

# **The Great Orme Archaeological Management Plan**

**(G1592)**



**Report No. 399**

**Prepared for Conwy County Borough Council**

**by**

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*But twenty Llandudno's could not spoil the Great Orme, for it is not merely a headland, but a world to itself, where, lifted high up between sea and sky, you may wander for miles over its white ribs of limestone and sweeps of velvet turf.*  
(Bradley 1909, 190)

## 1. INTRODUCTION

### 1.1 General

The Great Orme is a limestone headland located on the coast of north Wales at the mouth of the River Conwy. It rises to a height of 207m by a series of tiered sea cliffs and limestone grasslands and covers an area of 291 hectares (719 acres). It forms the north-west end of the Creuddyn peninsula, and juts out majestically into the Irish sea, forming a dominant landmark for sailors. It is connected to the mainland of Wales by an isthmus of sand on which the Victorian seaside resort of Llandudno was built.

The Great Orme constitutes an outstanding archaeological landscape, containing several hundred archaeological sites of all periods, many of them of national, some of international, importance. The sites range from caves containing the remains of the earliest human occupation in north Wales, through the largest known underground Bronze Age copper mines in Britain, settlements and field systems of the late prehistoric and medieval periods, post-medieval industrial sites to remains from activities associated with the Second World War.

Much of the area lies within the Great Orme Country Park, which was set up in 1980, and which includes a Local Nature Reserve, a Site of Special Scientific Interest (SSSI), and a considerable length of Heritage Coast. The Country Park has the potential to provide a stable context for the management and interpretation of the archaeological resource of the headland, not only on a site basis, but at a wider level, offering protection to entire archaeological landscapes. The presence of the archaeological resource combined with opportunities for management provide the Great Orme with some of the best opportunities in Wales for promoting and interpreting archaeology to a wider public, and for furthering our knowledge of the past.

In order to ensure that resources available for the management of archaeology are put to best use, it is important to have a sound understanding of the nature of the archaeological remains, an assessment of their importance, information concerning current management regimes, and a management strategy. These points were stressed in a recent management study of the Orme, commissioned by Conwy County Borough Council, which aimed to secure long-term strategic improvements to the headland (*Great Orme: Development and Management Study*, W S Atkins, 1998). As a result of these recommendations, Gwynedd Archaeological Trust was commissioned by the County Borough Council to undertake an archaeological assessment and management study of the archaeology of the Great Orme.

This study was jointly funded by grant aid from Cadw: Welsh Historic Monuments, ERDF, and Conwy County Borough Council.

### 1.2 Aims

The aim of this project is to ensure the archaeological resource of the Great Orme is appropriately managed, so that it is protected, preserved and interpreted. This will enhance the complementary long-term strategic improvements being undertaken to improve the overall environmental quality of the Orme. The following objectives were established at the outset of the project:

- Identify the heritage resource
- Identify management objectives
- Develop a management strategy
- Develop a research agenda

### **1.3 Report**

The output of the project is presented in two ways: a summary of the results is given in this report, whilst the detailed results are available through the digitally stored data which can be interrogated either through a database management system or as part of a geographical information system.

The data collected for this project was collated using a geographical information system (see 2.6 below), which combined the database of sites and related management information with Ordnance Survey Landline maps. The system was designed as a management tool to aid decision making, although to retain validity it requires updating and reinterpreting at intervals.

The report is divided into three parts. The first contains a description of the methodology, the discussion of the results of the desktop and fieldwork stages of the project, and accounts of the history and archaeology of the Orme. The second part contains management objectives and a management strategy, which are derived from the data gathered during the fieldwork stages of the project. The third part contains a research agenda for archaeology on the Orme.

### **1.4 Acknowledgements**

The Trust would like to thank Mrs Williams and Mr Gareth Davies, both of Pyllau Farm, Mr J Jones of Penmynydd Farm and Ms Sally Pidcock, Warden for the Country Park, for their co-operation and help during the field searches. Thanks are also due to Mr Tom Parry and members of the Great Orme Exploration Society for their assistance. The work has benefited from discussions with Mr Tom Gravett, Principal Countryside Officer, Conwy County Borough Council, and we are grateful for his comments on an earlier draft of this report. We are also grateful to David Longley, Director, and David Thompson, Principal Officer at Gwynedd Archaeological Trust, for their help and comments on earlier drafts. The project work was carried out, and the initial report compiled, by Susan Jones. Andrew Davidson undertook final editing of the report.

## SECTION I: THE ARCHAEOLOGICAL SURVEY

### 2 METHODOLOGY

#### 2.1 Introduction

This section describes the methods used to undertake the desktop study and fieldwork elements of the project, and discusses initial findings. The aim was to identify the archaeological resource of the Great Orme, using a range of techniques, so that when complete an assessment of the importance of what was known would be possible, as well as the identification of both themes and geographic areas of high archaeological potential, for which further work may be required. The data gathered during this stage had to be capable of being stored digitally to be used within a geographic information system, and capable of providing information to aid management decision making.

#### 2.2 Documentary sources

##### 2.2.1 Documentary sources consulted

The documentary evidence consisted of both published and unpublished material. The former included the *Inventory of Ancient Monuments* (RCAHMW 1956), and the works of early travellers such as Pennant's *Tours in Wales* (1781), and Fenton's *Tours in Wales* (1804-13). More local works included *Heart of Northern Wales* (2 vols) by Bezant Lowe (1912 and 1927) and *Historic Landscapes of the Great Orme*, Mary Aris (1996). In addition a wide range of articles in the *Transactions of the Caernarfonshire Historical Society*, *Archaeologia Cambrensis* and other relevant journals were consulted. For a full list of secondary sources see the bibliography at the end of this report.

The Sites and Monuments Record (SMR) at Gwynedd Archaeological Trust contained a list of all known archaeological sites, with additional information on many. Also held by the SMR were reports on relevant projects undertaken by the Trust. These latter included details of excavations undertaken at Gogarth (GAT Report 329), a report on the Historic Landscape Characterisation of Creuddyn and Arllechwedd (GAT Reports 318 and 319), and a report on the excavations at Pentrwyn (GAT Report 321).

Information supplied by Conwy County Borough Council included the *Great Orme Country park and local nature reserve: Management Plan*.

Records of the Mostyn estate and the estates of the Bishop of Bangor were examined at the following archives:

University of Wales Archives, Bangor  
National Library of Wales, Aberystwyth  
Gwynedd Archives, Caernarfon  
Flintshire Archives, Hawarden.

##### 2.2.2 Discussion of documentary sources

The estate papers of the Bishop of Bangor and the Mostyn family contain details of land transactions, rents and wills that reveal the pattern of landholding in medieval and post-medieval times. Many later documents refer to the development of the planned seaside resort of Llandudno, and although the majority of these lie outside the study area, some, including those that show the route for the construction of the Marine Drive around the Orme, were of particular use. A smaller number of documents referred to mining activities on the Orme, but this area of the history of the Orme is poorly represented in the documentary record.

A 1940 map showing the Coastal Gunnery School provided useful evidence for war-time activities on the Great Orme, although there must be considerably more evidence available on this aspect of the Orme's history available from official accounts, which were not consulted as part of this study.

Other unpublished material to prove of particular use included the results of the Ormesday Project, a list of mining relating sites based on fieldwork carried out by volunteers from the Great Orme Exploration Society.

## 2.3 Aerial photography

### 2.3.1 Aerial photographs consulted

Aerial photography can provide evidence in many ways, much of it unobtainable from any other source. The wide selection of aerial photographs available for the Great Orme allowed changes in different areas of the Orme to be examined over time since the 1940s. They were also of great help in identifying low earthworks and cropmarks that were generally not visible during fieldwalking. Aerial photographs were examined at the following locations:

National Monuments Record, Aberystwyth  
Gwynedd Archives Service, Caernarfon  
Gwynedd Sites and Monuments Record, Bangor.  
National Assembly for Wales, Cardiff.

These included photographs taken in 1947 (CPE UK 1939 20 Jan 1947), a large collection of photographs taken by Mary Aris, housed at Gwynedd Archives Service, Caernarfon, and several taken by GAT and held within the Gwynedd SMR.

The evidence from the aerial photographs was digitised by scanning the photographs, and then registering them against the Ordnance Survey map data within the GIS. Where possible, the larger features, such as areas of ridge and furrow, were digitised in their entirety, while the locations of small features were recorded by point data. Additional information was entered into the supporting database.

### 2.3.2 Discussion of evidence from aerial photographs.

The most informative aerial photograph for this project was the black-and-white vertical taken by the RAF in 1947. This was taken on a clear day, with a low light from the south. As the photograph was taken just after the end of the Second World War, the buildings associated with the Coastal Gunnery School and the radar installations located on the western side of the Orme are still clearly visible, although all are now demolished. It was also taken prior to the construction of further housing, especially along the southern strip of the Orme where part of the medieval township of Gogarth was located, and thus some of the relict medieval field boundaries around the manor are recorded which have subsequently been destroyed. Also visible are medieval strip fields in Parc Farm, which are now completely ploughed out, and in the same area are the greens, tees and bunkers of the Great Orme Golf Course (see figure 1). A number of denuded field banks are visible at Mynydd Isaf, where three long banks cut across the ridge, one of which may have the remains of a rectangular building built onto it. This area is now covered in gorse making it impossible to confirm the presence of the rectangular structure, but very denuded banks are visible in places on the ground.

On the north-western end of the Orme, an area today of shallow soils over limestone pavement, a number of low stone walls/banks were identified on the aerial photographs. Field visits have confirmed their presence and identified further short stretches of walling there. It is possible these represent the remains of prehistoric fields.

Large areas of mining activity are visible at Pyllau, and evidence for stone extraction is clearly depicted at Bishop's Quarry and Rofft Quarry. Smaller mining trials and stone quarries are also discernible over most areas of the Orme. At Bryniau Poethion the pattern of bell pits can be clearly mapped, as can the line brammock rod pits running between the mines at Pyllau and the site of the *Tom and Jerry* pumping engine at Ffynnon Gogarth (see figure 1).

## 2.4 Cartographic sources

### 2.4.1 Sources consulted

Copies of all relevant editions of the Ordnance Survey maps were examined. These included all editions of the 25" County Series, the original manuscript 2" series, which pre-dated the first edition, and the first edition 1" to the mile. The county Tithe Map was examined at Gwynedd Archives, Caernarfon. Estate maps, mainly of the Mostyn Estate, were examined at the Flintshire Archives, Hawarden and the University of Wales Archives, Bangor (see the bibliography for a full list of maps consulted).

### 2.4.2 Discussion of cartographic evidence

One of the most useful maps consulted was the Tithe Map of 1840, which revealed elements of the medieval strip field system in a number of areas. For example small, narrow strips (unenclosed) of mixed ownership are recorded around St George's Church, and at Penymynydd Farm, while a particularly well-preserved group is depicted around Gogarth farm. Other areas, however, particularly Pyllau, and the area around Wyddfydd and Y Fach (later Happy Valley), consisted of enclosed farmed land, mostly pasture but with small areas of arable land.

Most of the top plateau of the Orme, apart from Pyllau, Penymynydd and the Old Rectory by St Tudno's Church, is recorded as unenclosed common. However, there are two large areas located on what is now Parc Farm land which are recorded as enclosed. The northern area is named as *Ffridd Wiga* and the southern area is named as *Ffridd Mardir(?)*. On the map that accompanied the Enclosure Act for Llandudno Parish in 1843 these two areas are described as *ancient enclosures* which suggests that they had been enclosed for some time prior to the Enclosure Act.

The Tithe Map Schedule also records field names, which give an indication of contemporary and previous land use. For example the name *erw* is used quite a number of times. This describes a basic unit of land defined by the native Welsh Laws Codes which was the core unit of the open fields of the medieval period. Other terms associated with medieval open fields recorded in the schedule include *talar*, *quillet* and *cae*. Della Hooke, in her study of field names in Llanaber, suggests that *cae* refers to an enclosure created after the demise of shared lands, which took place in the later medieval period (Hooke 1975). Some fields on the Orme are called *Cae Hir* (long field) which may recall the enclosure of narrow medieval strips.

Mining features are also recorded on nineteenth century maps. The locations of shafts are recorded on the 1840 Tithe Map, and also the line of pits that held the brammock rods running from the Pyllau Valley mines to Ffynnon Gogarth. An undated map, but probably pre-1831, from the UWB Archives showing the lands of Sir Thomas Mostyn (Mostyn MSS 8508) depicts a number of shafts in the Pyllau Valley area. In addition it shows an area of open-cast mine works at the location of the prehistoric open-cast mine workings. This would suggest that at this early date in the nineteenth century the prehistoric open-cast workings were visible as a surface feature.

## 2.5 Consultation

A number of individuals and organisations were consulted during this study. This included local historical and archaeological societies, students carrying out research, the Llandudno Museum, and staff employed by Conwy County Borough Council. In addition to information concerning the whereabouts of archaeological remains, their opinions were sought on a number of management issues including access to archive material, undertaking archaeological research, and presentation of the archaeology. The results of the consultations are incorporated into the management section of this report.

## 2.6 Geographical Information System

One of the principal aims of the project was to ensure the archaeological information collated would be available for use as a management tool. It was felt that the most useful way to do this would be to collate all the information using a Geographical Information System (GIS). This would allow for the



integrated visual presentation of database, mapped data and aerial photographic evidence on the OS background data.

MapInfo was the GIS program chosen: it was suitable for all the tasks required, and was already used by both Gwynedd Archaeological Trust and Conwy County Borough Council.

## **2.7 Field search**

The survey area was defined as the whole of the Great Orme Country Park, the farms of Maes y Facrell and Pyllau, and Happy Valley and Haulfre which lie just outside the park. Fieldwork was carried out during January to April 2000.

All the information obtained from the desktop phase was marked onto maps scaled at 1:5,000. Each of these sites was visited to ascertain their condition and to check existing site descriptions. Field searches were then carried out throughout the area to identify previously unrecorded sites. The location of all archaeological sites or features that were encountered were recorded on the field maps, and supplementary information was recorded on forms designed and used by GAT for field survey. The information included site type, period of use, structural form and size, condition, threats and management details. A photographic record was taken (using 35mm colour prints) for identification purposes and for future monitoring. More general views were also taken to show sites in a wider landscape setting.

### 3. PHYSICAL BACKGROUND

#### 3.1 Geology & Geomorphology

The Great Orme is part of a Carboniferous limestone range that runs across north Wales from Clwyd in the east to Anglesey in the west. Erosion and folding of the range has resulted in the present isolated promontory. The limestone dates from the Lower Carboniferous period, some 350 million years ago, and consists of a series of hard crystalline limestone and interbedded sandstone and mudstone. A distinctive feature of much of the limestone, and an important consideration for early mining activities, is its dolomitized nature. It is believed that the oxidation of the primary sulphide ores to secondary carbonate ores has resulted in acidification of ground and pore water in the immediate dolomite, causing it to rot to a soft consistency (Lewis 1998, 47). This softening of the host rock would allow for relatively easy extraction of the ore with bone or wooden tools.

The mineralisation is usually associated with a number of vertical fractures that generally occur along a north-south axis, running parallel to one another through the promontory. East-west fracturing also occurs to a smaller extent. Chalcopyrite is the principal primary sulphide ore mineral, with malachite, azurite and goethite forming the secondary carbonate ores (Dutton *et al*, 255). Chalcopyrite generally increases with depth, while the vivid green and blue carbonate ore decreases with depth, being more prevalent near the surface.

The headland is covered by a thin deposit of glacial till, most of which has been removed by marine action from around the base (a process still on-going on the south-western side of the Orme around Gogarth). The isthmus that connects the Orme with the mainland is formed of alluvium, overlain near the two shores by sand, which, until the middle of the nineteenth century when it was drained, was a mixture of marsh and sand dunes.

The Great Orme exhibits many of the classic geomorphological features that are traditionally associated with limestone landscapes, the most obvious and striking of which are the impressive crags and sea cliffs which reach a maximum height of *circa* 120m. At the base of many of the inland cliffs and larger limestone scars are areas of scree, the result of weathering of the relatively soft limestone bedrock. Weathering along geological faults has produced numerous deep gullies, frequently leading to the formation of caves.

#### 3.2 Soils

Two types of soil are found on the Great Orme: brown earth of the Pentraeth Series and calcareous soils of the Gower Series. The thin calcareous soils dominate the headland, while the deeper, brown earth soils of the Pentraeth Series occur in small patches, notably around the farms of Penmynydd and Parc. Although these soils overlie Carboniferous limestone, this is not the sole parent material since the rate of solution of the pure limestone is slow. Much of the soil material also includes elements from the Carboniferous sandstones and marls which were formerly more extensive on the Creuddyn Peninsula, but were worn down by glacial action.

Soils of the Pentraeth Series on the Great Orme are valuable both for arable crops and for good pasture, while the grasslands of the calcareous soils have a high nutritional value for rough grazing. However, the excessive drainage of the soils produces heavy checks on grass growth in dry periods. Where soils are leached, gorse and heath occur extensively. The agricultural quality of the Orme, much of it classed as grade 5 land, is considered relatively low, although the enclosed farmland is grade 4 (Conwy County Borough Council, *Great Orme Management Plan*).

#### 3.3 Sea level changes

During earlier interglacials the sea level was often higher than at present, as evidenced by a number of raised beaches around the Orme, although during periods of glaciation it was often significantly lower. Following the last Ice Age, sea levels rose as the improving climate released water locked in the glaciers, although this was offset to a degree by gradual land uplift or isostatic rebound as land which had been covered by ice sheets was released from the massive downward pressure. Submerged peat

beds exist off both the North Shore and West Shore of the Orme. These contain fossilised tree remains that have been dated to *circa* 5000 bc, and finds of Bronze Age date have been recovered from the surface, showing that the sea levels were lower than present until later prehistoric times. Similar evidence has come from a borehole at the Oval, Llandudno, where two layers of peat were recorded, the lower of which dated to 7635±52 BP (Warren).

### 3.4 Climate

The Great Orme has a maritime climate, being surrounded on three sides by the Irish Sea. This, with the influence of the Gulf Stream, gives the headland mild winters and an early start to the growing season (Johnson, 385). Its exposed position does leave it vulnerable to winds, especially to the prevailing wind from the south-west. The annual rainfall is notably less than the rest of mainland north-west Wales and the average temperature is higher.



## 4. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

*The following sections summarise the main archaeological periods and describe the principal sites representing each. At the outset of this project 143 known archaeological sites had been recorded on the Great Orme. The aerial mapping, field search, documentary search and cartographic search increased this to 434, all recorded on a database linked to the GIS layer established for these sites. Wherever possible these sites have been integrated into the discussion below.*

### 4.1 Palaeolithic

The Great Orme is the location of some of the most important early cave deposits in Wales. This is, in part, due to the nature of the limestone rock which produces caves suitable for use as shelters, but also in part to the more open nature of the vegetation supported by the limestone headlands. Human settlement in Palaeolithic Britain took place in intermittent episodes, occurring during periods of climatic amelioration in between fully glacial conditions. There is no known evidence for the occupation of caves on the Orme from before the Late Upper Palaeolithic period, which dates from the end of the last glaciation (c. 12,000 BP). Further east, however, archaeological remains from the Lower Palaeolithic (c. 225,000 BP) survive at Pontnewydd Cave in Denbighshire, which is located on the same limestone ridge of which the Great Orme is part. It is possible future research will locate remains of comparable date within the caves of the Orme.

Kendrick's Cave provides the earliest surviving evidence for humans on the Great Orme. The cave, which has two levels, is located on the southern slopes of the headland, overlooking the modern town of Llandudno. It was used in the nineteenth century as a workshop by a local lapidary called Thomas Kendrick. While altering the lower cave he uncovered evidence for human occupation and burial from the Upper Palaeolithic, possibly relating to two main periods of use (c. 12,000 BP and 10,000 BP). The remains of four human skeletons date from the former, and a flint blade, the mandible of a horse with incised zig-zag decoration, and a number of decorated and perforated teeth of cattle and deer date from the latter (Green and Walker 1991). Finds of this period have also been found to the south-east of the Great Orme at Ogof Tan y Bryn, where there remain considerable deposits of Palaeolithic date.

### 4.2 Mesolithic

During the Palaeolithic and Mesolithic periods the human population lived a mobile lifestyle, existing by hunting and gathering. Permanent structures are therefore rare, and occupation in caves and rock shelters remains common throughout the latter period. The majority of Mesolithic sites in north-west Wales are represented by little more than scatters of stone tools and flakes, usually found close to the present coast. There is evidence for occupation on the Orme at both Kendricks Cave and Lloches yr Afr, now a rock shelter, but thought to originally have been a cave (Davies 1974).

Prehistoric human remains have been found at Skeleton Cave and Corkscrew Cave on the south facing cliffs of the Orme, and although these are undated, a Mesolithic date for them has been suggested (Roberts 1912 & David 1979).

### 4.3 Neolithic

#### 4.3.1 Settlement

The Neolithic period sees the gradual change from a primarily hunting and gathering society into a farming society. This was accompanied by the introduction of pottery, and changes in the production of stone tools, in particular the production of the polished stone axe. One source of stone for axes were the nearby volcanic lavas at Graig Lwyd, Penmaenmawr. However, despite these changes, which were to prove of momentous importance for humans, few settlement sites have been located in north Wales, and on the Orme the only evidence is the continuation of cave use. At Kendrick's cave, Lloches y Afr and Ogof Tudno (or Badgers Cave) finds have been made of artefacts from the Neolithic period. There are many other natural caves and rock shelters on the Great Orme which have not been investigated, but have high archaeological potential. These have not been included on the archaeological database for this project, but many have been recorded on other surveys of the Orme (e.g. Ormesday 1997).

#### 4.3.2 Burial and ritual

The Neolithic period, perhaps because of the economic and social changes involved with the adoption of a more settled farming lifestyle, witnessed the introduction of more permanent monuments for burial and ritual. The only surviving example on the Great Orme is the burial chamber or *cromlech* known as Llety'r Filiast near the copper mines in the Pyllau Valley. This megalithic burial chamber is related to the Portal Dolmen group of chambers, the dominant tomb type of north-west Wales, which typically consists of a rectangular, usually closed, chamber covered by a cairn. The cairn behind the Llety'r Filiast chamber is, at least in part, a natural rock outcrop.

Another possible burial chamber was recorded by Bezant Lowe close to Wyddfyd: '*They*[i.e. the stones] *are situated on the left of the road and at the base of a steep slope. They seem to have escaped notice, as they are, to a great extent, concealed by a rather thick growth of thorn bushes. At present, there are two upright stones, forming two sides of a chamber, and at the back of one of these is another stone which may possibly have been part of another upright. Lying flat on the ground, at the back of these, is a fourth stone, which may have been the capstone*' (Lowe 1912, 17). No site is visible in the area today. Another burial chamber, or barrow, is said to have been removed during the construction of the Marine Drive in 1872-73, near the site of the lighthouse. The probable location for this site is near a group of possible hut circles with an associated kerb cairn.

### 4.3 Bronze Age

#### 4.3.1 Settlement and agriculture

The Early Bronze Age (c. 2000 BC to 1500 BC) was characterised by an expanding population and a corresponding increase in the amount of land under cultivation, much of it onto areas of land now considered marginal. This was possible because of the more temperate climate then prevailing, which made it feasible to exploit higher land. After 1200 BC a deterioration in the climate meant that much of the more marginal land that had been cultivated now had to be abandoned, and a period of major political and social unrest followed, leading to the construction of defended settlements and hillforts.

This period saw a major increase in the impact of humans upon the natural environment. Trees and scrub were cut down for fuel, for building material, and to clear areas for cultivation. An excavation of the remains of a Bronze Age settlement at Pentrwyn on the Orme has produced evidence of the diet of the inhabitants. They exploited the marine environment, making use of shellfish and fish, but also present were bones from sheep and cattle. Plant remains from the same site included charred cereals, notably *Triticum dicoccum* (emmer wheat) and *Hordeum sativum* (barley), implying the cultivation of crops nearby (GAT Report No.321).

Denuded field banks were one of the most commonly identified archaeological sites during the field search. Without excavation it is difficult to date them, but some are likely to be of prehistoric date, in particular those located above the lighthouse where there is an area of marginal ground with very shallow soils over limestone pavement.

#### 4.3.2 Copper mining

Indications of early mining activity on the Great Orme first emerged in 1831 when miners in the 'Old Mine' broke into underground workings, the type and character of which were unfamiliar to them. These workings contained a 'broken stag horn' and 'two bronze items' (Smith 1988, 10). Again in 1849, a large chamber was discovered, with its roof and sides covered in stalactites and containing stone hammerstones and bone tools (Stanley 1850, 68). These 'Old Men's Workings' as they became known, were attributed to the Romans. Oliver Davies, a Roman mining expert working in the 1930s, was also convinced the remains were Roman. He examined the spoil tips around the mines in the Pyllau valley identifying stone hammers, pestles and 'sawn' bone in the tips (Dutton *et al*, 250), but felt that such artefacts could be from Post-Roman as well as Roman periods.

The Roman date for the 'Old Men's Workings' remained unquestioned until the 1970s, when underground explorations of the 'older' workings beneath Bryniau Poethion by Duncan James provided the first date in Britain for Bronze Age mining (2940±80 BP, which calibrates to 1410-920 BC (HAR-4845; Lewis 1998, 45)). Since then further investigations in the Pyllau valley area to the south of Bryniau Poethion by Great Orme Mines Ltd, Gwynedd Archaeological Trust and the Great Orme

Exploration Society have identified considerable evidence of prehistoric mining. This includes an extensive area, *circa* 5,000 sq. m, of bedrock and surface workings (Dutton *et al*, 252), and over 6km of prehistoric underground passages, covering an area almost 24,000 sq. m and occurring to a depth of 65m below surface (Lewis 1998, 51).

A total of thirteen radiocarbon dates have been obtained from both above ground and below ground workings. These span a calibrated range of 1880-600 BC, covering the Early to Late Bronze Age (Lewis 1998, 49), with a notable grouping around 1300-1400 BC (Lewis 1998, 49).

Since the discovery of the Bronze Age workings at Pyllau, evidence for other contemporary workings has been sought. So far the most promising site is at Badgers Cave where there is evidence (hammerstone pounding marks) for early mining which has been superseded by Victorian mining (Ormesday 1997). The field search identified a possible anvil stone at Cwlach, which is very similar to other anvil stones found near to the Bronze Age mining site at Pyllau.

