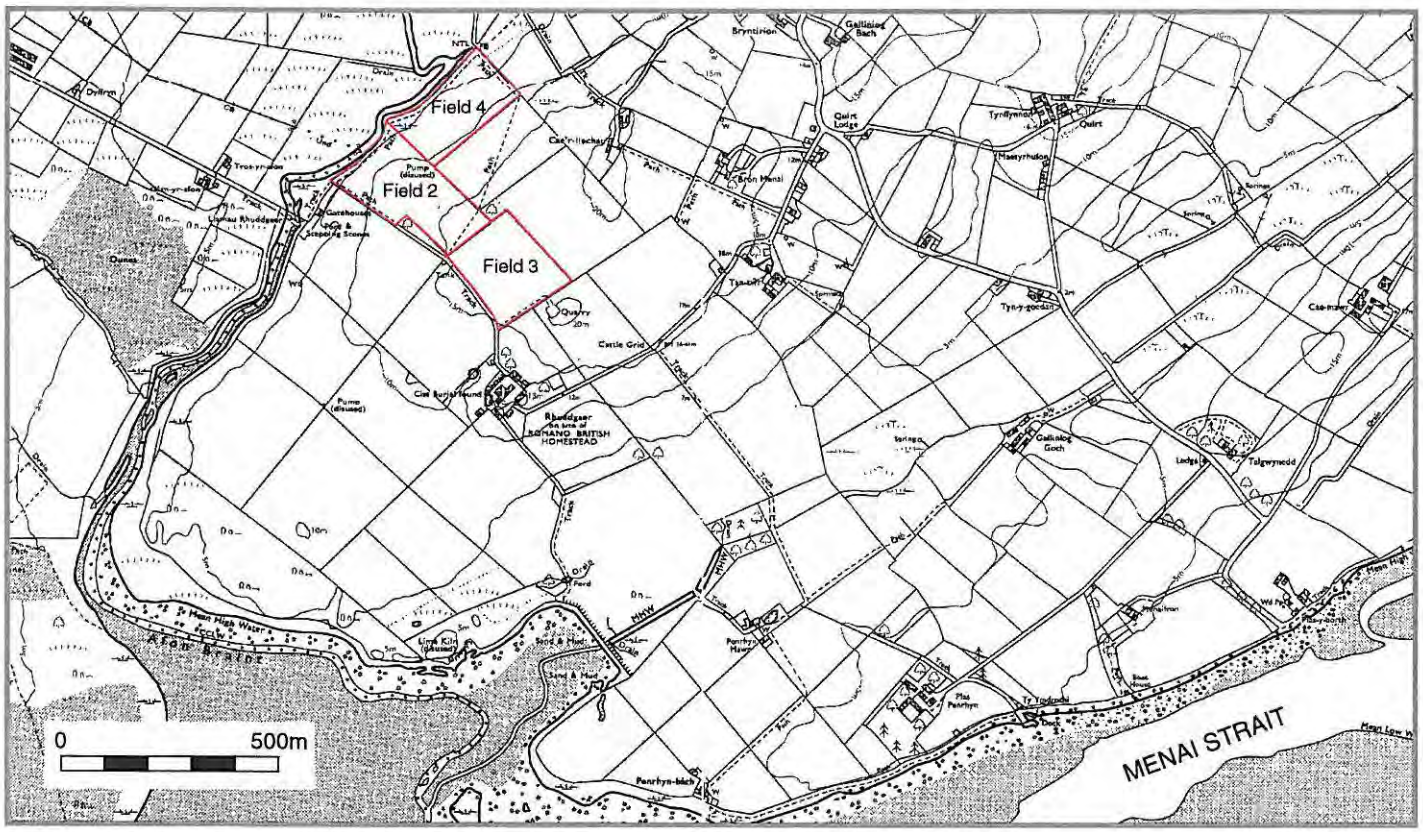
A large, gently sloping, north-west facing, well-drained field of 11.68ac (4.8ha). Dry and not rained on since being rolled and seeded just prior to the collection so poor soil visibility could be expected. Occasional broken stone and pebbles visible on surface but very little post-medieval pottery. Collected from using 10m spaced parallel traverses.

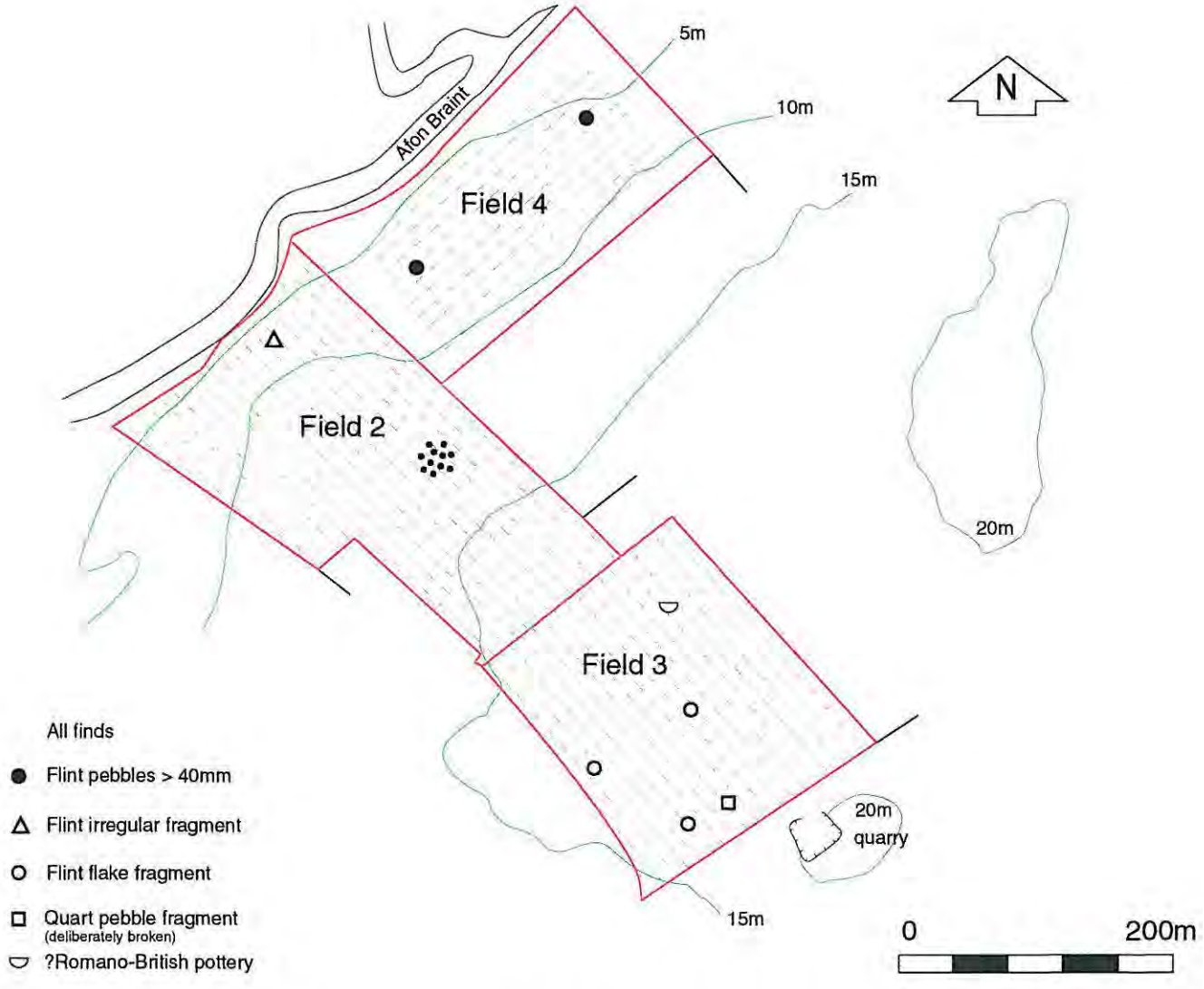
6.4.2 Results

Table 23 Rhuddgaer, Field 2: Summary of finds

Category	*No.*
Flint irregular fragment	1
Flint pebble	5

This was a large field, all of the same even slope, so there were no topographic features within it, such as a spring or knoll, that might provide any focus for early settlement. The field does border on a small river, the bank of which would have been attractive for Mesolithic activity. However, because of the slope, accumulation of topsoil at the lower end of the field, bordering the river, could have masked any finds occurring there. Two areas of finds were made. One was a single flint flake, close to the riverbank, which accords with the expectation of activity close to the river. The other a group of flint pebbles and fragments in the centre of the field, which may represent just the location of a natural glacial deposit.





Lithics Report - Fig.21. Fields 2-4 : Rhuddgaer. Location and surface distribution plots.

6.5 Rhuddgaer, Field 3

6.5.1 Description

This field was 9.34ac (3.78ha), almost level, on the flatter top of the low ridge, closer to the original settlement of Rhuddgaer and less well drained than the adjoining field 2. Ploughed, rotavated and well-weathered so good visibility could be expected. Much more natural stone visible on the surface than in other fields, including angular rock fragments, quartz fragments and occasional rounded beach pebbles. Collected from using 10m spaced traverses.

6.5.2 Results

Table 24 Rhuddgaer, Field 3: Summary of finds

Category	*No.*
Flint flake fragment	1
Quartzite pebble fragment	1
Shaped? limestone fragment	1
Pot, R-B? colour-coated	1

The few flint finds were widely dispersed with no suggestion of any focus of activity. The single flint flake could be a natural product as well as flint pebbles. The proximity to the Iron Age/Romano-British settlement at Rhuddgaer suggests that this area was very likely to have had contemporary cultivation and so to produce pottery as a result of middening. A single sherd of colour-coated red earthenware was found that might be Roman although this needs confirmation by a pottery specialist.

6.6 Rhuddgaer, Field 4

6.6.1 Description

Another large, gently sloping, north-west facing field of 4.15ac (1.68ha), also bordering the River Braint, less well drained than fields 2 and 3.Only part of this field was exposed when collected from. The central area of this field had been ploughed, not cultivated, but this had been weathered so visibility could be expected to be good. Numerous fragments of natural slate on the surface. Collected from using 10m spaced traverses.

6.6.2 Results

Table 25 Rhuddgaer, Field 4: Summary of finds

Category	*No.*
Flint pebble	2

This field produced only two widely separated finds of flint pebbles. These could have been a natural product of the glacial till and so cannot be taken as any indication of human activity.

6.7 Field 5: Llanedwen Farm, Llanfairpwllgwyn, Anglesey (Fig. 22)

6.7.1 Description

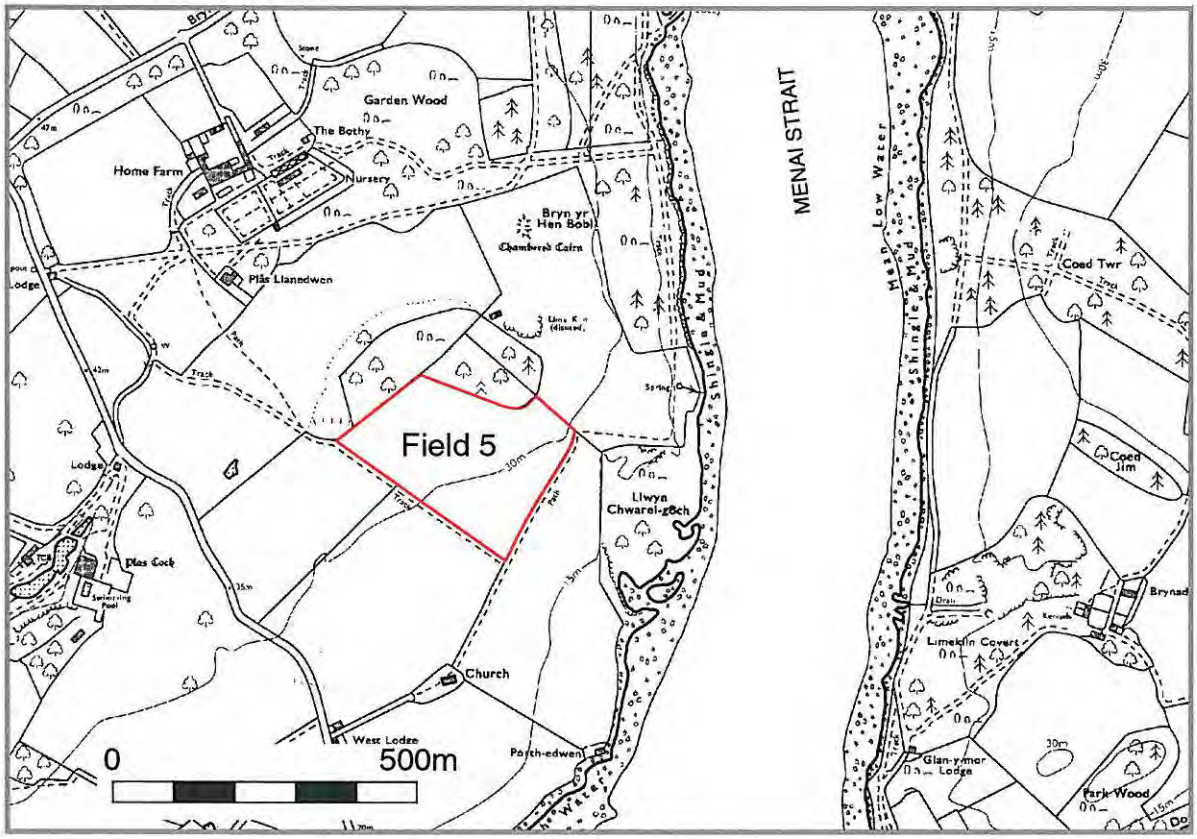
Three large fields were available and potentially of interest because they lay only 300m south-west of the Neolithic chambered tomb of Bryn yr Hen Bobl where previous evaluation projects have been carried out by Mark Edmonds and Julian Thomas in 1990 and by Cardiff and Newport Universities in 1999. The fields lie on south-east facing gentle slopes overlooking the Menai Straits. The soil is a well-drained silty loam, lying over limestone bedrock and likely to particularly suitable for early farming. The fields had been ploughed, harrowed and sown with cereal crop. The soil was dry but well comminuted and visibility was good. Written permission had to be obtained from Lord Anglesey and the fields were only available for one collection because of the germinating crop. Only one of the fields (Fig. 22) of 16.3 acres (6.6ha) was walked in the time available, using 10m spaced traverses. The ground had been ploughed, harrowed and recently sown with a cereal crop when visited so with good visibility although dry and unweathered. Collected from using 10m spaced traverses.

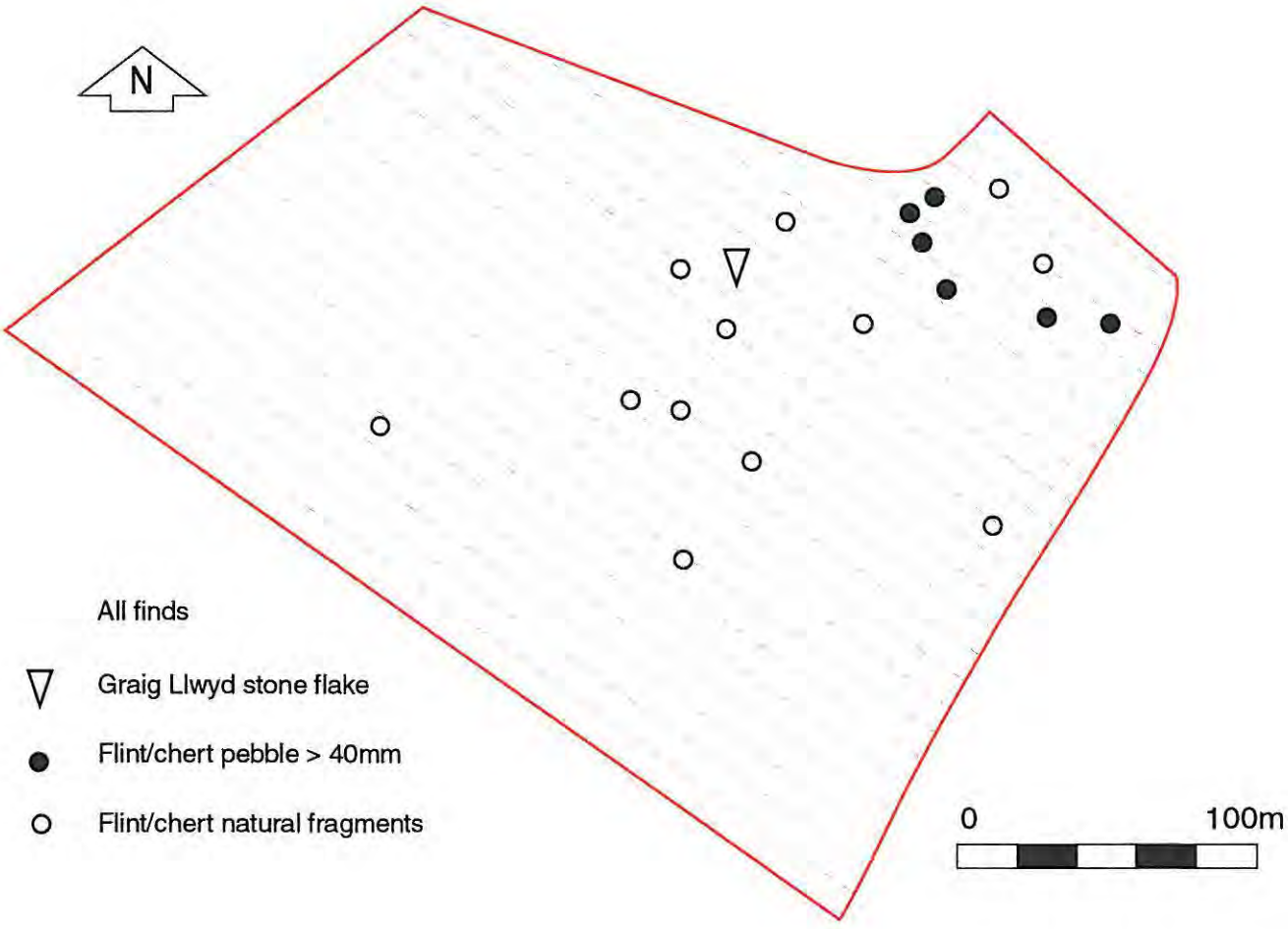
6.7.2 Results

Table 26 Llanedwen Farm: Summary of collection

Category	*No.*
Flint core fragment	2
Flint natural fragment	14
Flint pebble >30mm	7
Flint pebble <30mm	3
Flake, Graig Llwyd stone	1

300m to the north-east lies the Neolithic chambered tomb of Bryn yr Hen Bobl and in the adjoining field to the east lie a series of earthworks thought to be the remains of a deserted medieval village. The field around Bryn yr Hen Bobl was one of the subjects of the Anglesey Landscape Project by Lampeter University in 1990 (Edmonds and Thomas 1991) and is now the subject of another project by Newport University. In al one would expect that this area of exceptional soils would have been well used for arable farming since the Neolithic. The slope of this particular field, however, suggests that it would not have been chosen for settlement. In fact the collection produced only one definite artefact, a flake of Graig Llwyd stone. The remainder of the collection comprised a number of small, frost-shattered flint fragments and flint and chert pebbles. These lay in a fairly discrete although widely spread band across the slope. This pattern may derive from the way the flint occurred naturally in an underlying glacial deposit. However, it is possible that although naturally shattered, the flint fragments and pebbles somehow derive from human activity. This may be supported by the presence of the Graig Llwyd flake and could indicate an association with the nearby chambered tomb. Certainly at Trefarthen (below) where there were other indicators of actual settlement, the area of activity was also defined by a concentration of naturally shattered flint fragments. If the flint pieces do derive from some human activity, such a wide scatter as Llanedwen is likely to derive from cultivation and middening rather than actual settlement.





Lithics Report - Fig.22. Field 5 : Llanedwen. Location and surface distribution plot.

6.8 Field 6: Plas Trefarthen, Brynsiencyn, Anglesey (Fig. 23)

6.8.1 Location and description

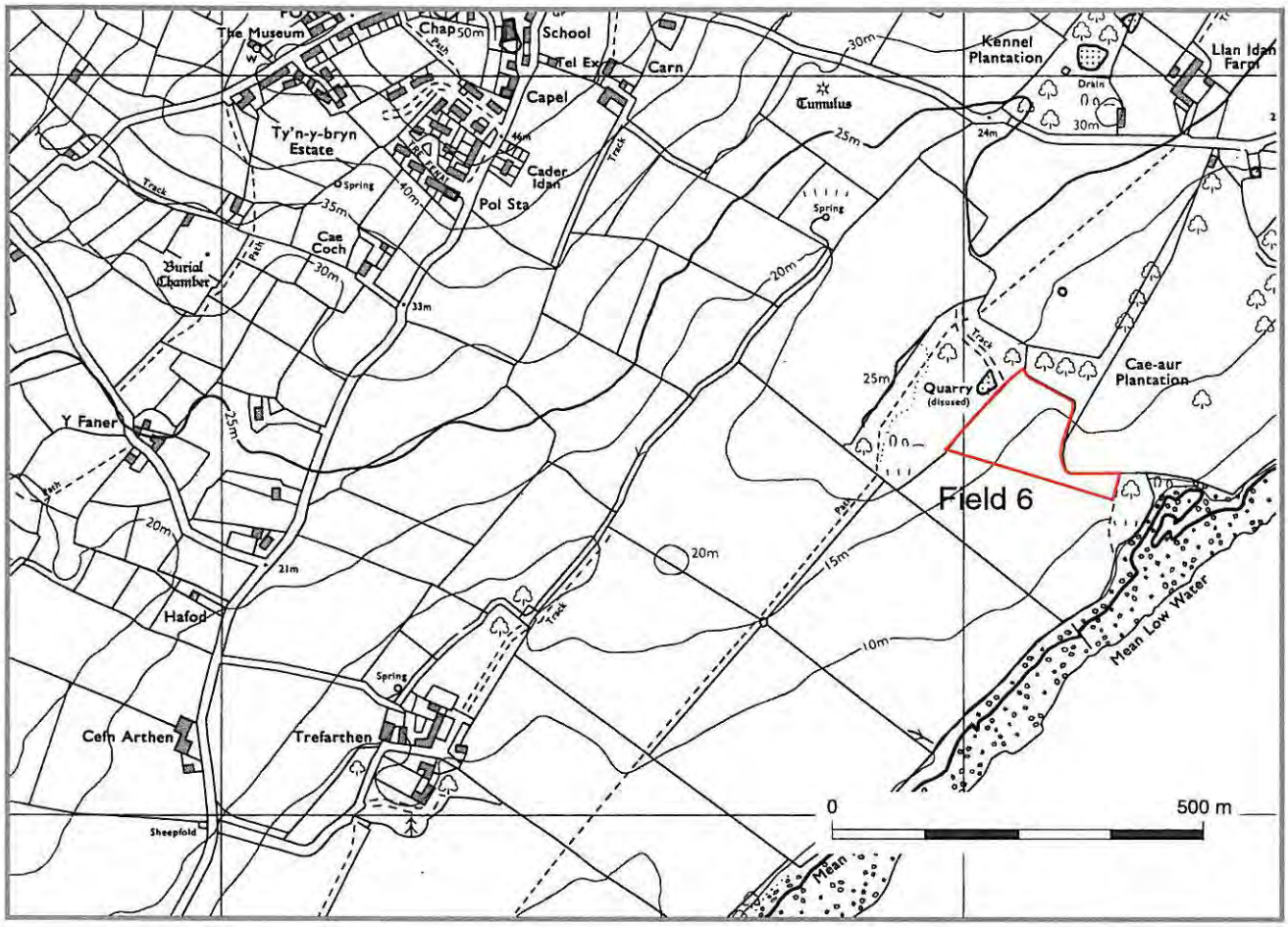
This was a large field of 8.9 acres (3.6ha). The field was one selected for intensive study as part of Stage 3 of the project and so it was collected from using a 20m grid. As a result only part of the field was collected from in the time available, comprising 4 acres (1.64ha) but covering the part of the field that was of particular interest because of previous chance finds by the farmer, of several flint flakes, two Neolithic axes and a saddle quern. The field is gently sloping, south-east facing, and bordering the Menai Straits. It lies over limestone and the soils are particularly good, supporting regular arable crops. The field partly surrounds a slight knoll or rise in a low ridge that borders the Straits here. The previous finds came from next to this knoll and geophysical survey (above) showed the presence of a sub-circular enclosure on the side of the knoll, but falling within the boundary of the field. This geophysical feature fell within the area of the surface collection.

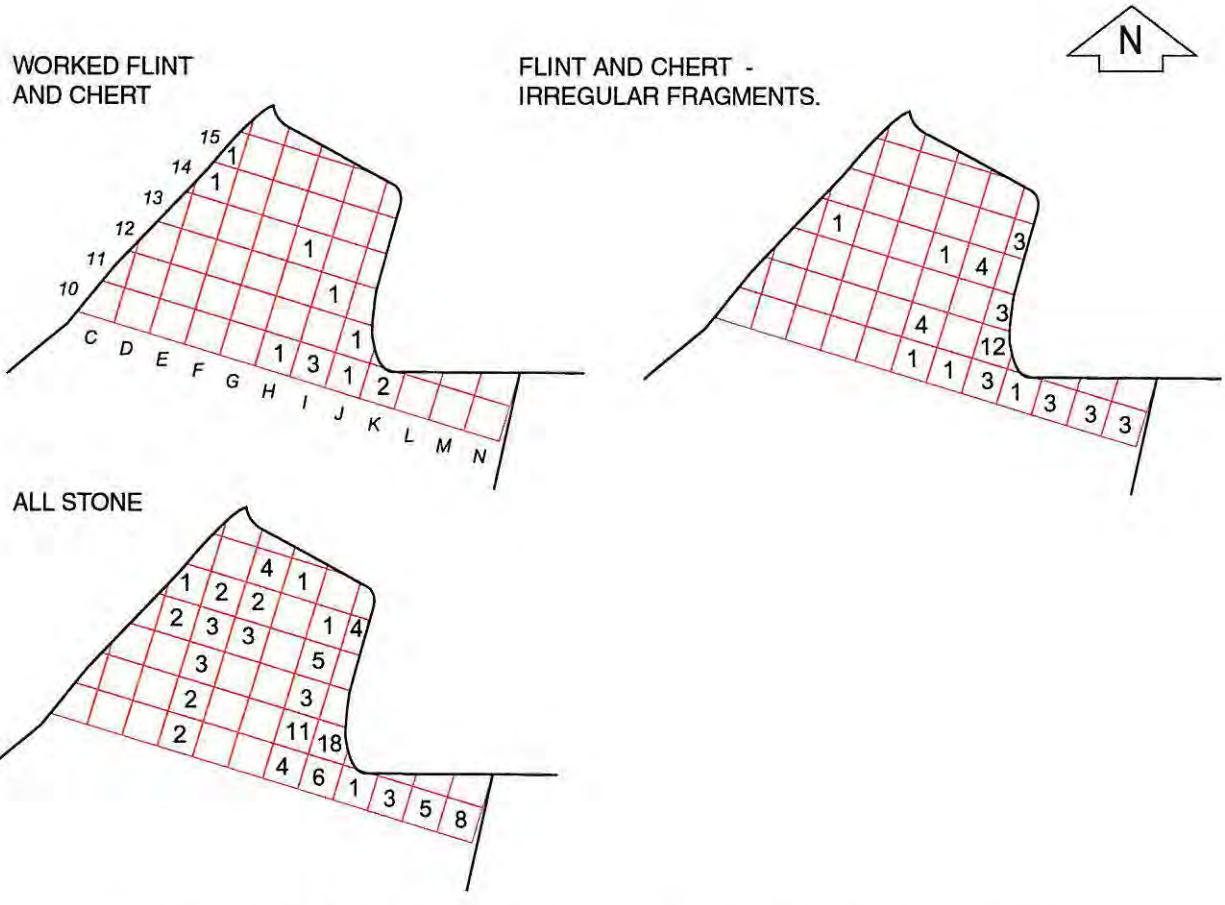
6.8.2 Results

Table 27 Trefarthen: Summary of finds

Category	*No.*
Flint flake/fragment	6
Flint irregular fragment	50
Flint core/core reject	4
Flint natural fragment	7
Burnt flint	1
Flint retouched pce fragment	1
Flint casually retouched pce	1
Flint pebble	6
Stone pebble	12
Non-local stone fragment	13
Calcite	6
Quartz	1
Burnt limestone?	1
Tobacco pipe	2
CuA coin, post-med	1

The number of regularly worked flint/chert pieces here is very small and outnumbered by the irregular fragments, pieces that were apparently the result of thermal, probably frost shattering. The reason for this is uncertain but possibly the material has been exposed to unusual conditions of weathering, causing a high degree of fracture. Another possibility is that the flint was being broken to produce filler for pottery. However, the larger number of irregular fragments provides the best distribution pattern, showing a concentration around the north of the knoll, just where the enclosure was identified by the geophysical survey (above). The same pattern is shown, to a lesser degree by the flint/chert flakes and cores and by the stone finds. Most of the pieces are derived from rolled, glacial flint and most have a well-developed cortication since their manufacture. However, there are two flakes and a core fragment of fresh, black flint with a thin creamy cortex and these pieces could be imported, nodular flint. The only retouched piece is a small, thick, bifacial fragment, possibly the tip of a pick or fabricator and this would fit in with the Neolithic date of the previous finds. The waste pieces and cores are generally small and irregular and not technically diagnostic of date. In all, it was expected, considering the previous finds, that this field might





Lithics Report- Fig.23. Field 6 : Plas Trefarthen, location and surface distribution plots.

produce a sizeable collection. The fact that it didn't is a useful indicator that even areas of good potential may not be easily identifiable from surface collection.

6.9 References for Stage 4

Coles, J.M. 1964. New aspects of the Mesolithic settlement of South-West Scotland. *Trans. Dumfries and Galloway Natural Hist. Antiq. Soc.* 41, 67-98.
Edmonds, M. and Thomas, J. 1991. *Anglesey Archaeological Landscape Project 1990.* Occ. Paper 16, University College, Lampeter.

7. General discussion of results of each stage and suggested amendments to project methods

7.1 Stage 1 summary

The work shows that it is possible to apply some definable values to these various types of finds sites, although in a slightly different way to that originally envisaged by the MPP Lithic Scatters Project. The criteria defined there are difficult to apply or inapplicable to almost all lithic collections in north-west Wales and the same can probably be said for Wales generally, at least for that part that falls outside the main arable farming zone.

It is clear from difficulties met in applying any criteria and, as has been seen, from the results of the second stage of the work that the desktop work must be accompanied by field assessment before a proper evaluation of any site can be made. However, the desktop work is an essential preliminary stage in providing a basic database, defining the resource and providing an overview of its main features.

