



ygruga'r caerau
heather and hillforts

HEATHER AND HILLFORTS

of the Clwydian Range and Llantysilio Mountains





Michael Griffith,
Photograph Stacey
Roberts, Courtesy of
the Daily Post.

Michael Griffith CBE DL 1938-2009

This book is dedicated to Michael as a tribute to his enthusiasm, knowledge and wise counsel as Chairman of the Heather and Hillforts Partnership Board.

A Family Tribute

The chance to Chair the Heather and Hillforts project came in 2006, just the right time for Michael. He had given up a lot of his Cardiff based responsibilities and was looking for a new challenge. This embraced the three subjects that he was passionate about - history, conservation and the Welsh countryside. He loved heather moorland and was fascinated by its delicate ecology. After spending many years studying various moorland projects, he became increasingly aware that the survival of numerous species of upland birds depended on careful management.

He was an avid reader of anything and everything, especially history, which not only made him a

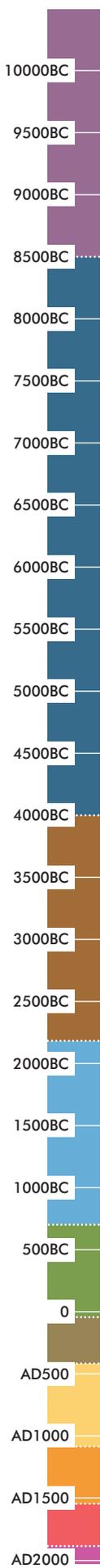
wonderful conversationalist, but a wise sage who linked many modern events to historical ones. Maybe this helped him take such a sensible, pragmatic approach to all that he did and why many others came to him for advice.

His various trips to the forts were conducted at furious pace, whatever the weather, gazing at these amazing sites, with the finest backdrop in the world, overlooking his beloved Vale of Clwyd across to the Snowdonian peaks. I was encouraged to go with Michael to visit Moel Fenlli which was described as "a nice gentle grassy stroll." It was certainly a lot more testing than the description, but was well worth the climb to see the fantastic view all around and to see the work first hand.

I think I can safely say that he is sorely missed for his counsel by not only his family, but many others in Wales.

Jill Griffith

Archaeological Time Periods



Pleistocene: about 1.64 million to about 8500BC

The first part of the geological Quaternary period, a time which included the ice ages and the first appearance on earth of humans.

Palaeolithic (Old Stone Age): 220,000BC to 8500BC

The forbears of modern humans developed stone tools and lived a nomadic life following the animals they hunted whilst also gathering food from plants. The oldest evidence of human activity in Wales dates to about 220,000BC when Neanderthals lived in Pontnewydd Cave in modern Denbighshire. Modern humans had emerged by the end of the Palaeolithic.

Mesolithic (Middle Stone Age): 8500BC to 4000BC

The period between the end of the last Ice Age and the introduction of farming to the British Isles. Life was still nomadic, probably revolving around the changing seasons. People constructed temporary shelters as they hunted animals with newly domesticated dogs, fished and collected food along the coast and gathered berries, nuts and roots. The characteristic finds of this period are tiny flint implements called microliths.

Neolithic (New Stone Age): 4000BC to 2200BC

The Neolithic is defined by the domestication of plants and animals, the introduction of pottery and polished stone axes, and the construction of the first houses and monuments. Much forest clearance took place and great structures of stone and earth served as places of burial and the focus for the spiritual lives of societies. Flint tools are the most commonly found artefacts dating to this time.

Bronze Age: 2200BC to 700BC

Societies that formerly relied solely on flint and stone as their main materials for making tools and weapons now began to use copper and bronze as well. Society itself seems to change in this period with a shift away from a focus on the group to that of the individual, hinted at by a move from communal burial to single burials or cremations. This may indicate the development of hierarchies in society and the migration of people or new ideas from the continent. There is also evidence of greater competition for the control of land.

Iron Age: 700BC to AD43

The first use of iron occurs in this period, complementing the older bronze working technology. The rearing of livestock seems to have been particularly important at this time when we see the development of tribes controlling particular areas of Britain. The most easily recognisable site of this period is the hillfort, a defended village and stronghold and in some places the centre for metalworking and other crafts. On lower ground farmsteads defended with banks and ditches topped by timber fences (palisades), in the manner of hillforts, were also occupied.

Roman: AD43 to AD410

The Romans arrived in Britain in AD43 and the conquest of Wales was completed by AD77. Roman rule over Britain lasted for nearly 400 years, the army being withdrawn to defend territories on the continent in AD410. A series of forts linked by a network of roads was constructed to exert control over the province.