#### *4.3.3 Copper ore processing*

In recent years work has been carried out to identify processing sites on the Great Orme associated with the Bronze Age mining activity (Jones 1994 & Wager 1996). The crushing of the material removed from the mine, and the concentration of the ore to separate the ore from the gangue (host rock), would have been an important stage in the preparation of the ore for smelting. Mortar and pestle stones found at the mine suggest that some crushing was taking place there, but it has been hypothesised that water separation or concentration may have taken place at a number of well sites on the Great Orme. A study of fresh water springs on the Orme identified earthwork remains consistent with spoil tips at a number of these sites, one of which, Ffynon Rufeinig (Roman Well), had long been identified as a 'Roman' washing site (Jones and Wager 1996; Roberts 1909).

Excavation by the Great Orme Exploration Society and Gwynedd Archaeological Trust in 1990 of two small trenches through the spoil tips at Ffynnon Galchog/Porth y Helig confirmed that they consisted of well-sorted and graded deposits of dolomitic silts, sands and gravels similar to the dolomitic waste found at the mines (Lewis 1990, 10). Copper-stained bone artefacts, including three shaped tools and a number of hammerstone fragments, were also recovered. Both the artefacts and the mineralogy resembled those from the prehistoric assemblages at the mining site, and the crushed nature of the material suggests processing taking place (Jones 1994, 69). A single radiocarbon date was obtained from bone collagen within the tip, producing a date of 1200 +/- 60 BP (BM - 2753), which calibrates to 720-740 AD or 680-960 AD (Lewis 1993, 56). This surprising date remains unsatisfactorily explained, but may indicate that early medieval mining activity, using techniques and tools almost identical to prehistoric ones, was taking place, although it is possible the single sample was contaminated.

Until recently there was no evidence for any prehistoric smelting of copper ores on the Great Orme or elsewhere in mainland Britain. Prehistoric mining is usually seen as a large-scale activity, which would have soon depleted the fuel sources on the Orme, resulting in the ore being transported to more accessible fuel resources. However, in 1996 David Chapman identified an eroding site on the Pentrwyn headland which appeared to contain slag fragments, charcoal and burnt stones. This was brought to the attention of Gwynedd Archaeological Trust who carried out a rescue excavation. This produced over one hundred fragments of metal working debris, the highest proportion of which were associated with a small, charcoal rich, feature which has been dated to 3310 +/- 80 BP (Beta-127076), cal BC 1675 - 1500 at 68% probability, contemporary with the earlier periods of activity at the Pyllau valley site. In addition to the fragments of metal working debris and copper ore, a whetstone, a fragment of shale bracelet and a polygonal glass bead were recovered from the excavation. This is the earliest known evidence for smelting in Great Britain. The same site produced evidence for domestic activity in medieval times, when much of the prehistoric evidence was disturbed.

Further prospecting work to identify other possible smelting sites was undertaken in 1997 by the University of Wales, Bangor. A geochemical survey of the Great Orme was undertaken using a portable XRF field analyser (TN Spectrace 9000). Soil samples from a 200m grid were taken, revealing major anomalies of copper (Cu). Some of these anomalies were identified with the known mining areas, while others were located at the suspected secondary processing sites at Ffynnon Galchog and Ffynnon Rufeinig. In addition, an area of possible smelting activity was identified around the summit of the Orme (Jenkins *et al* 1997, 29).



During the field search several mining trials and levels were identified, and although these appear to be recent in date, a site near Ffynnon Gaseg may be earlier. The earthworks at that site had been previously described as hut circles, but some have the appearance of tips rather than circular huts and some dolomitised material, similar to that found in association with prehistoric mining, has been identified eroding out of the earthworks.

#### 4.3.4 Other finds

Isolated finds from the Orme confirm human activity during the prehistoric period. Flint tools, including an arrowhead, have been found, along with stone and bronze axes.

The most notable prehistoric find was discovered in 1898, when two boys uncovered a group of objects consisting of two gold, finely engraved, lock-rings, a damaged bronze palstave and a socketed bronze implement, probably an awl for leatherworking, '*amongst the debris at the back of a large loose rock*' near Pigeon's Cave (Savory 1954, 51). The items form part of a major group of Irish goldwork of the Late Bronze Age found in north Wales. The mixed nature of the artefacts and metals suggest that it might have been a craftsman's hoard of metal objects.

#### 4.3.5 Burial and ritual

Several low, circular, stony features have been identified as cairns on the Great Orme. Such features are typically of Bronze Age date, although their function may be associated either with burial and ritual practices, or with clearance of lands for agricultural use. Spoil from quarrying and mining activities can also appear similar, and perhaps this is the source of the thirteen small cairns at Rofft Quarry (PRN 5433).

At the northern end of the Orme are other sites with a possible prehistoric ritual or ceremonial origin. These include a number of upright stones, some of which may be glacial erratics, but at least one appears to be a standing stone. There is a tradition that *Hwylfa'r Ceirw*, two parallel rows of upright stones, was a pathway by which deer from the plains below (when sea levels were lower) would ascend the Orme. It is located within an area of possible prehistoric fields and may be an access route between them.

### 4.4 Iron Age and Romano-British Period

#### 4.4.1 Settlement and agriculture

Settlement remains are far more common from this period (*circa* 500 BC to 400 AD) than from those preceding it. These consist of circular huts, either on their own or in open or enclosed groups, and often associated with the remains of terraced or walled fields. Round huts are also commonly associated with hillforts, of which there is one, Pen y Dinas, located on the Great Orme.

The fort at Pen y Dinas occupies a limestone spur on the south-east side of the Orme. The south and the east of the site consist of vertical cliffs falling towards the town of Llandudno. The land is more gently sloping on the west and north sides, with the easiest approach being from the north-west. Recent survey work (GAT Report No. 52) has identified over 40 probable hut circles and two defensive ramparts. Two hut circles have been excavated within the hillfort, one in the middle of the nineteenth century which yielded 'any quantity of animal bones, limpet and snail shells and a piece of pottery known as Samian ware' (Penrhos MS 841, UCNW). An excavation in the 1960's also yielded large quantities of sheep and ox bones as well as an antler knife handle, a bone needle, a small bone button, two cow horns, two hammerstones, burnt stones or pot-boilers and fragments of burnt clay. Samian pottery is a red fine ware of Roman date, typically made in France, and its presence here indicates sites of relatively high status, and continuity of occupation from the Iron Age into the Roman period.

Hut circle settlements are distributed in a dispersed pattern across the Orme, although their survival on marginal land suggests we are now looking at those not destroyed during agricultural improvements. Three possible sites have been identified on aerial photographs in improved areas of farmland, but further work would be needed to confirm their identification. Many sites of this period are also known to have been built of timber or clay, and would therefore not have been identified during this study.

There are four groupings of huts. Two of these are located on the north-western tip of the headland. The higher consists of two hut circles, the better preserved hut has an overall diameter of 9.5m with a double row of limestone blocks defining its limits (Bibby 1979). A curving field wall runs from the hut in a southerly direction. Approximately 82m to the south-south-west of this hut is a circle of stone possibly representing a denuded structure 6.7m in diameter. The second group of circular huts is located to the north of the first and consists of six or more badly damaged structures, although some may be tips associated with ore processing (see earlier). They are between 3 and 4m in diameter (Bibby 1979).

A third group of hut circles was excavated in 1939 by Oliver Davies. This excavation identified part of a settlement site on the southern slopes of the Orme near the modern Gogarth Abbey hotel. Davies found a number of shell-covered surfaces mixed with pot-boilers and bones which he interpreted as hut floors. Pottery from the site was Romano-British from the second or third century AD. During the field search stage of the present project a thick layer of shell material was identified eroding out of a path approximately 100m east of the location of the excavation, suggesting the settlement may extend further east than previously thought.

Two of the identified hut circles have associated field boundaries. At Hafnant a low, stone bank runs south from the hut circle towards an area of extensive field systems, most of which appear to be medieval in date, but may overlie earlier fields. The hut circle at Creigiau Cochion has a circular enclosure bank, which is visible on the 1947 aerial photograph and on the ground as a line of stones.

#### 4.4.2 Industry

It is possible that the Romans were involved with the exploitation of copper ores on the Orme, although the archaeological evidence is relatively slight. Miners in the nineteenth century are said to have found Roman coins in the Old Mine, but no contemporary documentary account exists and no examples survive. In 1926 the Board of Celtic Studies (BBCS 1926) reported that:

*Information has recently been received of the finding of a 'third brass' of Carausius at Llandudno in a copper mine with copper hammers etc. the coin was found many years ago.*

Two coin hoards have been found on the Orme: Thomas Kendrick discovered one while engaged on road alterations on Ty Gwyn Road. The seventeen coins covered the period AD 253 to AD 293 (Jones 1888). The second hoard consisted of several small brass coins, including one 'third brass' of Constantine, found south of Gogarth Abbey (Wheeler 1921).

Two much larger hoards have been found near the Little Orme. The first was found in 1873 in a jar of reddish pottery. Over 5000 brass coins, most dating from the reign of Constantine, were found within. The finder reported that the jar had been surrounded by *very old masonry* (Gardner 1909). The second hoard was found nearby in 1908 and consisted of 550 coins, mostly brass, from the reign of Carausius (between AD 287 and AD 293) (Gardner 1908). It has been suggested that these hoards represent the wages intended for copper miners (Gardner 1958, 68-9).

A coin of Aurelian is reported to have been found in the Pen Morfa adit, on the south-western side of the Orme. This adit was dug in the nineteenth century (prior to 1840) to help drain the mines at Pyllau. It is possible that the coin washed out of the mines or that it entered the adit through an air shaft which may have cut through the Romano-British settlement excavated by Davies in 1939.

### 4.5 Early Medieval

#### 4.5.1 General

This was the period (*circa* AD 400 to AD 1100) in which the Welsh kingdoms were established during turmoil and fighting, both amongst Welsh rulers and in defence against invasions from the Irish, the Saxons, the Vikings and ultimately the Normans. It was the period in which Christianity became the dominant religion, and new rites and beliefs were adopted.

The name of the Great Orme is thought to be derived from the Norse word *orma* meaning worm or sea-monster, most probably because of the shape of the headland as visible from the sea. The name was first used, as *Horma-Heva*, in the twelfth century by a Norman French monk describing the bloody

death of Robert of Rhuddlan, and thereafter appears on maps, although legal documents continue to refer to the township names of Gogarth, Cyngreadr and Wyddfydd, and the entire headland is occasionally referred to as Gogarth.

Archaeological evidence from this period is restricted to a coin hoard found at Pant yr Eglwys, near St Tudno's Church, in 1981. This hoard of four *Quatrefoils* dates from the reign of Cnut in the tenth to eleventh centuries (Boon 1986, 13). Three of the four coins were melted together, suggesting they were bullion. A similar, but larger, hoard from Cnut's reign was found at Bryn Maelgwyn, near Deganwy, in 1979. It has been suggested that these hoards are associated with the native royal residence at Deganwy which would have acted as a centre for craftsmen, jewellers and silversmiths (Boon 1986, 14), and it is clear that the period between the death of Llywelyn ap Seisyll, King of Gwynedd, in 1023 and the accession of Gruffydd ap Llywelyn in 1039 was a period of political chaos, a time for hoarding.

#### 4.5.2 Burial and ritual

Although the structure of the church of St Tudno dates from the twelfth century the dedication to Tudno suggests the original founding of the church may have been earlier. Early Christian cemeteries are sometimes associated with pre-Christian burial grounds and it is interesting to note a reference by Edmund Hyde Hall at the beginning of the nineteenth century to *graves of a giant and giantess* which lay to the south of the church (Hyde Hall 1952, 55). It has been speculated that these were mounds associated with mining, possibly mining tips (Aris 1996, 74), but they may have been pre-Christian burials. They are no longer visible.

The presence of a cult dedicated to Tudno is suggested by the existence of other remains linked with his name. These include St Tudno's Well located just south of the present church, and it is significant that the presence of a well is usually regarded as evidence for the antiquity of Christian sites (Edwards and Lane 1992, 8). The *Maen Sigl* or Rocking Stone on Pen y Dinas hillfort is also known as *Cryd Tudno* (Tudno's Cradle). An isolated cave on the northern cliffs of the Great Orme, known as Llech Cave is associated with St Tudno, sometimes described as his cell. An ode to the cave, written in the sixteenth or seventeenth century, suggests an ecclesiastical link:

*There is one cave in an abyss,  
Of fine stone, hard by the wave,  
An old building, most notable,  
Founded by God, of good substance.  
It was ever a cell in the cliff's base.*

The cave contains a stone trough and in the past it was reported that three carvings could be seen in the rock face above the cave: an Owl, a Swan and a Man's face (Rev. Owen Jones, *Cymru, yn Hanesyddol, Parthdegol a Bwygraffydol*, 1875). Today only the man's face is visible; it has been variously described as Egyptian, Roman and Celtic. It has also been described as wearing a Bishop's mitre, but this appears to be a misreading of the full face. Stylistically it appears most likely to be Celtic in design.

Traditionally Tudno was said to be the son of Seithennin, and came from an area now in Cardigan Bay said to have been overwhelmed by the sea in the sixth century (Bryce 1990, 268). Tudno and his brothers, having lost their patrimony, all became saints or monks (Miller 1979, 77-8).

## 4.6 Later Medieval

### 4.6.1 Settlement

The twelfth and thirteenth centuries in Wales marked the high point of native Welsh rule. More effective systems of administration were introduced, which involved the creation of administrative areas. The largest unit was the *cantref*, which literally meant 'one hundred settlements', although by the twelfth century this unit was being superseded by *commotes*, subdivisions of *cantrefi*. In each *commote* there were two *trefi* or townships set aside for the king's need. The first, and most, important, was the *maerdref* or lordship centre; and the second was the king's *ffridd* or summer pasture. Tenants paid their dues and fulfilled their obligations at the commotal centre. Townships or *trefi* were similar to later parishes and were the basic unit of assessment at a local level. Typically they consisted of

dispersed and loosely nucleated settlements, with arable sharelands of unenclosed, strip fields and rights of access to common pasture. Tenants in these townships held the land under a variety of tenures. Some townships were regarded as free, that is that they owed few dues to the lord and they had rights of inheritance. Bond townships were held by far more restrictive tenures, the most restrictive being *tir cyfrif*. Under this the total burden of dues and services was distributed equally among the total population of adult male tenants and the land could not pass from one generation to the next.

One of the most useful documents from this period is the Extent of the Bishop of Bangor's lands compiled in 1306. This records the bishop's land, the tenure by which it was held and who held it. The Great Orme was part of the *commote* called Creuddyn. There were three recorded townships on the Orme (and extending onto the Morfa below): Gogarth, Yr Wyddfydd and Cyngreawdr. Gogarth was, by the fourteenth century, the most important of the three. It was a mixed township, that is, there were free and bond tenants working the land. The area belonged to the Bishop of Bangor, and it has been suggested that it had been bestowed on Bishop Anian I by Edward I in 1279, but Gogarth is not clearly mentioned in the grant, although other properties, including Garthgogo in Denbighshire, which in later documents are associated with Gogarth, are mentioned. However, Gogarth is included amongst the Bishop's lands in the taxation of 1291, when it was worth £4 1s 8d per annum. A manor house or grange was built there, of which part, known as the Bishop's Palace, still remains. The site has been partially excavated on two occasions. In 1955/6 Douglas Hague excavated in both the remaining structures and concluded that one was a small hall of unorthodox design, built about 1280 and burnt by Glyndwr in circa 1402. The other structure, a large hall, was built in the early fourteenth century. Both structures fell out of use in the fifteenth century. A small excavation carried out in 1997 was designed to examine an area adjacent to the thirteenth-century hall where coastal erosion was taking place. This revealed details of a small building lying alongside, though later than, the hall.

The township of Cyngreawdr was a free township, and therefore the tenants owed nothing to the lord apart from suit of court. This township is thought to have been located around St Tudno's Church. St Tudno was sometimes referred to as Tudno of Cyngreawdr. This township shows many of the characteristics of a type of township which were held by a very free tenure and are thought to have been set up by the last princes of Wales as 'a protective screen of freemen' in strategically important locations. This is especially true on the Creuddyn Peninsula, which has been described "as a bridgehead covering the lower Conwy crossings, and at its *maerdref*, Degannwy, there was a castle which changed hands frequently before 1282 and possession of which reflected the relative strengths of the prince of Gwynedd and the English crown at any particular time" (Carr 1977, 10).

The final township was Yr Wyddfydd; the place name of which survives on the north-east side of the Orme. This township appears to have been a mixed township of both free and bond tenants, who owed suit of court and milling to the lord.

#### 4.6.2 Agriculture

The agricultural economy was a mixed one, involving both pastoral and arable. There is evidence of seasonal migration into the uplands for summer grazing. Summer houses or *hafodau* located in summer pastures were occupied at this time and the main farm or *hendre* on the lower slopes the rest of the year. On the Great Orme the opposite may have occurred. In the winter the well-drained soils on the headland would have provided good pasture, while the poorly-drained ground around the base may have become too marshy. However, in the summer the well-drained pasture on the headland may have become easily parched, while the marshy ground could have provided good meadowland (Aris 1996).

The clearest preserved remains of medieval activity on the Great Orme are the large areas of medieval ridge and furrow, the best preserved area being those located south of St Tudno's Church, on the slope to the Summit. Not only are the ridges still clearly visible on the ground, but there are also the remains of a deserted medieval settlement cut into the slope.

On land belonging to Parc Farm extensive areas of well-defined ridge and furrow can be seen on the 1947 aerial photograph, and, although subsequent land use has severely reduced the earthwork remains, the evidence shows that much of the area was intensively cultivated in the medieval period. The earthwork remains of field boundaries, cultivation ridges and enclosures at Llety'r Fadog would also appear to be part of this area, which probably represents the medieval township of Cyngreawdr.



On the Tithe Map of *circa* 1840, there is clearly marked an area of open strip fields, which were then in the process of being slowly enclosed to form larger fields. This area formed the Coastal Gunnery School in the Second World War, when many of the field boundaries were destroyed, although some lynchets and earth banks have been identified in a field recorded as pasture on the Tithe Map Schedule and this appears to be confirmed by its name, *Porfa* (grazing).

By the eighteenth century cultivation in this area had been abandoned, and settlement had shifted to the south. The medieval settlements below the summit, on the far north-west tip of the headland and on Mynydd Isaf, and their associated fields, had all been abandoned. Several factors account for this, one being the Black Death in the fourteenth century, which is known to have badly affected the Creuddyn area at the same time as the climate was deteriorating. From the sixteenth century sheep and cattle were becoming increasingly important to the Welsh economy. The Great Orme would have been well suited for grazing as the well-drained grasslands have a relatively high nutritional value, and it would appear that grazing increased on the headland to such a degree that in the sixteenth century overgrazing led to strict limitations being imposed on the number of grazing animals allowed for each tenant (Aris 1996).

The later medieval period also witnessed the breakdown of traditional Welsh laws of inheritance, and a move from partible inheritance to primogeniture. This allowed the development of consolidated farms, which in turn encouraged the development of large enclosed fields.

#### 4.6.2 Church

The present structure dates from the twelfth century, although only the west half of the north wall of the nave, dated by a small round-headed window, is of this period. However, the twelfth-century font, decorated with incised cinquefoils, and two thirteenth-century grave slabs now built into the south wall of the nave, confirm the importance of the church in this period. The church was re-roofed in the fifteenth century, when the south and west walls were rebuilt, and possibly the church extended to its present length. The church was badly damaged in a storm in 1839 and was in a ruinous state until it was restored in 1855. At this time evidence emerged of the medieval interior, including frescoes (predominantly red in colour) and a painted *piscina*, both of which were destroyed during the restoration (Hughes and North 1984, 30).

### 4.7 Post-Medieval

#### 4.7.1 Settlement

At the beginning of the post-medieval period Llandudno was an isolated, Welsh-speaking community, little mentioned by passing visitors. The village was located on the south-facing slopes of the Orme and in the sheltered valley running up to the Summit. The headland was separated from the rest of the Creuddyn Peninsula by the isthmus called Morfa Rhianedd. This area was known for its excellent wheat, but was also poorly drained and marshy in places. Indeed, many of the field names on the south-eastern side of the Morfa indicate its use as meadow. Settlement, in small pockets, continued higher up the Orme in sheltered valleys at Pyllau, Penmynydd and Cwlach, in the form of cottages and farms. But on the top of the Orme only the Semaphore Station on the Summit and later the Lighthouse on the north-eastern tip were inhabited.

As noted earlier, cultivated areas of the Great Orme were abandoned between the medieval period and the nineteenth century. Settlement on the higher parts became concentrated at a number of farms, mainly on the southern and south-western slopes. This change is clearly shown with the construction of a new church, St George's Church, on the Morfa. The old parish church of St Tudno's had become increasingly isolated from the main settlement and had begun to fall into disuse, a situation made worse by an infamous storm in 1839 which had stripped the roof from the church. It was therefore decided to construct a new church in a more convenient location for the population.

#### 4.7.2 Modern troglodytes

The use of caves as shelters, both permanent and semi-permanent, on the Great Orme did not cease at the end of the prehistoric period. Cave-dwellers are well documented in the nineteenth century, of whom the most famous were the Jones family, whose predilection for cave homes earned them the nickname of *Yr Ogo*, which their descendants retain to this day. The cave in which they lived was partly



destroyed by the construction of the Marine Drive, but part is reported to survive behind a modern garage. Similarly, Ogof Arth or Bear's Cave was inhabited by a Liverpoolian farm labourer in the early 1900s. Lady Augusta Mostyn was said to have donated a bed to make his home more comfortable (Ormesday no. 12). Thomas Kendrick used his cave as a workshop, whilst a disused quarry on the eastern cliffs of the Orme was used to house a photographic studio, hence its present name Rock Studio Quarry. To this day, homeless people shelter in many of the caves, especially on the southern slopes.

#### 4.7.3 Agriculture

The local economy was a mixture of mining, farming and fishing. Thomas Pennant, writing in the eighteenth century, described the summit of the Orme as a 'beautiful sheepwalk', and around 1809-1811, Edmund Hyde Hall described the soil of the headland as 'a fine deep loam, and upon this many spots are now enclosed and cultivated'. The enclosed and cultivated areas were probably Penymynydd, Pyllau and Dol Fechan near St Tudno's Church, and Wyddfyd. The 1840 tithe map shows that these farms were practising a mixed regime, mostly pasture with some arable land. Most of the top of the Great Orme is open pasture. Tenants would have certain grazing rights on this area. An unusual aspect of farming on the Great Orme is the tradition of herding the flocks uphill when gathering and not downhill. A number of denuded banks were identified during the survey, possibly related to herding activities. These short, low banks are found across small valleys and may have been an attempt to block these escape points for sheep during herding. One of the most important days in the village year was September 22, when the annual sheep fair on the Orme took place. The main activity of this 'gay festival' (Roberts 1917) was located around the sheep pens at Pen y Dinas. Farmers and sheepowners would gather there at the beginning of the day and set out onto the mountain to gather all the sheep. They would then be brought to a spot by the copper mines and driven as one herd to the pens at Pen y Dinas, where buying and selling would commence. The festival atmosphere was enhanced by a tent erected for selling beer and the appearance of Mary Thomas and her plum pudding, and *Pop y lolly* an old gentlemen with a nut and gun stall (Roberts 1917).

Two enclosures are recorded on the open pasture near the Summit, areas of deep loamy soil. Both are detached portions of farms located on the south-eastern slopes of the Orme. One is recorded as enclosing arable land, but both may represent surviving pockets of medieval cultivated land, enclosed to protect the crops from grazing animals.

#### 4.7.4 Enclosure

This landscape of open pasture came to an end in 1843 with the passing of the Inclosure Act for Llandudno Parish. The process of enclosure, whereby land became concentrated in fewer hands, had been under way in England since the medieval period, but in Wales it began in earnest in the nineteenth century. It was believed that by replacing the earlier strip fields with consolidated holdings it would be possible to respond to developing farming innovations more quickly and offer a more efficient style of farming. This process clearly benefited the major landowners of an area, whilst often resulting in the evictions of cottagers and loss of common rights. The Act is dated July 1843 and was initiated by Sir Edward Pryce Lloyd Mostyn (later the first Lord Mostyn), the major landowner in the area. It is clear from the Tithe Map that the process of consolidation was already well under way before the act, but the enclosure of the Morfa and the pasture on the Great Orme would have had an impact on the villagers who grazed their sheep and caught rabbits there.

Sir Edward Mostyn was allotted the greater part of the land on the Great Orme as well as elsewhere in the parish (832 acres out of the 955 acres - Williams 1996, 28), but the idea of a planned resort on the Morfa may already have been developing as Mostyn exchanged 'Ancient Enclosed Land' (one of the two enclosures near the Summit) on the Great Orme for land on the north shore.

#### 4.7.5 Industry

The first recorded exploitation of the copper ores from the Great Orme appears in 1692, when a 21-year lease was granted to Sir Thomas Mostyn (Williams 1979, 7). Little is then recorded until 1748, when Lewis Morris, the cartographer, describes the mines as 'quite sizeable and drowned out'. However, by the end of the eighteenth century two mines in the Pyllau valley area were being exploited, known as the 'Old' and 'New' mines, to be replaced in the next century by the Ty Gwyn Mine in Happy Valley. At the height of production, between 1830 and 50, the mine employed up to three hundred men (Smith 1988, 11), producing over a quarter of a million pounds worth of ore. The abolition of import duties on copper combined with the large copper deposits discovered in Australia, and increasing problems of flooding as the mines extended below sea level, ushered in the end of copper mining on the Great Orme. The New Mine closed in 1864, the Old Mine and Ty Gwyn Mine in 1881 (Dutton 1994, 248).

Archaeologically, much survives of the mining activities on the Orme. At Bryniau Poethion, the 'Welsh California' (so called when copper ore was found within 1½ yards of the surface in 1849), there survives an impressive mining landscape, made up of the upcasts of shallow pits and a smaller number of open trenches.

A series of depressions also runs in a line across the landscape from Pyllau Valley to the spring at Ffynnon Gogarth. These located the hinged pivots of a flat-rod system, which connected a pump mechanism in Vivian's shaft and a primitive but ingenious water-bucket engine known as the *Tom and Jerry* after man-about-town characters in a contemporary novel. No detailed descriptions of this engine survive, but it is thought to have consisted of a triangular frame, one angle of which was pivoted at ground level. Attached to another angle was a large tank which was filled with water from the spring. A third angle was attached to the flat-rods. When the full tank reached the ground it emptied automatically, and the weight of the returning rods worked the pumps (Williams, 9).