- It therefore provides the information on which a second stage of targeted field visits can be organised.

- It provides information of curatorial value, for instance on the location and availability of collections, on possible biases in the distribution of fieldwork and of the representativity of statutory protection in terms of period or geographical area. Flint scatters themselves do not strictly qualify for statutory protection according to the requirements of the 1979 Ancient Monuments and Archaeological Areas Act. However, it has been demonstrated by several large projects carried out under post-PPG16 conditions in Oxfordshire and elsewhere (e.g. Lisk *et al.* 1998), that they frequently indicate areas of sub-soil features and widespread evidence of early human activity. Desktop assessment of existing collections and synthesis of the evidence in each region provides the basis of appropriate development control work.

- The desktop work also provides information of research interest – extending the previously published record of distribution of activity and identifying areas of particular interest for fieldwork. It may also allow some ideas about where and how the landscape was being used in different periods. This will depend on the quality of information about period and function of assemblages. Identification of function was not found to be suitable here and, in addition, there were a considerable number of collections of unidentified period (Table 2). On the other hand, the GGAT study has shown, for instance for the Neolithic, a contrast between a small number of larger collections, possibly representing 'home' sites, in the lowlands, and a larger number of single finds, possibly representing hunting/gathering activities, spread across both lowland and upland (Locock 2000, 19).

- If and when the study is extended to other parts of Wales the availability of more widespread information will allow better understanding of variations in activity between upland, lowland and coastal areas in different periods.

Amendments to Stage 1 procedures

- Extend to include some consideration of the deposition of stone axes although without field visits.

- Location of material – need a recording field for exact owner and address to provide a better basis for research.

- Identify period more exactly, where this is possible.

7.2 Stage 2 summary

- The field visits provided very useful information about individual locations and identifying in several cases the exact find spots, allowing interpretation of the stratigraphy and of assessing the status of each site in terms of threats, vulnerability and potential.

- The case studies were very informative and suggest that all sites of medium or greater potential should be studied at the same level of detail. Only with this level of study can proper decisions be made about the suitability of sites for scheduling and of the areas involved.

- A limited amount of artefact checking and recording was carried out for the present study, for collections that were locally available. A further part of Stage 2 would be fuller assessment of the actual collections of artefacts. Only this can provide a proper record of what collections consist of and allow dating. It can also provide information on raw materials although this would be more of research rather than curatorial interest. It would form a logical follow-up stage to a desk top and field assessment, apart from any individual site evaluation as carried out for stages 3 and 4 of the present project.

Amendments to stage 2 procedures

- More detailed recording of topographic location.

- All sites proposed as suitable for scheduling to be recorded in greater detail as 'case studies' like the two described. This is necessary to demonstrate the value and the area concerned.

7.3 Stage 3 summary

Objective 1. To test the possibility that a small surface collection of lithic artefacts may indicate the presence of earlier prehistoric settlement. Evidence of such settlement has been almost absent from north-west Wales, despite the presence of numerous funerary and ritual monuments and widespread finds of stone axes.

Surface collections have proved to demonstrate the presence of in situ evidence of settlement both in the past – at Bryn Refail, Trwyn Du and Ty-n Lon and a part of the present project. Firstly, at Boncyn Ddol, sub-surface features were recorded by test pitting and at Trefarthen by geophysics. However, both of these sites had some unusually good lithic evidence. The test pitting at Boncyn Ddol produced features that on radiocarbon dating evidence are unrelated to the main identified flint scatters while at Trefarthen the features identified by geophysics alone may also be of more recent date than the identified lithic material. Further trial work is therefore needed at locations of small or otherwise unclassified scatters.

Objective 2. To employ a variety of techniques to evaluate the scatter sites, both to help locate any activity area and to test the usefulness of the techniques themselves.

a. The use of soil phosphate and magnetic susceptibility sampling has proved useful in two cases, at Boncyn Ddol and Trefor, but the methods need to be repeated in different circumstances and tested by follow-up trial excavation. The results show that the techniques are best applied firstly where there has not been prolonged post-medieval cultivation and secondly where the scatter assemblage indicates the presence of mainly a single period of activity.

b. Geophysics has proved useful in only one of the three cases, that on limestone at Trefarthen. Its use on glacial till subsoil is of uncertain productivity but being easily and quickly carried out is worth a trial in every case. Its usefulness will be limited to Neolithic sites, where subsoil features can be expected.

c. Soil depth studies have not proved as useful as hoped, with little variation in depths which might illustrate colluvial movement. However, observation of coastal scatters suggests that colluviation has affected the distribution of lithic material in that type of location.

d. Environmental analyses by pollen study of peat is likely to be the most informative, non-intrusive technique but unfortunately only rarely applicable because flint scatters in North West Wales occur most frequently on the coast edge and in the lowlands where peat deposits are rare. The preliminary results from Boncyn Ddol indicate that the peat did form during the periods represented by the lithic scatters there and should provide valuable environmental information as well as a radiocarbon time scale.

Objective 3. To assess what surface collections might represent in terms of survival of below ground remains and to what extent such remains might be at risk of erosion by cultivation.

The geophysical surveys provided little information about possible sub-soil features even where such features had already been identified by excavation (at Boncyn Ddol), partly because relevant features are likely to be shallow and because of unfavourable subsoil conditions. A great variation in soil depth between sites was found. Some areas that are marginal for agriculture have a very shallow cover. Cultivation or improvement or intake in such areas is therefore likely to be very damaging. In older arable areas of deeper soil the situation is likely to be fairly stable.

Amendments to stage 3

- Wherever possible a controlled surface collection should accompany the other techniques.
- The results of the soil analysis suggest that wider area sampling may be more useful than higher density sampling. Another possibility is to carry out preliminary sampling and this might show if values are sufficiently high or variable to justify more extensive sampling. Basic on-site soil phosphate testing might also prove a useful indicator.
- The addition of burnt stone sampling would allow better understanding of the soil magnetic susceptibility results.

7.4 Stage 4 summary

- The surface collection trial was designed to study a small sample of the Anglesey landscape and to provide some estimate of the overall occurrence of lithic material. The sample was very small and could not hope to provide a statistically significant random sample of the landscape since only small areas are ploughed each year and these are mostly in restricted areas of better soils. In that respect it could be expected that the areas of Llanedwen, Trefarthen and Rhuddgaer would be particularly attractive for early settlement, to have been intensively used and to produce more lithic finds than average. The work has demonstrated that worked flint and natural flint occur fairly widely in the landscape of Anglesey. The situation is therefore comparable to that found elsewhere in lowland Britain and suggests a quite widespread use of the landscape despite the lack of other evidence of settlement. The amounts of lithic material, however, are very small and this accounts for the previous infrequency of finds. The small number of recorded pieces is probably a reflection of the shortage of raw material than from lack of activity and is best borne out by the small surface collection produced from Trefarthen.
- Lithic finds here are at very low densities and in comparison to collections from the flint-rich areas of southern England, for instance, a collection of ten worked pieces in Anglesey may indicate a settlement or working area whereas in England a similar area might produce a hundred pieces. There is a methodological problem here in that such low densities fall outside the range of statistical validity. The actual archaeological variation may be less significant than the variation in recovery rates due to

factors such as collector bias or soil depth, moisture or cultivation conditions. This is well demonstrated at Cefn Poeth where the only possible focus of activity has amounts of material no greater than the rest of the field and so could be just a random variation.

- The very low densities of material also present a practical problem in that it can now be seen that only quite high intensity collection will produce useful results. The very small amounts collected by line traverse walking provides only a very tentative indication of where areas of activity might be yet it is necessary as a first stage in survey that might be followed by higher intensity collection from the same area. Within the time allowance of the present project, and the help available it was impractical to develop this approach because of the man-hours involved and the difficulty of matching field availability with that of worker availability. Any future surface collection work would need to use a two-stage approach unless there are already other indications of areas of interest, for instance previous chance finds (as at Trefarthen), particular topographic areas or the presence of earthworks or cropmarks.

- In terms of the wider area of north-west Wales, surface collection can only be used in a limited way to interpret the early prehistoric landscape because of the absence of cultivated areas that can be surveyed. There can only be tentative extrapolation from the existing few chance finds. Areas that are cultivated tend to be scattered and infrequent. Collection from these is only possible by local workers able to observe and collect from fields when they happen to become available. Much information has been produced in this way by the work of Margaret Griffith in western Llŷn and of Neil Fairbourne in north Anglesey.

- In an area with an absence of cultivated fields for surface collection another approach is that of 'shovel testing'. That is excavation of a series of small test pits in the topsoil. This is obviously very labour intensive and so can only be carried out in limited areas where there are previous indications of the likelihood of activity areas and where assistance is available. This approach was carried out on a limited scale at Dolwyddelan, Conwy (Stage 3, above) and as part of the Anglesey Landscape Project (Edmonds and Thomas 1991). In the former only 8 pits were excavated but in the latter over a hundred, producing some two thousand worked pieces (Edmonds, pers. com.). In both cases the technique was successful, in respect of the localised areas that each was investigating.

- The general unavailability of cultivated areas has been exacerbated by current agricultural conditions that have meant an increasing swing to pasture. Future fieldwork will have to depend on chance finds from minor exposures such as coastal paths, cliff edges, pipelines, ditch digging and reservoir edges. The latter, particularly, has never been systematically exploited and some of the others provide evidence about areas that would never, in any case, be illustrated by collection from cultivated areas, for instance the Beaker material from the Newborough sand dunes (PRN 3029), or the flint 'hoard' from the peat of Cors Bodwrog (PRN 2141). The finds from such areas, in conjunction with the evidence from the limited areas of surface collection do show that lithic material occurs widely in the landscape. It is justified to expect that early prehistoric activity was just as widespread as elsewhere in Britain and to extrapolate from known finds and experience of typical topographic locations elsewhere to look for settlement and other activity areas. Anglesey is of particular interest and potential because although being lowland it has, like Ireland, extensive wetlands and valley peat where good preservation can be expected. It also has some areas of particularly good soils where there is already evidence of Neolithic activity in the form of ritual and funerary monuments and numerous finds of stone axes, although the areas of settlement themselves have not yet been identified. In the future pursuit of these areas of research lithic finds will be important because they provide the only regularly surviving and occurring artefactual evidence.

- Overall it was found that this was very problematic because of the rarity of ploughed land with the decline in arable farming. Nevertheless, some suitable fields were located. Flint and chert finds were found to be extremely sparse.

- Despite the unpromising results some random testing of areas is worthwhile to produce comparative evidence about amounts of surface material, a factor that will be more apparent when seen in a pan-Wales context.

- Targeting of particular areas known to be cultivated regularly would be desirable using a two-stage intensity approach as described above.

- Techniques and levels of intensity need to be comparable between project areas.

7.5 General recommendations

- New direct assessment of artefact collections.

- Further surface collection sampling is needed.

- There is a need to differentiate between arable and non-arable areas and target some of the former.

- In terms of formal requirements for scheduling it must probably be accepted that whatever non-invasive techniques area used to evaluate a site, scheduling would only be justifiable when excavation has been employed to produce conclusive evidence of the existence of sub-soil features, layers or structures in addition to the spread of artefacts.

- A wider range of approaches is needed for the identification of Neolithic and Bronze Age settlement, for example consideration of the location of stone axe and metal finds, of the location of funerary monuments, particular topographic locations and the use of aerial photographic evidence.

- There is a need to give particular consideration to wetland locations for Mesolithic settlement, by assessing lake, bog, stream and river margins, especially those with peat cover.

- The coastal bias of the present distribution of lithic finds is probably a result of a combination of collector bias and distribution of raw material sources. This needs to be corrected by local studies of particular topographic areas, extending the work around Dolwyddelan in the Lledr valley, for instance, or other similar types of location.

8. Summary recommendations for future work

7.1 Conservation

The study has shown that the methods of value assessment developed for use in England are difficult to apply and not generally suitable for use in north-west Wales because of the limited areas of arable farming and the lack of systematic surface collection work. In addition to desktop study, field visits to selected sites are essential to allow adequate assessment. It is possible to select sites of higher value by desktop study but field visits are necessary to identify which of these are of greatest potential and in greatest need of conservation.

The project has produced results that are useful for management in terms of curatorial policies and of individual site conservation. The English Heritage leaflet *'Managing Lithic Scatters'* now provides advice for planners and developers that is applicable to Britain as a whole and should be endorsed (p. 3 above, Schofield 2000).

Any future extension of the work must:

- Assess sites on paper and in the field
- Identify sites of highest value
- Make proposals for statutory protection
- Identify particularly vulnerable sites

7.2 General research:

The project provides a database that should be of great use in research. Any further work in the same area, as opposed to extension of the work to other areas, might involve:

- Evaluation of individual sites
- Study of individual objects and assemblages
- Research into associated environmental evidence
- Study of raw materials and their availability

In order to be of wider relevance and use future work must:

- Ensure that recording is carried out to comparable standards
- Use a common relational database with standard recording field definitions
- Produce and make available a gazetteer and digital database
- Produce a summary of present knowledge by period for each region
- Outline research priorities for each period

7.3 Publication

- If the work is extended to other regions of Wales a final pan-Wales synthesis of results and research priorities should be produced.

- The final results of the Gwynedd project must wait until the soil and pollen analysis are completed. However, whether this adds to the interpretation or not, publication of the results will be worthwhile.

- Shorter notes providing an outline of the project prior to fuller publication or extension of the work should be produced for perhaps Archaeology in Wales, British Archaeology and the Lithics Society journal.

LITHICS ASSESSMENT FORM 1: Desktop Assessment				Gwynedd Archaeological Trust								Sheet no.
OSmap	PRN	Size	Period	Function	Sources	Location	Integrity	Scale	Survival	ArchRec	Potential	Comments

Appendix 1 Desktop Assessment Recording Form

Appendix 2: Lithic Scatters Project, G1590 Stage 1:Desktop Assessment, Catalogue in OS map order

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH12NE											
	767	***Castell Odo, Aberdaron***									
		3	6	1	3	6	4	3	2	3	6
DESCRIPTION		1 convex scraper, 1 edge retouched knife and about 41 waste flakes mainly flint, a few chert.									
COMMENTS		Residual finds during excavation of IA hillfort.									
	3289	***Mynydd Anelog, Aberdaron***									
		1	6	0	2	7	1	2	3	1	2
DESCRIPTION		1 scraper of fine-grained stone, not flint, probably Rhiw stone.									
COMMENTS		Surface find on eroding rocky hill summit.									
	3294	***Trwyn y Penrhyn, Aberdaron Bay***									
		3	2	0	2	2	1	3	2	1	4
DESCRIPTION		1 microlith, numerous cores and waste flakes.									
COMMENTS		Surface find in ploughed field, scattered over a wide area. Field now permanent pasture.									
SH12NW											
	1225	***St Mary's Church, Uwchmynydd***									
		2	6	0	2	7	1	3	3	1	4
DESCRIPTION		I scraper and several flakes. None diagnostic.									
COMMENTS		Several colllections. Some with M Griffiths.									
	4350	***Maen Melyn Llyn, Uwchmynydd***									
		2	6	0	1	2	1	3	3	1	4
DESCRIPTION		6 waste flint waste flakes and 1 piece of chert.									
COMMENTS		Part of same scatter as PRN 1225. Surface find from eroding turf close to cliff edge.									
SH12SE											
	3296	***Parwyd, Uwchmynydd***									
		2	3	0	2	5	1	3	2	1	4
DESCRIPTION		Several large flakes of fine-grained stone and one waste flake of flint. Late neolithic?									
COMMENTS		Surface find from eroding cliff edge.									

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL

SH12SE

3297 Porth y Pistyll, Uwchmynydd

3	3	0	2	2	1	2	3	1	4

DESCRIPTION 30 flint waste flakes and 12 cores. A double-ended stone hammer also found nearby.

COMMENTS Surface find from ploughed field.

4349 Hen Borth, Uwchmynydd

2	2	0	1	2	1	3	3	1	4

DESCRIPTION 42 flints including 1 rod microlith 5.5mm wide, 1 scraper frag 1 blade core and 6 other cores.

COMMENTS Surface find in ploughed field.

SH12SW

1224 Pared Llechymenyn cliff, Uwchmynydd

3	2	0	2	7	1	2	3	1	4

DESCRIPTION 3 microliths, 1 microburin and 2 cores as well as over 50 waste flakes, from at least four collections. One microlith is scalene. Later mesolithic date suggested.

COMMENTS Some in NMW, some with M Griffiths.

1226 Carreg Fawr, Ynys Enlli

2	6	0	2	7	1	2	3	1	4

DESCRIPTION Small collection including 1 truncated blade, one retouched blade and a discoidal scraper.

COMMENTS Exact findspot uncertain

1741 Pared Llechymenyn field, Bychestyn, Uwchmynydd

2	2	0	1	2	1	3	3	1	4

DESCRIPTION 14 flint waste flakes, 2 cores and 1 granite hammerstone. None diagnostic.

COMMENTS Close to and probably part of same site as PRN 1224. Later mesolithic date suggested.

7063 Porth Felen, Aberdaron

1	6	0	1	2	1	3	3	1	3

DESCRIPTION 1 pebble flint core, single platform

COMMENTS JR coll. Eroding from cliff edge.

7366 Bardsey, general

2	6	0	1	2	1	2	3	1	4

DESCRIPTION

COMMENTS Several small collections from different locations.

SH22NW

PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL

SH22NW

1232 Mynydd Rhiw axe factory, Rhiw

3	3	2	3	6	4	3	2	3	6

DESCRIPTION Industry of flaked tuff including discoidal, straight edge and convex scrapers, hollow scrapers, knives, awls and serrated flakes as well as axe rough-outs and very numerous waste flakes and one flake of flint.

COMMENTS Found during excavation of Neolithic axe factory working floors although radiocarbon dating gave an uncalibrated date in the later 2nd millennium BC.

3316 Mynydd Rhiw, East Slopes

2	3	0	2	8	1	1	3	1	3

DESCRIPTION Waste flakes of flint and fine-grained stone, probably Rhiw stone.

COMMENTS Surface finds during afforestation. Finds now lost. Further finds made in 1999, none flint.

3317 Ty'n y Muriau, Rhiw

2	3	0	1	7	1	1	3	1	7

DESCRIPTION Flaked fine-grained stone, now lost.

COMMENTS NMW. See also 3318. Exact findspot not certain. Possibly a collection of iindividual items from a wide area.

3318 Tan-y-garn

1	6	0	1	2	1	2	3	1	2

DESCRIPTION Flake tool of fine-grained rock - probably Rhiw stone.

COMMENTS Probably an isolated item, aprt of a very widespread scatter in this area.

5050 Nant-y-Gadwen,

1	6	0	2	5	1	2	3	1	2

DESCRIPTION 1 retouched blade.

COMMENTS Surface find, high up on valley slopes about quarter of a mile from the beach.

7398 Rhiw

1	6	0	1	5	1	2	3	1	2

DESCRIPTION Several collectioss including possible microlithic waste and one Neolithic small, bifacial knife or arrowhead.

COMMENTS One Rhiw stone flake.

SH22SE

4000 Pencilan Head, Llanengan

3	2	0	2	7	1	2	3	1	4

DESCRIPTION 70 pieces including 2 obliquely blunted microliths, 2 microblades and 1 core.

COMMENTS NMW. Surface collection from eroding turf. Jacobi (1980) includes it in the Early Mesolithic, with Trwyn Du.

SH23SE

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH23SE											
	411	***Ysgol Botwnnog, Botwnnog***									
		2	6	0	1	5	1	3	3	1	3
DESCRIPTION		Unspecified number - 'several' - flint flakes.									
COMMENTS		Surface collection during grading and ploughing of new school sports field.									
	1797	***Twtil, Llaniestyn***									
		2	4	3	2	1	4	3	2	3	1
DESCRIPTION		A few? flint waste flakes.									
COMMENTS		Found during 19thC barrow excavation.									
	4374	***Bod Nithoedd, Botwnnog***									
		2	3	0	1	5	2	3	3	1	3
DESCRIPTION		6 flint waste flakes - possibly Late Neolithic - F Lynch.									
COMMENTS		Surface find from ploughed field prior to excavtion of Bod Nithoedd barrows.									
SH23SW											
	1695	***Meyllteyrn Uchaf, Sarn Meyllteyrn***									
		2	4	0	3	5	4	3	2	3	3
DESCRIPTION		2 convex scrapers, 1 serrated piece, 2 casually retouched pieces, 2 cores, 1 ?gunflint, 3 waste flakes.									
COMMENTS		Found during excavation of Meyllteyrn Uchaf MBA settlement.									
	3645	***Trygarn***									
		1	6	0	1	8	1	2	3	1	2
DESCRIPTION		1 scraper of fine grained rock, not flint, probably Rhiw stone.									
COMMENTS		Surface find, collector now deceased and find lost.									
	3646	***Bryncroes***									
		1	6	0	1	7	1	2	3	1	2
DESCRIPTION		1 scraper of fine grained rock, probably Rhiw stone.									
COMMENTS		Surface find on NW slope of Mynydd Rhiw. In NMW.									
SH27NE											
	1654	***Pentre Gwyddel, Rhoscolyn, Holy Island***									
		2	2	0	2	6	1	2	3	1	4
DESCRIPTION		1 obliquely blunted microlith and 38 waste flakes, all flint. Later mesolithic date suggested - F Lynch.									
COMMENTS		Found in ploughed field.									

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH27NE											
	2567	***Cae Llyn, Rhoscolyn***									
		1	6	0	1	5	1	3	3	1	2
DESCRIPTION		1 flint waste flake.									
COMMENTS		Surface find during forestry planting.									
SH28SE											
	2500	***Trefignath Chambered tomb***									
		3	3	0	3	7	4	3	2	3	6
DESCRIPTION		3 awls, 15 cores, 6 knives, leaf arrow-head, 1 notched pce, 23 ret pces, 22 scrapers, 1 serrated pce, 1 truncated pce, 348 WF.									
COMMENTS		NMW									
	2505	***Traeth Penrhos, Holyhead***									
		2	3	0	2	2	1	2	3	1	4
DESCRIPTION		A leaf arrow-head, denticulate, notched blade and probable convex scraper fragment as well as several flint waste flakes.									
COMMENTS		Found eroding from colluvial deposits in cliff-face.									
	2506	***Penllech Nest, Holyhead, unlocated***									
		2	3	0	2	1	1	2	3	1	1
DESCRIPTION		1 convex scraper as well as 1 ground stone axe, a slingstone and a hammerstone.									
COMMENTS		Findspot built over and finder dead. Findspot no longer locatable.									
SH28SW											
	1749	***Porth Ruffydd, Holy Island***									
		2	2	0	3	5	1	3	3	1	3
DESCRIPTION		2 flint cores. Early mesolithic date suggested - R Kelly.									
COMMENTS		Found eroding from blanket peat (probably from under it?).									
	1755	***Holyhead Mountain Hut Circle Settlement, Anglesey***									
		3	2	0	3	0	4	3	2	3	6
DESCRIPTION		119 pieces of flaked stone of which 73 were flint, the rest chert. The majority are of pebble flint and of mesolithic type from one small area of excavation. These include scalene triangles and truncated pieces, 4 microburins, scrapers and knives as well as 17 cores and a core axe or adze and two bifacial chopping tools. The non-pebble flint is rather different including a barbed and tanged arrowhead, convex scraper and two waste flakes. The site also produced numerous pebble hammers, rubbing stones, mortars etc.									
COMMENTS		Found during excavation of RB? hut circle settlement.									
SH32NW											

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH32NW											
	4005	***St. Tudwal's Island East, Abersoch***									
		2	2	0	2	2	1	1	3	1	3
DESCRIPTION		A few flint waste flakes.									
COMMENTS		Surface find after natural erosion?									
	4007	***Bryn Refail, Bwlchtocyn, Nr Abersoch***									
		3	2	0	3	1	4	3	2	3	4
DESCRIPTION		About 1700 pieces of flint and chert including 11 cores and 30 tools. The latter include 3 'rod' microliths, scrapers, denticulates and casually retouched pieces.									
COMMENTS		Finds from excavtion in 1946.									
	5074	***Abersoch, unlocated***									
		2	2	0	2	1	1	1	3	1	4
DESCRIPTION		Stray local finds catalogued at end of Bryn Refaill report - see PRN 4007.									
COMMENTS											
SH32SW											
	5046	***Porth Ceiriad, Llanengan, Nr Abersoch***									
		2	2	0	2	2	1	3	3	1	4
DESCRIPTION		1 thumbnail scraper and 2 flint waste flakes.									
COMMENTS		From surface of ploughed field at coast edge.									
SH33NW											
	1534	***Tir Gwyn, Llannor, Nr Pwllheli***									
		1	6	0	2	7	1	3	3	1	7
DESCRIPTION		1 plano-convex knife, a typical Early Bronze Age piece. Four flint waste flakes also found nearby - see PRN 3651.									
COMMENTS		Surface find near to standing stones.									
	3651	***Tir Gwyn, Llannor, Nr Pwllheli***									
		2	6	0	1	2	1	2	3	1	4
DESCRIPTION		4 flint waste flakes.									
COMMENTS		Surface find in field containing 2 standing stones.Same as PRN 1534 from same field.									
SH33SW											
	3654	***Trwyn Llanbedrog***									
		1	3	0	1	7	1	2	3	1	2
DESCRIPTION		1 leaf-shaped arrowhead.									
COMMENTS		Surface find from footpath? On headland of Twyn Llanbedrog.									
SH34NE											

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH34NE											
	1477	***Old Pier, Trefor***									
		3	3	0	1	5	1	3	3	1	5
DESCRIPTION		Over 200 waste flakes of flint including only one retouched piece and that non-diagnostic. Lack of microlithic technology suggests a Neolithic date.									
COMMENTS		Finds from several collections.									
	2239	***Nant Gwrtheyrn, Llithfaen***									
		2	6	0	2	1	1	3	3	1	2
DESCRIPTION		Single flint waste flake and other frags.									
COMMENTS											
SH34SE											
	2250	***Tre'r Ceiri, Llithfaen***									
		1	3	0	2	7	1	2	3	1	2
DESCRIPTION		Derived petit tranchet derivative arrowhead.									
COMMENTS		Near Tre'r Ceiri. NMW.									
	2257	***Caer Gribin, Llithfaen***									
		1	4	0	2	7	1	2	3	1	2
DESCRIPTION		Barbed and tanged arrowhead.									
COMMENTS		NMW.									
	4314	***Tre'r Ceiri S, Llithfaen***									
		1	6	0	1	6	1	2	3	1	2
DESCRIPTION		2 scrapers and 1 ?gunflint.									
COMMENTS		Bangor Museum. Surface find on S slopes below Tre'r Ceiri hillfort.									
	4315	***Tre'r Ceiri, Llithfaen***									
		1	6	0	1	6	1	2	3	1	2
DESCRIPTION		1 scraper.									
COMMENTS		Found on W slopes, below Tre'r Ceiri hillfort.									
SH34SW											
	1261	***Carreg y llam, Pistyll***									
		2	6	0	2	7	4	3	1	3	1
DESCRIPTION		4 flint waste flakes.									
COMMENTS		Residual finds during excavation of ?Dark Age hillfort.									
SH36NE											

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL

SH36NE

5055 Trwyn Du, Aberffraw, Anglesey

SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
3	2	0	3	6	4	3	2	3	4

DESCRIPTION Very large Early Mesolithic assemblage including several thousand waste flakes, 84 cores, 123 obliquely blunted large microliths, 87 scrapers. 7 triangles, 8 tanged points and 2 tranchet axes.

COMMENTS Finds from excavation in 1974. Other finds have also been made from the eroding cliff edge. Now SAM? Bangor Mus.

SH36SE

3029 Bryn Llwyd, Newborough, Anglesey

SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
2	3	1	2	6	1	2	3	1	4

DESCRIPTION Flint leaf-shaped and triangular arrowheads, numerous waste flakes and cores as well as Beaker pottery.

COMMENTS Surface finds in 1826-8 from eroding sand dunes, now afforested and findspot not identiifiable.

SH37SE

2447 Ty'n-lon, Dothan, Anglesey

SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
3	3	0	2	2	1	3	2	1	7

DESCRIPTION 4 convex thumb scrapers, 2 edge retouched knives, cores and about 70 waste flakes as well as ground stone axe frag.

COMMENTS Surface find followed by excavation of settlement site. Suggested to include both Mesolithic and Neolithic elements - D Longley.

2528 Din Dryfol Chambered tomb excavation

SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
3	3	3	3	6	4	3	2	3	6

DESCRIPTION 4 convex scrapers, 1 fabricator, 2 retouched blades,one 'strike-a-light' and 70 waste flakes as well as one ground stone axe frag..

COMMENTS Found during excavation of Neolithic chambered tomb. Oriel Ynys Mon.

SH37SW

3030 Ty Newydd burial chamber

SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
2	4	0	2	7	4	3	2	3	6

DESCRIPTION 1 barbed and tanged arrow-head, 2 ret pces, 2 WF.

COMMENTS NMW

3041 Near Barclodiad y Gawres, Llanfaelog

SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
2	2	0	2	2	1	2	3	1	3

DESCRIPTION 1 blade, 1 core, 2 flint waste flakes. Suggested mesolithic date - J Conway.

COMMENTS Surface find from ploughed field near Neolithic chambered tomb.

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH37SW											
	7972	**Glan-y-gors, Llanfaelog**									
		2	3	0	1	5	1	3	3	1	3
DESCRIPTION		Thumbnail scraper and backed blade.									
COMMENTS		DH coll during Welsh Water watching brief.									
SH38SE											
	2079	**Bodedern**									
		1	4	0	1	6	1	3	3	1	2
DESCRIPTION		Barbed and tanged arrowhead.									
COMMENTS		Bangor Mus.?									
	5869	**Chwaen-ddu, Llantrisant**									
		2	3	0	1	5	1	3	3	1	4
DESCRIPTION		Several flints including a small blade, one convex scraper and two chert cores. G1208, GAT Rep no. 100.									
COMMENTS		GHS coll., Llyn Alaw Survey, G1208									
	5870	**Cors-y-bol, Llantrisant**									
		2	6	0	1	1	1	2	3	1	4
DESCRIPTION		Several flints found E of Cors-y-bol barrow (AM7 form, CADW), no other record.									
COMMENTS											
	7046	**Penbol Uchaf, Rhosybol**									
		2	2	0	1	2	1	2	3	1	4
DESCRIPTION		2 flakes/blades and 1 microburin									
COMMENTS		Possibly early mesolithic date.									
SH44NE											
	116	**Cefn Graeanog hut group excavation**									
		2	6	0	3	6	4	3	1	3	1
DESCRIPTION		3 convex scrapers, one casually retouched piece and 25 flint or chert waste flakes, including some banded chert.									
COMMENTS		Residual finds during excavation of RB settlement.									
SH46NE											
	1538	**Trefarthen, Brynsiencyn, Anglesey**									
		1	6	0	1	2	1	2	3	1	7
DESCRIPTION		1 casually retouched flake.									
COMMENTS		Surface find from ploughed field. Associated with PRN 1634.									