Early Medieval: AD410 to 1086

Also known as the Dark Ages and the Age of the Saints and spanning the period between the breakdown of Roman rule and the Norman Conquest. Christianity spread and the kingdoms and language of Wales. Little is known of settlement although some Iron Age hillforts were reoccupied. The most visible and iconic remains are carved stone memorials to individuals, with writing in Latin and the Irish Ogham alphabet.

Medieval: AD1086 to 1536

The Normans imposed a new weapon, the castle, soon copied by the Welsh Princes as they fought the invaders, and each other. In its earliest form this was a mound of earth (the motte) topped with a timber tower and often supported by an enclosure surrounded by a bank and ditch (the bailey). The stone castle developed from this and became increasingly complex over succeeding centuries. Boroughs, where markets could be controlled and taxed were established outside castles and soon grew into towns.

Post-Medieval: AD1536 to 1899

The beginning of the suppression of the monasteries by Henry VIII and the first Act of Union binding Wales to England occurred in 1536 and mark the beginning of the Post-Medieval Period. Many medieval castles were reused defensively for the last time during the Civil War between 1642 and 1648. With the advent of the Industrial Revolution in the 18th century (1700s) massive change came to Wales as its economy, formerly dominated by agriculture, developed industrially and commercially and its towns expanded greatly in size.

Modern: AD1900 to the present

Wales has experienced two World Wars and the collapse of the heavy and extractive industries. Since 1945 the productivity and efficiency of farming has greatly expanded although the number of farms and people working on them has decreased. The landscape has been altered by the construction of wind farms, hydroelectric schemes and the planting of conifer forests in the uplands. The countryside has also had to adapt to the pressures of recreation, while towns have continued to expand, leading to threats to their historic character.





...a spine of purple rolling hills, rising above broad green valley floors that creates a landscape of breathtaking beauty. The upland moorland contains a patchwork of heather, bilberry, gorse and bracken; a plant community of international importance. It is home to a special group of upland breeding birds such as the rare black grouse, red grouse, hen harrier, merlin, ring ouzel, whinchat and wheatear. A landscape that holds the footprint of past communities and cultures, dominated by an exceptional chain of Iron Age hillforts. An area important for agriculture, with the traditional 'cynefin' system providing grazing for hefted flocks. The beauty of the area is special not only to the people who live in its shadow, but also to those who visit these hills.

The combination of the natural and historic heritage of the Clwydian Range and Llantysilio Mountains creates a truly unique landscape, greatly valued for its beauty, wildlife and archaeology, which remains to be discovered by many.

Heather and Hillforts

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"From my favourite place on the Clwydian Range, as you sit and look out over Moel Arthur and Penycloddiau hillforts, all the way to the sea, you start to think about how many people have enjoyed this view before you. The people from the past have left monuments behind them to remind us of their existence, but it is easy to forget that they may have once stood in this same spot, enjoying the view, just as we do today."