However, the main area of mining activity on the Orme was just to the south at Pyllau, the site of the prehistoric opencast. Thousands of tons of mining spoil have now been removed from this area to expose the prehistoric workings. This also exposed the remains of the nineteenth-century engine house and the remains of other structures. The capped heads of a number of shafts are visible on the northern side of the valley and the classic 'doughnut' shaped earthworks of shafts are visible on the southern side of the valley at Pyllau. The survey has also recorded the remains of a number of structures to the south-east, along Pyllau Road, which are probably associated with the mines. Also at this location there are two possible leats; this is approximately where the washing floors or slime-pits associated with the post-medieval mines are thought to have been located (Rowlands).

The miners of the nineteenth century sought to increase their income by prospecting for other sources of copper. Over one hundred of these small trials and shafts have been identified across the whole of the Great Orme.

Evidence for nineteenth-century quarrying is also visible on the south-eastern side of the Great Orme. Here massive chambered underground quarries have been excavated into the headland, producing stone for the construction of the hotels of the nearby resort and also for export. At Pigeon's Cave, stone was quarried for the construction of the Conwy Cob and Telford's Suspension Bridge (1826) and Stevenson's Tubular Bridge (1848) (Ormesday Project, GOES). The Bishop's Quarry near the summit and the quarry at the foot of Pen y Dinas still retain some associated features, notably trackways. Numerous small quarries were located around the Orme and were used for a number of purposes, notably field walls and nearby structures. A small quarried area near Penymynydd Isa was also identified on an early estate map as the site of a lime-kiln.

#### 4.8 Modern Period

##### 4.8.1 Settlement

Since the decline of the mining industry and the rapid development of the seaside resort of Llandudno, housing development has gradually increased on the Orme. Initially some houses, such as those on Cromlech Road, were built to re-house those villagers who were moved from the Morfa to allow for the construction of the planned resort, but as the general population has increased so has the pressure to develop areas on the Great Orme. In the twentieth century an estate was constructed at Cwllach, and the

area around Gogarth which included relict medieval field systems has also undergone, and is still undergoing, development. The farms at Wyddfydd and Penymynydd Uchaf are no longer worked as farms and have become residential properties. Ruined miners' cottages from the nineteenth century at Pen y Ffridd have been refurbished and re-occupied, and a number of chapels on the Orme have been converted into domestic properties, for example St Beuno's Chapel.

#### *4.8.2 Recreation*

During the twentieth century, recreational activities increasingly became the main influence on the landscape of the Great Orme. A golf course was laid out at Parc Farm on the Summit plateau, with a golf house and hotel on the site of the old semaphore station. Greens, tees and bunkers were constructed and are clearly visible on the RAF aerial photograph taken in 1947, seven years after the area had reverted to farmland. Two miniature golf courses and one 'pitch and putt' green were also laid out at Wyddfyd, Cwlach and Happy Valley respectively. Unlike at Parc, where subsequent re-seeding of the land has removed much of the surviving evidence for the golf course, greens and tees are still visible at Cwlach (still used as a miniature course) and in places at Wyddfyd. However, most of the surface evidence at Wyddfyd was obliterated by the construction of the dry ski slope there in the 1980s.

A curious site was found at the base of Pen y Dinas in the site of an old quarry. All that remains today is a stone platform and a blocked gateway, but photographs from the end of the nineteenth century show the platform to have been a stage with benches laid out on the opposite slope, and a troupe of minstrels called the Scarlet Merions holding daily performances.

#### *4.8.3 Parks and gardens*

Two public gardens were created on the Orme. The first, at Happy Valley (previously known as Y Fach), was given to the town soon after the quarry there was closed in 1887. Some planting appears to have taken place here at that time but the lower part of the valley remained open, making it possible to set out areas for archery and skittle alleys. Remains associated with the earlier phases of quarrying are visible along the southern side of the valley, as are indications of mining prospecting in the form of capped mining shafts. More evidence undoubtedly lies hidden below the sedate gardens. Entertainment was provided by what were then called 'Nigger minstrels'. A Gorsedd circle was constructed in 1896, and another in 1962 when the Eisteddfod returned. A colonnaded walk leading to the gardens was constructed in 1932 (Cadw 1998, 117-8).

The second public garden at Haulfre started as the home (then called Sunny Hill) of Henry Pochin, creator of the garden at Bodnant. The gardens were acquired for the town and opened by Lloyd George in 1926. Built on a steep hillside, paths were terraced into the slope, along with glasshouses and an aviary. Evidence survives which indicates that the gardens at one time extended beyond the present maintained areas, and the later gardens hide earlier industrial activity. Abandoned terraced gardens were found behind the houses fronting Cwlach Road during the field search.

#### *4.8.4 Defence*

The greatest number of modern archaeological remains identified during the project relates to the activities taking place on the Orme during the Second World War. Features from this period can be found over most of the headland, but often go unnoticed and unremarked upon by the visitors. The population of Llandudno was boosted at this time by the relocation of the Inland Revenue to the area. The closure of the south coast resorts also led to a boom in the tourist sector, as did the stationing of American troops later in the war. But the major influence was the relocation of the Coastal Gunnery School to Trwyn y Gogarth on the north-west of the Great Orme. The remains of gun emplacements, ammunition stores and buildings can still be seen here in spite of their partial destruction in the 1960s by the town council, due to their reoccupation by homeless families after the end of the war. The remains of a number of other purpose-built army buildings are present on the Orme, many of which are related to the development and use of radar. The Summit Hotel was taken over at this time and the old Semaphore Station overlooking the lighthouse also shows evidence for re-use at this time. At the site of the now demolished coast guard hut on the Pentwyn headland, all that marks its location is a pill box, with its solitary loophole, built to repel invaders. Little is known of these activities; at the time areas of the Orme were fenced off and patrolled. The RAF aerial photograph from 1947 clearly shows a

number of straight lines running to and from the various buildings, which probably indicate buried communication lines.



## 5. ARCHAEOLOGICAL SURVEY: DISCUSSION

The documentary research and fieldwork undertaken as part of this project greatly increased the number of recorded sites on the Great Orme, and has enabled a clearer picture of the changes in land use and settlement to be reconstructed. The largest group of sites to be identified was that which included agricultural features, particularly field banks and boundaries. These related to both arable farming and pastoral farming. Areas of cultivation ridges, enclosed by banks, visible both on the ground and on aerial photographs, show that large areas of the Orme have been cultivated in the past. Pastoral farming is evidenced by denuded banks across valleys with no associated cultivated land, and the remains of sheepfolds associated with the traditional sheep fair at Pen y Dinas.

Dating many of these features is difficult without excavation. However some areas of cultivation ridges have the classic 'S'-shape of medieval ridge and furrow. These are found within the area today known as Parc Farm, south of the church, and around the deserted medieval settlement at Mynydd Isaf. These areas are no longer cultivated, but do correspond to the probable locations of the medieval townships on the Great Orme. Smaller, enclosed areas of cultivation are present at Llety'r Fadoc above the church. These cultivation ridges are straighter and some may be hand-dug, rather than made with a plough and oxen. This may be due to the local topography or possibly re-use of an earlier enclosure. Some areas also produced almost obliterated evidence of cultivation ridges, notably at Pant y Ffridd and lower down below Pen y Ffridd Farm. Evidence for early agriculture within the boundaries of existing farms is scarce, due to their continued use, but a small enclosed area of cultivation ridges do survive on Penymynydd Farm, in an area of marginal land, used now for rough pasture. Evidence for early agriculture survives best on marginal land, although even here comparison of the remains visible on the aerial photograph of 1947 with the ground today shows that much has been lost since then.

Ephemeral traces of earlier field remains have been identified on the north-west tip of the headland, above the lighthouse and car park. Here the remains of prehistoric round huts are visible, one of which has an attached curving wall running to the east, perhaps originally forming an enclosure. Later medieval ridge and furrow partly overlies this, which in turn is overlain by the nineteenth-century enclosing wall of Parc Farm. Above the lighthouse very denuded banks can be traced running between and around natural low rises. This area has little soil cover and is today covered in gorse, which makes the identification of these banks difficult, and it is likely that many more denuded banks are presently hidden by the gorse. These boundaries are unlike the medieval remains, and are most likely prehistoric in date.

The project found clear evidence for changing settlement patterns on the Great Orme, although it is always difficult to know how much these changes are real, or a reflection of the surviving evidence. The majority of the remains of prehistoric and Romano-British domestic sites are distributed across the headland, but survive only in areas of marginal land. The medieval settlements, on the other hand, were sited in sheltered valleys with deeper soils, around St Tudno's, Penymynydd, Wyddfyd, Pyllau and on the fertile land around Gogarth. These settlements, and those at Mynydd Isaf, provide much potential for improving our knowledge of life in medieval times.

The second largest group of archaeological features recorded was related to industrial processes: mining and quarrying. These activities took place both on a small scale, and also on a much larger scale, incorporating whole landscapes, notably in the Pyllau Valley and Bryniau Poethion, where a well-preserved landscape of bell pits is clearly visible. Smaller mining landscapes, consisting of trials (levels and shafts) with associated spoil tips, are located over most of the Great Orme, from the steep cliffs above the Coastal Gunnery School to the gardens at Haulfre. Around the main focus of mining activity at Pyllau, the remains of a number of associated structures were identified including miners' cottages, leats and the brammock pits for the *Tom and Jerry* pumping device. At present interpretation of mining activity on the Orme has concentrated on the prehistoric workings, but there is clearly scope for interpretation of later mining and its associated structures.

Much evidence for stone quarrying was also identified. The large quarries around the foot of Pen y Dinas are related to the development of the sea-side resort of Llandudno, but small stone quarries on the headland seem to have been associated with the construction of field walls. There is an interpretation board at Bishop's Quarry near the Summit, but again there is more scope for further interpretation boards at the larger quarries.

The industrial landscapes of the Great Orme form an important element in the overall historic landscape of the headland. The evidence for prehistoric and later mining activities reflects different techniques of mining and the different societies involved. Their impact on the present landscape of the Orme has been fundamental and both offer many opportunities for interpretation and education.

Features associated with recreation and defence represent modern landscape features. The remains of the disused golf courses and the sites of small theatres were recorded, as were terraced areas along the southern slopes of the headland which were once part of the public gardens of Haulfre and Happy Valley. In some cases these later recreational activities had re-used or incorporated earlier industrial features, so that an interesting juxtaposition of mining shafts and ornate gardens can be found to reflect the general relationship of industry and recreation in the history of the Great Orme.

## SECTION II: MANAGEMENT AND PRESENTATION OF THE ARCHAEOLOGY

*This section examines the way in which the archaeological resource of the Great Orme is managed. The pressures upon the resource are identified, and management issues are discussed. The final part contains recommendations for the management of archaeological areas and individual sites, and general management guidelines for the preservation and presentation of sites and landscapes.*

### 6. EXISTING MANAGEMENT

#### 6.1 Land ownership

The majority of the Great Orme Country Park is owned by Mostyn Estates Ltd, with the remainder in the ownership of Conwy County Borough Council. The Council also leases small areas of land and the Marine Drive from Mostyn Estates Ltd. Ski Llandudno and the Great Orme Mines Limited lease lands from the Council, and the *Rest and be Thankful* café leases a small area of land from Mostyn Estates.

Areas of privately-owned land on the Orme include Pyllau farm, Pen y Ffridd farm, Parc farm and Penymynydd Isa farm. There are two privately-owned cafés at the Old Rectory and the Summit.

#### 6.2 The Country Park

The Great Orme has been managed by the local authority as a Country Park since August 1980. Since November 1981, much of it has also been a Local Nature Reserve. In 1985 a comprehensive Management Plan was introduced, which has been updated and revised on a five-yearly basis, and management of the park has been guided by revised Management Plans and Annual Work Plans. The Country Park is administered by Conwy County Borough Council through the Great Orme Country Park Working Party, which comprises representatives from Conwy County Borough Council, Mostyn Estates Ltd, the Countryside Council for Wales, Gwynedd Archaeological Trust and Llandudno Town Council.

#### 6.3 Environmental designations

There are two principal designations designed to protect the archaeological resource: Scheduled Ancient Monuments and Listed Buildings. However, many other designations, such as SSSI, are also able to protect archaeological sites, and brief consideration is also given to these.

##### 6.3.1 Scheduled Ancient Monuments

Under the Ancient Monuments and Archaeological Areas Act, 1979, the National Assembly for Wales has a duty to compile and maintain a schedule of monuments; monuments on the schedule have statutory protection. Inclusion of new monuments on the schedule is at the First Secretary's discretion, but monuments added to it must be of national importance. Once a monument has been scheduled, the consent of the National Assembly for Wales is required before any works are carried out which would have the effect of demolishing, destroying, damaging, removing, repairing, altering, adding to, flooding or covering up the monument. This is currently the principal means of protecting individual monuments (sometimes extending to small groups), but it is not intended to protect larger areas of significant landscape interest. There are currently eight Scheduled Ancient Monuments on the Great Orme. Further details can be found in Welsh Office Circular 60/96 *Planning and the Historic Environment: Archaeology*.

##### 6.3.2 Listed Buildings

Buildings of all kinds may be listed by the Secretary of the National Assembly for Wales. Such structures are considered to be of special architectural or historical interest. Listed building consent must be obtained from the relevant local planning authority for alteration or demolition. There is only one Listed Building on the Great Orme, which is the Telephone call-box on Ty Gwyn Road. Welsh Office Circular 61/96 *Planning and the Historic Environment: Historic buildings and conservation areas* and Welsh Office Circular 1/98 *Planning and the Historic Environment: Direction by the Secretary of State for Wales* contain details of the relevant legislation and its application.

#### *6.3.3 Site of Special Scientific Interest (SSSI)*

An area of land notified under the Wildlife and Countryside Act 1981 (as amended) as being of special interest by reason of its flora, fauna or geological or physiographical features. A large part of the Orme has been designated a SSSI, and many of the management prescriptions are of benefit to the archaeological heritage. There are a number of 'notifiable operations' for which permission from the Countryside Council for Wales must be sought before works/actions may be undertaken. The protection afforded by this designation is further strengthened by the designation of most of the site as a Candidate Special Area of Conservation (under the European Habitats Directive).

#### *6.3.4 Country Park/Local Nature Reserve*

The Great Orme Local Nature Reserve was declared in November 1981. It is managed by the Conwy County Borough Council. The management of the reserve provides considerable potential for complementary management of archaeological sites. Some protection is afforded by virtue of the byelaws that apply to the Country Park.

#### *6.3.5 Register of Landscapes of Historic Interest in Wales*

The Register, published by CCW, Cadw and ICOMOS UK, contains defined landscapes that are of special historic value and significance. The Register is non-statutory and advisory only, and its aim is to provide information and raise awareness of the most important and significant historic landscape areas in Wales. Creuddyn and Conwy, which contains all of the Great Orme, is one of the defined landscapes, included because of its rich variety of well-preserved and significant archaeological monuments.

#### *6.3.6 Heritage Coast*

The Great Orme was identified as Heritage Coast by the Countryside Commission in 1974. Designation as Heritage Coast does not accord statutory protection, but those features that contributed to the designation of the area may be important in planning policy decisions.



## **7. PRESSURES UPON THE ARCHAEOLOGICAL RESOURCE**

### **7.1 Introduction**

The archaeological resource on the Great Orme, because of the present ownership and management regime, exists in a relatively stable environment. Nonetheless, there are certain pressures upon the archaeology, and these are considered below. Methods of responding to these pressures are considered in the following section.

### **7.2 Visitor numbers**

A recent study identified the Great Orme as Llandudno's most important tourist attraction, receiving approximately 500,000 visitors annually (W S Atkins 1998, 1). Its impressive location, with views of Snowdonia and the north Wales coast, and its unspoilt landscape, makes it a very popular destination for visitors. Access to the summit of the headland can be undertaken on foot, bus, cable car, tram but most often by car. Such large and increasing numbers of visitors can result in the erosion of, and accidental damage to, archaeological sites and landscapes.

The provision of services for increasing visitor numbers can also cause problems. For example the car park at Pant yr Eglwys overlies an area of excellently preserved medieval strip fields. This is an intrusion onto an archaeological landscape which has resulted in erosion and destruction of earthwork remains (see photo).

The archaeological importance of the caves on the Orme has been already stressed in this document. However, during the last couple of years, many of the caves have been promoted as sites of interest by the Llandudno Heritage Trust, who have produced booklets on the caves and who lead commercial guided tours to them. (At one cave site a small-scale model of Stonehenge, constructed of beach pebbles, has been set up. Candles and paper littered the cave, as did the remains of small fires, which could easily contaminate archaeological deposits.) The archaeological deposits within the caves are very fragile and can be easily destroyed or severely damaged during visits.

### **7.2 Vehicle erosion**

In the past, access for motor vehicles was unrestricted (Great Orme Management Plan), which led to serious problems of erosion occurring. This was especially true in areas of heathland where the shallow soils were soon eroded leaving visible scars in the landscape (see photo). An example of the damage caused by motorcycle scrambling can be found in an area south of Bishop's Quarry, where vegetation and soil cover have been destroyed.

Use of both four- and two-wheeled motor vehicles can cause major damage to archaeological sites and deposits, particularly to earthwork remains, which can become severely reduced. Erosion can also lead to the removal of old land surfaces, which may contain palaeo-environmental data. It is important to stress that whereas a damaged landscape can regenerate its vegetation cover, the archaeological loss is permanent.

### **7.3 The removal of archaeological material from archaeological sites for building**

The re-use of material from archaeological sites, in particular stone robbing for hardcore or walls, can occur, although usually by accident rather than design. An example of this occurred during the construction of the car park for Ski Llandudno in Happy Valley, when material from the rampart of Pen y Dinas Hillfort (a Scheduled Ancient Monument) was removed during construction. Similarly, the re-positioning of large limestone boulders for parking restrictions may affect archaeological sites.

### **7.4 Commercial development**

Since the start of the twentieth century, housing development has increased on the Great Orme. This had an impact upon a number of archaeological landscapes, in particular an area of the medieval township of Gogarth along what is now Llys Helig Drive, and in the Cwlach area. Although modern planning regulations should inhibit similar damage to archaeological sites, it is not always easy to recognise the impact a development may have upon archaeological landscapes.

## 7.5 Agriculture

Many modern agricultural techniques (in particular deep ploughing or drainage of wetlands) are damaging to archaeological remains. On the Great Orme arable ploughing no longer takes place, but the re-seeding of Parc Farm has destroyed much of the medieval ridge and furrow visible on aerial photographs taken in the 1940's.

## 7.6 Vegetation growth

An increasing threat to archaeological remains on the Great Orme, and an impediment to their presentation to the public, is the increase of vegetation, notably bracken and gorse. A recent survey on the impact of bracken on archaeological remains in Scotland concluded that *stony features (such as cairns and dykes), and embanked soils (such as hut banks), are especially vulnerable to bracken colonisation, since these provide well-drained environments which correspond to the plant's own preference* (Owen *et al* 1992). The fleshy root mass and the shoots which rise vertically from it can disrupt the stratigraphic boundaries and dislocate stones and artefacts. Although root penetration varies between 0.2m and 0.6m in depth, becoming thinner below 0.2m, in areas of thin soils archaeological deposits probably survive at quite shallow depths and therefore damage from bracken could be, potentially, very high.

Damage to archaeological sites from scrub growth is well documented. Tree roots cause damage to archaeological strata and the uprooting of trees by storm damage, or because of a lack of woodland management when trees have died, can have a major impact on archaeological features.

During the last couple of years grazing on much of the Country Park has ceased. It has been notable that slight earthwork features are now being obscured by long grass. More importantly, if the lack of grazing continues scrub plants will begin to multiply and will pose an increasing major threat to archaeological remains.

## 7.6 Animal burrowing

Many archaeological remains are fragile and vulnerable to animal erosion. This is especially true of burrowing animals. If left unchecked such burrowing activities can:

- Destroy or damage irreplaceable sub-surface archaeological deposits
- De-stabilise archaeological sites
- Disfigure archaeological sites, altering their appearance.

Damage to archaeological sites by rabbits has recently been identified as one of the greatest threats to archaeological earthworks in Eastern Scotland (Historic Scotland, 2). Archaeological sites particularly at risk are earthwork remains that make attractive burrowing areas for specific species, for example field banks.

*Summary of general burrowing characteristics of species* (Historic Scotland, 4):

	Rate of incremental digging	Risk of new burrowing causing extensive damage within 5 years
Rabbit	High	High
Rat	Low	Low
Mole	High	Medium
Badger	Medium	Medium
Fox	Low	Low

Damaged caused by rabbits has been identified at the copper ore processing site at Ffynnon Rhufeinig on the northern side of the Orme.

### **7.7 Metal detecting**

Metal detecting can cause serious damage to the archaeological heritage by removing artefacts from their original archaeological context and disturbing archaeological deposits. Often such finds are not reported and so their archaeological significance is lost. This activity is prohibited under the provisions of the byelaws that apply to the site.

### **7.8 Natural erosion**

Heavy flooding in 1993, in which a large quantity of rain fell in three hours, resulted in at least twenty landslips around the Great Orme. These were created by a combination of surface run-off together with 'blow-outs' where layers of more impermeable limestone met vegetation slopes. The resulting erosion, reaching 1m in places, will inevitably have affected archaeological remains, although only two sites, those at Gogarth and Porth y Helig, are known to have suffered.

Coastal erosion is active on the south side of the Orme, which has resulted in the loss of medieval remains at Gogarth.

## 8. MANAGEMENT OF THE ARCHAEOLOGICAL RESOURCE

### 8.1 Introduction

In recent years it has been recognised that management of the cultural heritage is best achieved by positive management of complete landscapes wherever possible, tailored to individual sites as necessary. Such an approach needs to take into account not just the archaeology, but all elements of the environment. Archaeology is just one of a number of resources on the Orme, which relate in a complex myriad of competing and complementary ways, and which make up the present environment. The basic building blocks are formed from the geological nature of the area, which, with the climate, influences the biological environment and the landscape. The remaining factor is human activity, that is the way the land has been, and is, managed and used by humans. It is this that has given rise to the archaeological remains which are the subject of this report.

Appropriate management is a product of both the resource and the value set upon it. The first part of this report and the accompanying database of sites list the archaeological resource of the Great Orme. The setting of values, however, is more subjective, and is related to the various demands placed upon it. Recent studies (see for example Fairclough 1999, 32-4) have attempted to place a broad set of values upon archaeological sites as follows:

- **cultural values:** the historic environment helps to define a sense of place and provides a context for everyday life. Its appreciation and conservation foster distinctiveness at local, regional and national level. It reflects the roots of our society and its evolution.
- **educational and academic values:** the historic environment is a major source of information about our ancestors, the evolution of their society and the characteristics of past environments. It provides a means for new generations to understand the past and their own culture. We can use archaeology to learn about the long-term impact of past human activity and development, and can use this knowledge when planning our future.
- **economic values:** the historic environment can make a significant contribution to economic development by encouraging tourism, but more generally it also supports viable communities by creating good environments where people will prefer to live and work.
- **resource values:** longer-lived buildings usually make better use of the energy and resources that were used during their construction, and reuse is usually more economic than demolition and redevelopment.
- **recreational values:** the historic environment plays a very significant role in providing for people's recreation and environment.
- **aesthetic values:** archaeology and historic buildings make a major contribution to the aesthetic quality of landscapes, giving historic depth and interest to our countryside and built environment.

Land-use decisions require parallel lists for landscape character, nature conservation, and key rural issues such as employment, housing, rural identity and farming. Such issues lie largely outside the remit of this report, but the important point is that management of archaeological sites cannot be undertaken in isolation from other issues. Often there is room for complementary management. For example, management to avoid visitor pressure at an archaeological site may be of benefit to nature conservation. The enhancement of an archaeological site could improve the aesthetic value of the landscape, and improve the quality of life for inhabitants of the area. Vegetation control, such as the removal of bracken, would benefit both archaeology and nature conservation. There are, however, competing values: encouraging visitors to an archaeological site may have a detrimental impact upon nature conservation, and *vice versa*, or the conservation of an archaeological landscape may affect the economic benefits that could accrue from tourism if the area were provided with additional visitor amenities.

The management of nature, landscape and heritage conservation is therefore intertwined, and related to wider decisions concerning the economy and general aspirations of the area. The remainder of this chapter offers guidelines for the management of archaeological sites, which need to be viewed in this wider setting prior to implementation.

## 8.2 General management guidelines

The following guidelines are adapted from those drawn up by the Heritage Management section of Gwynedd Archaeological Trust for farmers and landowners.

The aims of archaeological site management are:

- to retain the existing archaeological resource;
- to ensure the archaeological heritage satisfies the demands placed upon it by society;
- to reconcile conflict and competition for the use of land containing archaeological remains.

These are best achieved by the use of management plans, which take into account the nature of the archaeological resource, and which contain clear objectives for management, whether that involves preservation or exploitation. The plan must contain a clear strategy for achieving the set objectives.

The preparation of management plans involving archaeological sites requires a sound understanding of the nature of the archaeology, of the nature of external pressures or threats, and appropriate mitigation. Much of this chapter contains examples of ways to mitigate many of the principal pressures, identified in Chapter 7, which act upon the archaeological resource.

As noted above, the management guidelines offered in this chapter do not take into account other management objectives. No work should be undertaken without first considering the affect upon other aspects of the environment. It will usually be necessary to find a balance between management of the natural environment, the landscape, and management of archaeological sites.

### 8.2.1 Agriculture:

- Grazing where practical is normally a desirable means of conserving archaeological sites.
- Grazing should be maintained at a level that keeps undesirable vegetation under control but not such as to cause erosion. Where erosion from grazing is identified fencing may be necessary to protect the archaeological site. Any alteration in the pattern of frequency of grazing should be monitored.
- Archaeological consultation should be sought when locating temporary or permanent fencing around archaeological sites. Fencing that cuts across an archaeological site should be avoided.
- Tree planting schemes should be assessed for the impact upon the archaeological resource.
- Woody growth and bracken should be cut or treated with herbicide without disturbing the ground surface.
- No land should be cleared and improved without prior archaeological consultation.
- Proposals for changes in land use should be referred for archaeological comment.
- Artificial feed points and licking blocks should not be located on archaeological sites.
- Care should be taken when moving any heavy machinery in the area.
- Stones or boulders should not be used or relocated without archaeological consultation.
- Field walls and banks should be maintained and all repairs should be carried out sympathetically. Expert advice should be sought where necessary.
- No new drainage should be carried out without prior archaeological consultation.
- No areas should be ploughed without prior archaeological consultation.