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH46NE											
	1634	**Trefarthen quarry field, Brynsiencyn, Anglesey**									
		2	3	0	2	2	1	2	2	1	7
DESCRIPTION		Several flint waste flakes, 1 ground stone axe, 1 flaked axe and 1 saddle quern. Neolithic settlement indicated.									
COMMENTS		Probably associated with PRN 1538. Flint finds removed by J Thomas.									
	3140	**Castell Bryn Gwyn henge excavation**									
		3	3	0	2	7	4	3	2	3	6
DESCRIPTION		5 scrapers, 1 ptd arrowhead, 1 plano-convex knife, 1 retouched blade, 2 cores, 19 waste flakes.									
COMMENTS		From excavation of Late Neolithic henge.									
SH46NW											
	7620	**Glan Morfa, Llangaffo**									
		2	6	0	1	2	1	3	3	1	3
DESCRIPTION		1 gunflint. 1 flake and 1 nat? highly patinated flake.									
COMMENTS		Ian Stenson coll. From surface of ploughed field while metal detecting.									
SH46SE											
	3126	**NE of Meinaifron, Llangeinwen**									
		2	3	0	1	2	1	2	3	1	3
DESCRIPTION		1 scraper, 1 hollow-base arrowhead.									
COMMENTS		Surface find from ploughed field.									
SH46SW											
	3080	**Newborough Warren, Newborough, Anglesey, unlocated**									
		2	2	0	2	1	1	2	3	1	4
DESCRIPTION		Microliths - later mesolithic.									
COMMENTS		Finds in 1926-8 from eroding sand dunes. Exact findspot not identified.									
SH47NW											
	2133	**Glan Llyn, Bodfordd, Anglesey**									
		2	3	0	1	2	1	2	3	1	7
DESCRIPTION		1 flake knife and 1 core.									
COMMENTS		Surface find from ploughed field.									
	2138	**Heneglwys Parish, Anglesey, unlocated**									
		3	6	0	2	1	1	1	2	1	7
DESCRIPTION		Numerous flint flakes.									
COMMENTS		A 19thC find during peat cutting. Findspot not located.									

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH47NW											
	2141	***Bodwina, Cors Bodwrog, Anglesey, unlocated***									
		2	4	0	2	1	1	1	3	1	4
DESCRIPTION		2 convex scrapers and numerous flakes.									
COMMENTS		A 19thC find. Findspot not located.Very fresh flint, suggested by FML to be an imported hoard.									
SH47SE											
	2731	***Capel Eithin, Llanfighangel Ysc.***									
		3	3	1	3	7	4	3	2	3	6
DESCRIPTION		28 retouched tools including convex end scrapers, knives, borers, retouched and serrated blades and one leaf-shaped arrowhead as well as 294 flint and chert waste flakes. Contexts include Late Neolithic and Early Bronze Age.									
COMMENTS		From excavation of Late Neolithic settlement and EBA funerary site.									
SH48NE											
	2125	***Ogof Arian, Pentre Eriannel***									
		2	3	0	2	7	1	2	3	1	6
DESCRIPTION		3 convex scrapers.									
COMMENTS		From cave site SAM A106.									
	2132	***Din Lligwy hut group excavation***									
		1	3	0	2	7	4	2	2	3	6
DESCRIPTION		1 petit tranchet derivative arrowhead.									
COMMENTS		Residual find during excavation of RB settlement.									
SH48SE											
	2203	***Parciau hillfort, Moelfre, Anglesey***									
		1	6	0	2	7	4	3	2	3	6
DESCRIPTION		1 WF									
COMMENTS		NMW									
SH52SE											
	1067	***Dyffryn Ardudwy chambered tomb, Mer.***									
		2	6	0	3	7	4	3	2	3	6
DESCRIPTION		3 cores, 1 leaf arrow-head, 1 util pce, 11 WF.									
COMMENTS		NMW									
SH53NW											

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH53NW											
	218	***Cist Cerrig Portal Dolmen, Morfa Bychan***									
		2	3	3	2	7	1	3	3	1	6
DESCRIPTION		2 flint waste flakes.									
COMMENTS		Surface find near Neolithic burial chamber.									
SH54NE											
	3372	***Cwm Cloch, Beddgelert***									
		2	3	0	1	2	1	1	2	1	3
DESCRIPTION		1 flint flake, a broken perforated axe-hammer and a broken sandstone hammer.									
COMMENTS		Finder and findspot no longer traceable. Possibly all from different places.									
SH56NE											
	2	***Goetre Uchaf barrow, Penrhosgarnedd, Bangor***									
		1	6	4	2	7	1	3	3	1	2
DESCRIPTION		One convex scraper, flint.									
COMMENTS		Surface find near BA barrow.									
	3737	***Hafod Cottage***									
		1	6	0	2	2	1	3	3	1	2
DESCRIPTION		1 scraper.									
COMMENTS		Surface find in vegetable garden.									
SH57NE											
	2643	***Cremlyn, Llansadwrn, Anglesey***									
		2	3	3	2	6	4	3	2	3	7
DESCRIPTION		1 small scraper, 1 small bifacial piece - possibly an unfinished ptd arrowhead and 1 utilised blade.									
COMMENTS		Finds from excavation of standing stone and from surface of field nearby.									
SH57NW											
	401	***Bryn Eryr, Llansadwrn***									
		2	6	0	2	6	4	3	2	3	3
DESCRIPTION		1 end scraper, 2 cores and 67 waste flakes of flint.									
COMMENTS		Residual finds during excavation of IA and RB settlement. Oriel Ynys Mon.									
SH57SE											

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH57SE											
	222	***Llandegai, Bangor***									
		3	3	0	2	2	4	3	2	3	6
DESCRIPTION		Unspecified number of flint flakes and tools.									
COMMENTS		Found during excavation of Neolithic henge complex. Post excavation work in progress - F Lynch.									
	2178	***Goggerddan,***									
		1	3	0	2	7	1	1	3	1	2
DESCRIPTION		1 convex end scraper and 1 side scraper.									
COMMENTS		Surface find. Findspot not located.									
	6578	***Llandegai, Bangor***									
		1	6	0	1	2	1	2	3	1	7
DESCRIPTION		Single burnt flint flake plus some burnt stones nearby									
COMMENTS		Burnt mound site? Steve Hughes coll.									
	7870	***Minfordd, nr Bangor***									
		1	4	0	1	2	1	2	3	1	2
DESCRIPTION		Plano-convex flint knife									
COMMENTS		Found on river bank so possibly washed out of nearby in situ deposits.									
SH57SW											
	2694	***Bryn Celli Ddu***									
		2	3	0	2	7	4	3	2	3	6
DESCRIPTION		1 backed pce, 2 scrapers, 1 tranverse arrow-head, 12 waste flakes									
COMMENTS		NMW									
	2698	***Holo Gwyn, Llanddaniel, Anglesey***									
		2	3	0	2	6	1	1	3	1	7
DESCRIPTION		1 arrowhead, type unknown, 2 flint waste flakes and 2 Graig Llwyd axes.									
COMMENTS		Surface finds, possibly from different places on the same farm. Owner deceased. Findspot no longer traceable.									
	2719	***Llandysilio***									
		1	3	0	1	2	1	2	3	1	2
DESCRIPTION		1 arrowhead, possibly ptd.									
COMMENTS		Surface find.									
SH58NW											

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH58NW											
	3594	***Lligwy Chambered tomb***									
		2	4	0	2	7	4	3	2	3	6
DESCRIPTION		1 plano-convex knife, 2 ret pces, 4 scrapers, 1 util. pce, 14 WF									
COMMENTS		NMW									
	3598	***Porth Forllwyd, Moryn, Rhos Lligwy, Anglesey***									
		2	2	0	2	7	1	1	3	1	4
DESCRIPTION		30 waste pieces, including 1 microburin.									
COMMENTS		From 'above the boulder clay'.									
SH58SW											
	60	***Pant y Saer burial chamber excavation***									
		1	6	0	2	7	4	3	2	3	6
DESCRIPTION		5 leaf arrowheads, one convex scraper, flint.									
COMMENTS		Some from chamber, others residual find during excavation of RB settlement.									
	3607	***Gwynfa, Marianglas***									
		1	3	0	1	2	1	3	3	1	2
DESCRIPTION		1 hollow base arrowhead indicates Later Neolithic date. Thought to be of Irish type and possibly of imported Antrim flint (Savory)									
COMMENTS		Found on surface in garden. Oriel Ynys Mon?									
	3626	***Pant-y-saer hut group excavation***									
		1	3	3	1	7	4	3	2	3	6
DESCRIPTION		1 chisel arrowhead of chert and several leaf-shaped arrowheads of flint.									
COMMENTS		BM. Found during excavation of Pantysaer Neolithic burial chamber.									
	5230	***Glyn, Benllech, Anglesey***									
		3	3	0	2	7	4	3	2	3	5
DESCRIPTION		No details available yet.									
COMMENTS		NMW									
SH62SW											
	1105	***Llanaber, Mer.***									
		1	6	0	3	7	4	3	2	3	3
DESCRIPTION		1 retouched pce.									
COMMENTS		NMW									
SH63SW											

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH63SW											
	803	***Cwm Dyli, Nant Gwynant, Beddgelert***									
		2	4	1	2	7	1	2	3	1	6
DESCRIPTION		Arrowheads, unspecified, 2 ground stone axes and 2 'chisels'.									
COMMENTS		Residual finds during excavation of IA/RB settlement.									
	1004	***Moel y Gerddi, Mer.***									
		2	3	0	3	7	4	3	2	3	3
DESCRIPTION		1 core, 2 knives, 2 ret pce, 3 scrapers, 1 util pce, 19 WF.									
COMMENTS		NMW									
	1036	***Erw Wen settlement, Mer.***									
		2	6	0	3	7	4	3	2	3	3
DESCRIPTION		1 core, 1 scraper.									
COMMENTS		NMW									
SH64NW											
	5688	***Nantmor, Nr Beddgelert***									
		1	6	0	1	2	1	1	3	1	7
DESCRIPTION		Convex scraper, waste flake and serrated flake.									
COMMENTS		The first two from a river bank, the latter from a garden at a different location.									
SH65NE											
	4513	***Bwlch Tryfan,***									
		1	4	0	2	3	1	3	3	1	2
DESCRIPTION		1 barbed and tanged arrowhead - Conygar Hill type									
COMMENTS		Surface find from mountain path between Glyder Fach and Tryfan.									
SH65SE											
	2566	***Garnedd Pen Bont, Blaenau Dolwyddelan***									
		3	2	1	2	2	3	3	2	2	4
DESCRIPTION		79 pieces, mostly flint including 2 possible unfinished microliths, 2 microburins, 1 burin and 2 cores. Later mesolithic in character.									
COMMENTS		See also PRN 3450 and 3451. First found on mole hills. Further pieces found during test pit excavation in advance of turbine house construction.									
SH68SW											

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL

SH68SW

2568 ***Llangoed, Anglesey, unlocated***

2	2	0	2	7	1	2	3	1	4

DESCRIPTION 1 obliquely blunted microlith, 1 retouched blade, 1 thumbnail scraper, 1 core and 14 flint waste flakes.

COMMENTS Old collection (Hemp). Findspot no longer locatable.

5073 ***Penmon, Anglesey, unlocated***

2	2	0	2	7	1	1	3	1	4

DESCRIPTION 1 obliquely blunted microlith, 1 large retouched blade, 1 small steeply retouched scraper, a Bann flake and a core as well as 13 waste flakes.

COMMENTS From 'beach' (Livens 1972). Findspot needs relocating. NMW.

SH72SW

4927 ***Afon Wen, Ganllwyd***

1	2	0	1	2	1	3	3	1	2

DESCRIPTION 1 end scraper on unusually long blade.

COMMENTS Surface find at stream edge, possibly redeposited.

SH73NW

5108 ***Bryn-y-Bleiddiad, Trawsfynydd***

1	6	0	3	1	1	1	3	1	2

DESCRIPTION 1 thin convex scraper, probably Neolithic.

COMMENTS Surface find from path at edge of Llyn Trawsfynydd.

SH74NW

3743 ***Ro Wen Mountain, Penmachno***

2	3	0	2	6	1	2	3	1	7

DESCRIPTION 1 end scraper, 1 notched blade and 36 large flakes of a distinctive grey mottled flint up to 200mm long and clearly imported.

COMMENTS The Penmachno Hoard. Bangor Museum. Found eroding from peat bed near mountain summit.

SH75SW

3450 ***Bonc-yn-ddol, Blaenau Dolwyddelan***

2	2	0	1	2	3	3	3	2	4

DESCRIPTION 2 narrow blade, later mesolithic microliths, 2 neolithic pieces - a leaf-shaped arrowhead and a bifacial knife. Also over 50 waste flakes including several pieces of flaked crystal quartz.

COMMENTS Finds from surface collection from mole-hills and from excavation of 8 one metre square test pits.

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH75SW											
	3451	**Ty-yn-y-ddol, Blaenau Dolwyddelan**									
		2	2	0	1	2	1	2	3	1	4
DESCRIPTION		One small plano-convex flint knife and several flint waste flakes.									
COMMENTS		Finds from surface collection, from mole hills.									
SH76NE											
	4615	**Porthllwyd burial chamber, near to, Dolagarrog**									
		1	6	0	2	7	1	1	3	1	2
DESCRIPTION		1 flint waste flake.									
COMMENTS		Surface find near Porthllwyd Neolithic burial chamber.									
SH77NW											
	2897	**Graig Llwyd, NW, Penmaenmawr**									
		1	3	0	1	2	1	3	3	1	2
DESCRIPTION		Flint blade or knife.									
COMMENTS		Surface find from footpath, Graig Llwyd area.									
	2898	**Graig Llwyd, Penmaenmawr**									
		1	6	0	1	2	1	3	3	1	2
DESCRIPTION		I flint waste flake.									
COMMENTS		Surface find. Graig llwyd area.									
	6219	**Foel Lus, Penmaenmawr**									
		1	6	0	1	5	1	2	3	1	2
DESCRIPTION		Single flint flake									
COMMENTS											
SH77SE											
	5028	**Coed Gors-wen, Roewen, Conway Valley**									
		1	2	0	2	2	1	2	3	1	2
DESCRIPTION		1 convex backed, narrow blade, later mesolithic microlith.									
COMMENTS		Single redeposited find on footpath.									
SH78SE											
	635	**Kendrick's Cave, Llandudno**									
		2	1	0	2	7	4	3	2	3	6
DESCRIPTION		Several flint tools as well as two ground stone axes along with Neolithic pottery.									
COMMENTS		Some also in Gt Orme Mine museum. Found during several excavations of cave site.									

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH78SE											
	4571	***Ogof Tan-y-bryn, Llandudno***									
		3	1	0	2	0	4	3	2	3	6
DESCRIPTION		Finds include 2 flint pieces of Upper Palaeolithic type - a Creswellian blunted back blade and a leaf-shaped flake.									
COMMENTS		Cave excavation. Now SAM Cn 204.									
	4579	***Bryniau Poethion, Great Orme***									
		1	3	0	1	8	1	2	3	1	2
DESCRIPTION		1 flint 'lance head'.									
COMMENTS		Cave find from Gt Orme but findspot unknown. Grosv. Mus., Chester.									
	4584	***St Tudno's Church, Great Orme***									
		1	4	0	2	2	1	3	3	1	2
DESCRIPTION		1 unusually large barbed and tanged arrowhead.									
COMMENTS		19th C surface find from Gt Orme.									
	4585	***Great Orme, Unlocated***									
		1	3	0	1	7	1	1	3	1	2
DESCRIPTION		1 convex scraper.									
COMMENTS		Surface find from Gt Orme footpath. NMW.									
	4587	***Llandudno, unlocated***									
		1	6	0	1	8	1	1	3	1	2
DESCRIPTION		1 flint blade.									
COMMENTS		Llandudno unlocated. BM.									
	4602	***Great Orme NW end, Llandudno, unlocated***									
		2	3	0	2	8	1	1	3	1	4
DESCRIPTION		Several flint waste flakes, 1 scraper, 1 scraper made from a broken Graig Llwyd axe, a hammer stone and a rubbing stone.									
COMMENTS		Surface find. Context and exact location uncertain. Prestatyn Mus.									
	5076	***Llandudno, unlocated***									
		2	6	0	1	8	1	1	3	1	2
DESCRIPTION		Blades and flakes, unretouched, 10cm long.									
COMMENTS		Old finds, Llandudno, unlocated, possibly from a cave site. Kendrick's?									
	5453	***Pyllau, Great Orme***									
		1	6	0	2	2	1	1	3	1	2
DESCRIPTION		1 convex scraper.									
COMMENTS		Surface find from Gt Orme footpath.									

	PRN	SIZE	PERI	FUNC	SOUR	LOCA	SCAL	INTE	SURV	ARCH	POTL
SH83NW											
	4995	**Arenig, unlocated**									
		1	4	0	2	7	1	1	3	1	2
DESCRIPTION		1 barbed and tanged arrowhead.									
COMMENTS		Surface find from hill footpath, exact findspot not located. NMW.									
SH86NW											
	4646	**Mwdwl Eithin barrow,**									
		2	4	0	2	1	4	1	2	3	6
DESCRIPTION		1 flint knife and 1 ?borer.									
COMMENTS		Found in EBA urn in barrow excavation.									
SH88SW											
	4570	**Ogof Pant-y-wennol, Llandudno**									
		3	3	0	2	3	4	3	2	3	6
DESCRIPTION		Lower layer probably early Mesolithic with 3 microliths - 2 with blunted backs and one similar to egs at Starr Carr. Upper layer, probably Early Neolithic with a leaf-shaped arrowhead, scraper and many fragments.									
COMMENTS		Finds from cave excavation. Now SAM Cn 190.									
SH92NE											
	4953	**Aberhinant forest, Llanfor**									
		1	4	0	1	2	1	3	3	1	2
DESCRIPTION		1 barbed and tanged arrowhead.									
COMMENTS		Found during ditching as part of forestry work.									
SH93SW											
	4394	**Penllyn Forest**									
		1	6	0	1	5	1	3	3	1	2
DESCRIPTION		1 flint blade retouched on both edges - ?knife.									
COMMENTS		Surface find from forest path.									
SH94SE											
	1595	**Caer Euni stone circles**									
		2	3	0	3	7	4	3	2	3	6
DESCRIPTION		1 convex scraper, 47 flint waste flakes.									
COMMENTS		Found during excavation of group of Bronze Age cairns - F Lynch.									

Appendix 3 Fieldwork Recording Form

GWYNEDD ARCHAEOLOGICAL TRUST			
LITHICS SURVEY, G1590, *Form 1: Field assessment*			*MAP*
DESCRIPTION	*Site Name*		*PRN*
Accuracy of location of site			
Exposure type			
Extent			
Slope class			
Aspect			
Topography			
Land use			
Vegetation			
Distance to water			
Threat type			
Threat value		*Threat likelihood*	
Colluvial value			
Site location: Descriptive text			
Comments:			
CRITERIA			
Condition			
Vulnerability			
Potential			
Summary text: Brief description of the site, date, value and area concerned			
Management comment: assessment of criteria, overall potential and proposed response			
Owner/tenant and address			
Date	*Author*	*Photo Ref Numbers*	

Appendix 4, Lithics Report, Fieldwork catalogue in PRN order

PRN	*Accuracy*	*Exposure*	*Extent*	*Slope*	*Aspect*	*Topography*	*Land use*	*Vegetation*	*Colluvial value*	*Threat type*	*Threat value*	*Threat Occurrence*	*Condition*	*Vulnerability*	*Potential*
222	0	0	0	0		0	0		0	0	0	0	0	0	0
1224	5	3	3	3	SW	6	3	1	2	4	2	1	2	2	3
1225	5	3	3	4	SE	6	3	1	2	3	3	1	2	3	4
1226	0	0	0	0		0	0		0	0	0	0	0	0	0
1232	5	6	3	2	NE	1	3	3	3	6	1	3	1	1	5
1477	5	3	2	3	E	6	6	1	0	4	3	1	1	4	5
1534	4	2	3	2	S	5	2	1	3	1	3	3	4	3	4
1538	4	2	4	2	SE	6	1		2	1	3	2	5	3	3
1634	4	2	4	2	SE	6	2	1	2	1	3	3	4	5	4
1654	5	2	2	2	S	6	2	1	2	1	3	4	4	3	4
1741	4	2	2	2	SW	6	2	1	2	1	3	3	4	4	4
1749	4	3	2	1	S	6	6	3	3	4	2	1	2	2	3
2133	5	2	2	2	SE	5	2	1	2	1	3	4	4	3	2
2138	0	0	0	0		0	0		0	0	0	0	0	0	0
2141	0	0	0	0		0	0		0	0	0	0	0	0	0
2447	5	6	2	0	L	5	2	1	3	2	2	3	4	2	4
2505	4	7	0	1	NE	6	6		3	4	3	1	2	3	0
2506	0	0	0	0		0	0		0	0	0	0	0	0	0
2566	5	6	2	1	S	3	2	1	3	1	3	4	4	3	4
2568	0	0	0	0		0	0		0	0	0	0	0	0	0
2643	0	0	0	0		0	0		0	0	0	0	0	0	0
2698	0	0	0	0		0	0		0	0	0	0	0	0	0
3029	4	4	4	6	L	6	5		4	6	4	4	4	4	4
3041	5	2	2	3	E	6	2	1	2	1	3	4	4	3	2
3080	4	4	0	6	L	6	5	7	2	6	4	4	3	4	4
3126	5	2	2	2	S	6	2	1	3	1	3	4	4	3	3
3294	4	3	3	2	S	6	2	1	2	1	3	4	4	3	4
3296	5	3	2	2	S	6	6	0	1	4	3	1	2	5	3

PRN	Accuracy	Exposure	Extent	Slope	Aspect	Topography	Land use	Vegetation	Colluvial value	Threat type	Threat value	Threat Occurrence	Condition	Vulnerability	Potential
3297	5	2	2	2	SE	6	2	1	4	1	3	3	3	3	3
3316	5	7	3	3	E	2	3	3	2	2	2	1	3	2	3
3317	0	0	0	0		0	0		0	0	0	0	0	0	0
3450	5	4	3	1	L	3	2	1	2	1	2	4	3	2	4
3451	5	2	2	2	L	3	2	1	2	1	3	3	3	3	3
3598	5	1	2	0	NW	6	2	1	2	1	3	3	4	3	3
3651	4	2	3	2	S	5	2	1	3	1	3	3	4	3	4
3743	4	3	1	3	L	1	3	3	2	4	3	1	3	3	2
4000	4	3	2	3	S	6	3	1	2	4	3	1	2	3	4
4005	0	0	0	0		0	0		0	0	0	0	0	0	0
4007	5	6	2	0	L	1	2	1	3	5	5	5	3	4	4
4349	5	2	2	2	SE	6	2	1	4	1	3	3	4	3	3
4350	5	3	3	4	SE	6	3	1	2	4	3	1	2	3	3
4602	4	3	2	3	N	6	3	1	0	5	4	5	1	4	3
5046	5	2	4	3	SE	6	2	1	4	1	3	3	4	3	3
5055	5	3	2	2	S	6	6	1	3	3	2	1	1	2	4
5073	0	0	0	0		0	0		0	0	0	0	0	0	0
5074	0	0	0	0		0	0		0	0	0	0	0	0	0
5688	0	0	0	0		0	0		0	0	0	0	0	0	0
6578	5	2	1	1	L	5	1	1	2	1	3	2	5	4	2
7870	5	3	1	1	L	3	2	1	2	4	3	4	3	3	3
7895	5	3	3	2	W	6	6	1	2	4	2	1	1	2	4
7972	5	7	1	0	L	5	2	1	2	1	3	4	4	3	3

Appendix 5: Lithics Report Fieldwork catalogue in OS map order

MAP	*PRN*	*Accuracy*	*Exposure*	*Extent*	*Slope*	*Aspect*	*Topography*	*Land use*	*Vegetation*	*Colluvial value*	*Threat type*	*Threat value*	*Threat occurrence*	*Condition*	*Vulnerability*	*Potential*
SH12NE	3294	4	3	3	2 S	6	2	1		2	1	3	4	4	3	4
SH12NW	1225	5	3	3	4 SE	6	3	1		2	3	3	1	2	3	4
	4350	5	3	3	4 SE	6	3	1		2	4	3	1	2	3	3
SH12SE	3296	5	3	2	2 S	6	6	0		1	4	3	1	2	5	3
	3297	5	2	2	2 SE	6	2	1		4	1	3	3	3	3	3
	4349	5	2	2	2 SE	6	2	1		4	1	3	3	4	3	3
SH12SW	1224	5	3	3	3 SW	6	3	1		2	4	2	1	2	2	3
	1226	0	0	0	0	0	0			0	0	0	0	0	0	0
	1741	4	2	2	2 SW	6	2	1		2	1	3	3	4	4	4
SH22NW	1232	5	6	3	2 NE	1	3	3		3	6	1	3	1	1	5
	3316	5	7	3	3 E	2	3	3		2	2	2	1	3	2	3
	3317	0	0	0	0	0	0			0	0	0	0	0	0	0
SH22SE	4000	4	3	2	3 S	6	3	1		2	4	3	1	2	3	4
SH27NE	1654	5	2	2	2 S	6	2	1		2	1	3	4	4	3	4
SH28SE	2505	4	7	0	1 NE	6	6			3	4	3	1	2	3	0
	2506	0	0	0	0	0	0			0	0	0	0	0	0	0
SH28SW	1749	4	3	2	1 S	6	6	3		3	4	2	1	2	2	3
SH32NW	4005	0	0	0	0	0	0			0	0	0	0	0	0	0
	4007	5	6	2	0 L	1	2	1		3	5	5	5	3	4	4
	5074	0	0	0	0	0	0			0	0	0	0	0	0	0
SH32SW	5046	5	2	4	3 SE	6	2	1		4	1	3	3	4	3	3
SH33NW	1534	4	2	3	2 S	5	2	1		3	1	3	3	4	3	4
	3651	4	2	3	2 S	5	2	1		3	1	3	3	4	3	4
SH34NE	1477	5	3	2	3 E	6	6	1		0	4	3	1	1	4	5
SH36NE	5055	5	3	2	2 S	6	6	1		3	3	2	1	1	2	4
SH36SE	3029	4	4	4	6 L	6	5			4	6	4	4	4	4	4

MAP	*PRN*	*Accuracy*	*Exposure*	*Extent*	*Slope*	*Aspect*	*Topography*	*Land use*	*Vegetation*	*Colluvial value*	*Threat type*	*Threat value*	*Threat occurrence*	*Condition*	*Vulnerability*	*Potential*
SH37SE	2447	5	6	2	0	L	5	2	1	3	2	2	3	4	2	4
SH37SW	3041	5	2	2	3	E	6	2	1	2	1	3	4	4	3	2
	7972	5	7	1	0	L	5	2	1	2	1	3	4	4	3	3
SH46NE	1538	4	2	4	2	SE	6	1		2	1	3	2	5	3	3
	1634	4	2	4	2	SE	6	2	1	2	1	3	3	4	5	4
SH46SE	3126	5	2	2	2	S	6	2	1	3	1	3	4	4	3	3
SH46SW	3080	4	4	0	6	L	6	5	7	2	6	4	4	3	4	4
SH47NW	2133	5	2	2	2	SE	5	2	1	2	1	3	4	4	3	2
	2138	0	0	0	0		0	0		0	0	0	0	0	0	0
	2141	0	0	0	0		0	0		0	0	0	0	0	0	0
SH57NE	2643	0	0	0	0		0	0		0	0	0	0	0	0	0
SH57SE	222	0	0	0	0		0	0		0	0	0	0	0	0	0
	6578	5	2	1	1	L	5	1	1	2	1	3	2	5	4	2
	7870	5	3	1	1	L	3	2	1	2	4	3	4	3	3	3
SH57SW	2698	0	0	0	0		0	0		0	0	0	0	0	0	0
SH58NW	3598	5	1	2	0	NW	6	2	1	2	1	3	3	4	3	3
SH64NW	5688	0	0	0	0		0	0		0	0	0	0	0	0	0
SH65SE	2566	5	6	2	1	S	3	2	1	3	1	3	4	4	3	4
SH68SW	2568	0	0	0	0		0	0		0	0	0	0	0	0	0
	5073	0	0	0	0		0	0		0	0	0	0	0	0	0
SH74NW	3743	4	3	1	3	L	1	3	3	2	4	3	1	3	3	2
SH75SW	3450	5	4	3	1	L	3	2	1	2	1	2	4	3	2	4
	3451	5	2	2	2	L	3	2	1	2	1	3	3	3	3	3
SH78SE	4602	4	3	2	3	N	6	3	1	0	5	4	5	1	4	3

Appendix 6, Lithics Report, G1590: Stage 2. Field Assessment Gazetteer

PRN *Name*

1224 Pared Llechymenyn cliff, Uwchmynydd

Accuracy

The exact findspot has been identified

Exposure

Natural erosion, continuing

Extent	*Slope*	*Aspect*	*Topography*
50-100m (estimated)	Medium	SW	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Rough grazing	Grass	Slight depletion	50m
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Slight	Continuous	

Site location

Exposed faces of terracettes on steep sloping coast edge above cliffs at the south-east side of the cove of Parer Llechymen

Comments

Several new pieces found in 1999, some in the eroded material of the terracettes, some washed out onto the surface, even the turf, lower down slope, and two in situ in the terracette faces, amongst stony colluvium. This shows they may have originated further upslope, possibly from the adjoining field from which a separate collection has been made - PRN 1741.

Condition	*Vulnerability*	*Potential*
Good, material in undisturbed context	Continuing minor erosion	Medium.

Summary

A scatter of finds in the eroding face of coastal slopes suggests an occupation area of some sigificance further upslope. The site is located on the cliff tops immediately above the cove of Pared Llechymenin. The actual occupation/activity area is likel to be PRN 1741 in the adjoining field upslope. Two diagnostic pieces in the collection show it to be of later mesolithic date. area concerned cannot be properly determined on present evidence but appears to be fairly localised, possibly as a result of the way the colluvium has collected, in a shallow erosion channel.

Management comments

The material is not part of the original occupation deposit so is of only medium potential but is still valuable because of the scarcity of sites of this period. The site is fairly remote and the main threat is wind and rain erosion which needs to be monitored in conjunction with the National Trust archaeologist or warden.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
National Trust	26/10/99	GHS	3/21-28	4/21-28

PRN *Name*

1225 St Mary's Cove, Uwchmynydd

Accuracy

Findspot identified on map

Exposure

Natural erosion, continuing

Extent	*Slope*	*Aspect*	*Topography*
50-100m	Significant	SE	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Rough grazing/public access	Grass	Slight depletion	50m
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Medium	Continuous	

Site location

From SE facing slopes of coast edge, just above the cliffs on the west side of St Mary's Cove where limited areas are expos by wind and rain.