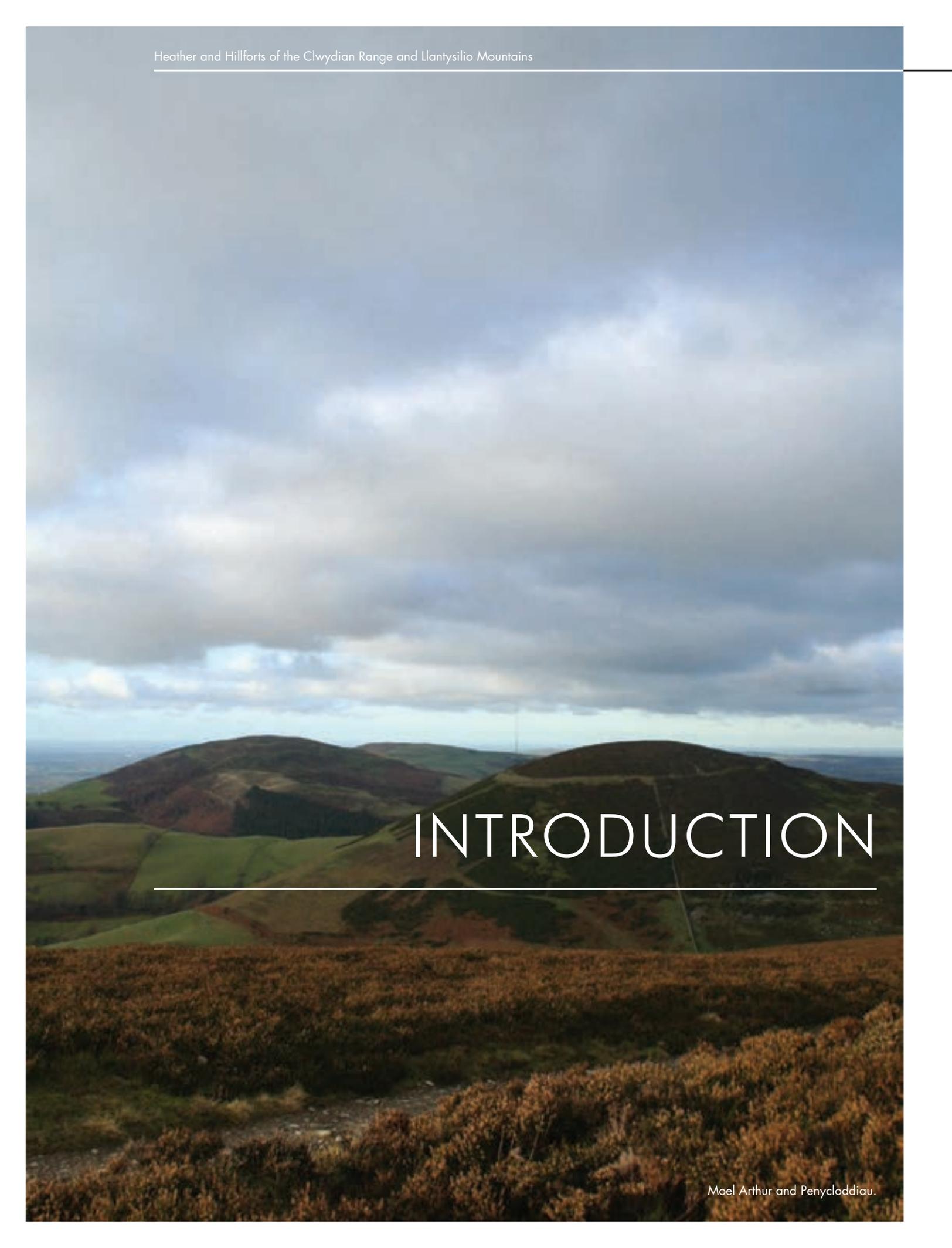
Erin Robinson, Heather and Hillforts Interpretation Officer

www.heatherandhillforts.co.uk

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Front Cover: Moel Arthur hillfort with Penycloddiau in the distance. Crown Copyright. Royal Commission on the Ancient and Historic Monuments of Wales.



INTRODUCTION

This book celebrates the achievement of the Heather and Hillforts Landscape Partnership Scheme, a five year project funded by the Heritage Lottery Fund. 'Heather' and 'Hillforts' are the two defining features that make the upland area of the Clwydian Range and Llantysilio Mountains special. It is a unique landscape of outstanding beauty that lies close to the hearts of many. It is an area rich in wildlife and history. This book aims to reveal the different layers of the landscape we see today. The land has been created and shaped by geological processes over millions of years, with today's landscape the result of nature, weather and people's influence on the land.

The landscape is of course a dynamic feature, constantly changing and this is true of the Clwydian Range and Llantysilio Mountains. Many people have a vested interest in caring for its future, such as graziers, landowners, archaeologists, conservationists, schools, community groups, tourism businesses, walkers and others. Around ten years ago a number of people, from different backgrounds, came together with a common concern for the area's heritage. The challenge they set themselves was to link the conservation and restoration of the natural and historic heritage of the Clwydian Range and Llantysilio Mountains and to encourage greater understanding and enjoyment of these uplands amongst residents and visitors alike. It is hoped that the Heather and Hillforts Landscape Partnership Scheme has played a small part in bringing these people together to care for the natural and historic features of the area, and to increase people's awareness and understanding about why this area is so special.



*Moel Famau from
Loggerheads.*

Clwydian Range Area of Outstanding Natural Beauty

Areas of Outstanding Natural Beauty are regarded as some of Britain's most treasured landscapes and along with National Parks, their special character represent our finest and most precious tracts of countryside.

The Clwydian Range extends from the Vale of Clwyd in the west to the foothills of the Dee Estuary to the east; from Prestatyn Hillside in the north to the Nant y Garth pass in the south. The heather moorland of the high ridge rises above the hedged fields and woodlands of the lower slopes. In places limestone rock outcrops are exposed in attractive wooded escarpments.

Designated in 1985 the Clwydian Range celebrated its 25th Anniversary as an Area of Outstanding Natural Beauty in 2010.



“My favourite spot in the Clwydian Range is near Moel Dywyll. Travel north along the Offa’s Dyke path from the Jubilee Tower, and you leave the crowds behind. The views are no less spectacular, the path surface turns from stone to grass, and you somehow feel more surrounded by nature. Sky larks and meadow pipits flourish on this part of the mountain and the walking is relatively easy. Days working in this area are always a pleasure.”