### 8.2.2 Development:

- Traditional buildings, should be maintained in good condition. All repairs and renovations should be carried out carefully and sympathetically. Expert advice should be sought where there are any doubts.
- The layout of roads, tracks, footpaths, walls, banks or areas of hard standing should be designed to avoid crossing areas of archaeological significance.
- Archaeological consultation should be sought prior to the provision of any new, or renewal of existing, services.

### 8.2.3 Leisure:

- There should be careful monitoring of leisure activities in respect of archaeological and historical interest. In particular visitor access and numbers will need to be monitored and action taken if erosion or other damage occurs.

### 8.2.4 Other:

- Rabbit populations (and those of other burrowing animals) should be kept under control.
- Materials (including stone, topsoil etc) should not be stored or dumped in archaeologically sensitive areas.
- Boggy and other wet areas should not be drained.
- The erection of coastal protection works should involve archaeological consultation.

### 8.2.5 Isolated finds

- The finding of any archaeological artefacts should, ideally, be reported to Country Park staff and to the regional Sites and Monuments Record Officer. Wherever possible finds should be left *in situ*, but if removal is necessary, then the exact location and context should be recorded. The finds remain the property of the landowner, but, depending upon their character, it may be worth negotiating for their donation or purchase.
- Metal detecting is not allowed within the park. It is also an offence to use a metal detector on Scheduled Ancient Monuments.

## 8.3 Management of vegetation growth

### 8.3.1 Bracken

Where it does not conflict with other environmental policies, bracken clearance should be undertaken on archaeological sites both to prevent damage by the roots, and to enable the site to be clearly seen and thus help prevent accidental damage. Examples on the Great Orme where this would be effective include the medieval settlement and associated fields at Mynydd Isaf/Ffynnon Galchog and at Hwylfa'r Ceirw/Ffynnon Rhufeinig. The bracken should be sprayed or cut, but not pulled up as this would cause further damage to archaeological strata. Systematic grazing and monitored trampling by stock would deter new growth. The remains of the Second World War Coastal Gunnery School at Trwynyogarth and relict medieval fields associated with the township of Gogarth are also suffering damage and are obscured from view by bracken, although more so by gorse (see photo).

### 8.3.2 Scrub

It is important that areas of scrub or woodland on or near archaeological sites are carefully managed, both to safeguard the archaeology, but also to ensure ecological interests are fully met. For example, an area of woodland and scrub (approximately 4ha.) exists on and around the hillfort at Pen y Dinas

and at Cwllach, near and including part of Haulfre Gardens. This forms a rare and important element of the ecology of the headland as a whole. Abandoned coppice stools are found in both areas, showing that past woodland management has taken place. However, present day dense canopy cover over the stone ramparts at Pen y Dinas hillfort has led to severe erosion in places, and up-rooted trees have caused damage to the ramparts. Positive management is therefore required to avoid this, by, for example, felling dead or vulnerable trees before they fall, and by selective lopping of branches to allow more light onto the ground to encourage the growth of grasses. Uncontrolled scrub growth on the ramparts and on the hut circles on the summit of the hillfort will cause serious damage to the archaeological strata. Therefore, management could include the control and removal of scrubs such as blackthorn and hawthorn.

### *8.3.3 General vegetation control*

Archaeological earthworks are best maintained under grass cover, which prevents soil erosion and general degradation of the sites. This is best achieved by controlled grazing, which keeps undesirable vegetation under control. During the last few years grazing open areas of the Great Orme has ceased. This has resulted in an increase in the length of grass cover, resulting in the obscuring of many low archaeological features and sites. Other vegetation such as blackthorn is also beginning to spread unchecked. An increase in scrub may damage the earthwork remains of archaeological sites and their sub-surface archaeological deposits. It is therefore recommended that, where it does not conflict with other objectives, a controlled level of grazing be re-established within the Country Park.

## **8.4 Visitor management**

With high numbers of visitors within the Country Park it is important to avoid the concentration of people at sensitive sites. Central information boards and leaflets (at the Summit Visitor Centre) could identify a number of interesting archaeological sites and a number of different archaeological trails to be visited (see chapter 9 below). Information concerning the potential vulnerability of many of the sites could have a high profile in information literature. The trails and the main public footpaths over the Orme will be liable to erosion. In a few examples footpaths cross archaeological features, resulting in minor erosion. This is something that will have to be continuously monitored and it may be necessary to re-route footpaths or trails if numbers of visitors increase. Similarly, concentrations of parked cars need to be managed, so that casual parking of cars does not damage fragile archaeological landscapes.

## **8.5 Vehicle erosion**

In response to the threat from motor vehicles, restrictions have been imposed in conjunction with specific provisions within the byelaws, which have reduced this problem thus enabling the more seriously affected areas to regenerate. The continued enforcement of these byelaws is essential for the preservation of the historic landscape of the Great Orme.

## 9. MANAGEMENT PROPOSALS

### 9.1 Introduction

During the field search part of the project all the archaeological sites within the Country Park were visited and site specific management recommendations considered (note: management recommendations were not made for sites outside the Park). The management information resulting from this is held in a database, which consists of four fields of information (in addition to the PRN) described below.

#### 9.1.1 Assessment of importance

This allocates each site to a category of importance.

Category A are sites of national importance, and include Scheduled Ancient Monuments, Listed Buildings and sites of schedulable or listable quality, *i.e.* those which would meet the requirements for scheduling (ancient monuments) or listing (buildings) or both. Sites which are scheduled or listed have legal protection, and it is recommended that all Category A sites remain preserved and protected *in situ*.

Category B includes sites of regional or county importance. These would not fulfil the criteria for scheduling or listing, but are nevertheless of particular importance within the region. Preservation *in situ* is the preferred option for Category B sites, but if damage or destruction cannot be avoided, appropriate detailed recording might be an acceptable alternative.

Category C sites are of district or local importance.

Category D sites include all minor and damaged sites, of which too little remains to justify their inclusion in a higher category.

Category E sites are those that require further investigation before their importance can be determined, and then allocated to categories A – D.

#### 9.1.2 Condition of site

This field refers to the physical condition of the site, which can be defined as:

- |   |           |
|---|-----------|
| 1 | Bad       |
| 2 | Poor      |
| 3 | Fair      |
| 4 | Good      |
| 5 | Very good |

#### 9.1.3 At Risk

This field determines if the site is actively suffering from erosion.

#### 9.1.4 Threats

This field contains any active or potential threats to the archaeology of the site.

### 9.2 Site recommendations

Using the data from the management database, 58 sites were identified as being under threat. Vegetation growth was identified as the main threat (39 sites) and visitor erosion as the second main threat (9 sites). The full list of sites is given below. Where possible these are grouped into areas and general management area guidelines are provided prior to site specific guidelines. The site specific guidelines contain an assessment of the priority for the work, divided into high, medium and low, which is based upon the nature of the threat, the importance of the site, and professional judgement. The tables also contain the threat field from the management database, and recommended action based upon the nature of the threat and the nature and importance of the site.



### 9.2.1 Pen y Dinas

#### 9.2.1.1 General management

- The removal of dead or unstable trees
- Thinning of the canopy
- Reseeding of ramparts, where severe erosion has taken place
- Draw profiles through the ramparts to monitor erosion
- Removal of scrub on archaeological sites (hut circles/ramparts)
- Heritage panel

### 9.2.2 Mynydd Isaf and Ffynnon Galchog

#### 9.2.2.1 General management

- Removal of bracken from archaeological sites
- Grazing at an appropriate level
- Topographic survey
- Heritage panel

#### 9.2.2.2 List of sites

PRN	Site name	Priority	Threat	Action
641	Hut platform & field system, Mynydd Isaf	High	Bracken	Clear bracken
15589	Enclosure and hut platform?, Porth y Helig	High	Animal erosion	Record/Monitor
15590	Cultivation ridges, Mynydd Isaf	Medium	Bracken	Clear bracken
15591	Cultivation ridges, Mynydd Isaf	Medium	Bracken	Clear bracken
15593	Cultivation ridges, Mynydd Isaf	Medium	Bracken	Clear bracken
15594	Cultivation ridges, Mynydd Isaf	Medium	Bracken	Clear bracken
15605	Cultivation ridges, Mynydd Isaf	Medium	Bracken	Clear bracken
15231	Bank, west of Ffynnon Galchog	Low	Bracken	Clear bracken
15358	Rectangular Hut?, Gorsedd Uchaf	Low	Bracken	Clear bracken
15592	Enclosure, Ffynnon Galchog	Low	Bracken	Clear bracken

### 9.2.3 Hwylfa'r Ceirw and Ffynnon Rhufeinig

#### 9.2.3.1 General management

- Clear bracken from archaeological sites
- Grazing at an appropriate level
- Topographic survey

### 9.2.3.2 List of sites

PRN	Site name	Priority	Threat	Action
839	Field system, Hwylfa'r Ceirw	Medium	Bracken	Clear bracken
15481	Cultivation ridges, Llety'r Fadoc	Medium	Bracken	Clear bracken
15482	Cultivation ridges, Llety'r Fadoc	Medium	Bracken	Clear bracken
15483	Cultivation ridges, Llety'r Fadoc	Medium	Bracken	Clear bracken
15371	Cultivation ridges, Ffynnon Rhufeinig	Low	Bracken	Clear bracken
15373	Cultivation ridges, Ffynnon Rhufeinig	Low	Bracken	Monitor
15480	Cultivation ridges, Llety'r Fadoc	Low	Bracken	Clear bracken

### 9.2.4 Trwynyogarth

#### 9.2.4.1 General management

- Clear bracken and gorse from archaeological sites
- Grazing at an appropriate level
- Heritage panel

#### 9.2.4.2 Site list

PRN	Site name	Priority	Threat	Action
15225	Gun emplacement, Gunnery School	Medium	Water erosion	Record
15501	Gun emplacements, Gunnery School	Medium	Water erosion	Record
15220	Command Post, Gunnery School	Medium	Bracken & gorse	Clear bracken & gorse
15223	Gun emplacement, Gunnery School	Medium	Bracken & gorse	Clear bracken & gorse
15224	Control tower, Gunnery School	Low	Bracken & gorse	Clear bracken & gorse
15498	Gunnery School building, Trwynyogarth	Low	Bracken & gorse	Clear bracken & gorse
15499	Power House, Trwynyogarth	Low	Bracken & gorse	Clear bracken & gorse & record
15500	MOWF engine house, Trwynyogarth	Low	Bracken & gorse	Clear bracken & gorse & record
15502	Gunnery School building, Trwynyogarth	Low	Bracken & gorse	Clear bracken & gorse

15503	Gunnery School building, Trwynygogarth	Low	Bracken & gorse	Clear bracken & gorse
15504	Gunnery School building, Trwynygogarth	Low	Bracken & gorse	Clear bracken & gorse
15512	Bank, Trwynygogarth	Low	Bracken & gorse	Clear bracken & gorse
15513	Bank, Trwynygogarth	Low	Bracken & gorse	Clear bracken & gorse
15514	Field bank, Gogarth	Low	Bracken & gorse	Clear bracken & gorse
15515	Field bank, Trwynygogarth	Low	Bracken & gorse	Clear bracken & gorse
15516	Field bank, Trwynygogarth	Low	Bracken & gorse	Clear bracken & gorse

### 9.2.5 Pant yr Eglwys

#### 9.2.5.1 General management

- Review location of the carpark
- Carry out topographic and photographic survey of the area

#### 9.2.5.2 Site list

PRN	Site name	Priority	Threat	Action
797	Field system, Pant yr Eglwys	High	Vehicle erosion	Relocate car park/record/monitor
15528	Cultivation ridges, Pant yr Eglwys	High	Vehicle erosion	Relocate car park/record/monitor
15529	Cultivation ridges, Pant yr Eglwys	High	Vehicle erosion	Relocate car park/record/monitor
15527	Field bank, St Tudno's Church	Medium	Bracken	Clear bracken
15531	Cultivation ridges, Pant yr Eglwys	Medium	Bracken	Clear bracken
15518	Field bank, St Tudno's Church	Low	Bracken	Clear bracken
15532	Field bank, Pant yr Eglwys	Low	Bracken	Clear bracken
15533	Field bank, Pant yr Eglwys	Low	Bracken	Clear bracken

### 9.2.6 Cave sites

#### 9.2.6.1 General management

- Members of the general public should be discouraged from entering or digging in caves
- Advice should be given to organisations who promote the use and investigation of cave sites for commercial purposes concerning the damage likely to be caused to archaeological deposits and cave environments by their activities.

### 9.2.6.2 Site list

PRN	Site name	Priority	Threat	Action
5432	Skeleton Cave, Great Orme	High	Visitor erosion	Discourage use of cave
15456	Bear's Cave/Ogof Arth	High	Visitor erosion	Discourage use of cave

### 9.3 Other site specific management

PRN	Site name	Priority	Threat	Action
20708	Engine House (remains), Great Orme Mines	High	Erosion	Stabilise and monitor
15206	Field bank, south of Parc	Medium	Visitor erosion	Monitor
15207	Field bank, south of Parc	Medium	Visitor erosion	Monitor
15459	Shell Midden?, Penmorfa	Medium	Visitor erosion	Record and stabilise
7380	BA metalworking site, Pentwyn	Medium	Visitor/water erosion	Monitor
15294	Bank, west of Penmynydd	Low	Gorse	Monitor
15344	Cultivation ridges, south-west Great Orme	Low	Gorse	Clear gorse & record
15550	Cultivation ridges, Bishop's Quarry	Low	Bracken & gorse	Clear bracken & gorse
15551	Cultivation ridges, Bishop's Quarry	Low	Bracken & gorse	Clear bracken & gorse
15552	Cultivation ridges, Pyllau	Low	Bracken & gorse	Clear bracken & gorse
5449	Banks/earthwork complex, south of Parc	Low	Visitor erosion	Monitor
15244	Field bank, south of Parc	Low	Visitor erosion	Monitor
15458	'Zig-Zag' Path, West Shore	Low	Visitor erosion	Stabilise
15549	Cultivation ridges, Parc	Low	Visitor erosion	Monitor
15446	Cultivation ridges, Cwlach		Low	Record
20719	Washing/dressing floors (site of), Great Orme	Low	Erosion	Monitor/watching brief

### 9.4 Summary of high priority sites

There are, on the Great Orme, a number of areas containing a high density of archaeological sites. These areas, which include the medieval remains at Mynydd Isaf and at Pant yr Eglwys, and the field remains at Hwylfa Ceirw, are of particular importance, as the density of sites allows a greater appreciation of the sites within the landscape, and provides for greater potential of archaeological research and interpretation. The primary need for these areas is identification of the nature and extent

of the archaeological resource, as only then can appropriate management plans be compiled. A programme of topographical survey is therefore recommended at these areas, to be followed by geophysical survey and/or trial excavation where there is doubt concerning the nature of the remains.

Of similar status to the areas mentioned above are the prehistoric mines, however these are currently under private management, and, with the exception of recommendations for work at the engine house and washing sites, no overall management recommendations have been made for that area.

The following is a summary of the recommendations considered to be of high priority. Indicative costs are given for each of the tasks. Further details of the recommended interpretation panels are given in the next chapter of the report.

Pen y Dinas	Management of trees and shrubs and establishment of grass cover	£4,000
	interpretation panel	£3,000
	recording and monitoring of erosion	£2,500
	Path restoration	£3,000
Mynydd Isaf and Ffynnon Galchog	Topographical survey of the area	£2500
	clear bracken and establish grass cover if there is no conflict with other management objectives.	To be determined
Hwylfa'r Ceirw and Ffynnon Rhufeinig	Topographical survey and geophysical survey.	£2,500
Trwynyogarth	Targeted clearance of bracken and gorse, if it does not conflict with other management objectives Heritage panel.	To be determined
Pant yr Eglwys	Review location and management of carpark	To be determined
	Topographical survey and photographic record.	£2,500
Cave sites	Discourage use of caves; provide information, perhaps at the Country Park interpretation centre, to warn of the physical dangers involved when visiting caves, and of the vulnerability of the archaeological deposits within the caves.	To be determined
Engine house remains, Great Orme Mines	Stabilise the masonry.	To be determined
Ffynnon Gogarth	Interpretation panel	£3,000
Pyllau Valley	Interpretation panel	£3,000
Elephant's Cave	Interpretation panel	£2,000
Summit	Interpretation panel	£3,000



## 10. MANAGEMENT THROUGH PRESENTATION AND INTERPRETATION OF THE ARCHAEOLOGY

*The Great Orme contains a number of multi-period landscapes and individual sites that are capable of being presented and interpreted to the public, so as to enhance their understanding of the development of the landscape and the human presence within it. Several ways in which this can be achieved are suggested below.*

### 10.1 Heritage panels

Panels which interpret and contain information about the history of an area should inform the viewer about individual sites and areas of archaeology, whilst giving a sense of the development of the landscape and the society that formed it.

It is recommended that the number of heritage panels is kept to a minimum and that they are located at strategic points which overlook areas rather than individual sites and not directly on or near to individual sites. This would allow visitors to appreciate an archaeological landscape and to see that archaeological sites are not found in isolation but are components of a larger group. It is unlikely that all visitors would continue to examine the sites in more detail and thereby potential erosion of sites would be reduced. Also, by interpreting landscapes rather than individual monuments visitor movement would be more dispersed.

At present there are information boards at:

- Pen y Dinas Hillfort
- the Summit car park
- Coastal Gunnery School
- Bishop's Quarry
- Llety'r Filiast
- The Visitor Centre

The following locations are suggested as suitable for interpreting the wider landscape:

- Summit (SH76758334) – located on a small terrace just below the summit trig point and showing the area of medieval ridge and furrow, the locations of medieval hut platforms, St Tudno's Church, the bell pits at Bryniau Poethion, Great Orme Copper Mines and the Cromlech. A short explanation of each site and how they relate to one another would be included.
- Mynydd Isaf (SH77808351) – located overlooking Gorsedd Isaf and showing positions of the remains of medieval farmsteads and associated field systems. Also visible are a small scale post-medieval mining trial and the possible prehistoric copper ore washing site at Ffynnon Galchog/Porth y Helyg.
- Ffynnon Gogarth (SH76378304) – overlooking the covered tank just below Ffynnon Gogarth and just below the issue of Ffynnon Gogarth. This board would explain the *Tom and Jerry* hydro-power device which was located here and whose power was transferred to the mine in the Pyllau valley by brammock rods. The pits for which are clearly visible running from Ffynnon Gogarth to the mines.
- Pyllau valley (SH77028317) – located at the side of the summit road, overlooking Pyllau valley and showing the location of the Cromlech, Great Orme Copper Mines, ruined miners' cottages, brammock rod pits and the underground workings *i.e.* shafts. A short explanation of each site would be given, including their period.
- Site of the Coastal Gunnery School, Trwynygogarth (SH75358370) – located at the side of the Marine Drive, overlooking the remains of the Gunnery School. This board would explain the history of the Gunnery School and have a plan that showed the location of the buildings.

- St Tudno's Car park (SH76928350) – located just off the road where the two roads meet (car park). This board would highlight the surrounding medieval ridge and furrow, the locations of the medieval hut platforms, the medieval Church of St Tudno and bell pits. Short explanations of each site and how they relate to one another would be included.
- Elephant's Cave (SH78008304) – located just off the Ski Llandudno Happy Valley road and showing the location of the drift mines/quarries at the foot of Pen y Dinas and explaining techniques involved in their construction and purpose.

## 10.2 Heritage Guides

The use of guides, combined with organised guided tours, has proved in other parts of Wales to be a particularly beneficial method of educating visitors, enabling the importance of both the natural and built environment to be stressed. It is understood such facilities are available within the Country Park. We believe these facilities should be maintained, and reviewed at intervals to ensure they meet requirements.

## 10.3 Web site

Much information could be included on the County Borough Council web site, such as background information, trails, details of the tours *etc.* Other suggestions include: a short list of recommended publications on the history and archaeology of the Great Orme; a list of known research work being carried out on the archaeology and history of the Great Orme; a list of local societies and organisations.

## 10.4 Leaflets

The Country Park have produced a number of booklets on various aspects of the history and ecology of the Great Orme, including *Historical Trails around the Great Orme* which has two planned walks around the Country Park, identifying historical/archaeological sites and local folklore. These could be further developed to look at historical and archaeological themes or specific areas in more detail.

## 10.5 Exhibitions

Exhibitions, located at the Town Library, Llandudno Museum, Town Archives or Visitor Centre on the Great Orme, could be developed using information gained from archaeological work and research.

## **SECTION III: RESEARCH AGENDA FOR THE GREAT ORME**

### **11. ARCHAEOLOGICAL RESEARCH**

#### **11.1 Introduction**

Continued archaeological research on the Great Orme is essential if we are to advance our understanding of the historic environment and how best to manage it. By encouraging further archaeological work, the headland will maintain a high profile, both nationally and internationally, and generate further interest and study. For this to be successful it is necessary that all results be fully published.

Much research has been undertaken in recent years on the Great Orme, which has led to an increased understanding of the nature of the archaeological resource, in particular in relation to prehistoric mining and related processes, although many subjects have been examined, including excavation at the medieval site at Gogarth. The work has been undertaken by a wide variety of individuals and organisations, including the Great Orme Exploration Society, university students undertaking dissertations, and grant-aided projects funded by Cadw. Much of the work takes place without the knowledge or involvement of the Country Park staff, a situation which is to the detriment of both those charged with managing the Orme, and those undertaking the research. It is important that the results are made available for use in the future management of the Country Park; only by understanding the environment and history of the headland can it be preserved and promoted as a valuable educational and recreational resource.

#### **11.2 The relationship between the researcher and the Country Park**

It would be of benefit to all parties to ensure close co-operation between researcher and country park staff. A mechanism should therefore be put in place that would enable park managers to monitor, and benefit from, all research projects undertaken within the park. This would, in turn, benefit researchers, who could be put in contact with each other.

This point is reinforced by the results of consultation, undertaken during the preparation of this management plan, between individuals and groups involved in archaeological research, and park staff. A number of problems were identified, as outlined below.

The main problems raised by researchers:

- Poor communication
- Confused procedures
- Difficulties identifying the relevant responsible organisation
- Lack of advice
- Slow responses

The main problems raised by the Country Park:

- Poor communication
- Confused procedures
- Lack of feed back
- Lack of clear guidance over archaeological requirements for research

It is clear, therefore, that it is important to implement a simple procedure for those wishing to undertake research work, so that the researcher is given appropriate information when needed, and the council is able to monitor the work and benefit from the results. This would be best achieved by ensuring someone from the country park is responsible for co-ordinating research projects, although this would, of course, be dependant upon having the staff resources to cope with the additional work. Lack of the necessary resource may affect the number of research requests that could be determined.

The researcher could be issued with a standard letter, or leaflet, outlining the necessary permissions to obtain (for example, CCW, Cadw, landowners), and the level of information required by the country park.

### 11.3 Levels of archaeological work

Projects that require the agreement of the park to proceed, such as those involving excavation, should fulfil certain criteria. In particular the proposed work should cause the minimum amount of damage to the archaeological resource and ensure that the aims of the research can be achieved within the financial and practical limitations of those proposing to undertake the work. Archaeological work must be undertaken in a way that is sympathetic to other interests.

All applications for research projects will be examined by country park staff and the Curatorial Section of the Gwynedd Archaeological Trust. Projects will be assessed according to the contribution they will make to the knowledge base and the impact they will have upon the archaeological and environmental resource. Projects considered to be inappropriate will not be granted permission to proceed.

It is important that all projects are monitored, and that, once complete copies of the results are deposited with the Country Park and with the Gwynedd Sites and Monuments Record, thus making them available for public consultation. Any finds resulting from the project should also be deposited locally.

Different types of research project will entail different levels of impact on the archaeological resource; for example, a topographical survey of an area would cause little damage to a site, whilst a full excavation would destroy it. Guidelines to researchers would therefore vary according to the type of proposed work and the impact upon the archaeological resource. The following gives an indication of the varying levels of research according to potential impact.

#### *Level 1- No impact.*

This would include projects involving historical research, with field visits where necessary.

*Response:* Close co-operation with the Country Park and private landowners to avoid trespassing. A copy of the results of the work to be deposited with the park and regional SMR.

#### *Level 2 – Minimal impact.*

This would include projects involving topographic and geophysical survey. Pegs may need to be knocked into the ground, and care should be taken when placing these, using thin metal ones when possible, rather than thicker wooden ones, and avoiding knocking them in further than is necessary (generally no more than 20cm deep). Projects may also include geochemical sampling, which involves the setting out of a grid system and sampling small amounts of soil at intervals.

*Response:* Permission to be sought from landowners and relevant organisations. A copy of the results of the work to be deposited with the park and regional SMR. Care would need to be taken with the siting of pegs, and that removal of samples does not affect archaeological deposits.

#### *Level 3 – Moderate impact.*

This would include assessment and trial excavations, undertaken to determine the nature and sub-surface survival of archaeological deposits. This work may provide results upon which to base further detailed research proposals.

*Response:* Detailed project and research designs, to include justification for this level of work, would be submitted to the park and relevant organisations. A time-table for the proposed work should be included, and arrangements made for monitoring visits. A copy of the results of the work to be deposited with the park and regional SMR.

#### *Level 5 – High impact.*

This would include archaeological excavation, which by its nature would have a major impact upon any archaeological remains.

*Response:* Detailed project designs would have to be submitted to the park and relevant organisations, setting out the aims, objectives, background information and justification of the work. A time table for the proposed work should be included. Full publication of the results would be required at the end of the proposed work.

## 11.4 Project designs

A typical project design should contain the following elements.

### *1. Introduction*

### *2. Description of the area/site to be examined:*

- Location including grid reference.
- Map/location plan.
- The period and type of site (if known).
- The condition of the site, and the anticipated state of preservation of the deposits.
- A short synopsis of previous archaeological work on site and in the immediate area.
- The existing documentary/archive evidence consulted.
- The results of any evaluation fieldwork undertaken (site visits).
- The legal status of the site (is it a Scheduled Ancient Monument or within a SSSI).

### *3. Research design:*

- Aims and objectives.
- The contribution of the project to archaeological knowledge in the context of local, regional and national research priorities.
- Opportunities for integrating with other research projects.
- Likely possibilities for future research which may emerge from the project.
- Opportunities for experimental work.
- Method statement.
- The timing of the project.
- Arrangements for access agreed with land owners and site occupiers.
- Proposed reinstatement (after excavation).