Comments

One piece found in situ in stony colluvium shows it probably eroded from its original position further upslope, probably on th top of the small promontory. Other pieces found in a scatter along the area between the cove and the promontory of Maen Melyn Llyn show that 1225 and 4350 are part of the same scatter.

Condition	*Vulnerability*	*Potential*
Good - stratigraphy undisturbed	Medium - some continuing erosion	Medium - survvival may be poor in this exposed pos

Summary

A sparse scatter of material, possibly later mesolithic. The exposed position suggests it was a temporary seasonal knapping site rather than a home site. The colluvium suggest that the original site, probably on the promontory highr upslope, may ha been eroded away although there must be considerably more lithics surviving in the area. This may consist of a sparse, widespread scatter around the area of the spring. There is some possibility of better preservation of occupation horizons un colluvium closer to the spring.

Management comments

A probable lack of in situ occupation levels suggests that the site is of only medium value but ther is insufficient evidence to certain. Recreational pressure may be increasing path erosion so monitoring and management hand in hand with the NT is needed.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
National Trust	26/10/99	GHS	3/5-18	4/5-18

PRN *Name*

1232 Mynydd Rhiw axe factory

Accuracy

Findspot identified on map

Exposure

Excavation

Extent	*Slope*	*Aspect*	*Topography*
100-200m	Gentle	North-east	Hill ridge top
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Rough grazing	Heathland, mainly gorse	Stable	
Threat type	*Threat value*	*Threat occurrence*	
Visitor interference, heath fires	Negligible	Sporadic	

Site location

The site consists of a series of shallow depressions in the north-eastern slopes of Mynydd Rhiw.

Comments

The site lies close to a well-used track up the hill but is itself now completely overgrown with low gorse, probably due to a decline in grazing and cessation of management by burning. The site is now difficult to see and so is fairly safe from illicit digging.

Condition	*Vulnerability*	*Potential*
Very good	Negligible	Very high

Summary

The axe factory and its products, which have been found widely across Wales are well known and it is a protected monume There may be more of the site than has been recorded so far and the presence of a long cairn and finds of waste flakes som way away on the eastern slopes of the hill suggests that there may have been an area or areas of settlement nearby.

Management comments

The site is clearly of national importance and retains high potential both in the area within the SAM and beyond, where there may be other trial quarry holes or working areas. Management of the site is determined by management of the heathland generally. For instance should it be allowed to be come fully overgrown and hidden by gorse or an attempt made to retain it grassland heath? As a well known and significant site it deserves particular attention - for example control of vegetation, topographic and perhaps geophysical survey and a long term research and management plan.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	30/11/99	GHS	0	0

PRN *Name*

1477 Old Pier, Trefor, Nr Clynnog Fawr

Accuracy

Findspot identified on map

Exposure

Natural erosion

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Medium	East	Coastal fringe, cliff-edge
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Derelict rough grazing	Grass	Not relevant - deposits buried	
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Medium	Continuous	

Site location

An unusually large amount of material - all of flint - is eroding out of buried colluvial material exposed at the dge of an old mining level and in the cliff edge on the east-facing side of a small valley at the cliff edge close to an old quarry jetty formerl served by a tramway.

Comments

The site has been collected from by several people since its dicovery about 10 years ago but most of the objects have been kept together at GAT. However, although ther are several hundred pieces there are none diagnostic of date. The lack of microlithic technology suggests that it is probably a Neolithic assemblage. When first vivited by myself, in 1993, it appeared that someone had cut out blocks of the eroding sediment edge in a deliberate manner, ie for archaeological purposes althou no-one had reported any work. Since then, and partly because of this excavation there has been considerable natural erosio of the exposed edge although the buried surface is probably quite extensive so has not reduced the value of the site.

Condition	*Vulnerability*	*Potential*
Good	High	Very high

Summary

The recorded material is visble in two places - in the side of the mining level and lower down the slope in the naturall erodin cliff edge. It is in a fine colluvial layer buried by a coarser colluvial layer and must be quite extensive. This colluvium must originate from higher upslope from the top of the broad, low, grassy ridge . This is the most numerous collection of worked f from Gwynedd.

Management comments

This is potentially a very valuable site. Although it is eroding quite badly, the deposits identified are actually in a secondary context and are probably quite extensive. There is the potentialfor very useful research and the first questions are why the colluvial horizon formed, how extensive it is, where the original occupation area was and whether any of it survives. There is problem in that the landowner - the owner of the nearby quarry - is involve with a planning application to develop the area as marina and boatyard, an aplication apposed by many local people and causing some friction. Clearly the owner is unlikely to support any request to carry out archaeologiacl investigation.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	30/11/99	GHS	5/25-32	6/25-32

PRN *Name*

1534 Tir Gwyn, Llannor

Accuracy

Field identified

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
50-100m	Gentle	South	Inland plateau

Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Stable	

Threat type	*Threat value*	*Threat occurrence*
Ploughing	Medium	Sporadic - occasional reseeding of pasture

Site location

A few waste flakesd and a plano-convex knife found in the same field as two standing stones (SAM ???). The stones lie so distance apart at either end of a field which is on a fairly level area at the head of a broad valley about 1km east of Moelypenmaen and 2km west of Llanor.

Comments

Although only a small scatter was found, the possibility of significant activity in the area between the standing stones seems very likely. This area has also produced two high status early medieval graves,

Condition	*Vulnerability*	*Potential*
Fair, an area frequently ploughed	Medium	High

Summary

A small scatter of waste flakes and one plano-convex knife - a diagnostic early bronze age type, most probably part of activi associated with the two standing stones. The collection itself is not of great value but hints at an area of possibly important activity of high value comprising the whole of the field.

Management comments

The finds suggest the field has high overall potential. Further asessment by controlled surface collection, test-pitting, aerial photgrphy or geophysics is needed.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
SEE SAM RECS	23/09/99	GHS	1/5-6	2/5-6

PRN *Name*

1538 Trefarthen, Brynsiencyn, Anglesey

Accuracy

Field identified

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
Single find	Gentle	South-east	Coastal plateau
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Arable	Cereal crop	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Annual	

Site location

Low ridge close to the edge of the Menai Straits.

Comments

The land is some of the best in Anglesey and must have been used for arable since Neolithic times. Repeated cultivation means the field should become available for surface collection again. Possibly part of the same activity as that represented 1634, further to the east.

Condition	*Vulnerability*	*Potential*
Poor - regualrly cultivated	Medium	Requires further assessment

Summary

Only a single find.

Management comments

Surface collection of this area is needed. Long continued ploughing for arable probably means that only surface finds and su surface features remain.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Mr J Roberts, Plas Trefarthen	22/09/99	GHS	0	0

PRN *Name*

1634 Trefarthen quarry field, Brynsiencyn, Anglesey

Accuracy

General area within field identified

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
10-200m	Gentle	South-east	Coastal plateau
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Arable	Cereal	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Annual	

Site location

Low, nearly level coastal area side of the Menai Straits.

Comments

This area has probably long been in use for arable. The finds, which include flint waste flakes in association with 2 axes and saddle quern. The farmer has found objects from a small area at different times, indicating a possible settlement area. PRN 1538 may be part of related activity.

Condition	*Vulnerability*	*Potential*
Fair - repeatedly ploughed	Medium - probably fairly stable	Uncertain - requires further assessment

Summary

This lowlying area of good soils, close to the sheltered waters of the Menai Straits was one of intensive Neolithic occupation judge by the presence of several chambered tombs and standing stones although the site of actaual settlement has never been located. These finds could indicate such a site but its exact location, extent and value cannot be estimated without furt evaluation.

Management comments

The overall value and potential require further assessment by surface colllection, Ap study or geophysics. Although regularly cultivated the level nature of the ground suggests that any sub-surface features are probably relatively stable and there may be some aggradation further down the slope.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Mr J. Roberts, Plas Trefarthen, Brynsi	22/09/99	GHS	0	0

PRN *Name*

1654 Pentre Gwyddel, Rhoscolyn, Holy Island

Accuracy

Area of field identified

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
Localised - 10-50m	Gentle	South	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slght depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing, possible developmen	Medium	Sporadic	

Site location

A gently sloping field close to the coast edge and containing three rocky outcrops just to the south of Pentre Gwyddel farmhouse.

Comments

The field was poor pasture before it was improved at the time the flints were discovered. The soil is probably not very deep. is unlikely to be ploughed again in the near future. The farmhouse is now within a caravan park (Silver Bay Caravan Park) while the field is part of Bodior Estate farmland and are managed seperately although both are actually under the same ownership. The field cannot be approached through the caravan park but from a track running east from Rhoscolyn. There i farm bailiff at Bodior but the senior person is George Price, the gamekeeper who lives at The Lodge, Bodior and is very help (Tel 740466).

Condition	*Vulnerability*	*Potential*
Fair	Medium	Medium - Good

Summary

A sizeable scatter of waste flakes and one microlith suggests that this is an area of later mesolithic activity of some value although there is no exposure now. The deposits must have been disturbed for the flints to be visible but it is impossible to know what still remains in situ. A small stone mortar was found at the same spot although such objects are typical of Iron Age/Romano-British settlements on Anglesey.

Management comments

A site of possible significant value but its exact location is not identifable. There is little immediate threat but in the longer ter any in situ deposits remaining may be eroded by reploughing. There is also a clear posssibilty of expansion of the caravan park and the works involved with this would destroy the remains and wopuld require a proper response - either protection or excavation. Further assessment by test pitting is required to locate and evaluate the remains. Requires at least monitoring a part of development control. Mr Price gives the impression that the owner (Bodior Estate - Bulmer Cider) would be agreeabl to further archaeological work.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Miss C. Bulmer, Little Brainton, Heref	19/11/99	GHS	0	0

PRN *Name*

1741 Pared Llechymenyn field, Uwchmynydd

Accuracy

Field identified

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
10-50m (estimated)	Gentle	South-west	Coastal plateau above hig
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Sporadic	

Site location

A south-west facing pasture field close to the coast edge at the west side of Mynydd Bychestyn.

Comments

The finds were made after the field was ploughed although this is probably only a very occasional occurrence. The occurren of finds in the ploughsoil shows that occupation levels must have been disturbed. Material from here may have been eroded downslope where other finds have been made - recorded as PRN 1224,

Condition	*Vulnerability*	*Potential*
Fair - affected by cultivation	High	Medium

Summary

A collection of waste flakes, two cores and a hammerstone, none diagnostic of date. One core is small and prismatic and sugests a mesolithic date. The value of the site must have been reduced by ploughing but much more material must remain and some occupation surfaces/features may have been protected by colluvium at the lower end of the field.

Management comments

The overall potential cannot be properly assessed. Furthe surface collection or test pitting is needed to allow definiton of the area and to provide diagnostic material for dating.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Garreg Fawr?	26/10/99	GHS	3/19-20	4/19-20

PRN *Name*

1749 Porth Ruffydd, Penrhosfeilw, Holy Island

Accuracy

Findspot idenitifed on map

Exposure

Footpaths and eroding blanket peat

Extent	*Slope*	*Aspect*	*Topography*
Finds from one spot	Very gentle or level	South	Coastal fringe - cliff-top pl
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Disused rough pasture	Gorse and moor grass	Stable	
Threat type	*Threat value*	*Threat occurrence*	
Footpath wear and natural erosi	Slight	Continuous	

Site location

An area of coastal plateau on a wide promontory south of Gors Goch and just inland from Porth Ruffydd. Discovered by R Kelly after observation of eroded peat surface while walking.

Comments

The area is no longer grazed and has become overgrown with gorse, some of which seems to have been deliberately burnt. There are very few exposures to be seen now and no furthe material was found so it is not possible to identify the exact location of the finds.

Condition	*Vulnerability*	*Potential*
Good	Slight	Medium

Summary

Two cores of mesolithic type were found here, eroding from the peat surface. The exact site cannot be located now so its value cannot be estimated. The peatbv layer means there must be a preserved land surface which, if it is of the date of the lithic finds rather than a later episode, gives it some potential.

Management comments

There may be a relatively well preserved occupation area here but it needs to be located. R. Kelly needs to re-visit the site a to attempt to re-locate the findspot. There is car park close by here and the footpaths are quite heavily used. Further information on the site would be useful to the tourism use of the area and so monitoring could be sought via the Ynys Mon coastal heritage warden.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	19/11/99	GHS	5/9-10	6/9-10

PRN *Name*

2133 Glan Llyn, Bodfordd, Anglesey

Accuracy

Findspot identified on map

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Gentle	South-east	Lowland plateau, low valle
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	50-100m
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Occasional	

Site location

The site lies on a gentle, east-facing slope on the west side of the Afon Cefni and close to a small stream, now canalized int the field ditches but which may originally have determined the location of the site.

Comments

The finds were made by a local flint collector in 1965 who was also an employeee of the Min of Ag and so had the opportuni to visit many farms.

Condition	*Vulnerability*	*Potential*
Poor	Medium	Slight

Summary

These two finds were made probably from a freshly ploughed field close to a farm track. The knife suggests a later Neolithic date. It is impossible to tell if there is a settlement as opposed to casual loss without further investigation. However, the farm is clearly not favourable to such work.

Management comments

This field has been very well cultivated in the past and continues to be. There must have been slight but frequent erosion an depletion on the slope although if there were settlementof Neolithic date, sub-surface features such as pits couold be expect to survive. Generally of uncertain but low potential. Sdtudy of APs could identify subsurface features.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Glan Llyn	29/11/99	GHS	5/23-24	6/23-24

PRN *Name*

2447 Ty-n-Ion, Dothan, Anglesey

Accuracy

Findspot identified on map

Exposure

Archaeological excavation

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Level	Level prospect	Lowland plateau
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Stable	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Slight	Occasional	

Site location

Situated on a very slight ride in a generally level, slightly undulating inland area.

Comments

The site was discovered by chance by a farmers daughter and then excavation was carried out jointly with GAT and publish in TAAS. The excavation exploratored a small area and did not attempt to define the extent of the site.

Condition	*Vulnerability*	*Potential*
Fair	Slight	High

Summary

Excavation of a limited area produced evidence of occupation.

Management comments

More of the occupation evidence must survive. The excavated area was not backfilled and at the time of the visit was floode to form a shallow pond. The field is being used for horses and has only a slight chance of being reploughed to omprove the pasture. The present owners are still the same family that discovered the site and realize that it is of interest so are unlikely damage it. However, the excavation trench should be backfilled and contact needs to be maintained.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Jones, Ty-n-Ion, Dothan	29/11/99	GHS	5/21-22	6/21-22

PRN *Name*

2505 Traeth Penrhos, Holyhead

Accuracy

Somewhere within the bay

Exposure

'Sand digging'

Extent	*Slope*	*Aspect*	*Topography*
Unknown	Little slope	Nort-east	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Intertidal	None	Stable	
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Slight	Continuous	

Site location

Somewhere on the beach where peat beds occur. These are now visible at mid-tide on the west side of the centre of the be

Comments

Found during 'sand digging' on the beach - presumably quarrying but could have been just holidaymaking.

Condition	*Vulnerability*	*Potential*
Never cultivated	Medium	Not known, possibly high

Summary

If the site could be relocated it could be of great value, like those discovered on the Severn Estuary or at Westward Ho!, N. Devon. It would help if the original finds could be relocated- seach still in progress. Finds donated to Anglesey Antiqs but no give to the Oriel, probably because of the presence of human bones - some such archaeological finds have found their way the Langefni Record Office or to Bangor Morgue! - info from I. Carruthers.

Management comments

As a very rare find of artefacts in an intertidal preserved land surface this deserves continued monitoring, research and revis

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Crown Commissioners	04/10/99	GHS	1/15-16	2/15-16

PRN *Name*

2566 Ty'n ddol, Roman Bridge, Dolwyddelan

Accuracy

Findspot identified on map

Exposure

Test pit excavation and mole hills

Extent	*Slope*	*Aspect*	*Topography*
10-50	Slight	South	Valley floor
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Stable	1m
Threat type	*Threat value*	*Threat occurrence*	
Ploughing, river erosion, develo	Medium	Sporadic	

Site location

The site lies in a small field which is part of the alluvial fan of a small side strewam of the Afon Lledr.

Comments

The site was first found by surface collection. Then GAT carried out a test pit excavation prior to construction of a small turbi generator house at the side of the stream.

Condition	*Vulnerability*	*Potential*
Poor/fair	Medium	High

Summary

Over 50 pieces of waste flint plus 2 possible microlith rejects and 2 microburins have been found suggesting that this is a significant later mesolithic occupation area. A considerable quantity of burnt stones were also recognised by R. Robbins in t stream side when the generator house was built. The site has also produced some worked crystal quartz as at the Boncyn Ddol site, nearby.

Management comments

The site has considerable potential because the field has not been cultivated with any great intensity and there must be are beyond the dge of the field where there is still intact stratigraphy. The GAT investigation only tried to identify the spread of material and did not try to excavate the main area of activity. More excavation would therefore be worthwhile. Possibly management could be arranged through the SNP. The farmer, who also owns the Boncyn Ddol site, has so far been very helpful.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Mr Gwynros Jones	01/12/99	GHS	7/13-14	8/13-14

PRN *Name*

3029 Bryn Llwyd, Newborough Forest, Anglesey

Accuracy

Topographic location identified

Exposure

Natural erosion

Extent	*Slope*	*Aspect*	*Topography*
100-200m (estimated)	Undulating	South	Coastal fringe with rock rid
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Forestry	Conifers with some grass and br	Some wind blown sand cover	
Threat type	*Threat value*	*Threat occurrence*	
Forestry	High	Occasional	

Site location

A low but locally prominent rocky ridge and raised area close to the coast edge.

Comments

The site consists of a scatter of flints, including mesolithic pieces and Beaker pottery picked up over and around the hillock a number of visits before the forestry was established. At that time wind erosion was exposing archaeological material. The area has now been stabilised and the forest cover is well established, with a thick cover of tree litter and growth of brambles There are very few soil exposures of any kind and nothing new was found.

Condition	*Vulnerability*	*Potential*
Good	High	High

Summary

The site consists of an area where frequent finds have shown the existence of activity in the later mesolithic and Beaker periods. The finds came from on and around a small rocky ridge close to the coast edge. Although never excavated the existence of occupation deposits of this period would be very significant for this region and the likelihood of preservation und blown sand gives it additional value. Location and identification of the actual occupation area could only be achieved by test pitting.

Management comments

The site is of high value but requires further assessment, first to locate the occupation deposits and secondly to identify the likelihood of good preservation under blown sand cover. Finally it is under high threat from future forestry operations.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Forestry Authority	21/09/99	GHS	0	0

PRN *Name*

3041 Barcloddiad y Gawres, Llanfaelog, Anglesey

Accuracy

Findspot identified on map

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Medium	East	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Occasional	

Site location

On the east-facing slope of a small hillock close to that on which the megalithic tomb lies.

Comments

Identified when the field was observed by chance when it had been freshly ploughed, a rare chance.

Condition	*Vulnerability*	*Potential*
Poor, ploughing has probably eroded the slope.	Medium	Slight

Summary

A small scatter of probabaly later mesolithic date.

Management comments

Probaably of little remaining potential because of erosion on the slope although depending on the extent of the scatter there could be other material nearby on stable or even aggrading ground. Possibly contact could be maintained with the farmer w is probably the same as the owner of the adjoining SAM. Surface collection could then be arranged.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	29/11/99	GHS	5/17-20	6/17-20

PRN *Name*

3080 Newborough Warren, Newborough Forest, Anglesey

Accuracy

Topographic area identified

Exposure

Natural erosion

Extent	*Slope*	*Aspect*	*Topography*
Unknown	Undulating	South	Coastal fringe - sand dune
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Forestry, recreation	Conifers with some ground flora	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Forestry. Visitor trampling. Wind	High	Forestry: Occasional. Others continuous	

Site location

Surface finds in 1927 describe a location next to a ruined cottage of which there are three possible buildings near here. No further finds were made in 1999 so the actual site was not identified.

Comments

The original exposure was probably due to wind erosion, before the forestry plantation. Some of the material is of Later Neolithic date.

Condition	*Vulnerability*	*Potential*
Medium - possibly good	High	Unknown without further assessment

Summary

A possibly dispersed scatter of finds of possibly different periods together with shell middens, close to the coast suggests seasonal visits over a long period. As the dunefield possibly only developed in the 14th century AD there may be extensive areas of valuable preserved old land surface but the true location, value and extent cannot be assessed without further investigation.

Management comments

Possibly of high value but the true potential is not known. The area is under threat from future forestry and possibly tourist development. The main exposure is now trampling although maturation of the forest must mean future felling and threat fro forestry vehicles etc. Monitoring and management agreements and possibly evaluation by test-pitting area required.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Forestry Authority	21/09/99	GHS	0	0

PRN *Name*

3126 Meinafron, Llangeinwen, Anglesey

Accuracy

Findspot identified on map

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Gentle	South	Coastal fringe - lowland pl
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Stable	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Occasional	

Site location

A lowlying, almost level field bordering the Menai Straits

Comments

The collection was made during chance observation of the field after an occasional ploughing.

Condition	*Vulnerability*	*Potential*
Poor -ploughing must have caused erosion	Medium - further ploughing will cause erosion	Uncertain, possibly low

Summary

The two diagnostic pieces found suggest a later Neolithic date, but the lack of waste pieces means these could be isolated finds not representing an occupation area. The value of the site cannot be estimated on the present evidence.

Management comments

The site has some potential but ther is unlikely to be a chance to carry out further surface collection and the finds do not warrant carrying out any more detailed investigations. Contact needs to be made with the farmer to arrange surface collectio when the next ploughing for reseeding takes place.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	29/11/99	GHS	5/15-16	6/15-16

PRN *Name*

3294 Trwyn y Penrhyn, Aberdaron Bay

Accuracy

Field identified, other finds nearby id on map

Exposure

Ploughing and natural erosion

Extent	*Slope*	*Aspect*	*Topography*
50-100m estimated	Gentle	South	Coastal cliff promontory
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture and rough gra	Grass	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Occasional	

Site location

A broad grass field on a gentle slope on a rather exposed promontory at the east side of Aberdaron bay..

Comments

The field was a re-intake of an old enclosed area that had been used prior to the construction of the stone walled fields, so, perhaps pre-19th century. The finds were made by chance observation of the field when it had just been ploughed for re-seeding. The exposure of the finds shows that they were disturbed by the plough although more must remain and the existence of a drift cover (as opposed to just rock) means that ther could be features in the subsoil.

Condition	*Vulnerability*	*Potential*
Fair - disturbed but not destroyed	Medium - further ploughing will erode the site	High - possibly only ploughed the once

Summary

A scatter of lithic material on a cliff promontory. An apparently well-used location of Mesolithic date. Much of the headland remains unploughed and some material has been found in situ on the eroding cliff edge so the area is of significant value. There may be a number of scatters representing different areas or periods of activity.

Management comments

This is a valuable site covering a considerable area and with some material in situ. Its overall value and the extent and presence of in situ deposits can only be identified by further fieldwork. Furthe ploughing and surface collection is unlikely in t foreseeable future so evaluation by test pitting would be required.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Penrhyn Farm?	04/11/99	GHS	5/1-8	6/1-8

PRN *Name*

3296 Parwyd, Uwchmynydd

Accuracy

Identified on map

Exposure

Natural erosion

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Gentle	South	Coastal fringe - cliff edge
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Nil - fence -off exposed cliff edg	Grass	Extensive depletion	
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Medium	Continuous	

Site location

High cliff edge above the cove of Parwyd where the wind and rain is eroding the edge of the drift and topsoil cover exposing layers of silty drift and cobbly drift.

Comments

Several finds have been made at different times of large flakes of a fine grained tuff - similar to but not the same as Mynydd Rhiw stone. No diagnostic pieces have been found but a later Neolithic date seems likely. Pieces found previously were washed out of the eroding drift face and none have been identified in siru so it is not known where in the stratigraphy the material originates. The only new piece found in 1999 was a piece of burnt flint. It is possible therfore that this was small knapping scatter that has now been removed by collecting.

Condition	*Vulnerability*	*Potential*
Poor	High	Slight

Summary

Finds on the coast edge above the cliffs of Parwyd Cove in a very exposed position. No datable pieces have been found but the size of the waste pieces and the use of tuff suggests a Neolithic date. This is an unusual find but the lack of further simil finds in 1999 suggests that it may have been a single knapping episode, perhaps using a single stone found in the drift, and that the evidence has now been removed.

Management comments

The lack of further finds in 1999 means the site now has only possible potential. The deposits are continually eroding washi out new material and further monitoring visits would be worthwhile.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Solfach?	26/10/99	GHS	3/29-34	4/29-34

PRN *Name*

3297 Porth y Pistyll, Uwchmynydd

Accuracy

Findspot identified on map

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Gentle	South-east	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight aggradation	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Sporadic	

Site location

Coastal plateau, small enclosed fields close to the cliff edge at the west side of Uwchmynydd. All this area is now pasture b must have been used for arable in earlier times.

Comments

The collection was made during chance observation of ploughing for reseeding of the pasture. Previous use for arable may mean that any in situ levels have all been disturbed although there may be some accumulation and preservation at the downslope edge of the field, closer to the coast edge.

Condition	*Vulnerability*	*Potential*
Medium - the possibility of some preservation	Medium - only occasional ploughin	Medium - much more material must remain

Summary

This is a relatively large collection of material, including several cores but no diagnostic tools. All found in a newly ploughed field close to the coast edge above Porth -y -Pistyll. The date and value of the site cannot be properly assessed as it is now hidden under pasture. However, it must retain some significant value. Only a very small proportion of the actual artefacts would have been exposed and collected. Finds of few other flint pieces close by but further inland at the edge of another recently re-seeded field suggests that there may be a widespread scatter or number of scatters in the area.

Management comments

The value of the site cannot be assessed without further controlled surface collection to locate, date and interpret the site. T pitting would also be needed to assess the possibility of stratified levels.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	26/10/99	GHS	3/35-36	4/35-36

PRN *Name*

3316 Mynydd Rhiw, east slopes

Accuracy

Findspot identified on map

Exposure

Forestry operations

Extent	*Slope*	*Aspect*	*Topography*
100-200m	Medium	East	Hill slope
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Rough grazing	Gorse predominant	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Animal trampling, farm machine	Slight	Continuous	

Site location

The eastern slopes of Mynydd Rhiw just above Plas yn Rhiw in an area which has been a conifer plantation but which at the time of the visit was being cleared, probably to return the area to heathland.

Comments

Management by the NT has involved removing the young conifer plantation and introducing horses. The use of large forestr vehicles has caused some very deep disturbance of the surface and in one place a spring has been dug out by excavator. T original afforestation may also have involved deep ploughing.

Condition	*Vulnerability*	*Potential*
Medium	Low	Medium

Summary

The site consists of a scatter of pieces of flint and Mynydd Rhiw stone. The original finds were probably made when the forestry was planted and the hillside ploughed. These pieces have now been lost. Further finds were made during the prese visit scattere across the hillside after the felling operations which had eroded a deep trackway right across the hillside, throu the topsoil into the subsoil.

Management comments

The few pieces found in 1999 were widely scattered with none grouped to suggest working areas. The hillside has been quit badly damaged by the forestry clearance and there is the possibility of further and perhaps more significant finds being mad The NT needs to be contacted about management and further visits made.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
National Trust	30/11/99	GHS	7/1-4	8/1-4

PRN *Name*

3450 Bonc-yn-ddol, Roman Bridge, Dolwyddelan

Accuracy

Findspot identified on the map

Exposure

Mole hills and excavation test pits

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Slight	Level	Low hillock on valley floor
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	10m
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Slight	Occasional	

Site location

The site lies on a long low ridge within the main floor of the Lledr valley, provisding a relartively well-drained area close to th valley bottom which was a lake until drained, probably on the 18th century (shown on Speed's map).

Comments

The site was discovered by surface finds from mole hills by Mr and Mrs Robbins of Garnedd, Blaenau Dolwyddelan. Test pit were excavated by GHS in 1996 and 1997 producing further material and two small subsoil features.

Condition	*Vulnerability*	*Potential*
Fair	Low	Medium

Summary

Finds include later mesolithic and Neolithic pieces although a radiocarbon date from one of the two features located was in t middle of the 2nd millennium BC. The excavations showed that the field had been ploughed in the past and that there were surviving occupation levels, with all the lithic material incorp[orated into the plough zone, although there were some sub-soil features.

Management comments

The site does still have some considerable potential in terms of sub-soil features and horizontal stratigraphy by plotting of artefact distribution. There is also the possibility of related organic evidence in the marsh close by where woody remains ha been found at about a metre depth during ditch cutting. Geophysics could also be productive. Management could be carried out through the SNP.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Mr Gwynros Jones, Nadog ucha, Blae	01/12/99	GHS	7/9-12	8/9-12

PRN *Name*

3451 Ty'n ddol Quarry, Roman Bridge, Dolwyddelan

Accuracy

Findspot identified on map

Exposure

Ploughing, molehills

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Slight	Level	Low hillock on the valley fl
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Sporadic	

Site location

The site lies on a small hillock providing a relatively well-drained area within the valley floor and good view points so a very suitable location for prehistoric settlement.

Comments

The scatter of finds lies next to a well-preserved long hut which has recently been scheduled. The field has also recently be dug over to extract boulders, rotavated and reseeded. This was quite shallow cultivation and did not reveal any new finds.

Condition	*Vulnerability*	*Potential*
Fair/poor	Medium	Medium/High

Summary

This is quite a similar type of location to the nearby Bonc-yn -ddol site although it has not produced as much material or diagnostic pieces. The site has certainly been somewhat damaged and reduced in value by recent improvements. This is unfortunate since the three sites in this area are provide greater value together than individually.

Management comments

There are likely to be negative subsoil features surviving so the site still has some value but is impossible to assess without direct investigation. The farmer has applied for a Tir Gofal agreement so the site can be managed within that scheme. The recent scheduling of the long hut was received with anger and some of the associated field walls nearby have been remove so any further work on the lithic site is not likely to approved at present.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Edwin	01/12/99	GHS	7/15-16	8/15-16

PRN *Name*

3598 Porth Forllwyd, Moelfre, Anglesey

Accuracy

Identified on map

Exposure

Footpath

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Level	NW	Coast edge
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Sporadic	

Site location

The findspot is on the edge of the cliff, overlooking Porth Forllwyd which is a natural harbour, and, to west Traeth Lligwy Gor or fishtrap.

Comments

The exact findspot of the original finds is not known but several more pieces were found in 2000 at the only place where the is any exposure of the drift, ie part of the coastal footpath. This material must extend some way under the adjoinig field at le

Condition	*Vulnerability*	*Potential*
Poor/fair	Medium	Medium

Summary

The collection includes one microburin so must be Mesolithic in part. The coast edge would have been further away at that time but Traeth Lligwy, which is a very deep bay probably existed then. Ploughing has probably distrurbed some of the area but the relevant layer seems to be at some depth so there may be some undisturbed parts, under the field boundary, on the cliff edge or in the field to the east which is not as improved.

Management comments

Several pieces were collected from quite a small exposure of the footpath so there seems to be a considerable concentratio of material. The site therefore has at least medium potential. Furthe evaluation by surface collection or test pitting is needed

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Forllwyd?	22/02/00	GHS	7/29-30	8/29-30

PRN *Name*

3743 Ro Wen, Penmachno

Accuracy

Topographic area known

Exposure

Natural erosion of blanket peat

Extent	*Slope*	*Aspect*	*Topography*
All found in one spot as a 'hoard	Medium, undulating	Level	Hill ridge
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Rough grazing	Grass, heather	Not applicable	10m
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Medium	Continuous	

Site location

The finds were made in 1928 from an eroding peat bank close to the summit of Ro Wen, west of Glasgwm, Penmachno. Th is only one area that matches the description, and that is around a pool just south-west of the summit.

Comments

This is a fairly extensive area of eroding peat, up to a metre deep, formed on a plateau area, much of which has eroded awa leaving several eroding peat 'cliffs' up to metre deep. Only a few of these are eroded right down to the underlying stony surface. It is likely that the flints were at this level, the peat forming later over them. All the exposures were searched withou new finds being made so the exact findspot cannot be identified. However, the shepherd must have been following the track along the ridge and there is only one exposure that is close to and easily visible from the track. This is just to the west of the track, about 150m south-west of the summit cairn, as the track rises up over the secondary summit.

Condition	*Vulnerability*	*Potential*
Fair	Medium	Slight

Summary

This was a group of about 36 large flint flakes all found in one spot. Some were retouched and are probably of later Neolithic date. They must be imported, probably mined material. Their situation, very high, about 600m, but on what may have been important ridge route suggests they were either ceremonially deposited or lost due to an accident, similar to the 'ice man.

Management comments

The site is very remote and difficult to approach althought summit cairn shows it is well-visited. It seems unlikely that further finds will be made by deliberate visit or accidental discovery. The peat could be dated and examined for environmental information but only if further flints could be found to identify the stratigraphic location. The area was National Trust who sold to the FC who have now let the hilltop back to the farmer.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Forestry Commission?	10/04/00	GHS	9/11,12	10/11,12

PRN *Name*

4000 Pencilan Head, Llanengan

Accuracy

Topographic area identified

Exposure

Natural erosion

Extent	*Slope*	*Aspect*	*Topography*
10-100m	Medium	South	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Rough pasture	Grass	Slight depletion	200m
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Medium	Continuous	

Site location

Exposed coastal cliff promontory, well-grassed although there are areas of boggy heathland with surface pools.

Comments

The headland , now all rough grazing, contains an extensive series of rectilinear, earth banked enclosures - probably all pos medieval - but now abandoned. At the coast edge the land drops off into steep grassy slopes that in places are eroding in small sheep scrapes or wind and rain terracettes. At the actual point of the recorded finds there is a grassed over hollow, about 4m dia., possibly a bomb crater or WW2 observation trench that has partly removed one of the enclosure banks. It is possible that this feature is where there was an exposure from which the finds were made although it is all grassed over no There are very few exposures now. A few fargments of flint were found lower on the steeper slope where they probably had washed out of some of the terracettes and so must have derived from old colluvial layers similar to those found at other site

Condition	*Vulnerability*	*Potential*
Fair/good. Uncertain	Low	Unknown

Summary

The collection comprises 70 pieces of which 2 are of Early Mesolithic broad-blade microliths.

Management comments

The original findspot cannot be identified exactly although finds in 1999 indicate where it was, The area is relatively remote little used for farming or leisure. The main threat is now of natural erosion but this is only affecting the steeper slopes. The plateau top, where the actual activity area may be is now stable.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	23/09/99	GHS	1/1-2	2/1-2

PRN *Name*

4007 Bryn Refail, Bwlchtocyn, nr Abersoch

Accuracy

Identified on map

Exposure

Excavation

Extent	*Slope*	*Aspect*	*Topography*
10-100m	Level	Level	Small hill top close to coas
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Pasture	Grass	Stable	
Threat type	*Threat value*	*Threat occurrence*	
Building development	High	Unique - but total	

Site location

The site lies on a small knoll which is part of the wider raised headland of Bwlchtocyn and so has extensive views of the coa to the north at Borth Fawr.

Comments

The original collection identified a spread of material beyond the small field in which excavation in 1946 revealed a concentration of material including cores and three non-geometric microliths as well as areas of charcoal.

Condition	*Vulnerability*	*Potential*
Fair - cultivated in past	High	High

Summary

A large assemblage of 1700 pieces of worked flint was recovered by excavation which seemd to represent the larger part of flint working area. This area extended further to the east where it had been removed by a roadway. The site lies on a locally prominent small knoll and seems to represent a single period later mesolithic knapping area. Unfortunately there was little stratigraphy over the rock surface and the main part of the material scatter was removed in 1946 so reducing its value.

Management comments

Although reduced in value the original finds were never plotted or studied in detail and the work was done before radiocarbo dating. This is the largest colllection of material of this date from North West Wales and so reassessment is needed. Also it close to a house and next to a plot where a new house is being built (groundworks observed by N Johnstone without result). Excavation rather than preservation would be most suitable if any new development were planned.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	23/09/99	GHS	7/5-6	8/5-6

PRN *Name*

4349 Hen Borth, Uwchmynydd

Accuracy

Findspot identifed on map

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Gentle	South-east	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight aggradation	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Sporadic	

Site location

Coastal plateau in a post-medieval small walled field close to the cliff edge, now pasture but probably arable in the past.

Comments

A considerable collection of 42 pieces from a ploughed field, fortunatel observed during an occasional reseeding episode. Includes one microlith and one blade core,mprobably later mesolithic. Ploughing must have disturbed occupation levels but there may be some preservation under colluvium downslope against the field boundary.

Condition	*Vulnerability*	*Potential*
Fair - affected by cultivation	Medium	Medium

Summary

A collection of probably later mesolithic date from a field immediately above the cliffs of Hen Borth. The value cannot be assessed without further investigation.

Management comments

The occupation levels have been distrubed but there is likely to be much more material remaining and there may be some potential for preservation under colluvium. Controlled surface collection is needed but this could only be done in the longer term, because ploughing is infrequent, or by test pitting.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	26/10/99	GHS	3/35-36	4/35-36

PRN *Name*

4602 Great Orme, North-west, Llandudno

Accuracy

Topographic location identified

Exposure

Natural erosion

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Medium	N	Coast edge
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Leisure, abandoned rough pastu	Grass, some gorse	Not relevant	5m
Threat type	*Threat value*	*Threat occurrence*	
Building development	High	High	

Site location

On a natural limestone terrace at the foot of a cliff, close to a spring, with a small cave/cavity nearby.

Comments

No more material was found to confirm the location although this is the only spring in the area so must be the one described

Condition	*Vulnerability*	*Potential*
Good, never cultivated, possibly some stratigraphy	High, planning applic in progress	Medium

Summary

The location would be very suitable for early prehistoric occupation and the shallow cave nearby means that there may be some deeper stratigraphy.

Management comments

The lack of a substantial assemblage or of datable material or of the certain re-identification of the find spot means that the has only medium potential and needs further investigation. However, it is highly vulnerable because of a current applicationj dig out the well to provide a water supply for a nearby cafe and this needs monitoring.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	01/12/99	S Jones	0	0

PRN *Name*

4927 Pont Wen, Ganllwyd

Accuracy

Findspot identified on map

Exposure

Stream erosion

Extent	*Slope*	*Aspect*	*Topography*
Single find only	Gentle	West	Valley floor
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Forestry	Grass, deciduous trees	Slight depletion	1m
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Medium	Continuous	

Site location

At the edge of a stream where the Afon Wen cuts through a terrace of glacial till about 100m north of Pont Wen.

Comments

This was a single artefact find and it was found actually on the stream bank so it could have come from within the eroding terrace or it could have washed downstream from elsewhere. However, it is probably best to assume it came from the in situ deposits nearby.

Condition	*Vulnerability*	*Potential*
Good	Medium	Low

Summary

The valley terrace consists of mid-brown silts over a boulder bed. It is likely that the boulder bed derives from sub-glacial weathering while the silts are more recent. A fair bit of the terrace is exposed in the bank edge and there is no sign of any occupation deposits. The river bed has also changed slightly since the orignal find was made.

Management comments

Nothing has been found to suggest that this is more than just an isolated find. It is within a small area of mature deciduous woodland within the wider area of coniferous plantation and will not be under any threat. No resopnse is needed.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Forestry Commission	01/12/99	GHS	7/7-8	8/7-8

PRN *Name*

5046 Porth Ceiriad, Llanengan

Accuracy

Findspot identified on map

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
100-200m	Medium	South-east	Coast edge
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight aggradation	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Sporadic	

Site location

Top of coastal plateau, close to the cliff edge. Enclosed and improved fields, now pasture but probably once arable.

Comments

Sparse finds, some distance apart, could be part of widespread scatter, not a nucleated activity/settlement area. No exposur now and no new finds made in 1999.

Condition	*Vulnerability*	*Potential*
Fair	Medium	Unknown

Summary

Three flints discovered in ploughed fields close to but now asociated with an earthwork, cliff-edge enclosure of unknown dat (PRN 1325). The flints were found during chance observation of reseeding of pasture and were found at the coast edge so could derive from colluvium and the material originating from further upslope.

Management comments

The finds are so few that they could be stray finds not part of a conacentration so the overall potential is low and only furthe surface collection can help to imprve understanding.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	23/09/99	GHS	1/3-4	2/3-4

PRN *Name*

5055 Trwyn Du, Aberffraw, Anglesey

Accuracy

Findspot identified on map

Exposure

Excavation and natural erosion

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Gentle	South	Coast edge
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Redundant - leisure	Grass	Stable	
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Medium	Continuous	

Site location

On a low cliff headland south-west of Aberffraw at the mouth of the river Ffraw.

Comments

Partially covered by a Bronze Age cairn. Part of a coastal heritage trail. The cliff edge of sand and thin brick-earth/glacial till slowly eroding due to wind and rain and apart from the original excavated finds first discovered by chance during excavation the cairn, other finds have been made from the eroding cliff face (Lynch 1990).

Condition	*Vulnerability*	*Potential*
Very good - in situ preserved horizons	Medium	High

Summary

A dense spread of waste flint lying sealed beneath a Bronze Age cairn at the mouth of the River Ffraw. The site was first discovered when the cairn was excavated in 1956 and the flint site itself was then excavated in 1974 because of the threat from cliff erosion. The excavation produce a wealth of material and radiocarbon dates around 7000 BC - earlier mesolithic. This is the only known stratified occupation aea of this period in North West Wales. It is of high value because the occupatio area must extend over an area of at least 20m square, beyond that excavated. There coulod also be other occupation areas on the promontory.

Management comments

More of the site must remain sealed beneath the remainder of the cairn, now scheduled (SAM A??) and the site retains considerable potential so the area should be extended to give protection to the lithic site. No new flints were seen in the rodi cliff face in 1999 but this may depend on seasonal erosion factors.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Meyrick Estate, Bodorgan	05/10/99	GHS	1/17-20	2/17-20

PRN *Name*

5869 Chwaen Ddu, Rhosybol, Anglesey

Accuracy

Identified on map

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
50-100m	Gentle	N	Lowland, gently undulating
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	High	Sporadic	

Site location

Finds spread over the central area of a large, gently sloping field but the whole field was not walked.

Comments

The finds were collected during a rapid walkover as part of a new windfarm assessment (Llyn Alaw, G1208) when the field happened to have been freshly ploughed and quite deeply. The ploughing has very probably destroyed any in situ deposits.

Condition	*Vulnerability*	*Potential*
Poor	High	Medium

Summary

The finds were spread over quite a small area so it should be possible to identify a discrete activity area. The finds are not really diagnostic of date but the small blade suggests the later Mesolthic or early Neolithic. Inland areas of early prehistoric activity are rare so the site has some value.

Management comments

The site has some potential but needs further assessment by gridded surface collection to define its area and date. Howev it is under grass this year. (Owner tel 01248-470494)

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Jones, Ty Croes, Carmel, Llanerchym	22/02/00	GHS	7/21-22	8/21-22

PRN *Name*

5870 Cors-y-bol, Rhosybol, Anglesey

Accuracy

Field identified

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
Unknown	Gentle	NW	Lowland, gentle hillside
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	5m
Threat type	*Threat value*	*Threat occurrence*	
Ploughing	Medium	Sporadic	

Site location

A gently sloping hillside overlooking and dirctly adjoining Cors-y-bol bog.

Comments

'A few flints' recorded as having been collected close to the Cors-y-bol barrow but the exact findspot is not known and the fi is under grass now, the only exposure being mole-hills but nothing found.

Condition	*Vulnerability*	*Potential*
Poor	Medium	Medium

Summary

It seems likely that the finds relate to the barrow which is a SAM, so presumably EBA. The barrow is an unusual and valuab site, with a bank and stone circle/kerb so the flint finds added value.

Management comments

The flint finds themselves don't have greta value but do in association with the barrow and because of the presence of deep peat deposits for environmental and dating information. However, the area need further evaluation by surface collection afte ploughing which will not take place this year. The owner (who recently sold Snowdon to the NT) is generally quite agreeable

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Richard Williams, Bryncir Home Farm	22/02/00	GHS	7/23-28	8/23-28

PRN *Name*

6578 Viaduct Covert, Llandegai, Bangor

Accuracy

Findspot identified on map

Exposure

Ploughing

Extent	*Slope*	*Aspect*	*Topography*
Isolated find	Little	Level	Lowland plateau
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Arable/woodland	Cereal/deciduous plantation	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Ploughing/tree felling	Medium/low	Annual/Unique	

Site location

A low knoll half in a field and half in a wood, just south of the Llandegai industrial estate and railway.

Comments

A single burnt flint and burnt stones, nearby.

Condition	*Vulnerability*	*Potential*
Poor/good	High/low	Uncertain. Needs further assessment

Summary

A stray find but occupying a slight knoll that would be a typical site for early settlement or flint-working site. That part in the fi has been reduced by heavy ploughing but that in the wood survives in good condition.

Management comments

This could be just a stray find but the topographic situation suggests it would be worth a further visit after the next ploughing

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	17/02/00	GHS	7/17-18	8/17-18

PRN *Name*

7046 Penbol Uchaf, Llyn Alaw, Anglesey

Accuracy

Identified on the map

Exposure

Natural erosion, regular

Extent	*Slope*	*Aspect*	*Topography*
Unknown	Gentle	SE	Lowland plateau/gentle slo
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Reservoir	Grass	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion of lake edge	Medium	Continuous	

Site location

The site has been found because of water erosion at the edge of the reservoir. Llyn Alaw.

Comments

This was on the edge of a marsh, prior to the flooding of the reservoir, as shown by the first edition of the OS 25in map, and the site may have survived largely intact and never ploughed.

Condition	*Vulnerability*	*Potential*
Never cultivated plus deeper stratigraphy	Medium	High

Summary

The flints are not diagnostic but the size and quality of the blades and the distinctive reddish patina (incontrast to the yellow patina on later Mesolithic and Neolithic pieces) suggests that they may be of early Mesolithic date. One of the blades howev is fresher, yellow and could be more recent.

Management comments

The flints are erdog out of the peat at the reservoir edge. Furthe collection is required to assess the exact environmental location and to see if they are part of a larger scatter. The presence of the peat for possible preservation and envornmental information makes the site of high value.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
Welsh Water, Friddoedd Road, Bango	22/02/00	GHS	0	0

PRN *Name*

7870 Fridd-carw, Minfordd, Bangor

Accuracy

Identified on map

Exposure

River bank

Extent	*Slope*	*Aspect*	*Topography*
Isolated find	Little	E	Valley floor
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	2m
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Medium	Occasional	

Site location

River bank at the west side of the Afon Cegin about 500m south of ford on road between Llandegai and Glasinfryn road.

Comments

A single plano-convex knife found on river bank . It could have eroded out of the exposed edge of the field where it is cut int by a meander of the river, or have washed down from further up stream.

Condition	*Vulnerability*	*Potential*
Medium, cultivated in past.	Medium	Medium

Summary

A sharp meander of the river has cut onto a slightly raised area of ancient terrace, above the rest of the field and this would have been a suitable place for early settlement. No other finds could be seen in the exposed bank.

Management comments

The field is well grazed but is unlikely to be significantly improved so the site is fairly stable. The river itself poses little threat

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	17/02/00	GHS	7/19-20	8/19-20

PRN *Name*

7895 Brynglas, Penrhos Bay, Holyhead, Anglesey

Accuracy

Identified on ground

Exposure

Footpath and cliff erosion

Extent	*Slope*	*Aspect*	*Topography*
50-100m	Gentle	West	Coastal fringe
Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Open wasteland, not grazed	Grass	Slight depletion	
Threat type	*Threat value*	*Threat occurrence*	
Natural erosion	Slight	Continuous	

Site location

Cliff path and cliff edge on small coast promontory at the east side of Penrhos Bay.

Comments

No longer grazed although there is an old field bank running along the cliff edge. Mostly thickly grassed cliff edges, and stab apart from a few cliff exposures and eroding footpaths - this is a well-used walking area next to the Penrhos Coastal Park. New finds made from the cliff path and from two places on the cliff edge, one of them the original findspot.

Condition	*Vulnerability*	*Potential*
Good, probably intact	Slight but continuing	High

Summary

A significant number of items, including later mesolithic type microliths, have been recovered from one limited cliff exposure the west side of the headland at the east side of Penrhos Bay. The objects seem to be in a secondary, derived stony colluvi deposit suggesting that the original location wason the top of headland. The other few finds nearby suggest that ther may be fairly widespread scatter of material. This headland is obviously a suitable location for hunting/gathering activity.

Management comments

The lack of present or past cultivation or other disturbance, the quantity of material from a small area indicates that this is a valuable site. It is given added value by the presence of possibly related environmental evidence nearby in the form of a submerged forest and peat beds in Penrhos Bay from where flints were also recovered but never properly located earlier thi century (PRN 2505). These all suggest that this site is of high research potential. However, the low level of threat and the location in an area with leisure interests suggests that it could be kept safe by monitoring of footpath and cliff erosion.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	04/10/99	GHS	1/9-26	2/9-26

PRN *Name*

7972 Glan-y-gors, Llanfaelog, Anglesey

Accuracy

Identified on map

Exposure

Pipe line trench

Extent	*Slope*	*Aspect*	*Topography*
10-50m	Slight	Level	Top of a slight knoll in lowl

Land use	*Vegetation*	*Colluvial value*	*Distance to water*
Improved pasture	Grass	Slight depletion	

Threat type	*Threat value*	*Threat occurrence*
Ploughing	Medium	Occasional

Site location

A very low knoll close to the edge of an extensive marsh, presently partly a fishing lake.

Comments

Discovered during a watching brief on a sewage pipeline (G1498).

Condition	*Vulnerability*	*Potential*
Poor	Medium	Medium

Summary

Only two pieces found but both diagnostic tools. No waste pieces or occupation deposits were found during the cutting of th trench so there is little apparent value. The topographic position however, is interesting and could be suitable for early settlement activity.

Management comments

Although of only low overall valuenits situation suggests it would be worth further assessment. The field is probably seldom ploughed but it would be worth maintaining contact with the farmer.

Owner	*Visit date*	*Author*	*Photoref col neg*	*Photoref col tran*
	29/11/99	GHS	0	0

Appendix 7: CHEMICAL PROPERTIES AND MAGNETIC SUSCEPTIBILITY OF TOPSOIL SAMPLES FROM THE GWYNEDD LITHIC SCATTERS PROJECT

Report for: **Gwynedd Archaeological Trust**
By: **J. Crowther (February 2001)**
Department of Geography, University of Wales, Lampeter, Ceredigion SA48 7ED

INTRODUCTION

Analysis was undertaken on topsoil samples from three sites in Gwynedd, north-west Wales, as part of the Gwynedd Lithic Scatters Project (GAT Project G1590): (1) Boncyn Ddol, Roman Bridge, Conwy [NGR: SH 703517], (2) the Old Pier, Trefor, Lleyn Peninsula [SH 371475], and (3) Trefarthen quarry field, Brynsiencyn, Anglesey [SH 491665]. The work, which complements previous magnetometer surveys and soil pit studies (Smith, 2000), was undertaken in the hope that some additional insight might be gained into early prehistoric activity in the immediate vicinity of the lithic scatters. Analysis focused on magnetic properties and phosphate concentrations, both of which are widely used in archaeological prospection and have been employed with some degree of success in the investigation of other lithic scatter sites in the UK (e.g. Bradley, 1987; Entwistle and Richards, 1987):

Magnetic properties: χ (low-frequency mass-specific magnetic susceptibility) in soils largely reflects the presence of magnetic forms of iron oxide (e.g. maghaemite) Ð - this being dependent upon the occurrence of iron and of alternating reduction-oxidation conditions that favour the formation of magnetic minerals. Enhancement can result from microbial activity in topsoils, but is particularly associated with burning (see reviews by Clark, 1990; Scollar *et al.*, 1990). χ_{max} is a measure of maximum potential magnetic susceptibility, determined by subjecting a sample to optimum conditions for susceptibility enhancement in the laboratory. In general it will tend to reflect the overall iron concentration. χ_{conv} (fractional conversion), which is expressed as a percentage, is a measure of the extent to which the potential susceptibility has been achieved in the original sample, *viz*: $(\chi/\chi_{max}) \times 100.0$ (Tite, 1972; Scollar *et al.*, 1990). In many respects this is a better indicator of magnetic susceptibility enhancement than χ, particularly in cases where soils have widely differing χ_{max} values (Crowther and Barker, 1995). χ_{fd} (frequency-dependent susceptibility) was also determined. This is a measure of the difference in value between χ and χ_{hf} (high-frequency mass-specific magnetic susceptibility), expressed as a percentage of χ, *viz*: $(\chi$ Ð $\chi_{hf}) \times 100/\chi$. This difference principally reflects the proportion of ultrafine superparamagnetic grains contributing to the susceptibility (Maher, 1986; Thompson and Oldfield, 1986), and these tend to form as a result of topsoil microbial activity and burning rather than being derived from primary rock

minerals (Clark, 1990).

Phosphate-P (total phosphate): Phosphates are present in all organic material (plant tissue, excreta, bone, etc.). As they are released by organic decomposition processes they tend to form insoluble compounds and thus become 'fixed' within the mineral fraction of soils. Many forms of human activity lead to phosphate enrichment and this may remain detectable in soils over timescales of 10^2-10^3 years (see reviews of phosphate analysis by Hamond, 1983; Bethell and Máté, 1989; Crowther, 1997).

It should be recognised that three difficulties arise in interpreting the results of magnetic susceptibility and phosphate survey data. First, there is the problem of distinguishing natural variations caused by differences in soil parent material, pedogenic processes, soil horizon thickness (which can be significant where samples have been taken at a constant depth), etc. from those of anthropogenic origin. In order to obtain independent information about the variability of the soil samples analysed, **LOI** (loss-on-ignition) determinations were made. This provides an estimate of the organic matter concentration, which is a key property in distinguishing different topsoil types. The study also included sampling points beyond the confines of the known concentrations of lithic scatters to provide background 'controls'. Secondly, while evidence of χ enhancement and phosphate-P enrichment can remain detectable for long periods of time, some 'dilution' of the signals is inevitable in topsoils as a consequence of mixing by earthworm activity, ploughing, etc. Finally, it should be noted that any increases in levels of χ and phosphate evident within modern topsoils cannot be dated. Indeed, in many cases they are inevitably the product of more than one phase of activity and, other things being equal, it is likely that more recent phases of activity will leave stronger signals. In these circumstances caution must be exercised in interpreting any patterns that emerge from the survey results and in linking these with early prehistoric activity.

METHODS

The sampling was undertaken by Gwynedd Archaeological Trust following advice given by Dr David Jenkins and Dr Ian Kelsoe, University of Wales, Bangor. In each survey samples were taken on regular 5 or 10m grids which extended across the area of the lithic scatter (termed 'lithics site' samples) and onto land immediately adjacent to the site (termed 'control' samples). Samples were taken just below the modern turf line at a depth of *c*.15cm at Boncyn Ddol ($n = 91$) and Trefor ($n = 56$), and *c*.20cm at Trefarthen ($n = 91$). At Boncyn Ddol the topsoil was locally thinner than 15cm and in these locations samples were taken from the base of the topsoil.

Analysis was undertaken on the fine earth fraction (i.e. <2mm) of the soils. LOI was determined by ignition at 375°C for 16 hrs (Ball, 1964) and phosphate-P by alkaline oxidation with NaOBr (Dick and Tabatabai, 1977). A Bartington MS1 meter was used for magnetic susceptibility measurements. χ_{max} was achieved by heating samples at 650°C in reducing, followed by oxidising conditions. The method used broadly follows that of Tite and Mullins (1971), except that household flour was mixed with the soils and lids placed on the crucibles to create the reducing environment (after Graham and Scollar,

1976; Crowther and Barker, 1995). Because of financial constraints, $\chi_{max}$was determined on a subset of 20 samples from each of the sites, with half the samples being selected at random and the remainder targeted at those with higher χ values (i.e. which appear to show signs of enhancement). χ_{hf}, hence χ_{fd}, was determined only on the samples selected for χ_{max} determinations and which had a χ value $\geq 30.0 \times 10^{-8}$ SI kg^{-1}. Pearson product moment and Spearman's rank correlation coefficients(r and r_s, respectively) have been used to examine the relationships between the various properties analysed, and Student's t-tests to investigate differences in mean values between samples from the scatter sites and adjacent 'control' areas. In the case of the Pearson correlation analysis, the coefficient of determination (r^2), expressed as a percentage, is used as a measure of the proportion of the variability in the dependent variable that is explained by variation in the independent variable. Where the data for individual properties has a skewness value of ≥ 1.0 a $\log_{10}$ transformation has been applied in order to increase parametricity. Statistical significance was assessed at $\alpha = 0.05$(i.e. 95% confidence level).

RESULTS

Full analytical data for the samples are listed in Appendices I-III; summary data and the results of the correlation analyses are given in Tables 1-8; and plots showing the sampling locations and spatial variations in the key soil properties are presented in Figs. 1-15. It should be noted that in the various plots, produced using SPSS version 6 for Macintosh computers, the scales on the East and North axes are not the same, thereby compressing one axis relative to the other (cf. true scale plots in Smith, 2000).

(1) Boncyn Ddol, Roman Bridge

The site at Boncyn Ddol is located on a low knoll interpreted as a *roche moutonné*, on the edge of the marshy valley floor of the Afon Lledr (Smith, 2000). It is apparent from the soil pit descriptions that there is much local variability in the soils. In the majority of pits the soils are well drained, with red-brown subsoils overlying till or shale bedrock, and from the 1:250 000 soils map of Wales are presumed to be brown podzols of the Manod association (Rudeforth *et al.*, 1984). However, soils with gleyed subsoils occur in pits 2 and 3 along the northern edge of the survey grid and peat >70cm in thickness occurs in pit 11, located on the valley bottom at the south-east corner of the grid. Although the soils have not been ploughed in living memory, 19th century pottery fragments within the topsoil suggest that the soils were manured and ploughed at that time. The peats on the valley floor are thought to have developed on the edge of a former lake, Llyn Dolathelan, which is thought to have been drained in the 18th century.

Of the 91 samples analysed, 65 were from the lithics site and 26 control samples (Fig. 1). Overall, the analytical data reveal marked variability in LOI (Table 1). Thus, while 77 of the samples have values of 10.2-18.3%, the remaining 14 samples are very humic or peaty, with values ranging from 20.1-80.1%. The samples with higher organic matter concentrations are either from margins of the former lake in the south-east corner of the grid or along the central and eastern section of the northern edge, corresponding with the

area where gleyed subsoils were observed. In view of the very high degree of negative skewness in the LOI data, Spearman's rank correlation was used to investigate relationships between LOI and other soil properties. This revealed highly significant ($p<0.001$) inverse relationships with χ ($r_s = -0.550$) and χ_{max}($r_s = -0.764$), and a significant direct relationship with phosphate-P ($r_s = 0.331$, $p<0.01$). Moreover, the results of Student's t-tests (Table2) show that the very humic or peaty soils differ in character from those with LOI concentrations of <20.0%. In particular, they have a significantly lower mean χ (22.4×10^{-8} SI kg^{-1}, cf. 88.0×10^{-8} SI kg^{-1}) and χ_{max}(1290×10^{-8} SI kg^{-1}, cf. 4250×10^{-8} SI kg^{-1}) values, which presumably reflect their lower Fe content - resulting from a smaller minerogenic component and/or loss of Fe through gleying. Thus, the 20 determinations made of χ_{max}, the lowest (293×10^{-8} SI kg^{-1}) was recorded for sample 310/210 which has a LOI of 52.0%. Although there is no significant difference in mean phosphate-P concentrations between the samples with < or ≥20.0% LOI (Table 2). it should be noted that the nature of phosphate-P accumulation in a peaty topsoil differs from that in a more minerogenic topsoil and that spurious patterns can arise when soils are so variable in character. In these circumstances, the samples with LOI values ≥20.0 % have been eliminated in the analysis of the results.

A summary of the results from the remaining samples is presented in Table3. These show that the control samples have a significantly higher mean LOI than the lithics site samples, though the difference is quite small (14.0%, cf. 13.2%). The results of the correlation analysis (Table 4) show that LOI is inversely related to χ and χ_{max}, and directly related to phosphate-P. The coefficients of determination (i.e. r^2) for χ and phosphate-P are, however, so small (15.3 and 9.99%, respectively) that LOI is not considered to be a major factor in accounting for variations in magnetic susceptibility and phosphate across the survey area. Indeed, there are no significant differences in mean χ_{max} or phosphate-P between the two data sets. Importantly, χ is very strongly correlated with χ_{conv} ($r = 0.934$, $p<0.001$; $r^2 = 87.2\%$) over the 20 samples for which χ_{max} determinations were made, but is not significantly correlated with χ_{max}. This confirms that any elevations in χ recorded in the survey are associated with enhancement rather than being attributable to underlying variations in χ_{max}. It should also be noted that the χ_{max} values are consistently very high (range, 3240-5110x 10^{-8} SI kg^{-1}), which is ideal for magnetic susceptibility survey analysis. The fact therefore that χ, χ_{hf} and χ_{conv} are all significantly higher in the lithics site samples than in the control samples does therefore provide good evidence of enhancement within the area of the site, though there no significant correlation between χ_{conv} and χ_{fd}. The χ survey plot presented in Fig. 3 reveals a clear concentration of high values (>120 x 10^{-8}SI kg^{-1}) along the low ridge to the west of the main area of lithics finds. Smith (2000, p. 40) reports "a spread of burnt stone over the ridge" and it would be interesting to examine the extent to which this coincides with the zone of χ enhancement. There are no signs of enhancement on the eastern part of the ridge.