### *4. Archive deposition:*

- Location of the project archive, including finds and environmental samples, is to be specified.

### *5. Publication and presentation:*

- The scale of the published report (*e.g.* monograph, article or note) and the intended place of publication. Advice on a suitable place for publication could be given by the archaeological advisor to the Working Party.

## 11.5 Monitoring

It is desirable that the Country Park or their agents monitor all archaeological work. This, however, is limited by resource availability, which may, in turn, limit the number of research projects being undertaken.

## 11.6 Archiving

Ideally, archives and artefacts should be stored in secure, stable conditions where their condition can be monitored. It would be the researcher's responsibility to ensure that artefacts are deposited at the specified archive in a stable condition.

It is important that the results of projects are fed back into the database of sites, and that the management plan and research framework are updated at regular intervals.

Since the recent local authority re-organisation, information concerning archaeology of the Great Orme has remained at the Gwynedd Sites and Monuments Record in Bangor (the National Monuments Record in Aberystwyth also hold some records) and general archive material at the Gwynedd Archive



Service in Caernarfon. However, Conwy County Borough Council have recently set up an archive at the old Lloyd St School in Llandudno, which it is hoped will soon acquire archive material for the area from Caernarfon Archives. Artefacts should be deposited with Conwy Museums Service.

## 12. RESEARCH FRAMEWORK

### 12.1 Introduction

Research frameworks provide a background against which to assess and direct research proposals. They allow coherent and obtainable objectives to be set which advance our understanding of the heritage, and they:

- highlight what is already known;
- highlight the potential for acquiring further information;
- highlight the research needed to fulfil the potential.

A framework needs to be flexible, and designed to develop over time as new information is fed back and the framework is updated. In recent years research into the archaeology of the Great Orme has markedly increased. This is especially true of the Bronze Age Copper mines, where some of the most recent research investigations have been concentrated. In 1993 the growing need to respond to the continued commercial development of the site led to the establishment of the Great Orme Mines Research Steering Committee, which consisted of representatives from the commercial company, Great Orme Mines, two archaeological advisors and a chairman. Grants were obtained to draft a strategy document regarding previous and future research work at the Great Orme Mines. This remains the only research framework developed for archaeology on the Orme, but only deals with the Great Orme Mines.

It identified a series of research priorities for the Great Orme Mines, under headings:

- Raw materials
- Extent and location of prehistoric workings
- Extraction technology and artefacts
- Production processes and products
- Chronology
- Environmental context
- Social context
- Conservation
- Future tourist development

These primarily address the activities associated with the mines, but also highlight the need for a broader understanding of the social and environmental context of the mines within the Bronze Age.

The following section broadens the above framework to look at all periods. It examines the issues for each period, looks at those that are specific to the Great Orme, and at the potential for further work. Wider themes are suggested where relevant.

### 12.2 Palaeolithic

This period is divided into two sub-periods: the Earlier Upper Palaeolithic and the Later Upper Palaeolithic. The Earlier Upper Palaeolithic is the period before the height of the last phase of the last ice age, between 36000 and 25000 BC. The Later Upper Palaeolithic occurs as the temperature increases and evidence for human settlement in Britain reappears following the start of the withdrawal of the ice between *circa* 10500 and 8000 BC. The stone technologies of the period consist of large flakes rather than simple core tools.

*Sites of the following type are to be found on the Great Orme:*

- caves
- finds of surface lithic scatters

The archaeology of this period is represented by cave sites and occasional surface finds. There is no evidence of occupation from the Earlier Upper Palaeolithic on the Great Orme, but the Later Upper Palaeolithic period is represented by deposits from Kendricks Cave. The alkaline soil conditions of the

Great Orme have ensured the survival of organic material, such as the incised horse's mandible from Kendrick's Cave.

Most of the excavations on the Great Orme cave sites were carried out during the nineteenth century, and the evidence needs to be re-examined in the light of modern knowledge. The recent re-assessment of lithic material by Jacobi (unpublished) from some of the cave sites shows the potential for such studies. Environmental evidence from this period is again poorly represented. The soil conditions have preserved organic material such as shells and bone, but no environmental analysis of cave material, which could reveal important diet information, has been undertaken.

*Research priorities:*

- identification of other caves on the Great Orme with potential for preserved Palaeolithic remains;
- assessment of the lithic material obtained from past cave excavations on the Great Orme;
- assessment of the environmental evidence (bone, shell or soil samples etc) recovered from past cave excavations on the Great Orme;
- assessment of human burial evidence (skeletal remains) from Great Orme cave sites;

### 12.3 Mesolithic

This period falls between the end of the last ice age *circa* 8000 BC and the appearance of the first agricultural settlements associated with domesticated animals and crops *circa* 3500 BC. It is characterised by an improving climate and rising sea levels, causing the separation of Britain from the Continent.

*Sites of the following type are to be found on the Great Orme:*

caves  
finds of surface lithic scatters  
submerged land surfaces  
peat exposures

As in the Palaeolithic, cave sites provide most of the evidence for this period on the Great Orme, and the open sites, defined by lithic scatters, discovered elsewhere in Wales, have yet to be found on the Orme. One area of high potential is the peat beds and submerged forests lying in the inter-tidal zone, which can provide palaeo-botanical evidence for past climate trends and human activity. The peat on the North Shore at Llandudno has been dated to *c.* 5000 BC.

*The potential for evidence and research priorities*

- assessment of lithic material obtained from past cave excavations on the Great Orme;
- assessment of the environmental evidence (bone, shell or soil samples etc) recovered from past cave excavations on the Great Orme;
- an assessment of all cave sites on the Great Orme for potential of preserved Mesolithic remains;
- an assessment of likely Mesolithic sites by a programme of field walking to search for flint scatters;
- an assessment of human burial evidence (skeletal remains) from Great Orme cave sites;
- an assessment of peat beds and the study of organic remains from buried and submerged deposits;
- identification and assessment of possible rock shelters.

### *Themes*

- the reoccupation of north Wales after the last Ice Age;
- location of settlement sites and relationship to coastal routes;

## **12.4 Neolithic**

This period witnessed the change from a hunter-gatherer economy to one based upon farming. The growing of crops and the management of animals enabled man to live a more settled life and to construct prominent and permanent funerary structures. Domestic structures are more elusive having been made of wood, leaving only a series of post-holes in the ground. Changes in material culture included the manufacture and trading of stone axes, and the introduction of pottery.

*Sites of the following type are to be found on the Great Orme:*

megalithic tombs  
stone axe findspots  
settlement sites indicated by concentrations of scatters of lithic material

Finds of Neolithic artefacts, including stone axes, demonstrate the presence of an active community on the headland. The identification of one definite and a number of possible megalithic tombs confirm the evidence from the finds. There is evidence that the caves on the Great Orme were still used during this period but no other settlement sites have been identified, and there is still much to learn about the social and economic nature of these early communities.

### *Research priorities*

- assessment of lithic material obtained from past cave excavations on the Great Orme;
- assessment of the environmental evidence (bone, shell or soil samples etc) recovered from past cave excavations on the Great Orme;
- assessment of all caves on the Great Orme with potential for preserved Neolithic remains;
- assessment of human burial evidence (skeletal remains) from Great Orme cave sites;
- assessment of potential for the preservation and study of biological, organic and inorganic remains from buried and submerged deposits;
- relationship between megalithic monuments and topographical settings;
- identification and assessment of the evidence for settlement and agriculture.

### *Thematic issues*

- the transition from hunter-gatherers to farmers;
- the nature of settlement and society.

## **12.5 Bronze Age**

The Bronze Age is characterised by the use of metal, originally copper but later a copper and tin alloy known as bronze. Much study has been carried out on the metal artefacts produced, and the changes that took place, from the production of the earliest flat axes, heavily influenced by Irish work, to the later, weapon dominated, collections of spears and rapiers. The Bronze Age witnessed an increasing

stratification in society, which is reflected in part in the change from community based funerary monuments to those catering for individuals, and the elitist military nature of certain metalwork items. Wider changes that were taking place in society, caused partly by a deteriorating climate, which saw, by the later Bronze Age, abandonment of the complex burial and ritual monuments of the earlier Bronze Age, and the appearance of defended stone-built settlements.

*The following site-types occur on the Orme:*

- copper mines
- copper processing sites
- cairns

The Great Orme mines are of international importance. Only one secondary processing site, that excavated at Pentrwyn, has been discovered. Little is known of the society that mined the ore, or of the processes used to produce copper metal. In recent years research has concentrated on the techniques and development of mining itself, but it may now be time to examine the effect this would have had on the local economy and environment. Clearly the metal was exported, but in what form, to whom, and how these links would have influenced local and regional societies, is unknown. Settlement sites of the period have not yet been found. The finds are predominantly Late Bronze Age, although one axe of the later Early Bronze Age has been found (PRN 3472).

*Research priorities*

- identification of the full extent and location of prehistoric workings;
- identifying areas of ore processing;
- identifying smelting sites and processes used;
- an assessment of evidence for cave use;
- identification of settlement sites and agricultural remains;
- an improved understanding of the environmental history.

## **12.6 Iron Age**

This period witnessed the introduction of iron, but also the culmination of the art of bronze casting and decoration. Hut circle settlements and associated field systems became more common. Many of these were built of stone and hence survive in the present landscape. Concentrations of such huts are also found in hillforts.

*Sites of the following type are to be found on the Great Orme:*

- hillfort
- hut circle settlements
- field systems
- finds of metal work (bronze and iron)

This period is represented by the hillfort at Pen y Dinas with its round huts, and a number of hut circle settlements, particularly at Mynydd Isaf. A single radio carbon date from the Great Orme copper mines suggests exploitation continuing into this period, but further evidence has yet to be identified.

*The potential for evidence and research priorities*

- chronology and structural development of the hillfort of Pen y Dinas
- chronology of the hut circle settlements
- development of settlement patterns (morphology) and their relationship with topography



- evidence for external social and economic influences
- evidence for mining activity in this period
- environmental and palaeo-ecological evidence.

#### *Themes*

- the role of the hillfort in the local society and economy
- the continuation or decline of copper mining in this period
- external technical and social influences on the local community.

### **12.7 Romano-British**

The military occupation of north-west Wales, started in the late 50s AD with the campaigns of Suetonius Paulinus, were secured and consolidated by Agricola in 78 AD. Roman forts, such as Caerhun in the Conwy valley, gradually developed from military bases into administrative centres. Small farms characterised by stone-walled hut groups with arable and pastoral fields flourished in the rural landscape.

*Sites of the following type are to be found on the Great Orme:*

finds of coins and coin hoards  
hut circle settlements  
field systems  
hillforts  
mineral mines

Roman exploitation of minerals in Wales is well known, but as yet no definite evidence has been identified for Roman copper mining on the Great Orme. Individual coins and hoards of coins have been found on or near the Great Orme leading to the suggestion that they represent salaries for miners. However, no dating evidence from the mines themselves has yet confirmed a Roman mining presence. Pottery of Roman date was found during minor excavations carried out within some of the huts in Pen y Dinas hillfort. It is probable that many of the round-hut settlements were occupied within this period.

*The potential for evidence and research priorities*

- identifying evidence for Romano-British working of the copper mines;
- identifying settlements of this period;
- confirming the date, extent and nature of the Roman occupation of Pen y Dinas hillfort.

### **12.8 Early Medieval**

This period saw the end of direct Roman administration in Britain and the emergence of native, independent kingdoms. Christianity increasingly became the major cultural influence, while other cultural influences came from periodical incursions by Saxons, Vikings and later Normans.

*Sites of the following type are to be found on the Great Orme:*

inscribed stones  
early ecclesiastical foundations  
hoards

metal artefacts  
mining

The name *Orme* itself indicates a close Viking influence and confirms the headland's position within the network of Viking sea routes. There is no direct evidence for a Viking presence on the Orme.

Settlement for this period is scarce and none has been identified on the Great Orme. However the foundation of the church of St Tudno probably dates from the sixth century and indicates that the headland was occupied. A coin hoard from the tenth to eleventh century AD found near the church confirms settlement and may be connected with the Orme's close proximity to the Royal Court at Deganwy. The hiding of the hoard also indicates that this time was one of political and social unrest.

Mining for copper ore, or at least re-working ancient spoil tips, may have been taking place in this period. A single radiocarbon date from the copper ore washing site at Ffynnon Galchog indicated activity within the eighth century.

#### *The potential for evidence and research priorities*

- assess the potential for identifying early medieval settlements (especially around the location of St Tudno's Church and Pen y Dinas hillfort)
- identify settlement of the Viking period
- examination of the evidence (documentary, cartographic and traditional) for the early foundation of St Tudno's community
- identify any further evidence for copper mining (or processing of old tips) at this time

#### *Themes*

- the development of the sub-Roman kingdoms
- the growth and organisation of the early church
- trading patterns .

### **12.9 Later Medieval**

At the beginning of the later medieval period the Creuddyn Peninsula and the estuary of the Conwy was a frontier zone between the independent Welsh Princes and the English Crown. This situation was largely resolved by the conquest of Edward I in 1282, and the construction of Conwy castle, replacing the one at Deganwy.

Medieval documents record that the Great Orme was divided into three administrative townships. One of the townships, Gogarth, was held by the Bishop of Bangor and included a grange, the ruined remains of which still survive. Large areas of medieval field systems indicate an active agricultural community on the headland at this time.

In the period following the Conquest the traditional forms of Welsh inheritance and landholding were gradually broken down under pressure from market forces and new problems of administration. The consolidation of farms and larger estates began. This probably aided the development of modern copper mining on the headland, which was first recorded at the end of the seventeenth century. From this time onwards the scale and technologies used in mining advanced, reaching a climax in the nineteenth century. Both large-scale mining and small-scale prospecting have had a major impact on the landscape of the Great Orme.

*Sites of the following type are to be found on the Great Orme:*

grange  
church  
medieval settlement and house platforms  
medieval field systems

*The potential for evidence and research priorities*

- reconstructing the extent of the manor of Gogarth
- reconstructing the boundaries and organisational layout of the other townships
- identifying the nature of medieval settlement on the Orme
- identifying the extent of ore extraction and processing.

*Themes*

- changes in agricultural practices
- changes in settlement patterns during reorganisation and contraction from medieval to post-medieval times
- the development and comparison of ecclesiastical estates and secular estates

## **12.10 Post-medieval**

The post-medieval period on the Great Orme saw the breakdown of the traditional Welsh landholdings and the development of more consolidated farms within expanding secular estates. Copper mining became the dominant economic factor with farming relegated to a subsistence role. The mines attracted immigration and with new people came new ideas, religions and language. Settlement became concentrated in the sheltered valley on the south slopes of the Orme and old areas of cultivation on the top plateau were abandoned.

By the middle of the nineteenth century the discovery of large, easily extractable deposits of copper elsewhere and increasing problems with flooding in the copper mines on the Great Orme saw the mines gradually being abandoned. However, at the instigation of the main landowner, Lord Mostyn, a seaside resort was designed and built on the flat isthmus which joined the two Orme Heads. Stone quarries were excavated to provide building material for new boarding houses, hotels and churches. The planned town of Llandudno increased dramatically in size and population, with the focus of settlement shifting onto the isthmus and away from the Great Orme, which became recognised as a beauty spot and area for leisure activities.

*Sites of the following type are to be found on the Great Orme:*

consolidated farms  
copper and other mineral mines  
stone quarries  
cottages, private houses and hotels  
field boundaries  
chapels  
lighthouse and semaphore station

*The potential for evidence and research priorities*

- mapping of underground mining systems
- morphology of tunnels

- identification and recording of preserved organic material from underground contexts
- development of underground mining technology
- development of mining techniques above ground
- assess and record remains of above ground mining structures
- identify production models for different phases of production
- identify and record small scale prospecting sites
- record and assess the documentary archives of the nonconformist chapels and their impact on the mining community
- identify the timing and nature of the enclosure of open fields and common land
- examine the background and origin of migrant miners

#### *Themes*

- changes in agricultural practice
- the development of the copper mines
- the development of below ground copper mines
- the identification of mining techniques (pre black powder and post black powder)
- the development of power generation devices for the mines
- social influences of nonconformist religions
- development of the mining community
- social changes due to immigration

### **12.11 Modern period**

The decline of the mining industry on the Great Orme saw the dawning of the development of the planned town of Llandudno as a seaside resort. Recreational activities increasingly became the dominant feature on the landscape of the headland as farming also began to decline. A number of golf courses (of varying size) were laid out at the twentieth century, along with a number of open air theatres and other recreational areas such as archery galleries. As tastes have changed many of these attractions have been abandoned leaving only slight physical remains, but photographic and oral history survive to confirm their social importance.

Settlement patterns also changed as the headland changed from an industrial landscape to a recreational one. As the population of the town of Llandudno grew, so the pressures on the undeveloped areas, including the Great Orme, have grown. New estates have been built on the Orme and ruined miners' cottages have been refurbished.

An important influence on the landscape of the Great Orme in the modern period was the wartime activities which centred around the Coastal Gunnery School at Trwynygogarth. Today few upstanding structures associated with this survive, but they represent an important and little-recorded chapter in the social history of the headland.

*Sites of the following type are to be found on the Great Orme:*

Second World War Coastal Gunnery School and radar station  
Golf courses  
Tram  
Cable car  
Open air theatres

*The potential for evidence and research priorities*

- assessment of cartographic and documentary evidence for wartime activities on the Great Orme
- assess and record the remains of military installations
- the recording of oral descriptions of wartime activities (military and social) on the Great Orme
- the recording of oral descriptions of recreational activities on the Great Orme
- the identification of archaeological remains and archive material associated with recreational activities on the Great Orme
- the recording of the expansion of settlement in the modern period on the Great Orme

*Themes*

- the impact of military and wartime agricultural uses on the landscape of the Great Orme
- the development of the Great Orme as a recreational landscape
- oral recollections of activities taking place on the Great Orme
- changing settlement patterns – expansion and re-occupation of derelict properties

## **12.12 Conclusions**

A research framework has been constructed from our existing knowledge of the archaeology of the Great Orme, and from a perception of how that merges into a wider Welsh, or British archaeological framework. These parameters are not, of course, fixed, and as theories change, and as our knowledge of the archaeology of the Great Orme improves, so the research framework will need to be changed and adapted.

The research priorities above reflect the nature of the sources available. For the prehistoric periods, archaeology is the only means of obtaining new information, and thus our knowledge is limited by the restrictions of archaeological evidence. These tend to concentrate upon the development of tighter chronologies, and broad identification of the nature of settlement and ritual sites. Of particular interest and value will be work involving environmental archaeology, resulting in an increased knowledge of past climatic changes, vegetation history, and agricultural practices.

The archaeological deposits within the caves are identified as a valuable resource, particularly for the Palaeolithic period, but also throughout the prehistoric era. A general assessment of the cave sites and associated finds is a priority. Another area identified as of high potential is the peat exposures within the intertidal zone.

The prehistoric copper mines on the Great Orme are of international importance, and a wide variety of research priorities associated with these have been identified.

Within historic periods the options become greater as written evidence becomes more plentiful, until within the modern period the resources are so great that options become almost limitless. Recording



the nature and extent of medieval settlement and using archaeological and documentary evidence to reconstruct the boundaries layout of the medieval townships is a priority.

Within the post-medieval period the growth and nature of mining operations and the affect upon associated industries, economy and housing is a priority. In the modern period, we have identified the research potential of activities associated with the second world war, and with recreational activities of the post-war period.

It must be emphasised that this research framework is only a reflection of present knowledge. For it to remain valid it is necessary to ensure the contents are updated as new results become available, and a new plan be issued periodically.

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## Appendix I: List of local historical and archaeological organisations.

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### *Gwynedd Archive and Museum Service*

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### *Great Orme Mines Ltd*

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## Appendix 2: List of sites sorted by Primary Reference Number

Prn	Sitename		Ngr
635	KENDRICK'S CAVE, GREAT ORME	PREHISTORIC	SH77988281
636	ROMAN MATERIAL - FINDSPOT, PENMORFA ADIT, ORME	ROMANO BRITISH	SH77078220
637	PEN Y DINAS HILLFORT, GREAT ORME	PREHISTORIC	SH77908295
638	HUT CIRCLES SETTLEMENT GREAT ORME'S HEAD	ROMANO BRITISH	SH75458410
639	HUT CIRCLE, BRYNIAU POETHION, GREAT ORME	ROMANO BRITISH	SH76928335
640	HUT CIRCLE, HAFNANT, GREAT ORME	ROMANO BRITISH	SH76408410
641	HUT PLATFORMS & FIELD SYSTEM, MYNYDD ISAF, ORME	MEDIEVAL	SH77808356
642	HUT PLATFORMS, CENTRAL GREAT ORME	MEDIEVAL	SH76758375
643	HUT PLATFORMS, CENTRAL GREAT ORME	MEDIEVAL	SH76708350
644	ENCLOSURE S OF HWYLFAR CEIRW, GREAT ORME	MEDIEVAL	SH76518401C
645	ENCLOSURE, N. OF BRYNIAU POETHION, GREAT ORME	UNDETERMINED	SH76998343
646	HUT CIRCLE (POSS.), W. OF BISHOP'S QUARRIES, ORME	ROMANO BRITISH	SH76498311
647	CAIRN, CREIGIAU COCHION, GREAT ORME	PREHISTORIC	SH75618357
648	LLETY'R FILIAST BURIAL CHAMBER, GREAT ORME	PREHISTORIC	SH77228295
649	HWYLFAR CEIRW STONE ROW, GREAT ORME	PREHISTORIC	SH76568409
650	FFYNNON LLYGAID, GREAT ORME	UNDETERMINED	SH76158319
651	FFYNNON RUFEINIG, GREAT ORME	UNDETERMINED	SH76558386
795	RIDGE AND FURROW, BRYNIAU POETHION, GT. ORME	MEDIEVAL	SH77108330C
796	HUT PLATFORMS, E. OF FFYNNON RUFEINIG, GREAT ORME	MEDIEVAL	SH76728389
797	FIELD SYSTEM (RIDGE & FURROW), GREAT ORME	UNDETERMINED	SH76808350
798	HUT CIRCLE, N. OF BISHOP'S QUARRIES, GREAT ORME	UNDETERMINED	SH76438317
800	HUT GROUP (ENCLOSED), N. OF FFYNNON RUFEINIG, ORME	UNDETERMINED	SH76608390
813	GOGARTH GRANGE - BISHOP'S PALACE(REM. OF) GT ORME	MEDIEVAL	SH76058290
839	FIELD SYSTEM - HWYLFAR CEIRW	PREHISTORIC	SH76608410C
889	HUT CIRCLES AND ENCLOSURE GREAT ORME'S HEAD	ROMANO BRITISH	SH75618383
890	HUT CIRCLE POSS. GREAT ORME'S HEAD	ROMANO BRITISH	SH77258316
1559	PATHWAY, SUMMIT GREAT ORME	UNDETERMINED	SH76828321C
1694	GREAT ORME COPPER MINE	PREHISTORIC	SH77078308
1703	BRONZE AGE FLAT AXE - FINDSPOT, GREAT ORME	PREHISTORIC	SH76508400
3472	BRONZE AXE, PARC - FINDSPOT	PREHISTORIC	SH76908390
4414	HAPPY VALLEY GARDENS, GREAT ORME	POST MEDIEVAL	SH78208310C
4437	GOGARTH GRANGE GARDENS	MEDIEVAL	SH76078290
4454	SUNNYHILL GARDEN	POST MEDIEVAL	SH77008200A
4457	HAULFRE GARDENS, LLANDUDNO	POST MEDIEVAL	SH77508250
4566	FEATURE (NATURAL?), GORSEDD UCHAF, S. MYNYDD ISAF	UNDETERMINED	SH77688326
4567	GOLD COIN - FINDSPOT, LLWYNFRYN, NR. CWLACH	ROMANO BRITISH	SH77528279
4568	ROMAN COIN HOARD & HEARTH - FINDSPOT, TY GWYN RD.	ROMANO BRITISH	SH78208280A

4569	ROMAN COINS - FINDSPOT, NR. GOGARTH GRANGE	ROMANO BRITISH	SH76088286A
4576	HUT CIRCLE, GREAT ORME'S HEAD	ROMANO BRITISH	SH75418408
4577	GOLD & BRONZE HOARD - FINDSPOT, PIGEON'S CAVE	PREHISTORIC	SH77848381
4579	FLINT TOOL - FINDSPOT, S.E. OF BRYNIAU POETHION	PREHISTORIC	SH76808330A
4584	FLINT ARROWHEAD - FINDSPOT, NR. ST. TUDNO'S CHURCH	PREHISTORIC	SH76978383
4585	FLINT TOOL - FINDSPOT, GREAT ORME	PREHISTORIC	SH75008400A
4586	STONE AXE - FINDSPOT, LLANDUDNO PARISH	PREHISTORIC	SH7638340A
4587	FLINT TOOL - FINDSPOT, LLANDUDNO PARISH	PREHISTORIC	SH76608340A
4588	BRONZE AXE - FINDSPOT, NR. LLANDUDNO	PREHISTORIC	SH76808230A
4590	BRONZE AXE - FINDSPOT, NR. GOGARTH GRANGE	PREHISTORIC	SH76008300A
4591	ST TUDNO'S WELL (FFYNNON), LLANDUDNO	UNDETERMINED	SH77068378
4595	ST TUDNO'S CHURCH, GREAT ORME	MEDIEVAL	SH76978382
4597	STONE TOOL - FINDSPOT, BISHOP'S QUARRIES, ORME	PREHISTORIC	SH76608310A
4598	HUT PLATFORM, N. SIDE GREAT ORME	MEDIEVAL	SH76728349
4599	HUT PLATFORM, N. SIDE GREAT ORME	MEDIEVAL	SH76758345
4600	HUT PLATFORM, N. SIDE GREAT ORME	MEDIEVAL	SH76758343
4601	HUT PLATFORM, N. SIDE GREAT ORME	MEDIEVAL	SH76718349
4602	STONE IMPLEMENT INDUSTRY, N.W. END GREAT ORME	PREHISTORIC	SH76808370A
4604	COIN (INDIAN) - FINDSPOT, CWLACH STREET	ROMANO BRITISH	SH77608250
4605	BARROW - SITE OF, MARINE DRIVE, GREAT ORME	PREHISTORIC	SH75408410A
5029	UPPER KENDRICK'S CAVE, GREAT ORME	PREHISTORIC	SH78008284
5031	CAVE DEPOSITS, ROCK SHELTER, LLOCHES YR AFR	PREHISTORIC	SH77928383
5032	OGOF TUDNO, GT. ORME	PREHISTORIC	SH76408416
5033	CAVE DEPOSITS, CORKSCREW CAVE, GREAT ORME	PREHISTORIC	SH77278240
5076	FLINT TOOLS - FINDSPOT, LLANDUDNO	PREHISTORIC	SH77008200A
5429	HUT CIRCLE N OF PYLLAU ROAD	PREHISTORIC	SH77258305
5430	HUT CIRCLE ABOVE CREIGIAU COCHION	PREHISTORIC	SH75578373
5431	HUT PLATFORM, CORLAN GRAS PARI, GT. ORME	UNDETERMINED	SH76658261
5432	SKELETON'S CAVE, GT. ORME	PREHISTORIC	SH76928251
5433	CAIRNS (2) EDGE OF ROFFT QUARRY, GT. ORME	PREHISTORIC	SH77548325
5434	STANDING STONE (POSS), GT. ORME'S HEAD	PREHISTORIC	SH75828415
5435	CAIRN NR. FFYNNON GASEG, GT. ORME	PREHISTORIC	SH75418408
5436	FFYNNON Y GALCHOG, GT. ORME	UNDETERMINED	SH77758367
5437	FFYNNON GASEG, GT. ORME	UNDETERMINED	SH75328404
5438	FFYNNON GOGARTH, GT. ORME	UNDETERMINED	SH76358308
5440	FFYNNON POWEL, GT. ORME	UNDETERMINED	SH77128358
5441	BURIAL CHAMBER (POSS), PEN BWLCH, GT. ORME	PREHISTORIC	SH77908360A
5442	CRYD TUDNO (ROCKING STONE), GT. ORME	UNDETERMINED	SH77928287
5443	LLECH HIDING CAVE, GT. ORME	POST MEDIEVAL	SH75508431
5444	CAIRN (EXCAVATION) HWYLFA CEIRW, GREAT ORME	UNDETERMINED	SH76658420