There is no significant difference in phosphate-P between the lithics site and control

samples (Table 3). However, it is clear from the survey plot (Fig. 4) that there is not only quite marked variability in phosphate-P concentrations (range, 1.34-3.34 mg g^{-1}) but a very clear spatial pattern, with a zone of phosphate enrichment at the eastern end of the ridge, extending beyond the confines of the site into the control area. This suggests that the area assumed to form a control area for the present study may, in fact, be part of the site. Assuming background phosphate-P concentrations of <2.00 mg g^{-1}, then the magnitude of enrichment observed at the seven points with concentrations of 3.00-3.49 mg g^{-1} is quite considerable. It seems highly unlikely that the observed pattern is a reflection of 19th century manuring or subsequent grazing patterns, as such activities would presumably have extended across the whole area. The observed enrichment seems likely therefore to be a product of an earlier phase of human activity, possibly dating back to prehistoric times. Interestingly, the areas of phosphate-P enrichment and χ enhancement do not coincide, and this is a pattern that has been observed in relation to other lithics scatters sites (Entwistle and Richards, 1987). Following similar arguments to those advanced by Entwistle and Richards (1987), one possibility is that the area of burning represents a site of former domestic occupation and that of phosphate enrichment an area associated with midden-type deposits on the edge of the 'settlement'. On the evidence of the present data, the Boncyn Ddol lithics scatter site and its immediate environs would certainly appear to merit further investigation.

(2) Old Pier, Trefor

The lithics scatter site at the Old Pier, Trefor, is located on a cliff edge at 10-20m OD. The soils, which according to the 1:250 000 soils map of Wales are brown earths of the East Keswick 1 association (Rudeforth *et al.*, 1984), are developed on drift deposits overlying shales and sandstones, and have never been cultivated. In the 14 soil pits described by Smith (2000) the topsoils are dark brown sandy loams, 12->32cm in thickness. The subsoils vary quite markedly in character, from weathered bedrock to gravels, pebbles and blown sand - the latter, which occurs in the south east of the survey area, giving rise to the deepest soils. The majority of the lithics finds occur within locally-derived colluvial deposits towards the base of a slope. They are thought, however, to have originated on a flatter area of land immediately upslope, and this is where the present surveys were undertaken. Details of the sampling grid are shown in Fig. 5. Samples were taken on a 5m grid within the area of supposed archaeological interest (i.e. 'lithics site' samples; $n = 44$) and at 10m intervals along two transect lines which extended further upslope along a low ridge (i.e. 'control' samples; $n = 12$). It should be recognised that the site is poorly suited for magnetic susceptibility and phosphate surveys because of the variability of the soil parent material and the fact that much of the original topsoil, along with traces of χ enhancement or phosphate-P enrichment it may have contained, has presumably been lost downslope as a result of soil creep, slope wash, etc. Caution must therefore be exercised in interpreting the results from this site.

The topsoil samples display quite marked variability in LOI, with values ranging from 7.50-24.8% (Table 5). The more organic samples are clearly concentrated along the two control sample transects (Fig. 5) and the control samples as a whole have a

significantly (p<0.001) higher mean LOI than those from the lithics site. As a consequence, the control samples cannot be regarded as true controls for the site. Indeed, the results of the t-tests presented in Table 5 show the samples from the control transects to have significantly higher mean χ_{conv} and phosphate-P concentrations than those from the lithics site itself. Interpretation of both the χ and phosphate-P survey results (Figs. 7 and 9, respectively) appears to be complicated by underlying natural variability. In the case of χ, there are marked variations in χ_{max} (range, 41.7-1400 x 10^{-8} SI kg^{-1}; Fig. 8), which presumably reflect variations in parent material (but could also be related to localised gleying but there was no evidence of gleyed subsoils - G. Smith, *pers. com.*). However, χ_{conv}, rather than χ_{max}, is the main factor determining χ (r = 0.793; see footnote of Table 6), accounting for 62.9% of the variance. Under these circumstances, the χ data (Fig. 7) do provide a reasonable indication of the pattern of χ enhancement (though not nearly so reliable as at Boncyn Ddol, where the corresponding r^2 value is 82.7%). Only three of the samples stand out as having relatively χ values of ≥50.0x 10^{-8} SI kg^{-1}. The highest value (110 x 10^{-8} SI kg^{-1}) was recorded within the area of supposed archaeological interest an may merit closer field inspection. As at Boncyn Ddol there is no significant correlation between χ_{conv} and χ_{fd}.

Although the phosphate-P concentrations are not exceptionally high (maximum, 1.85 mg g^{-1}; cf. 3.34 mg g^{-1} at Boncyn Ddol), there is sufficient variability in the data to suggest that some enrichment has taken place. The survey plot (Fig. 9) reveals scarcely any sign of enrichment within the lithics site, and the samples of potential interest appear to be located in the area upslope of the site. Interpretation of this plot is complicated, however, by a highly significant (p<0.001) correlation between phosphate-P and LOI (both $\log_{10}$ transformed; Table 6). There is a similarly strong correlation between the untransformed data (r = 0.763), which indicates that 58.2% of the variance in phosphate-P is explained by variations in LOI. In these circumstances, the residual values from the regression plot of phosphate-P against LOI provide a better indication of phosphate enrichment. These values (here referred to as 'residual phosphate-P') vary either side of 0.0, with higher positive values indicating the most likely areas of enrichment. The plot of residual phosphate-P (Fig. 10) shows four samples with values ≥0.250 mg g^{-1} (maximum, 0.859 mg g^{-1}). As in the case of the χ survey, there is a clear concentration at the western end of the two control transects and this area may merit further investigation. At Trefor, in contrast to Boncyn Ddol, the areas with apparent elevations in phosphate-P and χ broadly coincide. In common, however, is the fact that there is again some evidence of activity in an area outside that of supposed archaeological interest.

(3) Trefarthen quarry field

The soils of the Trefarthen quarry field at Brynsiencyn, as at Trefor, are of the East Keswick 1 association. In contrast, the area is under an arable farming regime and, partly as a consequence, the topsoil is generally deeper (maximum recorded thickness, 60cm) and less variable in character. In total, 91 samples were analysed: 63 from the lithics site and 28 from the control area to the south (Fig. 11). Overall, LOI ranges from 5.49-7.81%

and χ_{max} from 2150-2560 x 10^{-8} SI kg^{-1} (Table 7). While the relative uniformity of the background topsoil characteristics is clearly advantageous from the point of view of χ and phosphate survey work, it should be noted that the survey area is mostly located in a zone of colluvial accumulation at the base of a slope, the only exception being in the north-west corner. As a consequence, any elevations in χ and phosphate-P associated with the various prehistoric enclosures identified from the magnetometer survey (Smith, 2000, Fig. 18) may well be significantly 'diluted' by, or even obscured by, accumulating deposits.

Compared with the previous two sites, the magnetic properties of the topsoils exhibit less variability. χ, for example, ranges from168-349 x 10^{-8} SI kg^{-1}. 94.1% of the variance in χ is attributable to variation in χ_{conv} (r =0.970, p<0.001; Table 8). Variations in χ across the survey area therefore closely reflect differences in the degree of χ enhancement, rather than the effects of underlying variations in χ_{max}.. However, the results are somewhat disappointing and reveal no clear pattern (Fig. 13). In fact, the majority of the higher values are located in the control area and the mean value for the control samples (287x 10^{-8} SI kg^{-1}) is significantly higher than for the lithics site samples (261 x 10^{-8} SI kg^{-1}). As at the two previous sites there is no significant correlation between χ_{conv} and χ_{fd}.

As noted above, there is relatively little variation in LOI. The majority of samples in fact have LOI concentrations of <7.00% and it is only on the slopes in the north-western corner of the survey area that higher values were recorded. Despite this, there is a significant underlying relationship between LOI and $\log_{10}$ transformed phosphate-P (r = 0.495, p<0.001; Table 8). The relationship with the untransformed phosphate-P data is also quite strong (r = 0.500), with LOI accounting for 25.0% of the variance in phosphate. The results of the phosphate-P survey are presented in Fig. 14 and, as in the case of the Trefor samples, the residual phosphate-P concentrations from the LOI/phosphate-P regression have also been plotted (Fig. 15). The untransformed data reveal that the four samples with phosphate-P concentrations ≥2.00 mg g^{-1} are located within the lithics site area, though overall there is no significant difference in the mean values between the site and control samples (Table 7). The residual phosphate-P plot (Fig. 15) perhaps provides a better indication of the phosphate enrichment. In this, two areas within the lithics site stand out with relatively high positive residuals and these areas may merit further investigation. Unfortunately, neither of these ties in with the enclosures identified in the magnetometer survey, and the results in general from Trefarthen are somewhat disappointing.

CONCLUSIONS AND RECOMMENDATIONS

1. The results from the three lithic scatters sites illustrate well the potential of topsoil χ and phosphate-P surveys in archaeological site investigation, when analysed in conjunction with data on organic matter content (LOI), χ_{max} and χ_{conv}.
2. **Boncyn Ddol** shows the strongest signs of χ enhancement and phosphate enrichment though, interestingly, the data from the two surveys produce totally different patterns

Thus, there are clear signs of burning activity along the low ridge to the west of the main area of lithics finds; whereas the zone of phosphate enrichment occurs at the eastern end of the ridge, extending into the 'control' area. Similar patterns have been reported from other lithics sites (Entwistle and Richards, 1987), where they have been tentatively interpreted as representing areas of domestic occupation (associated with burning), separated from areas of midden deposits (phosphate enrichment). It is recommended that:

(i) the survey area be extended eastwards so as to delimit the zone of phosphate enrichment;
(ii) trial excavation work be undertaken both on the western end of the ridge and in the area of phosphate enrichment in the hope of confirming the above interpretation; and
(iii) the chemical and magnetic properties of a profile through the adjacent peat deposits be investigated to establish whether traces of human activity can be identified.

3. **Old Pier, Trefor** is somewhat more problematic in that the majority of the lithic finds(along, presumably, with some of the original topsoil) are thought to have been transported by colluviation from an area of flatter land immediately upslope, where the present survey was undertaken. There was therefore little chance that strong signals of prehistoric activity would remain, and this appears to be borne out by the results. Indeed, the only clear signs of χ enhancement and phosphate enrichment are in the 'control' samples, taken along two transects which extended further upslope. It is recommended that:
   (i) the survey area be extended so as to delimit the area of χ enhancement and phosphate enrichment on the higher part of the slope; and
   (ii) trial excavation work be undertaken in this area to establish whether there is evidence of domestic occupation.
4. **Trefarthen quarry field** appeared to be a much better site for magnetic susceptibility and phosphate survey work in that the degree of natural variation in soil properties is relatively small. The results, however, proved to be disappointing and no clear patterns emerged. One possible reason is that the majority of the survey area may have been affected by colluviation, which would have 'diluted', or even obscured, traces of prehistoric activity. This is something that needs to be considered, though on present evidence there would appear to be little merit in undertaking further survey work at the site.

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Table 1: Summary of analytical data for Boncyn Ddol (n = 91)

	n	Mean	Minimum	Maximum	Std dev.
Control samples (n = 91)					
LOI (%)	91	17.2	10.2	80.1	10.9
χ (10^{-8} SI kg^{-1})	91	77.9	4.60	172	37.6
χ_{hf} (10^{-8} SI kg^{-1})	18	94.6	23.4	156	35.2
χ_{fd} (%)	18	7.72	3.36	10.1	1.80
χ_{max} (10^{-8} SI kg^{-1})	20	3660	293	5110	1350
χ_{conv} (%)	20	2.52	0.63	5.04	1.14
Phosphate-P (mg g^{-1})	91	2.33	1.34	3.34	0.45

Table 2: Comparison of analytical data for Boncyn Ddol samples with LOI values of <20.0 and ≥20.0% (see text)

	n	Mean[a]	Minimum	Maximum	Std dev
LOI <20.0% (*n* = 77)					
LOI (%)**	77	13.36	10.2	18.3	1.52
χ (10^{-8} SI kg^{-1})**	77	88.0	24.6	172	29.2
χ_{hf} (10^{-8} SI kg^{-1})nd	16	97.8	38.5	156	32.1
χ_{fd} (%)nd	16	8.10	5.26	10.1	1.44
χ_{max} (10^{-8} SI kg^{-1})**	16	4250	3240	5110	540
χ_{conv} (%)^{ns}	16	2.55	1.09	4.17	0.96
Phosphate-P (mg g^{-1})$^{+}$	77	2.28	1.34	3.34	0.44
LOI ≥20.0% (*n* = 14)					
LOI (%)**	14	38.2	20.1	80.1	15.6
χ (10^{-8} SI kg^{-1})**	14	22.4	4.60	119	29.1
χ_{hf} (10^{-8} SI kg^{-1})nd	2	69.2	23.4	115	64.8
χ_{fd} (%)nd	2	4.69	3.36	6.02	1.88
χ_{max} (10^{-8} SI kg^{-1})**	4	1290	293	2360	863
χ_{conv} (%)^{ns}	4	2.41	0.63	5.04	1.90
Phosphate-P (mg g^{-1})$^{+}$	14	2.60	1.96	3.24	0.41

[a] Statistical significance of t-tests (2-tailed significance) comparing mean values of control and lithics site samples are shown as follows: ** = $p<0.001$, * = $p<0.01$, $^{+}$ = $p<0.05$, ^{ns} = not significant, nd = not determined (because of small sample size).

Table 3: Summary of analytical data for Boncyn Ddol samples with <20.0% LOI (see text)

	n	Mean[a]	Minimum	Maximum	Std dev
All samples (*n* = 77)					
LOI (%)	77	13.4	10.2	18.3	1.52
χ (10^{-8} SI kg^{-1})	77	88.0	24.6	172	29.2
χ_{hf} (10^{-8} SI kg^{-1})	16	32.1	38.5	156	32.1
χ_{fd} (%)	16	8.10	5.26	10.1	1.44
χ_{max} (10^{-8} SI kg^{-1})	16	4250	3240	5110	540
χ_{conv} (%)	16	2.55	1.09	4.17	0.96
Phosphate-P (mg g^{-1})	77	2.28	1.34	3.34	0.44
Control samples (*n* = 19)					
LOI (%)	19	14.0^{+}	11.3	17.1	1.81
χ (10^{-8} SI kg^{-1})	19	63.7*	28.2	118	23.3
χ_{hf} (10^{-8} SI kg^{-1})	4	56.5**	38.5	84.1	19.8
χ_{fd} (%)	4	7.92^{ns}	5.26	10.1	2.50
χ_{max} (10^{-8} SI kg^{-1})	4	4170^{ns}	3470	4520	493
χ_{conv} (%)	4	1.46*	1.09	2.07	0.43
Phosphate-P (mg g^{-1})	19	2.32^{ns}	1.34	3.34	0.60
Lithics site (*n* = 58)					
LOI (%)	58	13.2^{+}	10.2	18.3	1.37
χ (10^{-8} SI kg^{-1})	58	96.0*	24.6	172	26.6
χ_{hf} (10^{-8} SI kg^{-1})	12	111**	82.6	156	21.6
χ_{fd} (%)	12	8.16^{ns}	6.71	9.35	1.05
χ_{max} (10^{-8} SI kg^{-1})	12	4280^{ns}	3240	5110	574
χ_{conv} (%)	12	2.92*	1.75	4.17	0.80
Phosphate-P (mg g^{-1})	58	2.26^{ns}	1.50	3.21	0.38

[a] Statistical significance of t-tests (2-tailed significance) comparing mean values of control and lithics site samples are shown as follows: ** = $p<0.001$, * = $p<0.01$, $^{+}$ = $p<0.05$, ^{ns} = not significant.

Table 5: Summary of analytical data for the Old Pier, Trefor (n = 56)

	n	Mean[a]	Minimum	Maximum	Std dev
All samples (n = 56)					
LOI (%)	56	11.9	7.50	24.8	4.30
χ (10^{-8} SI kg^{-1})	56	16.3	2.80	110	16.4
χ_{hf} (10^{-8} SI kg^{-1})	4	62.6	44.5	106	29.1
χ_{fd} (%)	4	5.15	2.76	7.87	2.37
χ_{max} (10^{-8} SI kg^{-1})	20	456	41.7	1440	356
χ_{conv} (%)	20	5.69	1.10	23.7	6.79
Phosphate-P (mg g^{-1})	56	0.643	0.254	1.85	0.33
Control samples (n = 12)					
LOI (%)	12	18.6**	11.8	24.8	3.56
χ (10^{-8} SI kg^{-1})	12	21.8^{ns}	2.80	54.3	19.6
χ_{hf} (10^{-8} SI kg^{-1})	3	48.2^{nd}	44.5	52.8	4.23
χ_{fd} (%)	3	5.66^{nd}	2.76	7.87	2.62
χ_{max} (10^{-8} SI kg^{-1})	6	148**	41.7	214	65.7
χ_{conv} (%)	6	13.0+	2.05	23.7	9.03
Phosphate-P (mg g^{-1})	12	1.12**	0.714	1.85	0.36
Lithics site (n = 44)					
LOI (%)	44	10.0**	7.50	17.5	2.04
χ (10^{-8} SI kg^{-1})	44	14.8^{ns}	3.70	110	15.3
χ_{hf} (10^{-8} SI kg^{-1})	1	106^{nd}			
χ_{fd} (%)	1	3.64^{nd}			
χ_{max} (10^{-8} SI kg^{-1})	14	588**	200	1440	348
χ_{conv} (%)	14	2.56+	1.10	5.00	1.00
Phosphate-P (mg g^{-1})	44	0.51**	0.25	1.00	0.16

[a] Statistical significance of t-tests (2-tailed significance) comparing mean values of control and lithics site samples are shown as follows: ** = $p<0.001$, * = $p<0.01$, + = $p<0.05$, ^{ns} = not significant, nd = not determined (because of low sample size); Log_{10} transformations were applied to the raw data for all variables for which comparisons were made.

Table 6: Pearson correlation coefficients[a] (r) for relationships between properties of control and lithics site samples at the Old Pier, Trefor[b]

	χ	χmax	χconv	Phosphate-P
LOI	ns	ns	0.606*	0.793**[d]
χ		ns	ns[c]	0.313
χmax			-0.716**	ns
χconv				0.571*

[a] Data for all variables except χ_{fd} were $\log_{10}$ transformed to increase parametricity; Sample size: n = 56 for pairs involving combinations of LOI, χ and phosphate-P; n = 20 for other pairs; Statistical significance: ** = p<0.001, * = p<0.01, ns = not significant (i.e. $p \geq 0.05$).

[b] χ_{hf} and χ_{fd} excluded from analysis because of small number of determinations.

[c] There is a very strong correlation (r = 0.793) between the untransformed χ and χ_{conv} data, and this is much stronger than that between the untransformed χ and χ_{max} data (r = 0.020).

[d] There is also a very strong correlation (r = 0.763) between the untransformed phosphate-P and LOI data, and the regression equation for the untransformed data, rather than the transformed data, has been used in determining the 'residual' P values (see text).

Table 7: Summary of analytical data for Trefarthen quarry field (n = 91)

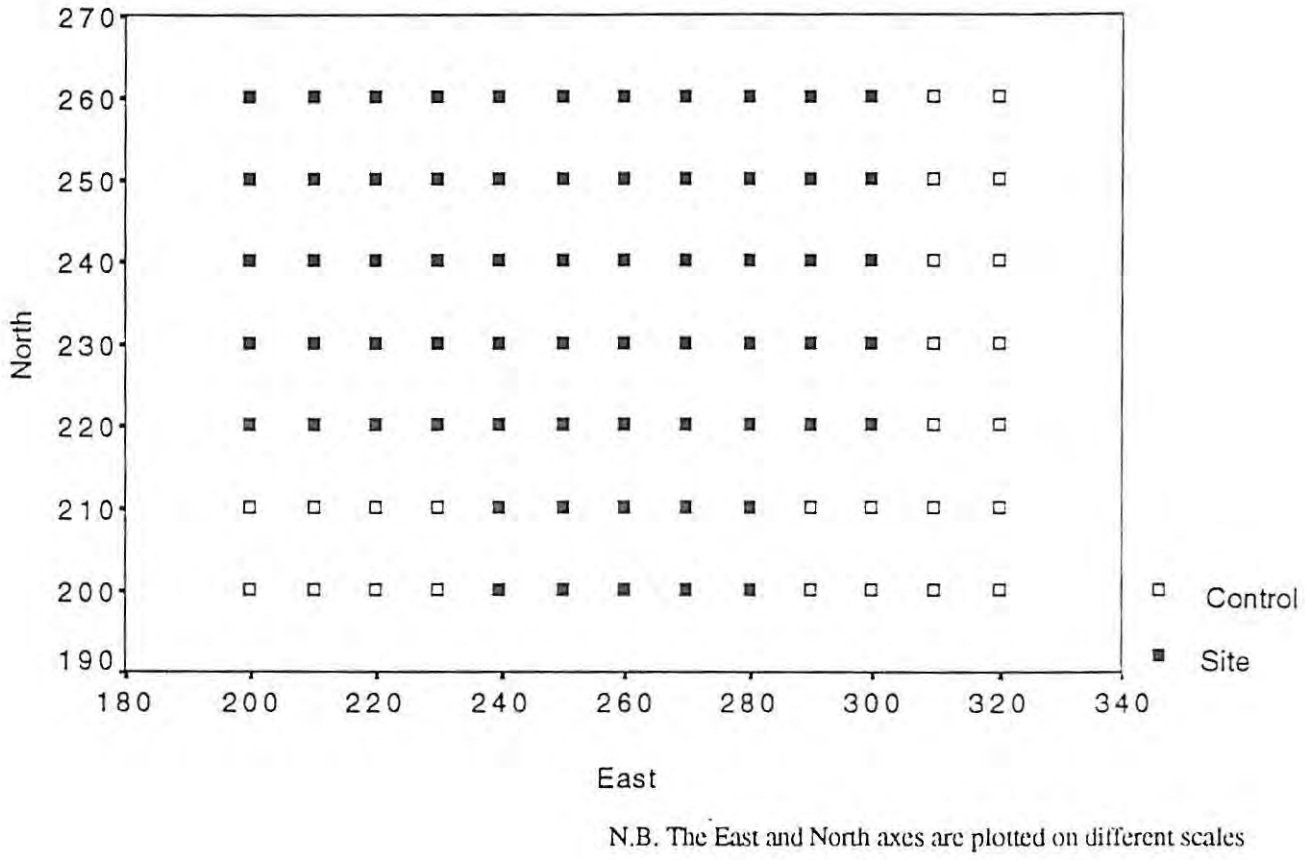
	n	Mean[a]	Minimum	Maximum	Std dev
All samples (n = 91)					
LOI (%)	91	6.35	5.49	7.81	0.44
χ (10^{-8} SI kg^{-1})	91	269	169	349	30.7
χ_{hf} (10^{-8} SI kg^{-1})	20	247	168	314	40.1
χ_{fd} (%)	20	10.3	9.03	11.9	0.65
χ_{max} (10^{-8} SI kg^{-1})	20	2280	2150	2560	88.0
χ_{conv} (%)	20	12.1	8.25	14.9	1.87
Phosphate-P (mg g^{-1})	91	1.65	1.34	2.39	0.18
Control samples (n = 28)					
LOI (%)	28	6.14**	5.56	6.97	0.29
χ (10^{-8} SI kg^{-1})	28	287**	248	349	18.9
χ_{hf} (10^{-8} SI kg^{-1})	7	275*	252	314	19.7
χ_{fd} (%)	7	10.6^{ns}	10.0	11.9	0.69
χ_{max} (10^{-8} SI kg^{-1})	7	2280^{ns}	2190	2380	74.1
χ_{conv} (%)	7	13.5*	12.6	14.9	0.72
Phosphate-P (mg g^{-1})	28	1.60^{ns}	1.45	1.94	0.11
Lithics site (n = 63)					
LOI (%)	63	6.45**	5.49	7.81	0.47
χ (10^{-8} SI kg^{-1})	63	261**	169	323	31.7
χ_{hf} (10^{-8} SI kg^{-1})	13	232*	168	293	40.3
χ_{fd} (%)	13	10.2^{ns}	9.03	11.0	0.63
χ_{max} (10^{-8} SI kg^{-1})	13	2280^{ns}	2150	2560	97.6
χ_{conv} (%)	13	11.3*	8.25	13.9	1.86
Phosphate-P (mg g^{-1})	63	1.67^{ns}	1.34	2.39	0.20

[a] Statistical significance of t-tests (2-tailed significance) comparing mean values of control and lithics site samples are shown as follows: ** = $p<0.001$, * = $p<0.01$, $^{+}$ = $p<0.05$, ^{ns} = not significant; Log_{10} transformations were applied to the data for χ_{max} and phosphate-P to increase parametricity.

Table 8: Pearson correlation coefficients[a] (r) for relationships between properties of control and lithics site samples from Trefarthen quarry field

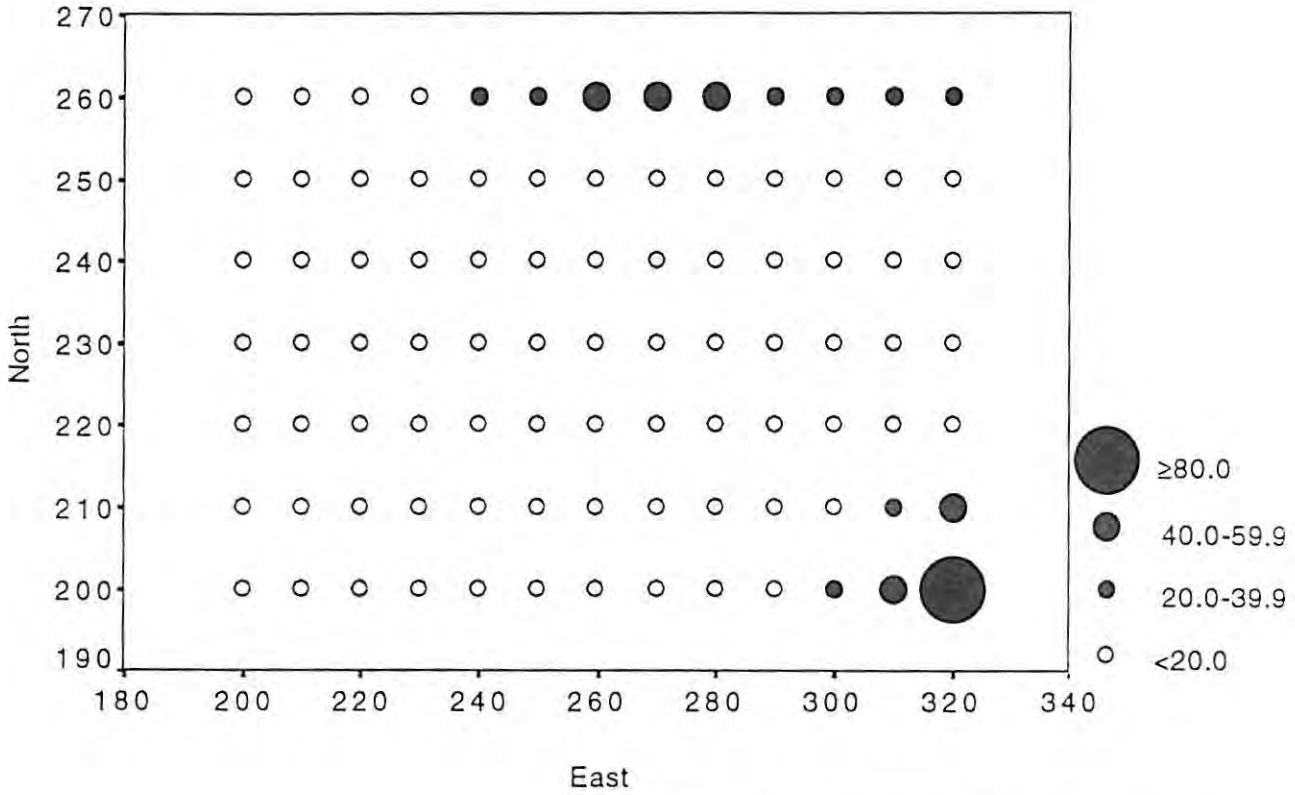
	χ	χ_{hf}	χ_{fd}	χ_{max}	χ_{conv}	Phosphate-P
LOI	ns	ns	ns	ns	ns	0.495**
χ		0.999**	ns	ns	0.970**	ns
χ_{hf}			ns	ns	0.966**	ns
χ_{fd}				ns	ns	ns
χ_{max}					ns	ns
χ_{conv}						ns

[a] Data for χ_{max} and phosphate-P were $\log_{10}$ transformed to increase parametricity; Sample size: $n = 91$ for pairs involving combinations of LOI, χ and phosphate-P; $n = 20$ for all other pairs; Statistical significance: ** = $p<0.001$, * = $p<0.01$, ns = not significant (i.e. $p \geq 0.05$).