5445	FIELD BANKS, GT ORME	PREHISTORIC	SH75628378C
5446	HUT PLATFORM ABOVE CREIGIAU COCHION, GT ORME	MEDIEVAL	SH75458410
5447	BUILDINGS AND ENCLOSURE, GT ORME	POST MEDIEVAL	SH76908274
5448	STONE 'HUT', SW OF PEN Y FFRIDD	UNDETERMINED	SH76488288
5449	BANKS/EARTHWORK COMPLEX, S. OF PARC, GT ORME	UNDETERMINED	SH76008330
5450	BANK, BRYNIAU POETHION, GT ORME	UNDETERMINED	SH76928330
5451	MONKS' PATH, GREAT ORME	UNDETERMINED	SH76108330C
5452	TRACKWAY, PEN Y BWLCH, GREAT ORME	UNDETERMINED	SH77408345
5453	FLINT SCRAPER - FINDSPOT, PYLLAU, GT ORME	PREHISTORIC	SH77108290A
5454	STONE AXE - FINDSPOT, HAULFA GARDENS, GT. ORME	PREHISTORIC	SH77508245A
5455	STONE LAMP - FINDSPOT, GREAT ORME MINES	ROMANO BRITISH	SH77048311A
5456	ROMAN COIN - FINDSPOT, NR. LLETY'R FFILIAST	ROMANO BRITISH	SH77208290A
5457	ROMAN COIN - FINDSPOT, GREAT ORME MINE	ROMANO BRITISH	SH75768278A
5458	O.DAVIES EXCAVATIONS - SITE OF, 1938-9	ROMANO BRITISH	SH77068228A
5459	FFYNNON GALCHOG, GREAT ORME	PREHISTORIC	SH77538365
5460	TRACKWAYS (?) W. OF OLD RECOTORY, GT.ORME	UNDETERMINED	SH76718396
5461	EARTHWORK, NR FFYNNON RUFENIG, GT ORME	UNDETERMINED	SH76508385
5462	ENCLOSURE AND STRUCTURES, PYLLAU ROAD, GT. ORME	UNDETERMINED	SH77368299
5677	STONE AXE - PLAS TUDNO, GT.ORME	PREHISTORIC	SH77818279
6598	PART OF HUMAN SKULL - FINDSPOT, TY GWYN RD.	UNDETERMINED	SH77798281
6961	LLANDUDNO PARISH CHURCH	MEDIEVAL	SH76978382
7380	BA METALWORKING SITE, PENTRWYN	PREHISTORIC	SH78098380
15200	CULTIVATION RIDGES, PARC	MEDIEVAL	SH75658376A
15201	GOLF GREEN?, GREAT ORME GOLF COURSE	MODERN	SH75668366
15202	GOLF GREEN?, GREAT ORME GOLF COURSE	MODERN	SH75668366
15203	GOLF GREEN?, GREAT ORME GOLF COURSE	MODERN	SH75668366
15204	GREEN, GREAT ORME GOLF COURSE	MODERN	SH75658363
15205	GOLF GREEN (TEE), GREAT ORME GOLF COURSE	MODERN	SH75638364
15206	FIELD BANK, SW GREAT ORME	MEDIEVAL	SH75798344C
15207	FIELD BANK, SW GREAT ORME	MEDIEVAL	SH75918338C
15208	GREEN, GREAT ORME GOLF COURSE	MODERN	SH76028381C
15209	BANK (GOLF COURSE), GREAT ORME	MODERN	SH76018379C
15210	'OLD QUARRY', NW GREAT ORME	UNDETERMINED	SH75978420
15211	FIELD WALL?, NW GREAT ORME	UNDETERMINED	SH75998411C
15212	FIELD WALL?, NW GREAT ORME	UNDETERMINED	SH75928410C
15213	CULTIVATION RIDGES	MEDIEVAL	SH75848372A
15214	AMMUNITION STORE, GUNNERY SCHOOL	MODERN	SH75258351
15215	WORKSHOPS, GUNNERY SCHOOL	MODERN	SH75278344
15216	GUARD SHELTER, GUNNERY SCHOOL	MODERN	SH75418334
15217	GUN STORE, GUNNERY SCHOOL	MODERN	SH75138347

15218	NAVAL GUN EMPLACEMENT, GUNNERY SCHOOL	MODERN	SH75098362
15219	GUN STORE, GUNNERY SCHOOL	MODERN	SH75118355
15220	COMMAND POST, GUNNERY SCHOOL	MODERN	SH75178355
15221	GUN EMPLACEMENT, GUNNERY SCHOOL	MODERN	SH75098355
15222	GUM EMPLACEMENT, GUNNERY SCHOOL	MODERN	SH75108352
15223	GUN EMPLACEMENT, GUNNERY SCHOOL	MODERN	SH75098355
15224	CONTROL TOWER, GUNNERY SCHOOL	MODERN	SH75148350
15225	GUN EMPLACEMENTS (A BATTERY), GUNNERY SCHOOL	MODERN	SH75028383
15226	O.P. WIRELESS, GUNNERY SCHOOL	MODERN	SH75058391
15227	OBSERVATION POST, GUNNERY SCHOOL	MODERN	SH75118372
15228	BANK, PENMYNYDD ISA	POST MEDIEVAL	SH77568336C
15229	QUARRY, EAST OF PENMYNYDD UCHA	UNDETERMINED	SH77428315
15230	SHAFT, PENMYNYDD UCHA	POST MEDIEVAL	SH77288314
15231	BANK, WEST OF FFYNNON GALCHOG	UNDETERMINED	SH77608367C
15232	BANK, NORTH OF PENMYNYDD ISA	UNDETERMINED	SH77388364C
15233	LEVEL, NORTH-WEST OF PENMYNYDD ISA	POST MEDIEVAL	SH77158366
15234	GREEN, GREAT ORME GOLF COURSE	MODERN	SH75768349
15235	CULTIVATION RIDGES, PARC	MEDIEVAL	SH75738366C
15236	CULTIVATION RIDGES, GREAT ORME	MEDIEVAL	SH76098383A
15237	FIELD BANK, GREAT ORME	MEDIEVAL	SH75868384C
15238	FIELD BANK, GREAT ORME	MEDIEVAL	SH75828389C
15239	FIELD BANK, GREAT ORME	MEDIEVAL	SH75808392C
15240	DITCH?, GREAT ORME	MEDIEVAL	SH75858390C
15241	FIELD WALL?, NW GREAT ORME	UNDETERMINED	SH76168414C
15242	GREEN (9TH HOLE), GREAT ORME GOLF COURSE	MODERN	SH76088335
15243	GREEN (15TH HOLE), GREAT ORME GOLF COURSE	MODERN	SH76158331
15244	FIELD BANK, S GREAT ORME	MEDIEVAL	SH76078331C
15245	FIELD BANK, S GREAT ORME	MEDIEVAL	SH76148330C
15246	FIELD BANK, S GREAT ORME	MEDIEVAL	SH76098337C
15247	TEE? (10TH HOLE), GREAT ORME GOLF COURSE	MODERN	SH76098332
15248	QUARRY?/TRIAL, S GREAT ORME	UNDETERMINED	SH76118326
15249	ENCLOSURE, GREAT ORME	POST MEDIEVAL	SH75958350
15250	CULTIVATION RIDGES, GREAT ORME	POST MEDIEVAL?	SH75968348A
15251	GREEN? (7TH HOLE), GREAT ORME GOLF COURSE	MODERN	SH76038367
15252	BUNKERS? (7TH HOLE), GREAT ORME GOLF COURSE	MODERN	SH75998365
15253	ENCLOSURE, S GREAT ORME	POST MEDIEVAL	SH76028341
15254	PLATFORM (CAFE?), S GREAT ORME	MODERN?	SH75958340
15255	FIELD BANK, S GREAT ORME	POST MEDIEVAL	SH75998341C
15256	CULTIVATION RIDGES, S GREAT ORME	POST MEDIEVAL	SH76008340A
15257	QUARRY/TRIAL?	POST MEDIEVAL?	SH76128341

15258	TRACKWAYS?, GREAT ORME	POST MEDIEVAL	SH76108342C
15259	BUNKER, GREAT ORME GOLF COURSE	MODERN	SH76068351
15260	DEPRESSION, GREAT ORME	UNDETERMINED	SH76108351
15261	BUNKER, GREAT ORME GOLF COURSE	MODERN	SH76128355
15262	QUARRY, S GREAT ORME	UNDETERMINED	SH75928339
15263	BANK (7TH HOLE), GREAT ORME GOLF COURSE	MODERN	SH75818353
15264	CROPMARK/DITCH, GREAT ORME	UNDETERMINED	SH75938356C
15265	EARTHWORK, GREAT ORME	POST MEDIEVAL	SH75898361
15266	DEPRESSION, GREAT ORME	UNDETERMINED	SH76038356
15267	GREEN (10TH HOLE), GREAT ORME GOLF COURSE	MODERN	SH76128349
15268	PLATFORM (GOLF FEATURE?), GREAT ORME	MODERN?	SH76108348
15269	EARTHWORK (BUNKERS?), GREAT ORME	MODERN?	SH76108349
15270	QUARRY?, GREAT ORME	POST MEDIEVAL?	SH76318367
15271	QUARRY?, GREAT ORME	POST MEDIEVAL	SH76308370
15272	DEPRESSION, GREAT ORME	UNDETERMINED	SH76338391
15273	BANK?, GREAT ORME	MEDIEVAL	SH76338390C
15274	CULTIVATION RIDGES, GREAT ORME	MEDIEVAL	SH76268384A
15275	QUARRY, SW OF PENMYNYDD UCHA	POST MEDIEVAL	SH77218312
15276	SHAFT?, E OF PENMYNYDD UCHA	POST MEDIEVAL	SH77358331
15277	MINE SHAFT, GREAT ORME	POST MEDIEVAL	SH76998308
15278	BUNKER?, GREAT ORME GOLF COURSE	MODERN	SH76078371
15279	CULTIVATION RIDGES, GREAT ORME	MEDIEVAL	SH75928368A
15280	CROPMARK, GREAT ORME	UNDETERMINED	SH75728375C
15281	ENCLOSURE BANK, GREAT ORME		
15282	TRACKWAY?, GREAT ORME	UNDETERMINED	SH75908386C
15283	BANK, GREAT ORME	POST MEDIEVAL	SH76128369C
15284	CULTIVATION RIDGES, PANT Y FFRIDD	MEDIEVAL	SH77138279A
15285	LYNCHET, PEN Y FFRIDD	POST MEDIEVAL?	SH77038273C
15286	BANK, PEN Y FFRIDD	MEDIEVAL	SH77048274C
15287	COTTAGE GARDENS, PEN Y FFRIDD	POST MEDIEVAL	SH76988277
15288	RECTANGULAR STRUCTURE, PEN Y FFRIDD	POST MEDIEVAL?	SH76918272
15289	GARDEN, PEN Y FFRIDD	POST MEDIEVAL	SH76948273
15290	WALL, S OF PEN Y FFRIDD	POST MEDIEVAL	SH76898258C
15291	WALL, 'CAER EVE', BRYN GWYNT	MEDIEVAL	SH77188268C
15292	QUARRY, MAES Y FACRELL	POST MEDIEVAL	SH76958299
15293	SUB-RECTANGULAR DEPRESSION, CYLL TERRACE	UNDETERMINED	SH77178281
15294	BANK, W OF PENMYNYDD UCHA	PREHISTORIC?	SH77178323C
15295	BELL PIT, W OF PENMYNYDD UCHA	POST MEDIEVAL	SH77198321
15296	BELL PIT, W OF PENMYNYDD UCHA	POST MEDIEVAL	SH77148320
15297	QUARRY?, W OF PENMYNYDD	POST MEDIEVAL	SH77188322

15298	BELL PIT, W OF PENMYNYDD UCHA	POST MEDIEVAL	SH77148320
15299	CULTIVATION RIDGES, PYLLAU VALLEY	MEDIEVAL	SH77158319A
15300	BANK, PYLLAU VALLEY	MEDIEVAL	SH77148317C
15301	ENCLOSURE, PYLLAU VALLEY	UNDETERMINED	SH77158315A
15302	RECTANGULAR BUILDING?, PYLLAU VALLEY	UNDETERMINED	SH77208310
15303	BANK, PYLLAU VALLEY	UNDETERMINED	SH77158310
15304	LEAT, PYLLAU VALLEY	POST MEDIEVAL	SH77258307
15305	LEAT, PYLLAU VALLEY	POST MEDIEVAL	SH77188305C
15306	BANK, PYLLAU VALLEY	POST MEDIEVAL	SH77258302C
15307	MINING ACTIVITY, SW OF PENMYNYDD UCHA	POST MEDIEVAL	SH77238320
15308	LEAT	UNDETERMINED	SH77218317C
15309	BANK, PYLLAU VALLEY	UNDETERMINED	SH77238311C
15310	BANK, PYLLAU VALLEY	UNDETERMINED	SH77188314C
15311	MOUND, PYLLAU	UNDETERMINED	SH77178313
15312	CULTIVATION RIDGES? PYLLAU	MEDIEVAL	SH77208314
15313	HUT CIRCLE? AND BANK, W OF PENMYNYDD UCHA	PREHISTORIC?	SH77218324
15314	SPRING?, PYLLAU ROAD	UNDETERMINED	SH77318298
15315	RECTANGULAR STRUCTURE? (REMAINS OF), PYLLAU ROAD	POST MEDIEVAL	SH77328300
15316	STONE CANNON?, PYLLAU ROAD	POST MEDIEVAL	SH7733830
15317	QUARRIES, N OF ST BEUNO'S ROAD	POST MEDIEVAL	SH77368306
15318	QUARRIES, N OF ST BEUNO'S ROAD	POST MEDIEVAL	SH77378304
15319	QUARRY, N OF ST BEUNO'S ROAD	UNDETERMINED	SH77358299
15320	TRACKWAY, ST BEUNO'S ROAD	POST MEDIEVAL	SH77388300C
15321	SUB-CIRCULAR PLATFORM, PYLLAU ROAD	UNDETERMINED	SH77298300
15322	SUB-CIRCULAR PLATFORM, PYLLAU ROAD	UNDETERMINED	SH77308299
15323	CURVING BANK, N OF PYLLAU ROAD	UNDETERMINED	SH77248303
15324	STONE WALL, N OF PYLLAU ROAD	POST MEDIEVAL?	SH77288302
15325	BUILDING?, BRYN EISTEDDFOD	UNDETERMINED	SH77258286
15326	QUARRY, BRYN GWYNT	UNDETERMINED	SH77258283
15327	BRYN GWYNT (SITE OF), GREAT ORME	POST MEDIEVAL	SH77178270
15328	SHAFT, PYLLAU	POST MEDIEVAL	SH77098292
15329	SHAFT, PYLLAU	POST MEDIEVAL	SH77028285
15330	LEAT, PYLLAU	POST MEDIEVAL	SH77028283C
15331	CULTIVATION RIDGES, SW GREAT ORME	UNDETERMINED	SH76868242A
15332	BANK, PEN Y FFRIDD	UNDETERMINED	SH76908251C
15333	RECTANGULAR EARTHWORKS, PEN Y FFRIDD	UNDETERMINED	SH76898250
15334	DENUDED WALL, PEN Y FFRIDD	PREHISTORIC?	SH76898251C
15335	QUARRY, SW GREAT ORME	UNDETERMINED	SH76948240
15336	BANK, SW GREAT ORME	MEDIEVAL	SH76928243C
15337	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76348357A

15338	CIRCULAR BANK, SW GREAT ORME	MEDIEVAL	SH76958242C
15339	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76218347A
15340	TRIAL, SW GREAT ORME	POST MEDIEVAL	SH77098242
15341	TRIAL, SW GREAT ORME	POST MEDIEVAL	SH77128244
15342	TRIAL, SW GREAT ORME	POST MEDIEVAL	SH77128244
15343	WALL, SW OF GREAT ORME	POST MEDIEVAL?	SH77048240C
15344	CULTIVATION RIDGES, SW GREAT ORME	MEDIEVAL	SH77008243
15345	BANK, W OF PEN Y FFRIDD	UNDETERMINED	SH76798272
15346	BANK, S OF BISHOP'S QUARRY	UNDETERMINED	SH76648280C
15347	SUB-CIRCULAR DEPRESSION, BISHOP'S QUARRY	PREHISTORIC?	SH76808298
15348	QUARRY, MAES Y FACRELL	POST MEDIEVAL	SH76958297
15349	TRACKWAY, W OF PYLLAU	POST MEDIEVAL	SH76958298
15350	QUARRIES, W OF PYLLAU	POST MEDIEVAL?	SH76948289
15351	QUARRY, PEN Y FFRIDD	POST MEDIEVAL?	SH76938275
15352	CAIRN?, ROFFT QUARRY	UNDETERMINED	SH77528322
15353	CAIRN?, ROFFT QUARRY	UNDETERMINED	SH77558321
15354	FIELD BANK, GORSEDD UCHAF	UNDETERMINED	SH77698321C
15355	PLATFORM?, GORSEDD UCHAF	UNDETERMINED	SH77668324
15356	FIELD WALL, S OF GORSEDD UCHAF	UNDETERMINED	SH77658322C
15357	FIELD BANK, E OF GORSEDD UCHAF	UNDETERMINED	SH77768333C
15358	RECTANGULAR HUT?, GORSEDD UCHAF	MEDIEVAL	SH77768332
15359	QUARRY?, PEN Y BWLCH	POST MEDIEVAL	SH77868340
15360	FIELD BANK, PEN Y BWLCH	MEDIEVAL	SH77888344C
15361	POSSIBLE STANDING STONE, PEN Y BWLCH	UNDETERMINED	SH77898337
15362	QUARRIES, MYNYDD ISAF	UNDETERMINED	SH77798344C
15363	RECTANGULAR DEPRESSION, MYNYDD ISAF	UNDETERMINED	SH77698349
15364	SHAFT, GORSEDD UCHAF, S. MYNYDD ISAF	POST MEDIEVAL	SH77668331
15365	BELL PIT?, MYNYDD ISAF	POST MEDIEVAL	SH77478327
15366	QUARRY, MYNYDD ISAF	POST MEDIEVAL	SH77478329A
15367	LIMEKILN?, MYNYDD ISAF	POST MEDIEVAL	SH77468334
15368	KIOSK (REMAINS OF), CWLACH	MODERN	SH77438251
15369	QUARRY, CWLACH	UNDETERMINED	SH77478261
15370	CULTIVATION RIDGES, FFYNNON RHUFEINIG	MEDIEVAL	SH76498398A
15371	CULTIVATION RIDGES, FFYNNON RHUFEINIG	MEDIEVAL	SH76418396A
15372	CULTIVATION RIDGES, FFYNNON RHUFEINIG	MEDIEVAL	SH76528388A
15373	CULTIVATION RIDGES, FFYNNON RHUFEINIG	MEDIEVAL	SH76488391A
15374	CULTIVATION RIDGES, FFYNNON RHUFEINIG	MEDIEVAL	SH76498395A
15375	CULTIVATION RIDGES, FFYNNON RHUFEINIG	MEDIEVAL	SH76588396A
15376	CULTIVATION RIDGES, NW OF ST TUDNO'S CHURCH	MEDIEVAL	SH76658405A
15377	FIELD BANK, NW OF ST TUDNO'S CHURCH	MEDIEVAL	SH76668404C



15378	CULTIVATION RIDGES, GREAT ORME	MEDIEVAL	SH76178340A
15379	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76408355A
15380	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76488358A
15381	BUNKER, GREAT ORME GOLF COURSE	MODERN?	SH76488355
15382	QUARRY? PARC	UNDETERMINED	SH76248355
15383	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76388342A
15384	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76398359A
15385	FIELD WALL, GREAT ORME		SH76018410C
15386	CULTIVATION RIDGES, PARC	MEDIEVAL	SH75908377A
15387	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76068343A
15388	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76138354A
15389	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76048355A
15390	CULTIVATION RIDGES, PARC	UNDETERMINED	SH75938345A
15391	POSSIBLE CULTIVATION RIDGES, PARC	UNDETERMINED	SH76288377A
15392	DENUDED FIELD BANK, PARC	UNDETERMINED	SH76158367C
15393	FIELD BANK, PARC	MEDIEVAL	SH76358387C
15394	FIELD BANK, PARC	MEDIEVAL	SH76358384C
15395	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76348383A
15396	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76348386A
15397	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76348388A
15398	QUARRY?, PARC	POST MEDIEVAL	SH76338374
15399	QUARRY, PARC	POST MEDIEVAL	SH76388376
15400	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76348322A
15401	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76318317A
15402	FIELD BANK?, PARC	MEDIEVAL	SH76318321C
15403	WORLD WAR II RADAR FACTORY (SITE OF), GREAT ORME	MODERN	SH75478395A
15404	QUARRY, GREAT ORME	POST MEDIEVAL	SH75828428
15405	CARINS?, GREAT ORME	UNDETERMINED	SH75868428C
15406	HUT CIRCLE (POSS.), PENMYNYDD UCHAF	PREHISTORIC	SH77358321
15407	FIELD BANK, PENMYNYDD UCHAF	UNDETERMINED	SH77298331
15408	HUT CIRCLE?, PENMYNYDD ISA	PREHISTORIC?	SH77398337
15409	BANK, PENMYNYDD ISA	UNDETERMINED	SH77498340C
15410	BANK?, E OF PENMYNYDD ISA	MEDIEVAL	SH77288345C
15411	BANK? PENMYNNYDD ISA	UNDETERMINED	SH77238365C
15412	LYNCHET, PENMYNYDD ISA	MEDIEVAL	SH77278364C
15413	CULTIVATION RIDGES, PENMYNYDD ISA	MEDIEVAL	SH77378363A
15414	TRACKWAY, ROFFT	UNDETERMINED	SH77428307C
15415	FIELD BANK, ROFFT	PREHISTORIC	SH77618311C
15416	TRACKWAY, PORTH Y HELIG	UNDETERMINED	SH77518357C
15417	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76508377A

15418	CULTIVATION RIDGES, FFYNNONRHUFEINIG	MEDIEVAL	SH76638383A
15419	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76448377A
15420	GREEN, GREAT ORME GOLF COURSE	MODERN	SH76448342
15421	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76458349A
15422	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76488345A
15423	TRACKWAY?, PARC	UNDETERMINED	SH76348349C
15424	LAZY BEDS?, SUMMIT, GREAT ORME	MEDIEVAL	SH76708361A
15425	QUARRY, PARC	UNDETERMINED	SH76688356
15426	QUARRY, PARC	UNDETERMINED	SH76608362
15427	FIELD BANK, PARC	MEDIEVAL	SH76678362C
15428	FIELD BANK, PARC	UNDETERMINED	SH76688358C
15429	TRACKWAY, PARC	UNDETERMINED	SH76648359C
15430	BUNKER, GREAT ORME GOLF COURSE	MODERN	SH76488363
15431	GREEN, GREAT ORME GOLF COURSE	MODERN	SH76438369
15432	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76488364A
15433	CULTIVATION RIDGES, ST TUDNO'S CHURCH	MEDIEVAL	SH76878369A
15434	FIELD BANK, ST TUDNO'S CHURCH	MEDIEVAL	SH76788377C
15435	LYNCHET, PORTH Y HELIG	UNDETERMINED	SH77498361C
15436	LEAT, PORTH Y HELIG	UNDETERMINED	SH77478365
15437	QUARRIES?, CWLACH	UNDETERMINED	SH77668273
15438	TERRACED AREA, CWLACH	POST MEDIEVAL	77548263
15439	DISUSED GARDENS?, CWLACH	POST MEDIEVAL	SH77678266A
15440	DISUSED GARDENS?, CWLACH	POST MEDIEVAL	SH77598262
15441	TRIAL, CWLACH	POST MEDIEVAL	SH77598265
15442	TRACKWAY/DUMP?, CWLACH	UNDETERMINED	SH77578265
15443	ANVIL STONE (POSS.), CWLACH	PREHISTORIC?	SH77588263
15444	POSS. TRIAL, HAULFRE GARDENS	POST MEDIEVAL	SH77508257
15445	MINITURE GOLF COURSE, CWLACH	MODERN	SH77428261A
15446	CULTIVATION RIDGES, CWLACH	UNDETERMINED	SH77348254A
15447	GUNSITE MINE/COWBOY MINE, TRWYNGOGARTH	POST MEDIEVAL	SH75008380
15448	WEST LOOKOUT TRIALS, TRWYNGOGARTH	POST MEDIEVAL	SH75168390
15449	METAL INGOT (FINDSPOT), TRWYNGOGARTH	UNDETERMINED	SH75178390
15450	MONK'S PATH TRIAL, GOGARTH	POST MEDIEVAL	SH75988322
15451	FFYNNON LLYGAID TRIAL	POST MEDIEVAL	SH76088318
15452	MIRIAM'S CAVE, GOGARTH	POST MEDIEVAL	SH76418250
15453	PEN Y FFRIDD GOCH TRIAL, GOGARTH	POST MEDIEVAL	SH76518265
15454	QUARRY, GOGARTH	POST MEDIEVAL	SH76668241
15455	QUARRY, GOGARTH	POST MEDIEVAL	SH76538243
15456	BEAR'S CAVE/OGOF ARTH, GREAT ORME	PREHISTORIC?	SH76928231
15457	GRAVEL PIT, GOGARTH	POST MEDIEVAL	SH76948227