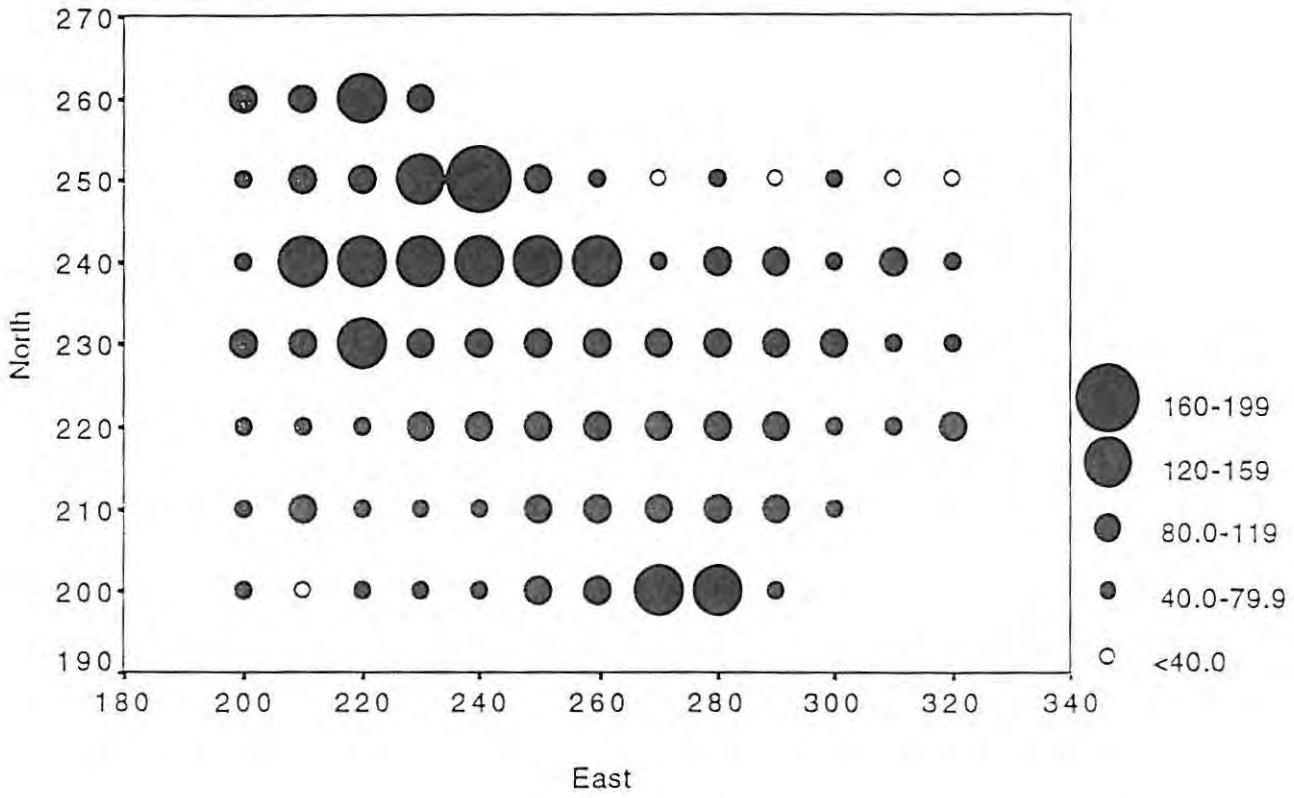
N.B. The East and North axes are plotted on different scales

Fig. 1: Sampling locations at Boncyn Ddol



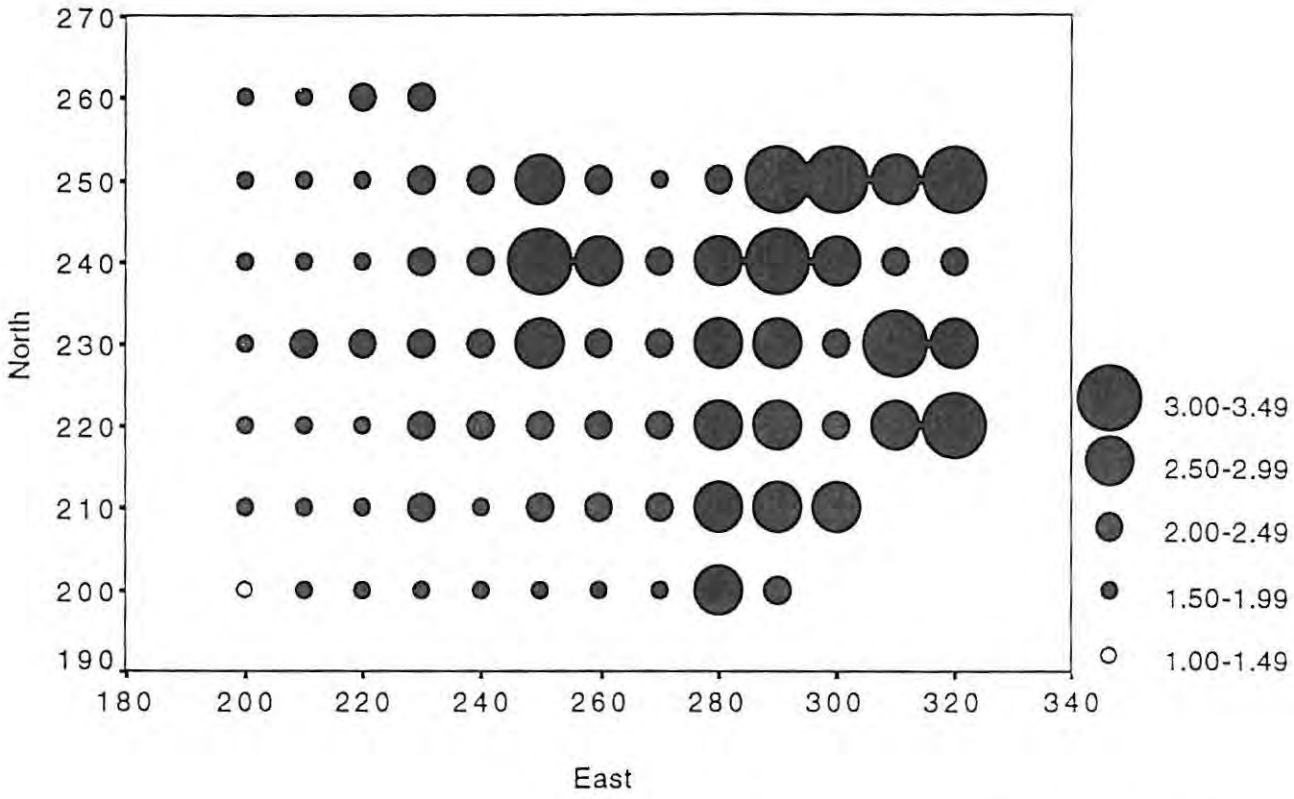
N.B. The East and North axes are plotted on different scales

Fig. 2: Variations in LOI (%) at Boncyn Ddol



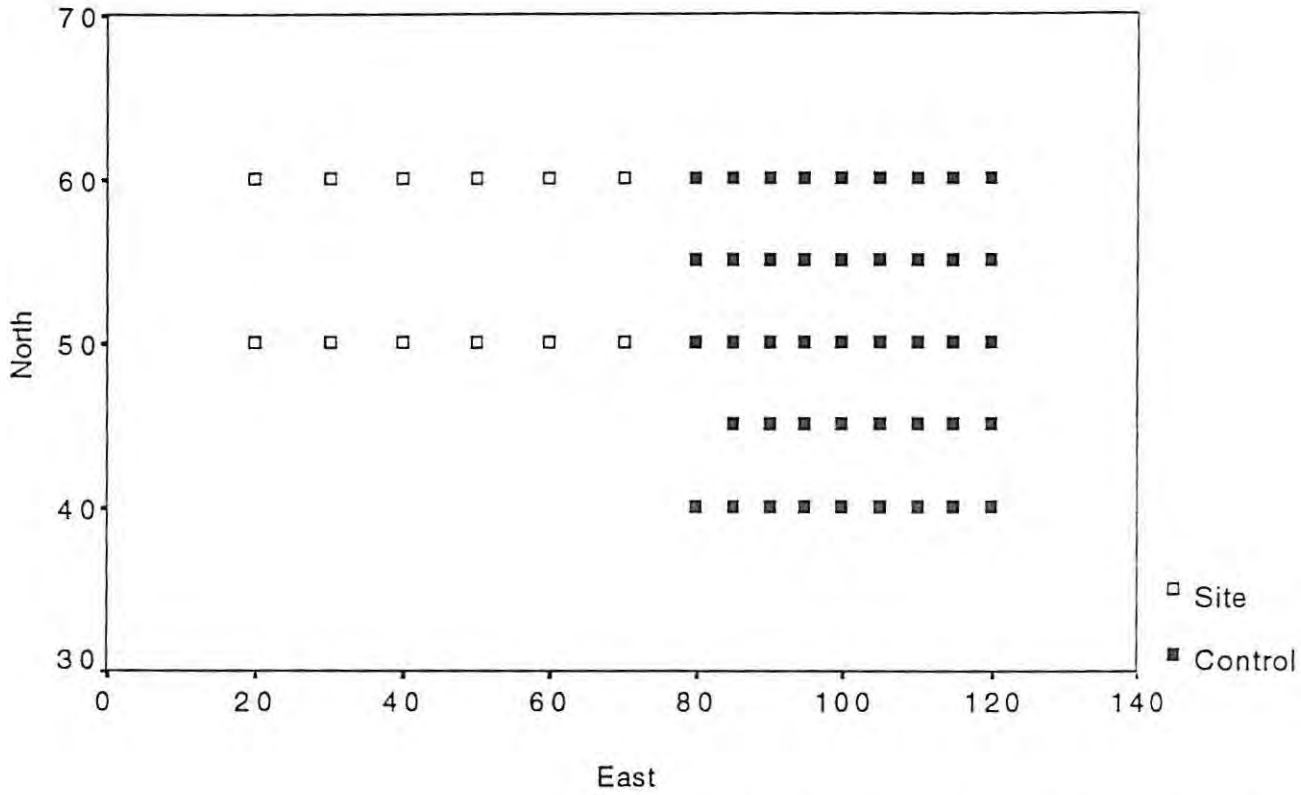
N.B. The East and North axes are plotted on different scales

Fig. 3: Variations in χ (10^{-8} SI kg^{-1}) at Boncyn Ddol



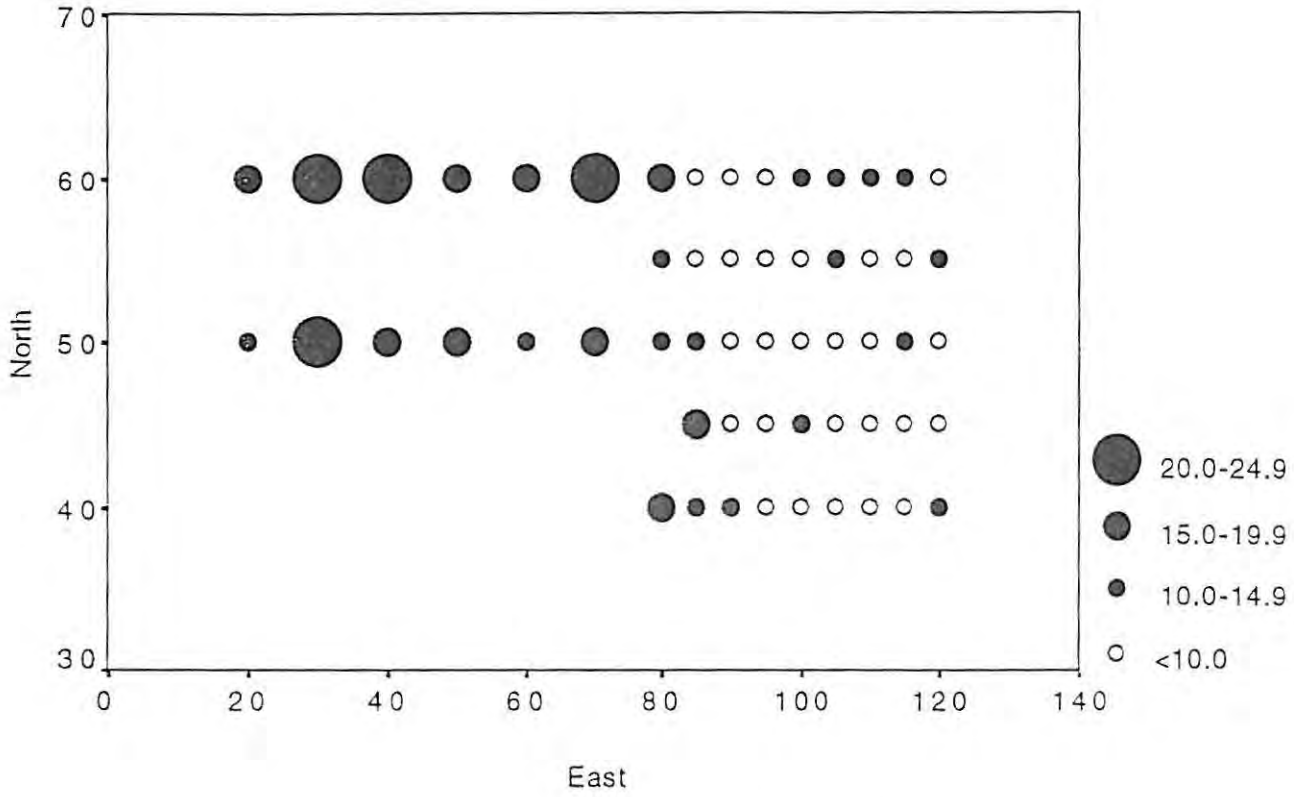
N.B. The East and North axes are plotted on different scales

Fig. 4: Variations in phosphate-P (mg g^{-1}) at Boncyn Ddol



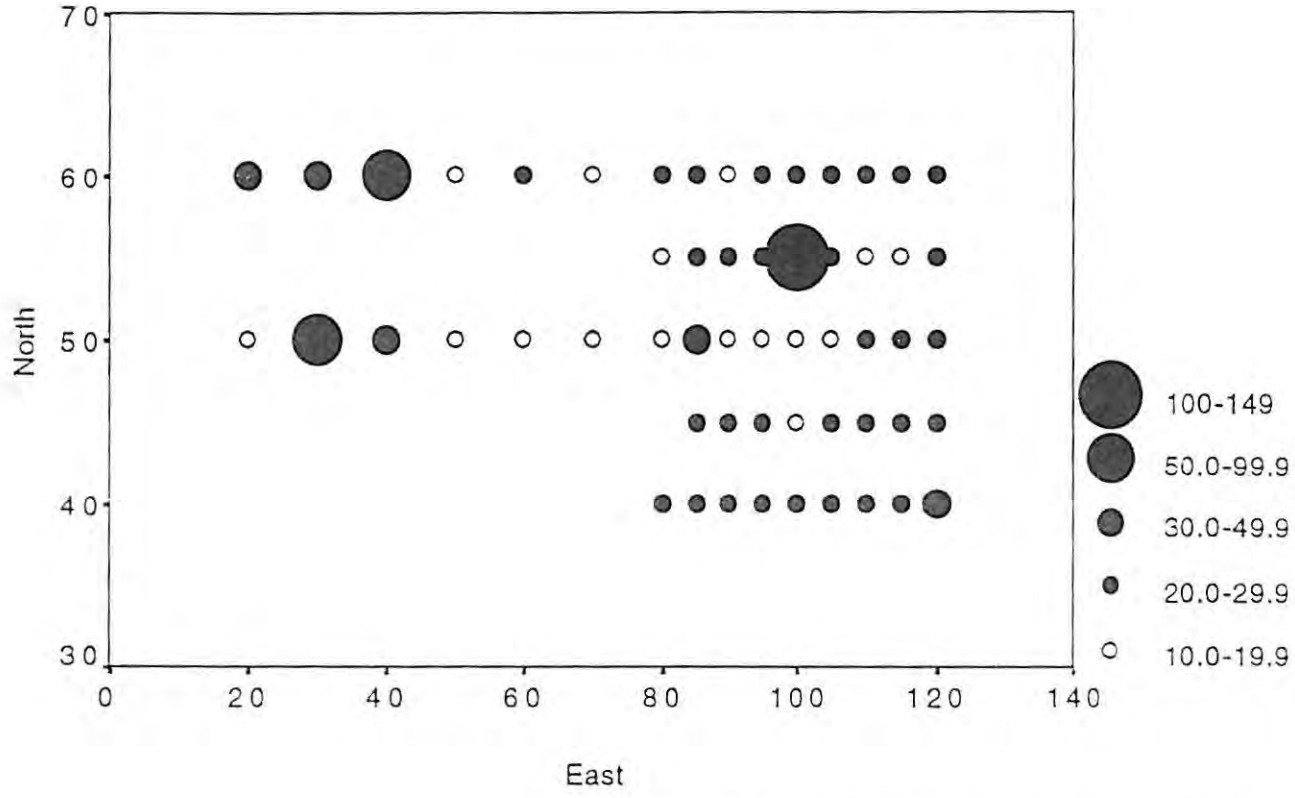
N.B. The East and North axes are plotted on different scales

Fig. 5: Sampling locations at the Old Pier, Trefor



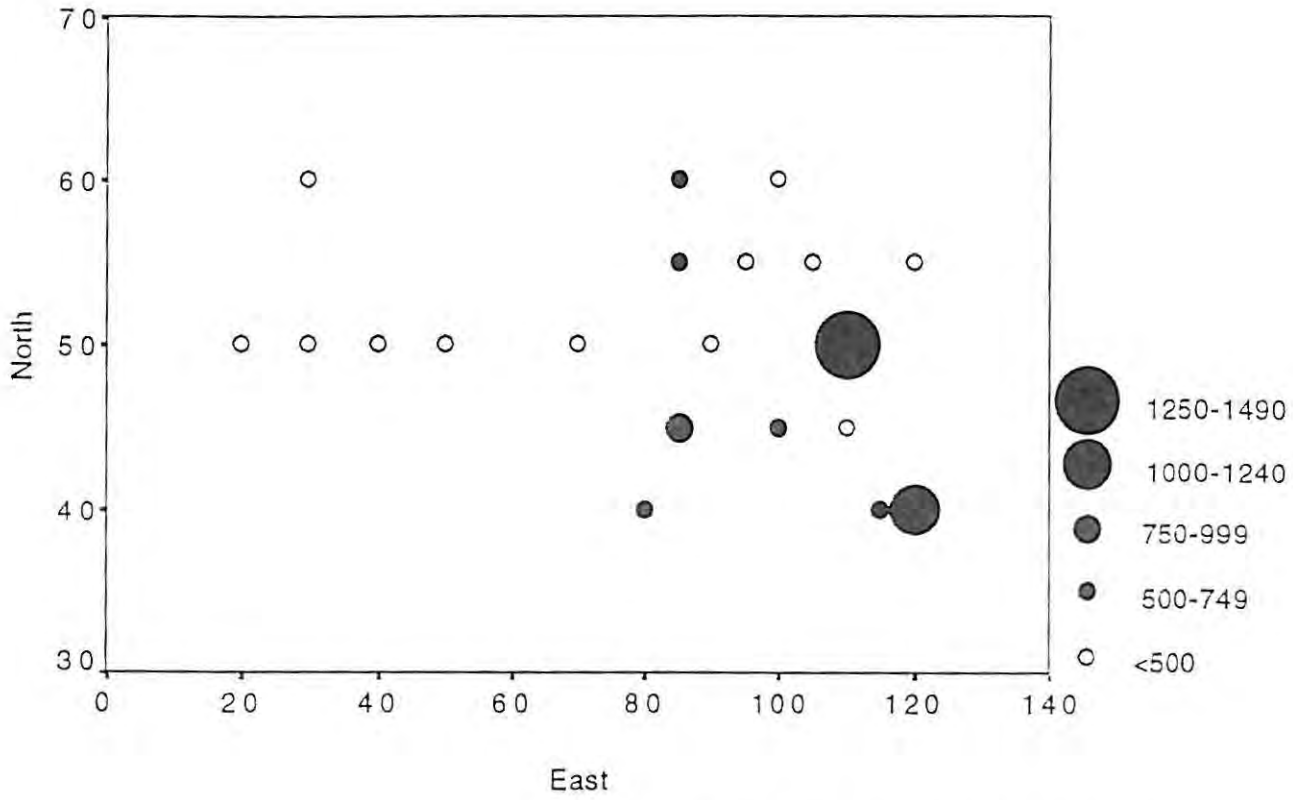
N.B. The East and North axes are plotted on different scales

Fig. 6: Variations in LOI (%) at the Old Pier, Trefor



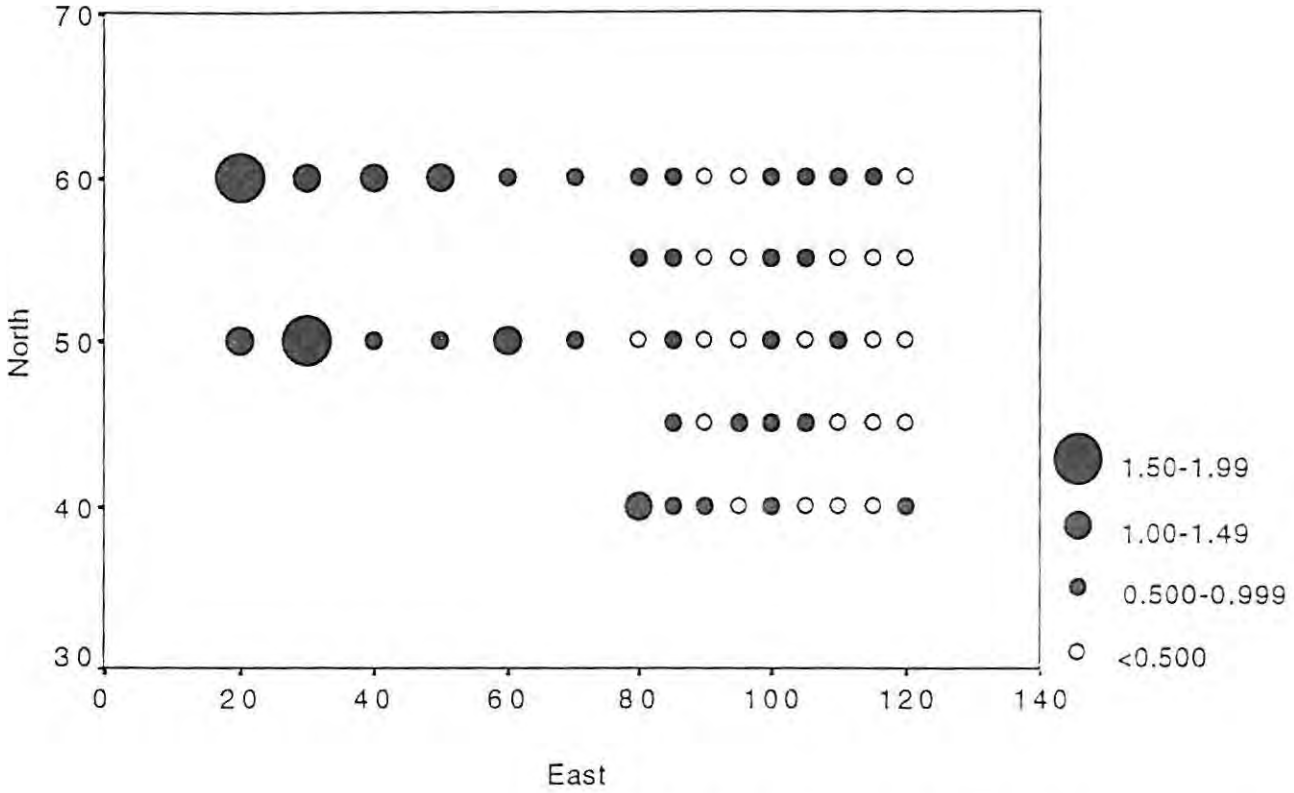
N.B. The East and North axes are plotted on different scales

Fig. 7: Variations in χ (10^{-8} SI kg^{-1}) at the Old Pier, Trefor



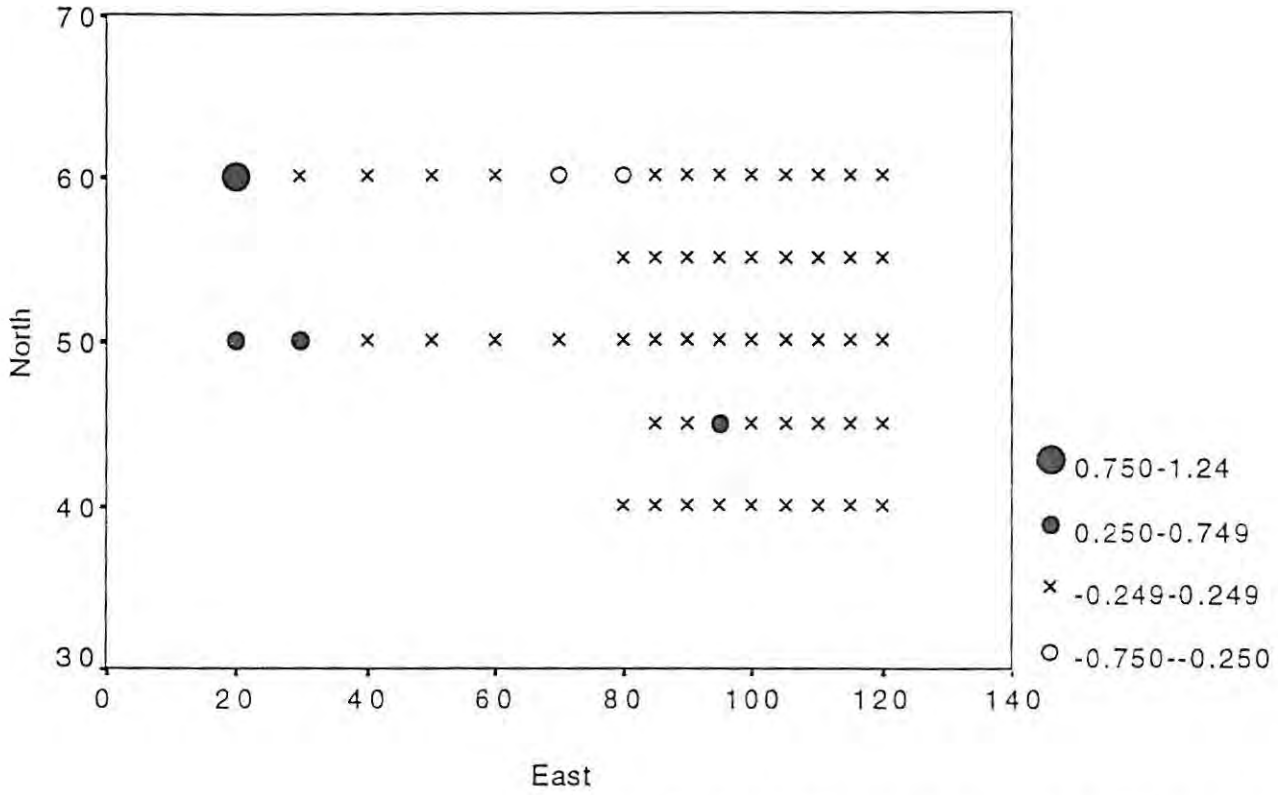
N.B. The East and North axes are plotted on different scales

Fig. 8: Variations in χ_{max} (10^{-8} SI kg^{-1}) at the Old Pier, Trefor



N.B. The East and North axes are plotted on different scales

Fig. 9: Variations in phosphate-P (mg g^{-1}) at the Old Pier, Trefor



N.B. The East and North axes are plotted on different scales

Fig. 10: Variations in values of residual phosphate-P (mg g^{-1}) from regression plot of phosphate-P against LOI (see text) at the Old Pier, Trefor