15458	'ZIG-ZAG' PATH, WEST SHORE	POST MEDIEVAL	SH77218237
15459	SHELL MIDDEN?, PENMORFA	PREHISTORIC	SH77198222
15460	PINK FARM SPRING, GREAT ORME	UNDETERMINED	SH77388356
15461	TRIAL, S OF ST TUDNO'S CHURCH	POST MEDIEVAL	SH77008370
15462	MANGANESE MINE, PEN Y FFRIDD	POST MEDIEVAL	SH77028260
15463	WELL, TYN Y COED	UNDETERMINED	SH77348267
15464	TYN Y COED SHAFT, CWLACH	POST MEDIEVAL	SH77308260
15465	ANGLESEY TERRACE TRIAL, GREAT ORME	POST MEDIEVAL	SH77198259
15466	QUARRY, TYN Y COED	POST MEDIEVAL	SH77238251
15467	QUARRY, TYN Y COED	POST MEDIEVAL	SH77238254
15468	'OLD QUARRY', PARC	UNDETERMINED	SH75878344
15469	QUARRY, TRWYNGOGARTH	UNDETERMINED	SH75508355
15470	WEST LOOKOUT (SOUTH) TRIAL, TRWYNGOGARTH	POST MEDIEVAL	SH75188390
15471	SHAFT, WEST LOOKOUT, TRWYNGOGARTH	POST MEDIEVAL	SH75158389
15472	TRIAL, HAPPY VALLEY	POST MEDIEVAL	SH78068315
15473	TRIAL, HAPPY VALLEY	POST MEDIEVAL	SH78068315
15474	BANK, GORLAN GRAS PARI	UNDETERMINED	SH76648260
15475	BANK, GOGARTH	UNDETERMINED	SH76658255
15476	BISHOP'S QUARRY, GREAT ORME	POST MEDIEVAL	SH76738307A
15477	FIELD WALL?, GREAT ORME	PREHISTORIC?	SH75918412C
15478	FIELD WALL?, GREAT ORME	PREHISTORIC?	SH75958406
15479	DESERTED RURAL SETTLEMENT?, E OF HAFNANT	MEDIEVAL	SH76418393
15480	CULTIVATION RIDGES, LLETY'R FADOC	MEDIEVAL	SH76398395A
15481	CULTIVATION RIDGES, HAFNANT	MEDIEVAL	SH76338398A
15482	CULTIVATION RIDGES, HAFNANT	MEDIEVAL	SH76358403A
15483	CULTIVATION RIDGES, LLETY'R FADOC	MEDIEVAL	SH76418403A
15484	TRIAL?, PENYMYNYDD UCHAF	POST MEDIEVAL	SH77398313
15485	TRACKWAY, ROFFT QUARRY	POST MEDIEVAL	SH77418310
15486	QUARRY, S. ROFFT QUARRY	POST MEDIEVAL?	SH77458303
15487	BANK?, KILLEN'S HILL	UNDETERMINED	SH77438301C
15488	HUT CIRCLE?, CRAIG ROFFT	PREHISTORIC	SH77498300
15489	QUARRY, WYDDFID	POST MEDIEVAL	SH77788322
15490	MINITURE GOLF COURSE, WYDDFIF	MODERN	SH77868320A
15491	RADAR STATION, GREAT ORME	MODERN	SH75178395
15492	OBSERVATION POST, GREAT ORME	MODERN	SH75488419
15493	OBSERVATION POST, TRWYNGOGARTH	MODERN	SH75078400
15494	OBSERVATION POST, TRWYNGOGARTH	MODERN	SH75068406
15495	OBSERVATION POST, TRWYNGOGARTH	MODERN	SH75118407
15496	OBSERVATION POST, TRWYNGOGARTH	MODERN	SH75088408
15497	ENGINE HOUSE ('A' BATTERY), TRWYNGOGARTH	MODERN	SH75118387

15498	GUNNERY SCHOOL BUILDING, TRWYNGOGARTH	MODERN	SH75168359
15499	POWER HOUSE, TRWYNGOGARTH	MODERN	SH75148369
15500	MOWF ENGINE HOUSE, TRWYNGOGARTH	MODERN	SH75148372
15501	GUN EMPLACEMENTS, TRWYNGOGARTH	MODERN	SH75188339
15502	GUNNERY SCHOOL BUILDING, TRWYNGOGARTH	MODERN	SH75348341
15503	GUNNERY SCHOOL BUILDING, TRWYNGOGARTH	MODERN	SH75318336
15504	GUNNERY SCHOOL BUILDING, TRWYNGOGARTH	MODERN	SH75358336
15505	GUN STORE AND SHELTER, TRWYNGOGARTH	MODERN	SH75468325
15507	OBSERVATION POST, TRWYNGOGARTH	MODERN	SH75458329
15508	TRACKWAY, TRWYNGOGARTH	UNDETERMINED	SH75478330C
15509	SLIT TRENCH?, TRWYNGOGARTH	MODERN	SH75458334
15510	BANK, PARC	MODERN?	SH76148347
15510	TERRACE, TRWYNGOGARTH	MEDIEVAL	SH75428339
15511	TERRACE, TRWYNGOGARTH	MEDIEVAL	SH74368343C
15512	BANK, TRWYNGOGARTH	MEDIEVAL	SH75328348
15513	BANK, TRWYNGOGARTH	MEDIEVAL	SH75338348
15514	FIELD BANK, GOGARTH	MEDIEVAL	SH75878303
15515	FIELD BANK, TRWYNGOGARTH	MEDIEVAL	SH75098373
15516	FIELD BANK, TRWYNGOGARTH	MEDIEVAL	SH75138357C
15517	CULTIVATION RIDGES, SUMMIT	UNDETERMINED	SH76658351A
15518	FIELD BANK, ST TUDNO'S CHURCH	MEDIEVAL	SH76758390C
15519	CULTIVATION RIDGES, ST TUDNO'S CHURCH	MEDIEVAL	SH76768395A
15520	CULTIVATION RIDGES, ST TUDNO'S CHURCH	MEDIEVAL	SH76748399A
15521	CULTIVATION RIDGES, ST TUDNO'S CHURCH	MEDIEVAL	SH76728402A
15522	FIELD BANK, ST TUDNO'S CHURCH	MEDIEVAL	SH76808397C
15523	CIRCULAR BANK?, ST TUDNO'S CHURCH	UNDETERMINED	SH76758400
15524	BANK, PANT YR EGLWYS	UNDETERMINED	SH76758378C
15525	SOIL MARK, PANT YR EGLWYS	UNDETERMINED	SH76808376C
15526	WORLD WAR TWO STRUCTURE, ST TUDNO'S CHURCH	MODERN	SH76978367
15527	FIELD BANK, ST TUDNO'S CHURCH	MEDIEVAL	SH76888364C
15528	CULTIVATION RIDGES, PANT YR EGLWYS	MEDIEVAL	SH76858353A
15529	CULTIVATION RIDGES, PANT YR EGLWYS	MEDIEVAL	SH76748358A
15530	CULTIVATION RIDGES, PANT YR EGLWYS	MEDIEVAL	SH76698363A
15531	CULTIVATION RIDGES, PANT YR EGLWYS	MEDIEVAL	SH76738367A
15532	FIELD BANK, PANT YR EGLWYS	MEDIEVAL	SH76678375C
15533	FIELD BANK, PANT YR EGLWYS	MEDIEVAL	SH76688372C
15534	CULTIVATION RIDGES, PANT YR EGLWYS	MEDIEVAL	SH77028355A
15535	FIELD BANK?, PENMYNNYDD ISA	MEDIEVAL	SH77058356C
15536	FIELD BANK?, PENMYNNYDD ISA	MEDIEVAL	SH77088348C
15537	CULTIVATION RIDGES, BRYNIAU POETHION	MEDIEVAL	SH76938332A

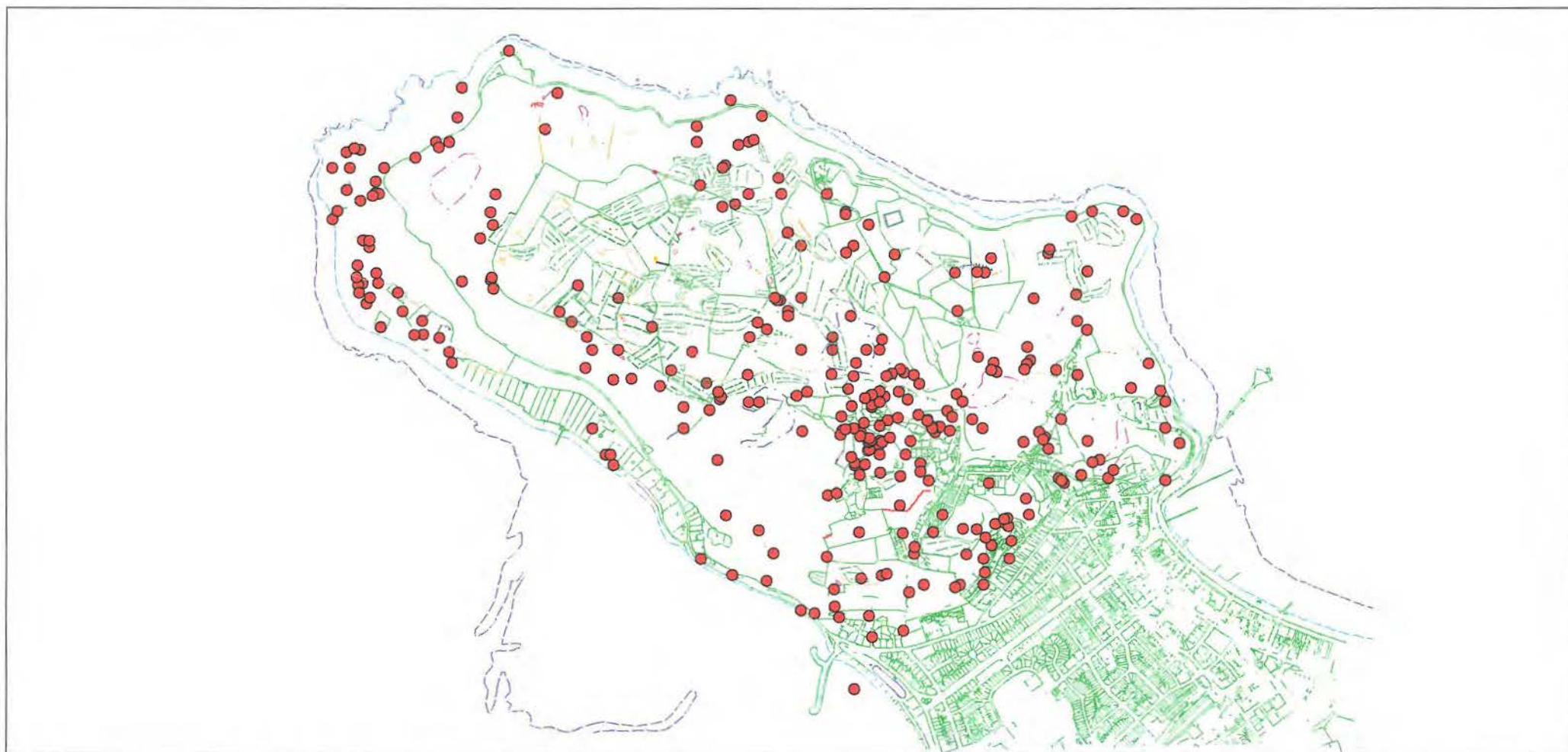
15538	CULTIVATION RIDGES, PYLLAU	MEDIEVAL	SH76938317A
15539	GREEN, GREAT ORME GOLF COURSE	MODERN	SH76368336
15540	CULTIVATION RIDGES, SUMMIT	MEDIEVAL	SH76308338A
15541	GREEN?, GREAT ORME GOLF COURSE	MODERN	SH76408327
15542	TEE?, GREAT ORME GOLF COURSE	MODERN	SH76438325
15543	SHAFT, PARC	POST MEDIEVAL	SH76388329
15544	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76458311
15545	FIELD BANK, PARC	MEDIEVAL	SH76478318C
15546	FIELD BANK, PARC	MEDIEVAL	SH76488320C
15547	CULTIVATION RIDGES, PARC	POST MEDIEVAL?	SH76398316A
15548	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76438317A
15549	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76408311A
15550	CULTIVATION RIDGES, BISHOP'S QUARRY	MEDIEVAL	SH76638318A
15551	CULTIVATION RIDGES, BISHOP'S QUARRY	MEDIEVAL	SH76548315A
15552	CULTIVATION RIDGES, PYLLAU	MEDIEVAL	SH76758319A
15553	TRIALS, N OF BISHOP'S QUARRY	POST MEDIEVAL	SH76598320
15554	OLD GRAVEL PIT, PYLLAU	POST MEDIEVAL	SH76828313
15555	BRAMMOCK ROD CUTTING, PYLLAU	POST MEDIEVAL	SH76848314
15556	CULTIVATION RIDGES?, PYLLAU	MEDIEVAL	SH76788312A
15557	PLATFORM, PYLLAU	UNDETERMINED	SH76918320
15560	QUARRY, W OF BISHOP'S QUARRY	POST MEDIEVAL?	SH764912
15561	PIT, W OF BISHOP'S QUARRY	POST MEDIEVAL?	SH76488313
15562	QUARRY, FFYNNON LLYGAID	UNDETERMINED	SH76268316
15563	QUARRY, MONK'S PATH	UNDETERMINED	SH75978335
15564	QUARRY, CREIGIAU COCHION	UNDETERMINED	SH75628353
15565	QUARRY, CREIGIAU COCHION	UNDETERMINED	SH75618357
15566	POSS. STANDING STONE, PARC	UNDETERMINED	SH75958355
15567	BUILDING FOUNDATIONS, PYLLAU	UNDETERMINED	SH76958304
15568	BUILDING PLATFORM, PYLLAU	UNDETERMINED	SH77038298
15569	QUARRY, PYLLAU	UNDETERMINED	SH76978299
15570	QUARRY, PYLLAU	UNDETERMINED	SH76998288
15571	SHAFT, PYLLAU	POST MEDIEVAL	SH77008285
15572	WALL, PANT Y FFRIDD	UNDETERMINED	SH77028282
15573	WALL, PANT Y FFRIDD	UNDETERMINED	SH77108283
15574	'L' SHAPED BANK, PYLLAU	UNDETERMINED	SH77008286
15575	SHAFT, PYLLAU	POST MEDIEVAL	SH77048286
15576	BANK, PYLLAU	UNDETERMINED	SH77038287
15577	SHAFT, PYLLAU	POST MEDIEVAL	SH77058291
15578	QUARRY?, PYLLAU	POST MEDIEVAL	SH77068291
15579	HOUSE PLATFORM?, PYLLAU	UNDETERMINED	SH77108295



15580	BANK, PYLLAU	UNDETERMINED	SH77118294C
15581	TRIAL?, PYLLAU	POST MEDIEVAL	SH77058294
15582	DEPRESSION, PYLLAU	POST MEDIEVAL	SH77068295
15583	SHAFT?, PYLLAU	POST MEDIEVAL	SH77068295
15584	MINER'S COTTAGES, PYLLAU	POST MEDIEVAL	SH77068296
15585	SHAFT, MAES Y FACRELL	POST MEDIEVAL	SH77148296
15585	BANK, MYNYDD ISAF	MEDIEVAL	SH78078330C
15586	MINE SHAFT, PEN Y GWAITH	POST MEDIEVAL	SH77028296
15587	STONE CANNON, BRYN GWYNT	POST MEDIEVAL	SH77298290
15588	DENUDED FIELD BANKS, PORTH Y HELIG	PREHISTORIC?	SH77508359A
15589	ENCLOSURE & HUT PLATFORM?, PORTH Y HELIG	PREHISTORIC?	SH77478359
15590	CULTIVATION RIDGES, MYNYDD ISAF	MEDIEVAL	SH77908376A
15591	CULTIVATION RIDGES, MYNYDD ISAF	MEDIEVAL	SH77778365A
15592	ENCLOSURE, FFYNNON GALCHOG	UNDETERMINED	SH77758368
15593	CULTIVATION RIDGES, MYNYDD ISAF	MEDIEVAL	SH77848362A
15594	CULTIVATION RIDGES, MYNYDD ISAF	MEDIEVAL	SH77938350A
15596	'BILLY'S' WALL, MYNYDD ISAF	MEDIEVAL	SH77978328C
15597	QUARRY, PEN Y DINAS	POST MEDIEVAL	SH78038296A
15598	BANK, WYDDFID	UNDETERMINED	SH77798298C
15599	TRACKWAY, WYFFID	UNDETERMINED	SH77708297C
15601	SMALL SCALE QUARRYING?, WYDDFID	POST MEDIEVAL	SH77718298A
15602	BUILDING PLATFORM, WYDDFID	POST MEDIEVAL	SH77728295
15603	QUARRY, TAN Y STAGE	POST MEDIEVAL	SH77658294A
15604	BANK, WYDDFID	UNDETERMINED	SH77748301C
15605	CULTIVATION RIDGES, MYNYDD ISAF	MEDIEVAL	SH77978375A
15606	OPEN AIR THEATRE, TY GWYN ROAD	POST MEDIEVAL	SH77878282
15607	CULTIVATION RIDGES, HAPPY VALLEY	MEDIEVAL	SH78158305A
15607	BANK, PARC	MEDIEVAL	SH76208350C
15609	GREEN? PARC	MODERN	SH76178347
15611	BANK?, ABOVE LIGHTHOUSE, GREAT ORME	PREHISTORIC?	SH75818415C
15612	BANK?, ABOVE LIGHTHOUSE, GREAT ORME	PREHISTORIC?	SH75808410C
15613	FIELD WALL, ABOVE LIGHTHOUSE, GREAT ORME	PREHISTORIC?	SH76078409C
15614	SHAFT?, S OF PENYMYNYDD ISA	POST MEDIEVAL	SH77368330
15615	BANK, TRWYNYGOGARTH	MEDIEVAL	SH75598322C
15616	BANK, PARC	MODERN?	SH75818361C
15617	BANK, PARC	MODERN?	SH75868355C
15618	CIRCULAR DEPRESSION, PARC	UNDETERMINED	SH75858357
15619	HUT CIRCLE?, PARC	PREHISTORIC?	SH75868359
15620	GREENS (2) GREAT ORME GOLF COURSE	MODERN	SH76048378C
15621	CULTIVATION RIDGES, PARC	POST MEDIEVAL?	SH76168380A

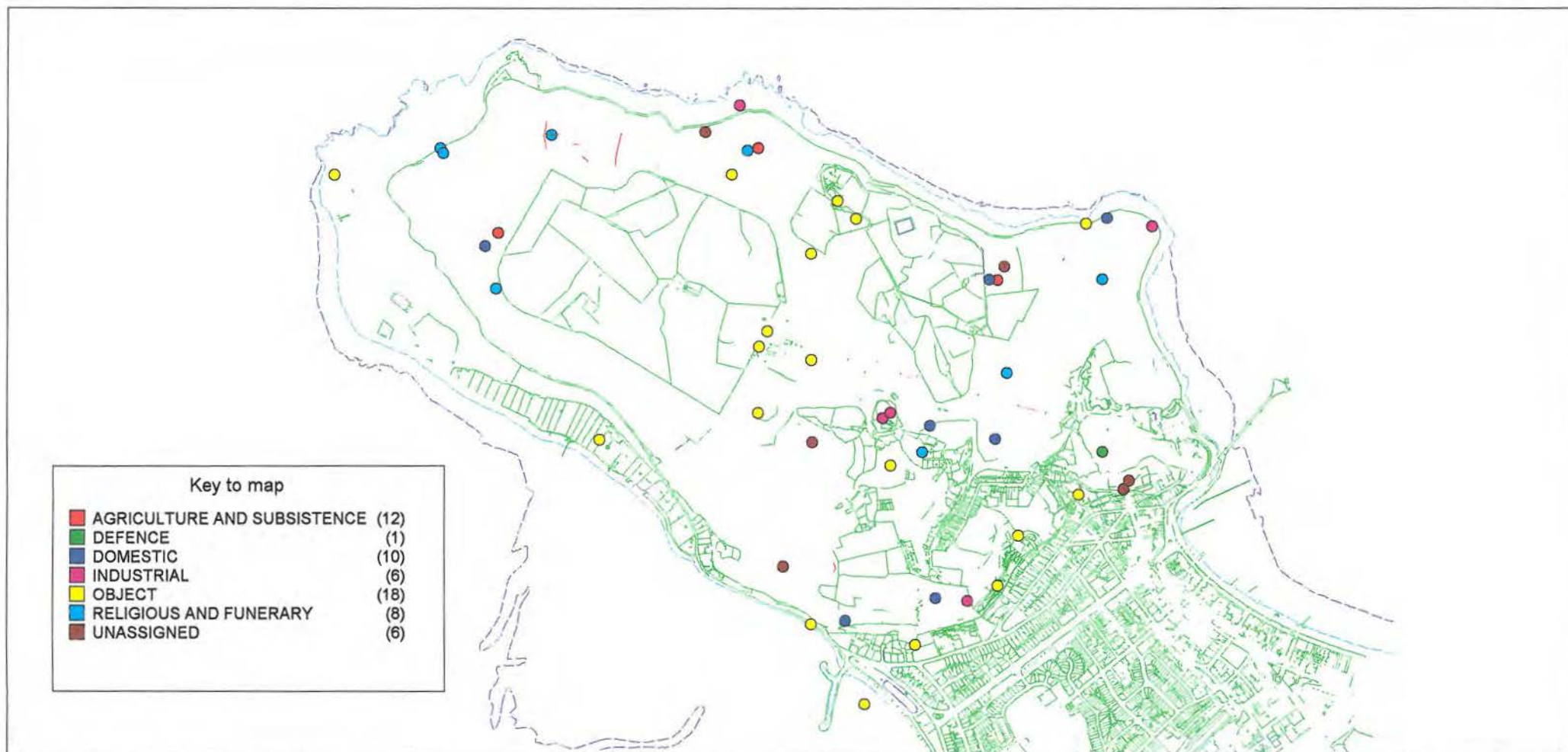
15622	ENCLOSURE, PARC	UNDETERMINED	SH76248393
15623	CIRCULAR DEPRESSION, PARC	UNDETERMINED	SH76268386
15624	ENCLOSURE, PARC	UNDETERMINED	SH76268394
15625	LINEAR DEPRESSION?, PARC	UNDETERMINED	SH76278396
15626	ENCLOSURE, PARC	UNDETERMINED	SH76248398
15627	BANK, PARC	MODERN?	SH76498364
15628	DITCH?, PARC	MODERN?	SH76478366
15629	MOUND, PARC	UNDETERMINED	SH76508366
15630	CIRCULAR FEATURES, PARC	UNDETERMINED	SH76248364
15631	GREEN, GREAT ORME GOLF COURSE	MODERN	SH76398343
15632	GREEN, GREAT ORME GOLF COURSE	MODERN	SH76418343
15633	BUNKERS, GREAT ORME GOLF COURSE	MODERN	SH76478343C
15634	CIRCULAR DEPRESSION, PARC	UNDETERMINED	SH76358321
15635	SHAFT?, PARC	POST MEDIEVAL	SH76308322
15636	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76238329A
15638	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76228359A
15639	BUILDING PLATFORM, WYDDFID	POST MEDIEVAL	SH77738296
15640	STONE CANNON, PEN Y DINAS	POST MEDIEVAL	SH77958288
15641	BANK, SW GREAT ORME	MEDIEVAL	SH76958244C
15642	RECTANGULAR DEPRESSION, SW GREAT ORME	UNDETERMINED	SH76928238
15643	CULTIVATION RIDGES, PARC	MEDIEVAL	SH76238347A
20701	OLD MINE, GT ORME	POST MEDIEVAL	SH77008300C
20702	NEW MINE, GT.ORME	POST MEDIEVAL	SH77108301C
20703	TY GWYN MINE, GT. ORME	POST MEDIEVAL	SH78208300A
20704	ROMAN SHAFT, GT ORME MINES	POST MEDIEVAL	SH77058330
20705	TREWEEKS' SHAFT, GT. ORME MINES	POST MEDIEVAL	SH77018325
20706	HIGHER SHAFT, GT.ORME MINES	POST MEDIEVAL	SH77108314
20707	OWEN'S SHAFT, GT.ORME	POST MEDIEVAL	SH76988315
20708	ENGINE HOUSE (SITE OF) GT. ORME MINES	POST MEDIEVAL	SH77128312
20709	PYLLAU SHAFT, GT ORME	POST MEDIEVAL	SH77048302
20710	VIVIAN'S SHAFT, GT.ORME	POST MEDIEVAL	SH77078309
20711	TY'N Y FRON SHAFT, GT. ORME	POST MEDIEVAL	SH77758292
20712	PENMORFA ADIT, GT. ORME	POST MEDIEVAL	SH77078220
20713	BISHOPS QUARRIES, GT ORME	POST MEDIEVAL	SH76648310C
20714	ROFFT QUARRY, GT. ORME	POST MEDIEVAL	SH77558315C
20715	BRAMMOCK RODS, SIRE OF, GT. ORME MINES	POST MEDIEVAL	SH76458307C
20716	'TOM & JERRY' ENGINE, GT. ORME	POST MEDIEVAL	SH76358300
20717	BELL PITS, BRYNIAU POETHION	POST MEDIEVAL?	SH76998336A
20718	COPPER MINE, HAULFRE, GT. ORME	POST MEDIEVAL	SH77418240
20719	WASHING/DRESSING FLOORS (SITE OF), GT.ORME MINES	POST MEDIEVAL	SH77138303