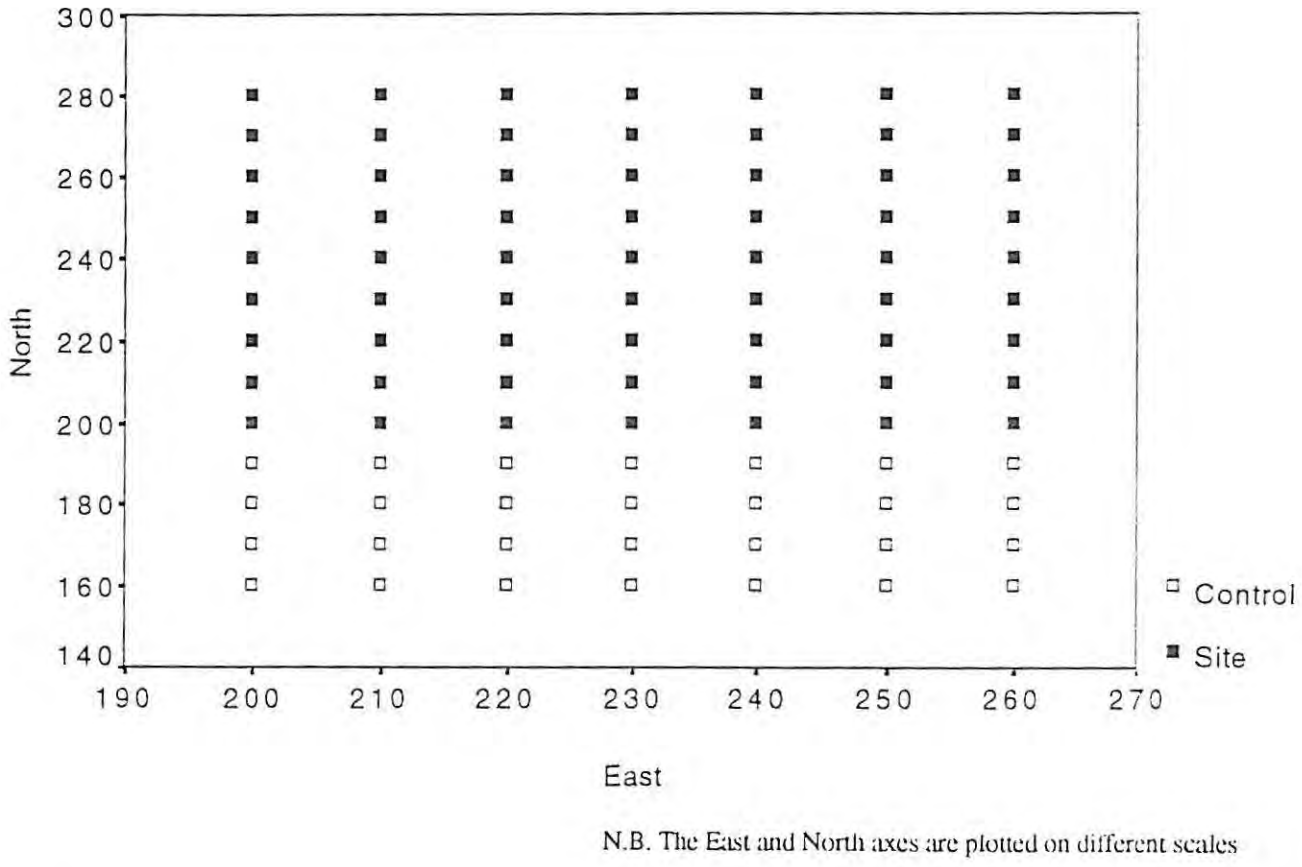
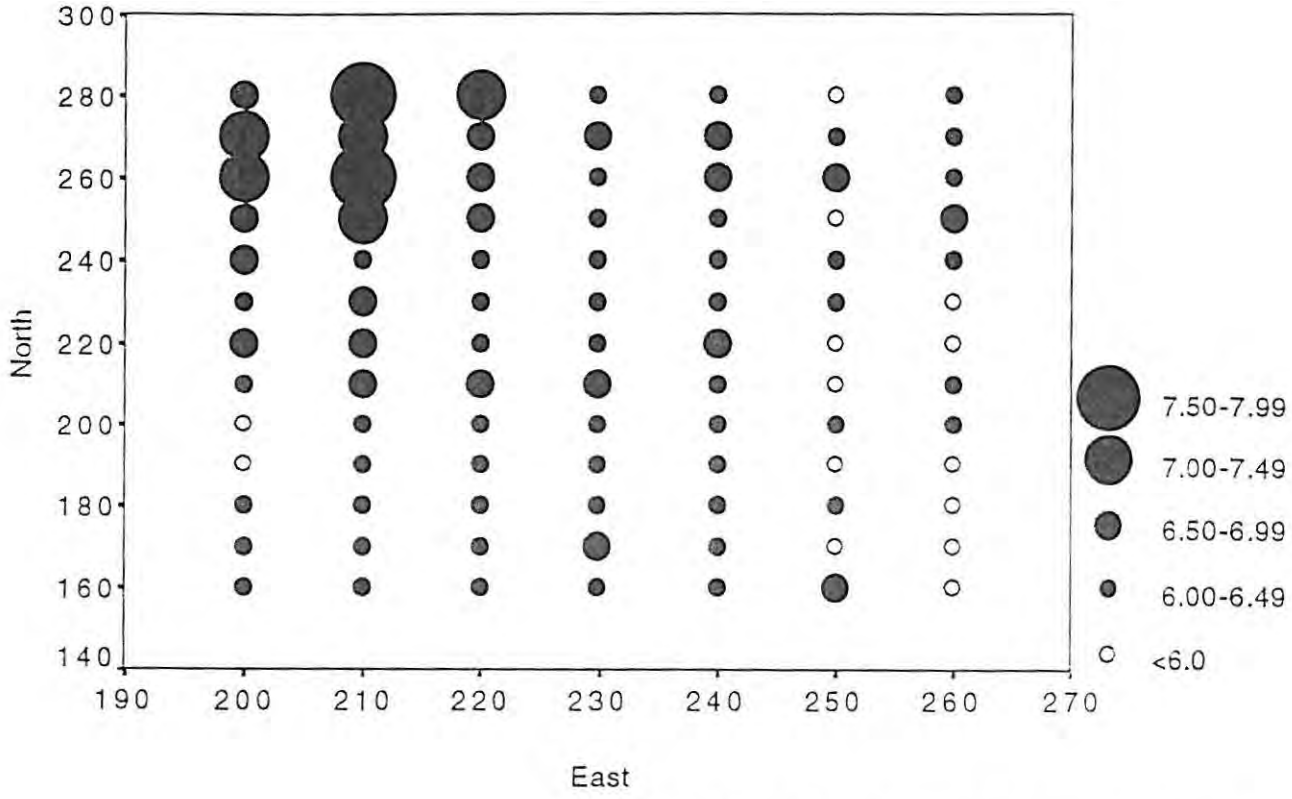
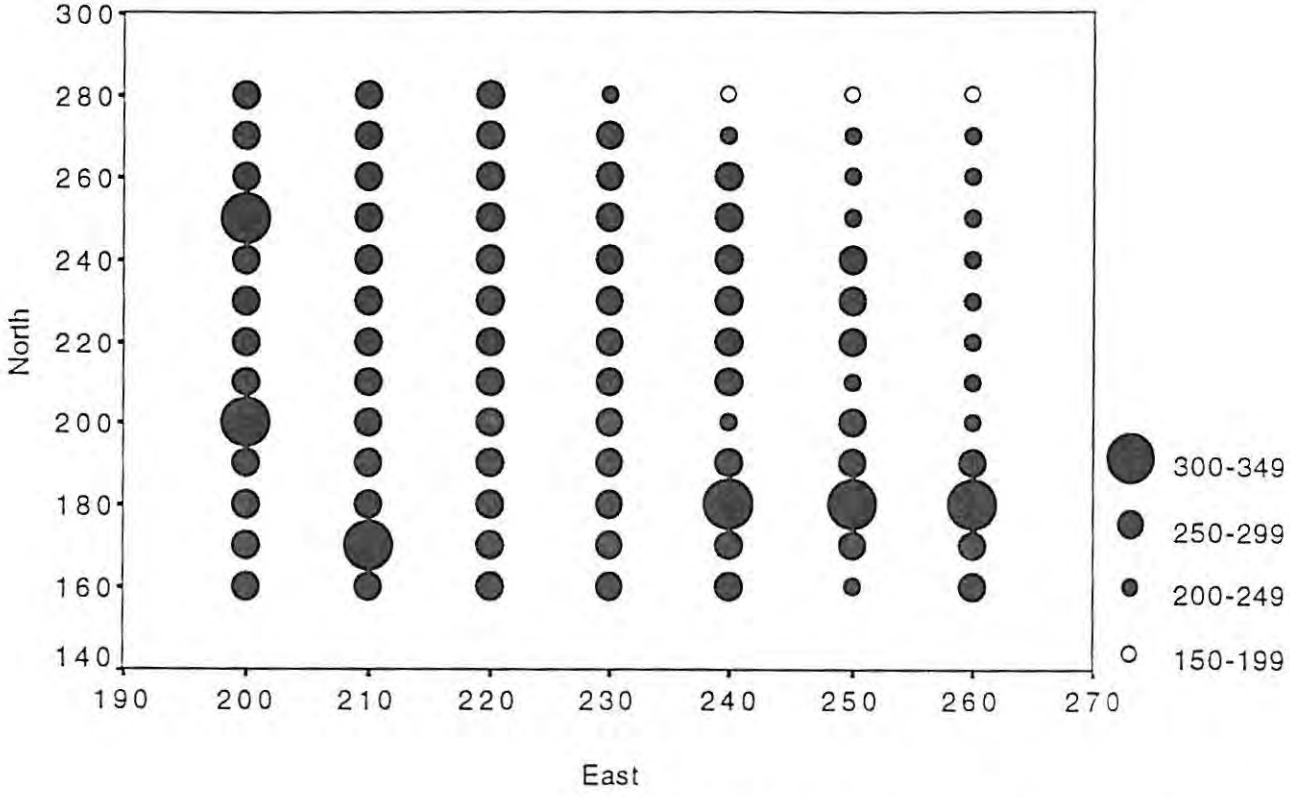


Fig. 11: Sampling locations at Trefarthen quarry field



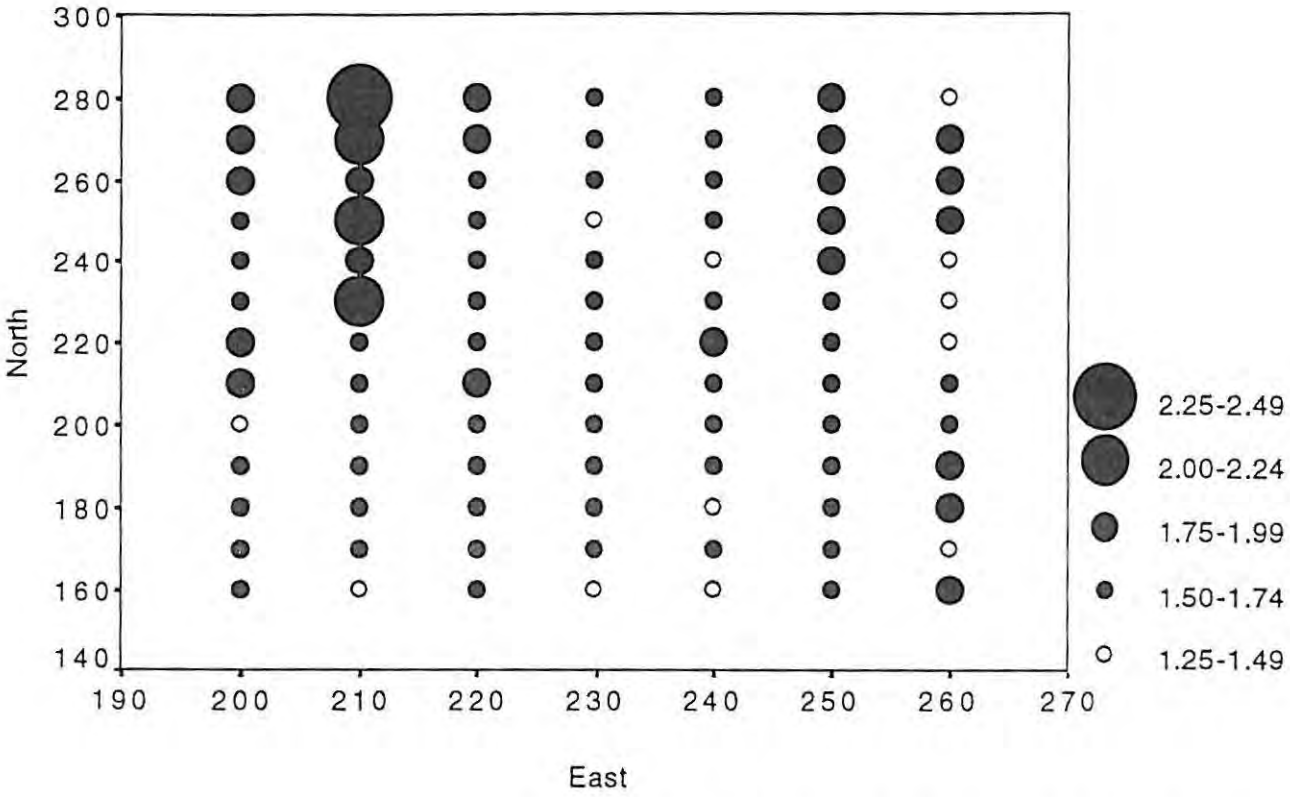
N.B. The East and North axes are plotted on different scales

Fig. 12: Variations in LOI (%) at Trefarthen quarry field



N.B. The East and North axes are plotted on different scales

Fig. 13: Variations in χ (10^{-8} SI kg^{-1}) at Trefarthen quarry field



N.B. The East and North axes are plotted on different scales

Fig. 14: Variations in phosphate-P (mg g^{-1}) at Trefarthen quarry field

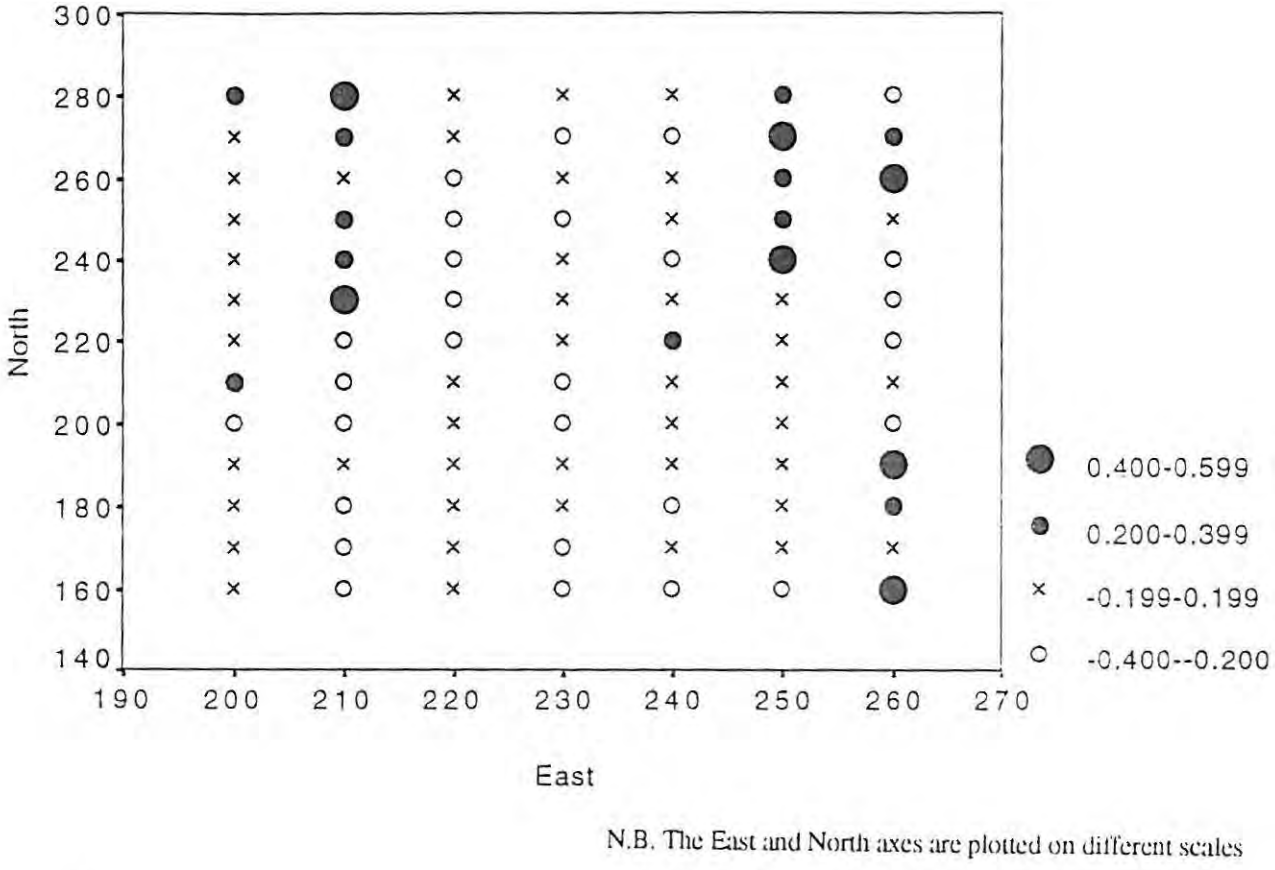


Fig. 15: Variations in values of residual phosphate-P (mg g^{-1}) from regression plot of phosphate-P against LOI (see text) at Trefarthen quarry field

APPENDIX I: Analytical data for site and control (labelled 'c') samples from Boncyn Ddol, Roman Bridge

E-coord	N-coord		LOI (%)	χ (10^{-8} SI kg^{-1})	χhf (10^{-8} SI kg^{-1})	χfd (%)	χmax (10^{-8} SI kg^{-1})	χconv (%)	Phosphate-P (mg g^{-1})
200	200	c	13.7	49.4	46.8	5.26	4520	1.09	1.34
200	210	c	15.7	56.9	nd	nd	nd	nd	1.82
200	220		12.7	72.4	nd	nd	nd	nd	1.86
200	230		12.9	90.9	84.8	6.71	5110	1.78	1.89
200	240		14.6	74.2	nd	nd	nd	nd	1.83
200	250		11.8	71.6	nd	nd	nd	nd	1.95
200	260		13.2	89.6	nd	nd	nd	nd	1.97
210	200	c	13.7	38.2	nd	nd	nd	nd	1.71
210	210	c	11.4	94.8	nd	nd	nd	nd	1.59
210	220		13.4	60.2	nd	nd	nd	nd	1.79
210	230		12.9	97.2	nd	nd	nd	nd	2.05
210	240		11.5	127	nd	nd	nd	nd	1.96
210	250		10.2	85.7	nd	nd	nd	nd	1.94
210	260		11.9	81.4	nd	nd	nd	nd	1.84
220	200	c	14.0	52.3	nd	nd	nd	nd	1.61
220	210	c	11.3	74.4	nd	nd	nd	nd	1.79
220	220		13.6	79.0	nd	nd	nd	nd	1.83
220	230		12.9	125	114	8.80	4670	2.68	2.28
220	240		10.4	128	nd	nd	nd	nd	1.96
220	250		11.6	114	nd	nd	nd	nd	1.99
220	260		13.4	125	nd	nd	nd	nd	2.23
230	200	c	15.5	52.5	nd	nd	nd	nd	1.74
230	210	c	13.0	61.8	nd	nd	nd	nd	2.43
230	220		13.4	80.7	nd	nd	nd	nd	2.23
230	230		12.4	117	nd	nd	nd	nd	2.33
230	240		11.9	128	117	8.59	3750	3.41	2.35
230	250		11.6	124	nd	nd	nd	nd	2.20
230	260		13.4	108	nd	nd	nd	nd	2.11
240	200		15.3	70.4	nd	nd	nd	nd	1.59
240	210		11.9	59.0	nd	nd	nd	nd	1.86
240	220		12.4	88.6	82.6	6.77	5050	1.75	2.29
240	230		13.2	113	nd	nd	nd	nd	2.26
240	240		14.2	143	130	9.09	3900	3.67	2.34
240	250		13.1	172	156	9.30	4250	4.05	2.11
240	260		20.1	32.2	nd	nd	nd	nd	1.96
250	200		14.1	90.6	nd	nd	nd	nd	1.50
250	210		12.7	83.5	nd	nd	nd	nd	2.16
250	220		11.6	95.1	nd	nd	nd	nd	2.18
250	230		13.4	105	nd	nd	nd	nd	2.60
250	240		14.6	120	nd	nd	nd	nd	3.00
250	250		14.2	103	95.9	6.89	3730	2.76	2.52
250	260		31.0	24.9	23.4	6.02	1040	2.39	2.17
260	200		13.9	107	nd	nd	nd	nd	1.83
260	210		11.9	97.3	nd	nd	nd	nd	2.23
260	220		13.1	116	108	6.90	4790	2.42	2.28
260	230		14.0	103	nd	nd	nd	nd	2.41
260	240		15.1	135	123	8.89	3240	4.17	2.67
260	250		14.4	65.7	nd	nd	nd	nd	2.49
260	260		41.7	9.3	nd	nd	1470	0.633	2.06
270	200		12.9	139	126	9.35	4390	3.17	1.86
270	210		12.5	42.5	nd	nd	nd	nd	2.06
270	220		13.4	75.1	nd	nd	nd	nd	2.27

270	230		11.9	107	nd	nd	nd	nd	2.17
270	240		12.3	79.4	nd	nd	nd	nd	2.22
270	250		14.6	24.6	nd	nd	nd	nd	1.93
270	260		47.5	7.7	nd	nd	nd	nd	2.13
280	200		13.1	125	115	8.00	4450	2.81	2.64
280	210		13.3	98.5	nd	nd	nd	nd	2.58
280	220		12.7	89.4	nd	nd	nd	nd	2.70
280	230		13.8	94.2	86.1	8.60	4010	2.35	2.93
280	240		13.1	83.2	nd	nd	nd	nd	2.73
280	250		14.3	62.3	nd	nd	nd	nd	2.34
280	260		46.6	8.7	nd	nd	nd	nd	2.97
290	200	c	12.6	57.1	nd	nd	nd	nd	2.20
290	210	c	15.8	93.5	84.1	10.1	4510	2.07	2.58
290	220		11.4	92.2	nd	nd	nd	nd	2.65
290	230		11.7	113	nd	nd	nd	nd	2.54
290	240		13.3	106	nd	nd	nd	nd	3.07
290	250		14.1	37.4	nd	nd	nd	nd	3.09
290	260		39.8	119	115	3.36	2360	5.04	2.79
300	200	c	28.1	25.8	nd	nd	nd	nd	3.01
300	210	c	16.5	42.8	38.5	10.1	3470	1.23	2.77
300	220		12.1	79.6	nd	nd	nd	nd	2.34
300	230		15.1	84.6	nd	nd	nd	nd	2.41
300	240		15.2	79.8	nd	nd	nd	nd	2.72
300	250		18.3	56.6	nd	nd	nd	nd	3.21
300	260		21.3	22.4	nd	nd	nd	nd	2.56
310	200	c	52.0	4.6	nd	nd	293	1.57	2.50
310	210	c	26.3	9.9	nd	nd	nd	nd	3.24
310	220	c	12.5	75.6	nd	nd	nd	nd	2.53
310	230	c	13.7	69.3	nd	nd	nd	nd	3.31
310	240	c	12.6	85.4	nd	nd	nd	nd	2.42
310	250	c	16.5	28.2	nd	nd	nd	nd	2.74
310	260	c	29.0	14.2	nd	nd	nd	nd	2.90
320	200	c	80.1	6.8	nd	nd	nd	nd	2.35
320	210	c	40.9	9.2	nd	nd	nd	nd	2.74
320	220	c	13.8	118	nd	nd	nd	nd	3.34
320	230	c	11.4	71.4	nd	nd	nd	nd	2.64
320	240	c	14.5	60.3	56.5	6.30	4180	1.44	2.48
320	250	c	17.1	28.9	nd	nd	nd	nd	3.10
320	260	c	30.8	18.4	nd	nd	nd	nd	2.96

nd = not determined

APPENDIX II: Analytical data for site and control (labelled 'c') samples from the Old Pier, Trefor

E-coord	N-coord		LOI (%)	χ (10^{-8} SI kg^{-1})	χhf (10^{-8} SI kg^{-1})	χfd (%)	χmax (10^{-8} SI kg^{-1})	χconv (%)	Phosphate-P (mg g^{-1})
20	50	c	11.8	2.83	nd	nd	41.7	6.79	1.12
20	60	c	17.8	48.3	44.5	7.87	nd	nd	1.85
30	50	c	20.9	50.4	47.2	6.35	214	23.55	1.80
30	60	c	22.8	27.0	nd	nd	199	13.57	1.08
40	50	c	16.2	30.1	nd	nd	127	23.70	0.924
40	60	c	21.3	54.3	52.8	2.76	nd	nd	1.17
50	50	c	18.9	9.46	nd	nd	115	8.23	0.830
50	60	c	19.4	5.47	nd	nd	nd	nd	1.15
60	50	c	14.9	6.54	nd	nd	nd	nd	1.03
60	60	c	16.9	15.7	nd	nd	nd	nd	0.714
70	50	c	17.8	3.86	nd	nd	190	2.03	0.954
70	60	c	24.8	7.84	nd	nd	nd	nd	0.863
80	40		17.5	13.9	nd	nd	618	2.25	1.00
80	50		12.1	6.99	nd	nd	nd	nd	0.416
80	55		10.5	5.71	nd	nd	nd	nd	0.544
80	60		15.3	13.7	nd	nd	nd	nd	0.584
85	40		10.2	14.3	nd	nd	nd	nd	0.645
85	45		15.0	13.4	nd	nd	804	1.67	0.969
85	50		12.3	24.2	nd	nd	nd	nd	0.695
85	55		9.31	18.4	nd	nd	506	3.64	0.538
85	60		9.43	12.2	nd	nd	580	2.10	0.518
90	40		12.6	15.7	nd	nd	nd	nd	0.534
90	45		9.68	13.8	nd	nd	nd	nd	0.400
90	50		9.25	8.32	nd	nd	304	2.74	0.405
90	55		9.18	16.7	nd	nd	nd	nd	0.426
90	60		8.08	9.83	nd	nd	nd	nd	0.313
95	40		9.70	10.8	nd	nd	nd	nd	0.436
95	45		8.17	14.0	nd	nd	nd	nd	0.799
95	50		8.74	3.71	nd	nd	nd	nd	0.254
95	55		8.65	10.9	nd	nd	324	3.36	0.478
95	60		7.64	16.0	nd	nd	nd	nd	0.450
100	40		9.34	16.3	nd	nd	nd	nd	0.521
100	45		10.1	9.00	nd	nd	559	1.61	0.530
100	50		9.62	7.65	nd	nd	nd	nd	0.627
100	55		8.21	110	106	3.64	nd	nd	0.623
100	60		10.9	10.6	nd	nd	405	2.62	0.501
105	40		8.07	15.3	nd	nd	nd	nd	0.443
105	45		9.37	14.4	nd	nd	nd	nd	0.539
105	50		7.50	5.03	nd	nd	nd	nd	0.327
105	55		10.5	10.3	nd	nd	313	3.29	0.515
105	60		10.6	16.3	nd	nd	nd	nd	0.633
110	40		9.10	16.2	nd	nd	nd	nd	0.282
110	45		8.13	11.3	nd	nd	472	2.39	0.281
110	50		9.79	15.9	nd	nd	1440	1.10	0.558
110	55		8.11	8.92	nd	nd	nd	nd	0.413
110	60		10.7	15.1	nd	nd	nd	nd	0.581
115	40		8.00	11.5	nd	nd	519	2.22	0.394
115	45		9.08	17.3	nd	nd	nd	nd	0.441
115	50		10.6	11.0	nd	nd	nd	nd	0.422
115	55		9.32	9.15	nd	nd	nd	nd	0.452
115	[illegible]		[illegible]	[illegible]	nd	nd	nd	nd	0.761
120	[illegible]		[illegible]	22.3	nd	nd	nd	[illegible]	0.611

120	45	9.92	12.3	nd	nd	nd	nd	0.404
120	50	9.43	10.4	nd	nd	nd	nd	0.343
120	55	11.3	10.0	nd	nd	200	5.00	0.472
120	60	8.55	11.3	nd	nd	nd	nd	0.430

nd = not determined

APPENDIX III: Analytical data for site and control (labelled 'c') samples from Trefarthen quarry field, Brynsiencyn

E-coord	N-coord		LOI (%)	χ (10^{-8} SI kg^{-1})	χhf (10^{-8} SI kg^{-1})	χfd (%)	χmax (10^{-8} SI kg^{-1})	χconv (%)	Phosphate-P (mg g^{-1})
200	160	c	6.11	299	269	10.0	2380	12.6	1.65
200	170	c	6.01	279	nd	nd	nd	nd	1.59
200	180	c	6.01	292	nd	nd	nd	nd	1.53
200	190	c	5.84	273	nd	nd	nd	nd	1.58
200	200		5.78	323	293	9.29	2320	13.9	1.42
200	210		6.37	268	nd	nd	nd	nd	1.84
200	220		6.59	284	nd	nd	nd	nd	1.77
200	230		6.44	299	nd	nd	nd	nd	1.63
200	240		6.59	291	nd	nd	nd	nd	1.60
200	250		6.80	303	272	10.2	2560	11.8	1.74
200	260		7.18	295	nd	nd	nd	nd	1.76
200	270		7.30	269	nd	nd	nd	nd	1.82
200	280		6.93	271	nd	nd	nd	nd	1.88
210	160	c	6.29	280	nd	nd	nd	nd	1.49
210	170	c	6.48	349	314	10.0	2350	14.9	1.54
210	180	c	6.35	299	nd	nd	nd	nd	1.54
210	190	c	6.18	292	nd	nd	nd	nd	1.59
210	200		6.21	296	nd	nd	nd	nd	1.50
210	210		6.63	281	nd	nd	nd	nd	1.51
210	220		6.81	265	nd	nd	nd	nd	1.64
210	230		6.75	296	nd	nd	nd	nd	2.16
210	240		6.41	299	272	9.03	2270	13.2	1.80
210	250		7.05	276	nd	nd	nd	nd	2.00
210	260		7.62	279	nd	nd	nd	nd	1.95
210	270		7.40	277	nd	nd	nd	nd	2.01
210	280		7.81	263	nd	nd	nd	nd	2.39
220	160	c	6.26	289	nd	nd	nd	nd	1.60
220	170	c	6.38	283	nd	nd	nd	nd	1.61
220	180	c	6.06	281	nd	nd	nd	nd	1.56
220	190	c	6.49	295	265	10.2	2200	13.4	1.64
220	200		6.01	283	nd	nd	nd	nd	1.53
220	210		6.93	296	265	10.5	2230	13.3	1.78
220	220		6.43	273	nd	nd	nd	nd	1.52
220	230		6.48	286	nd	nd	nd	nd	1.56
220	240	c	6.31	294	nd	nd	nd	nd	1.52
220	250		6.58	268	nd	nd	nd	nd	1.57
220	260		6.91	289	nd	nd	nd	nd	1.51
220	270		6.97	261	nd	nd	nd	nd	1.77
220	280		7.20	252	nd	nd	nd	nd	1.76
230	160	c	6.02	286	252	11.9	2190	13.1	1.47
230	170	c	6.67	292	nd	nd	nd	nd	1.61
230	180	c	6.34	290	nd	nd	nd	nd	1.61
230	190	c	6.03	281	nd	nd	nd	nd	1.55
230	200		6.48	264	nd	nd	nd	nd	1.50
230	210		6.82	292	nd	nd	nd	nd	1.54
230	220		6.20	273	nd	nd	nd	nd	1.52
230	230		6.42	296	266	10.1	2250	13.2	1.63
230	240		6.39	277	nd	nd	nd	nd	1.57
230	250		6.11	271	nd	nd	nd	nd	1.49
230	260		6.41	269	nd	nd	nd	nd	1.60
230	270		[illegible]	265	nd	nd	nd	nd	[illegible]
230	280		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

240	160	c	6.18	267	nd	nd	nd	nd	1.45
240	170	c	6.22	282	nd	nd	nd	nd	1.63
240	180	c	6.09	310	277	10.7	2240	13.8	1.48
240	190	c	6.05	267	nd	nd	nd	nd	1.51
240	200		6.18	249	nd	nd	nd	nd	1.65
240	210		6.44	252	nd	nd	nd	nd	1.69
240	220		6.61	263	236	10.3	2150	12.2	1.86
240	230		6.32	263	nd	nd	nd	nd	1.70
240	240		6.13	267	nd	nd	nd	nd	1.34
240	250		6.02	271	nd	nd	nd	nd	1.60
240	260		6.55	281	nd	nd	nd	nd	1.64
240	270		6.66	233	nd	nd	nd	nd	1.60
240	280		6.08	188	168	10.6	2280	8.25	1.50
250	160	c	6.97	248	nd	nd	nd	nd	1.65
250	170	c	5.83	265	nd	nd	nd	nd	1.59
250	180	c	6.00	316	284	10.1	2320	13.6	1.65
250	190	c	5.99	286	nd	nd	nd	nd	1.65
250	200		6.24	252	225	10.7	2190	11.5	1.59
250	210		5.97	239	nd	nd	nd	nd	1.51
250	220		5.89	264	nd	nd	nd	nd	1.51
250	230		6.40	264	nd	nd	nd	nd	1.57
250	240		6.06	255	228	10.6	2300	11.1	1.90
250	250		5.94	245	nd	nd	nd	nd	1.81
250	260		6.58	223	nd	nd	nd	nd	1.83
250	270		6.01	223	nd	nd	nd	nd	1.89
250	280		5.69	180	nd	nd	nd	nd	1.76
260	160	c	5.56	268	nd	nd	nd	nd	1.83
260	170	c	5.77	289	nd	nd	nd	nd	1.49
260	180	c	5.89	300	267	11.0	2260	13.3	1.85
260	190	c	5.86	273	nd	nd	nd	nd	1.94
260	200		6.19	219	nd	nd	nd	nd	1.51
260	210		6.09	249	nd	nd	nd	nd	1.68
260	220		5.49	226	nd	nd	nd	nd	1.36
260	230		5.71	244	218	10.7	2220	11.0	1.35
260	240		6.00	226	nd	nd	nd	nd	1.47
260	250		6.56	221	nd	nd	nd	nd	1.77
260	260		6.09	201	179	11.0	2250	8.93	1.93
260	270		6.00	205	183	10.8	2310	8.87	1.79
260	280		6.33	169	nd	nd	nd	nd	1.47

nd = not determined