20720	POWDER HOUSE (POSS, SITE OF), GT ORME MONES	POST MEDIEVAL	SH77178304
20721	COPPER SHAFT, HAULFRE GARDENS, GT. ORME	POST MEDIEVAL	SH77538255
20722	TRAMWAY, GT. ORME	POST MEDIEVAL	SH77008320C
20723	MARINE DRIVE, GT.ORME	POST MEDIEVAL	SH75208400C
20724	SEMAPHORE STATION, GREAT ORME	POST MEDIEVAL	SH75788424
20724	SEMAPHORE STATION	POST MEDIEVAL	SH75788424
20725	GREAT ORME'S HEAD LIGHTHOUSE	POST MEDIEVAL	SH75688445
20726	LLANDUDNO CABIN LIFT, GT.ORME	MODERN	SH78258294
20727	ARTILLERY OBSERVATION HUTS, GT.ORME	MODERN	SH75638390
20728	HAPPY VALLEY LODGE TOLL, MARINE DRIVE, GT.ORME	POST MEDIEVAL	SH78188314
20729	WEST LODGE TOLL, MARINE DRIVE, GT.ORME	POST MEDIEVAL	SH76858229
20730	GOLF COUSE, GT. ORME	MODERN	SH76108350
20731	SUMMIT CAFE/HOTEL/CLUB HOUSE, GT.ORME	MODERN	SH76678338
20732	PILL BOX, MARINE DRIVE, GT.ORME	MODERN	SH78048383
20733	QUARRYING, BRYNIAU POETHION, GT.ORME	POST MEDIEVAL	SH77118334C
20734	SHAFT & MINING SPOIL, NR. HWYLFAR CEIRW, GT.ORME	POST MEDIEVAL	SH76618410
20735	SHEEPFOLDS AND SHEEPFAIR, WYDDFID, GT.ORME	POST MEDIEVAL	SH77798303
20736	TRIAL SHAFT, PARC, GT.ORME	POST MEDIEVAL	SH76238339
20737	EARTHWORK, PARC WALL, GT.ORME	MODERN	SH75928341
21503	LLANDUDNO OLD MINE	PREHISTORIC	SH77108310
21504	LLANDUDNO NEW MINE	POST MEDIEVAL	SH77108301
21575	CWLACH MINE	POST MEDIEVAL	SH77508240
21919	TY GWYN MINE	POST MEDIEVAL	SH77808280
21940	HAFNANT MINE	PREHISTORIC	SH76538426
21942	OGOF PRYF LLWYD MINE	PREHISTORIC	SH76538426
21943	FIVE ENTRANCES MINE	PREHISTORIC	SH77398239

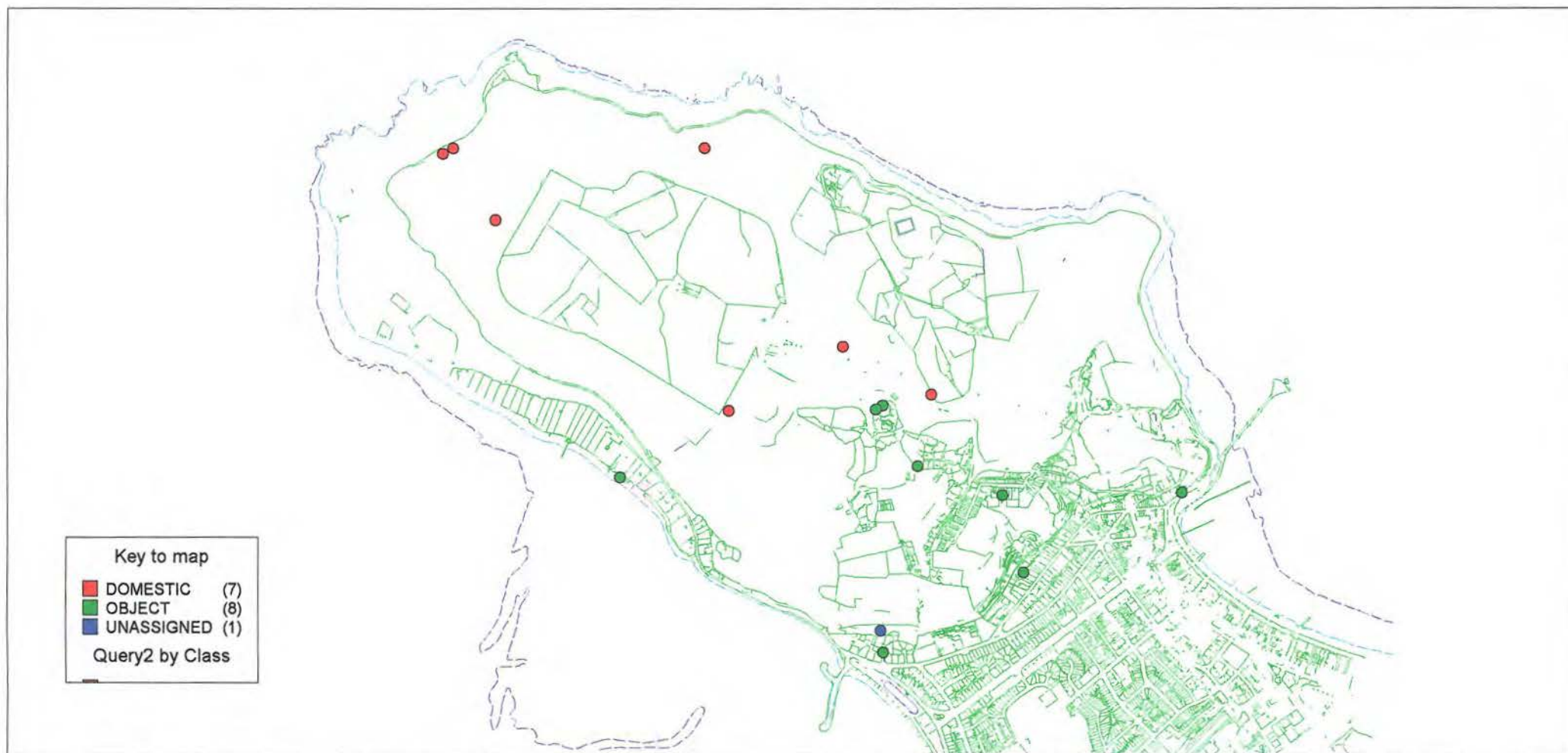


Map 1: Showing the distribution of recorded archaeological sites.



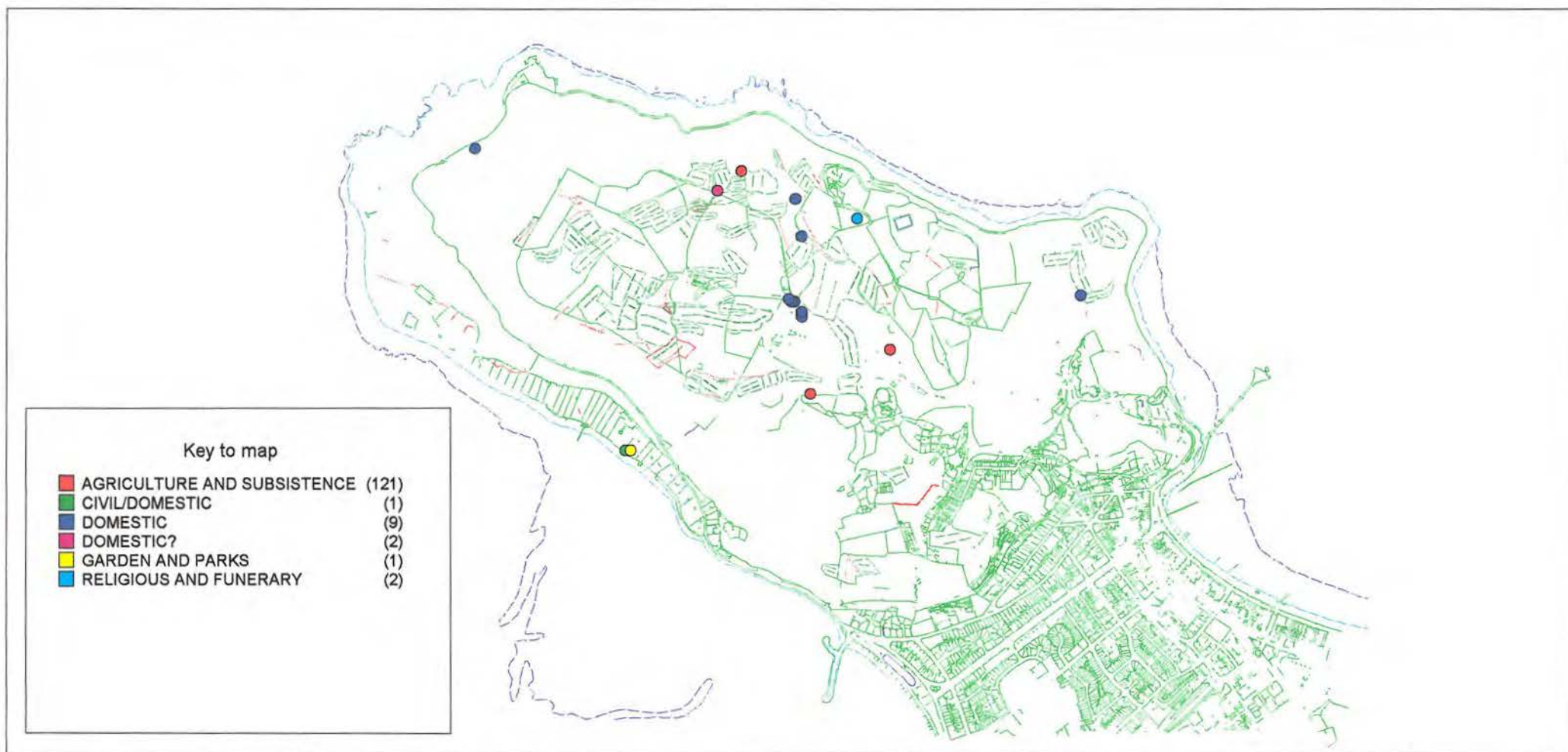


Map 2: Showing the locations of prehistoric sites.

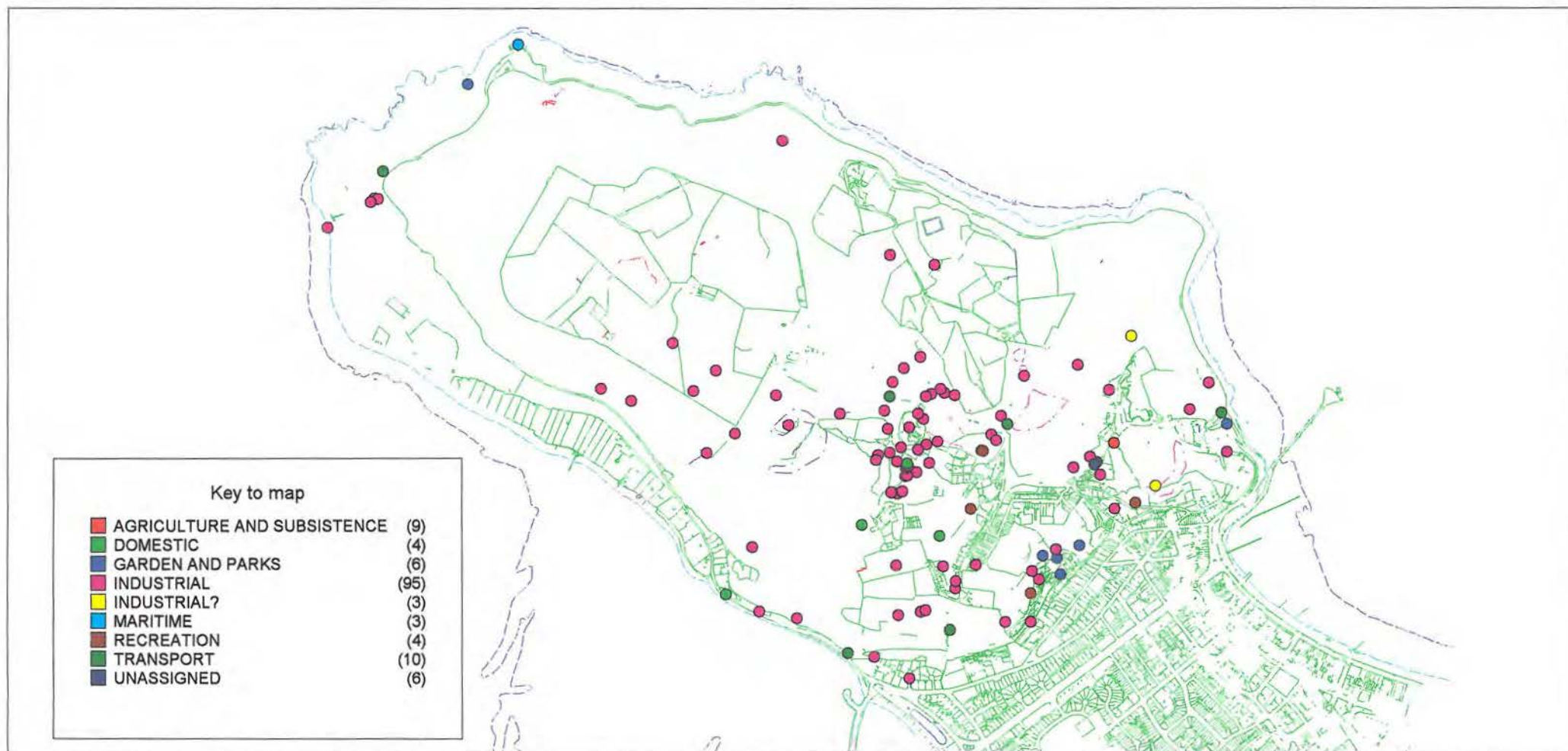


Map 3: Showing the locations of Romano-British sites.





Map 4: Showing the locations of medieval sites.

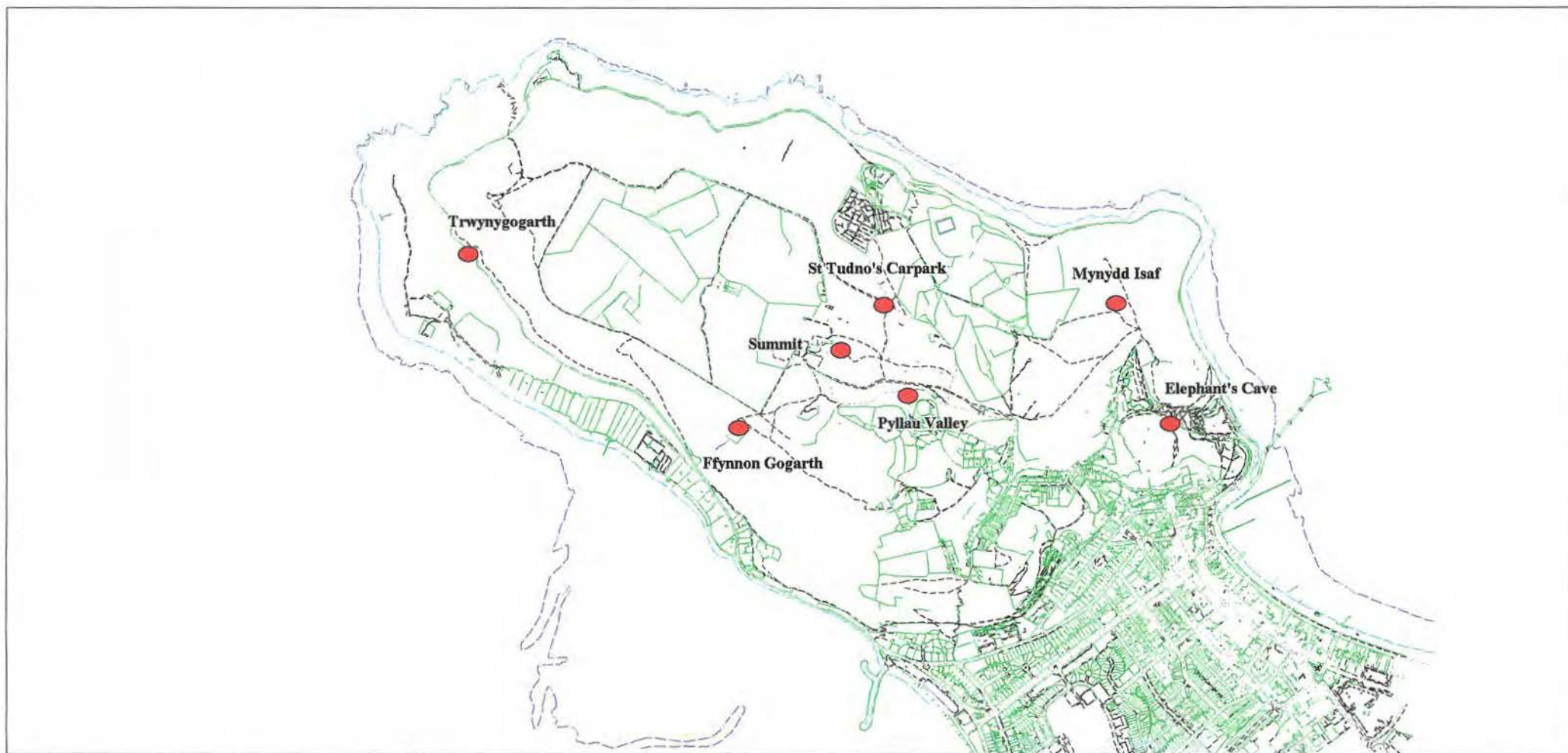


Map 5: Showing the locations of post medieval sites.



Map 6: Showing the locations of modern sites.





Map 7: Showing the locations of the proposed Heritage Panels.

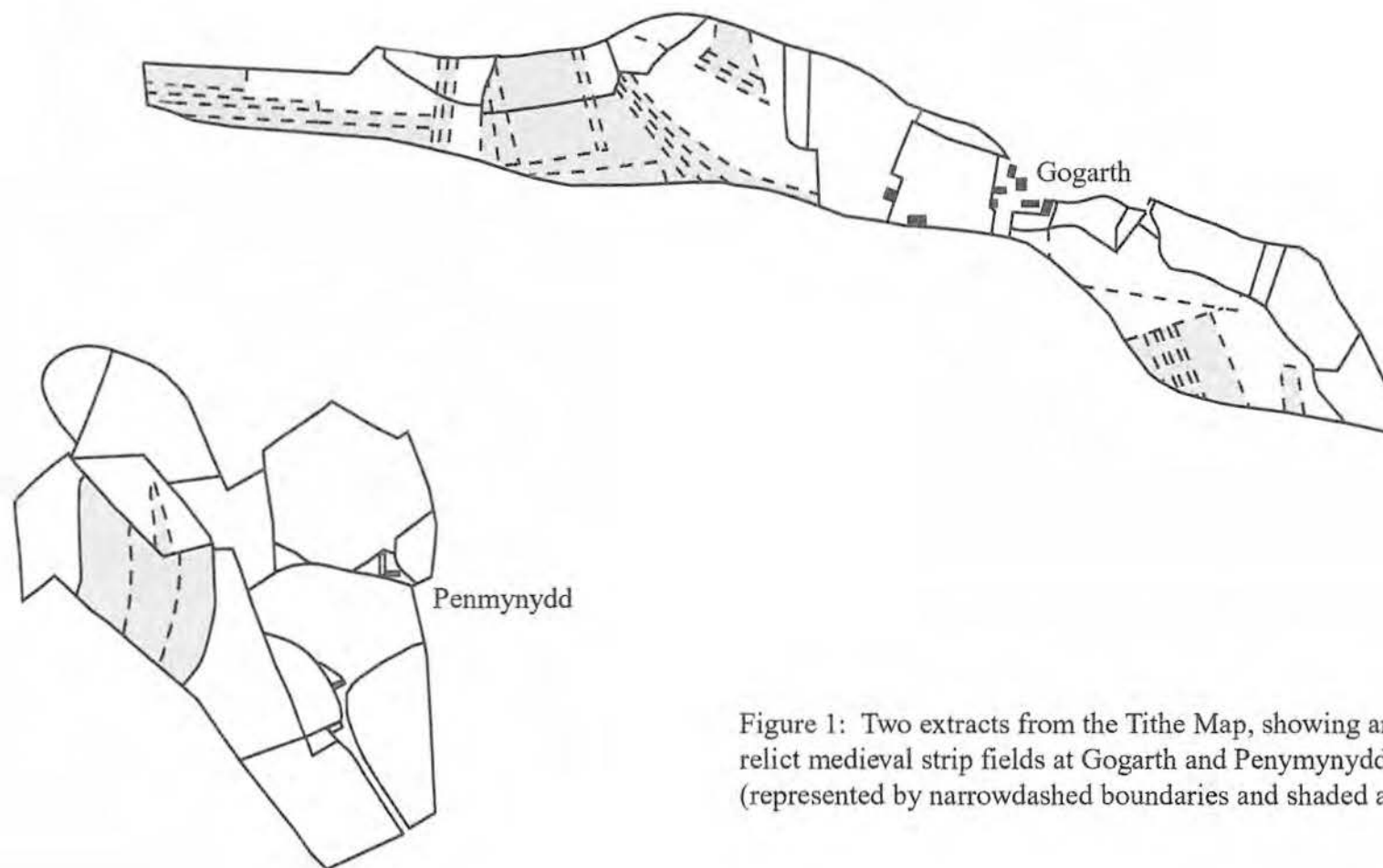


Figure 1: Two extracts from the Tithe Map, showing areas of relict medieval strip fields at Gogarth and Penmynydd Farm (represented by narrowdashed boundaries and shaded areas).

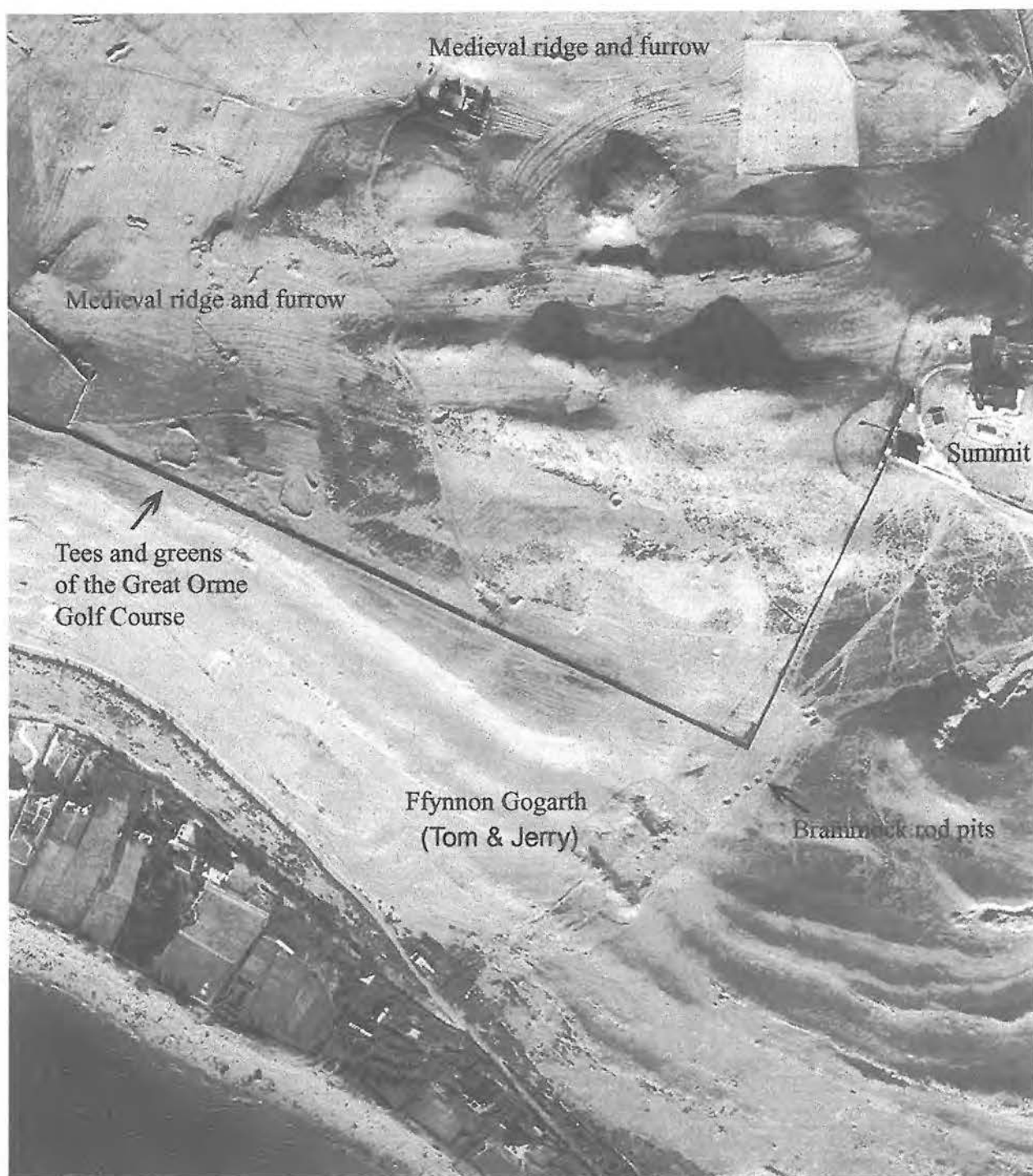


Plate 1: Part of the 1947 RAF aerial photograph of the Great Orme showing Ffynnon Gogarth and the line of pits for the brammcock rods which ran from the spring to Pyllau Valley and areas of medieval ridge and furrow overlain by features associated with the Great Orme Golf Course.





Plate 2: Part of the 1947 RAF aerial photograph showing areas of medieval ridge and furrow, settlement and later mining activity.



Plate 3: Showing a grassed over field bank, just outside Parc Farm, possibly medieval in date.



Plate 4: Showing a denuded field wall, at Eiwog, possibly part of a prehistoric landscape.



Plate 5: An abandoned terraced garden behind Cwlach Road.

Plate 6: The industrial landscape of bell pits overlying medieval ridge and furrow at Bryniau Poethion.







Plate 7: Medieval settlement at Mynydd Isaf obscured by bracken.

Plate 8: The remains of medieval fields of the township of Gogarth totally obscured by gorse and brambles.





Plate 9: Vehicle erosion on heathland, Great Orme.

Plate 10: Vehicle erosion on the area of medieval field systems above St Tudno's Church.







Plate 11: Ongoing development on Llys Helig Drive the location of agricultural land of the medieval township of Gogarth.

Plate 12: The old chapel of St Beuno's converted into a domestic property.