Nick Critchley, Heather and Hillforts Moorland Field Officer



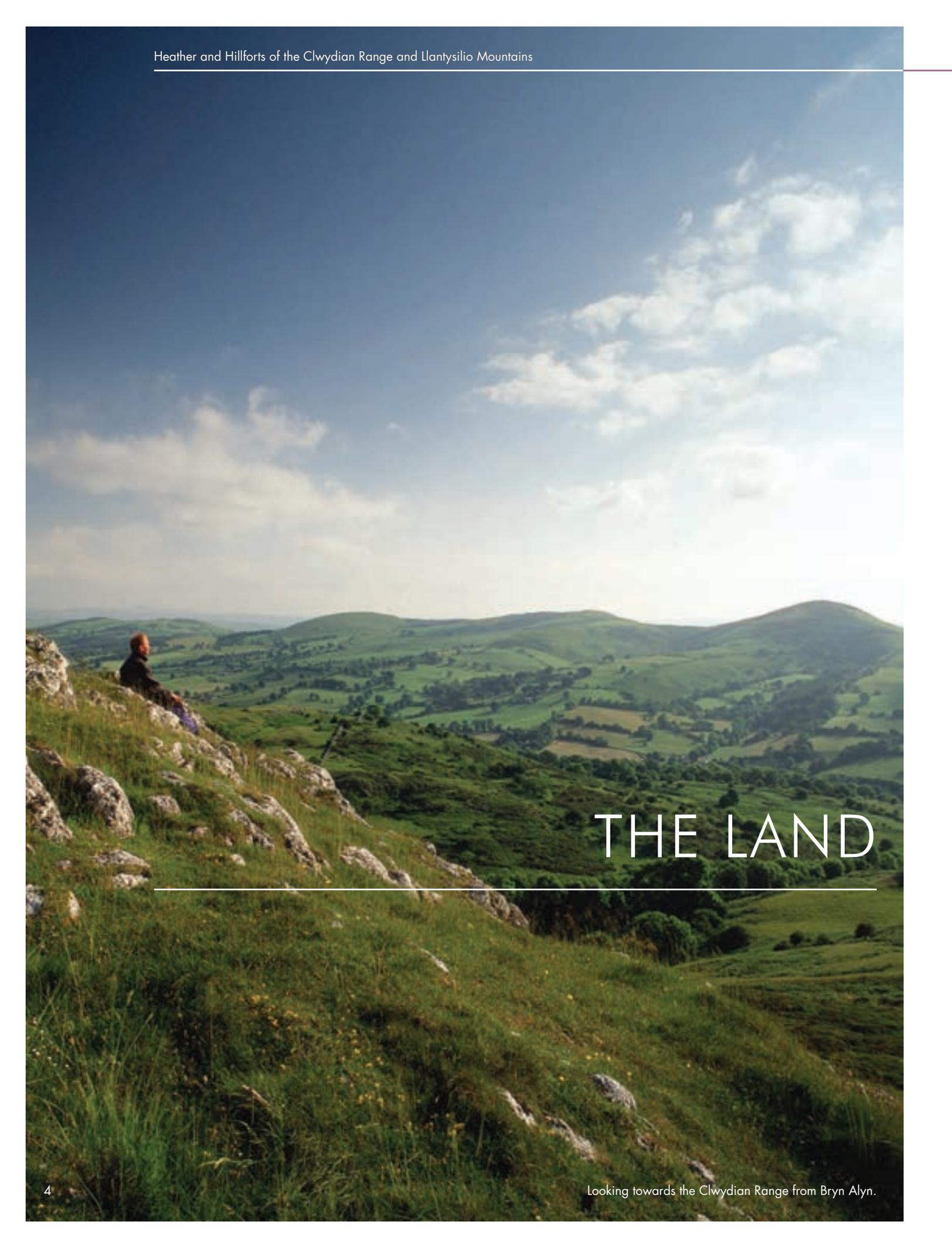
Offa’s Dyke National Trail heading to Moel Arthur.



View of the Clwydian Range from Gop Hill.



View of the Clwydian Range from Ffridd Fawr.



THE LAND

The profound influence of geology and geomorphology on people's use of the land is without doubt. It affects where we live and how we use the land and this is clearly evident in the distribution of hillforts and heather moorland on the Clwydian Range and Llantysilio Mountains. The shape of the hills and valleys, the distribution of water and mineral resources, as well as the growing substrate for plants, are all determined by the underlying rocks and geomorphological processes. Although the heather and hillforts are confined to the hilltops, the geology and geomorphology of the neighbouring lowland areas also play an important part in forming people's perception of the uplands.

A LONG TIME AGO

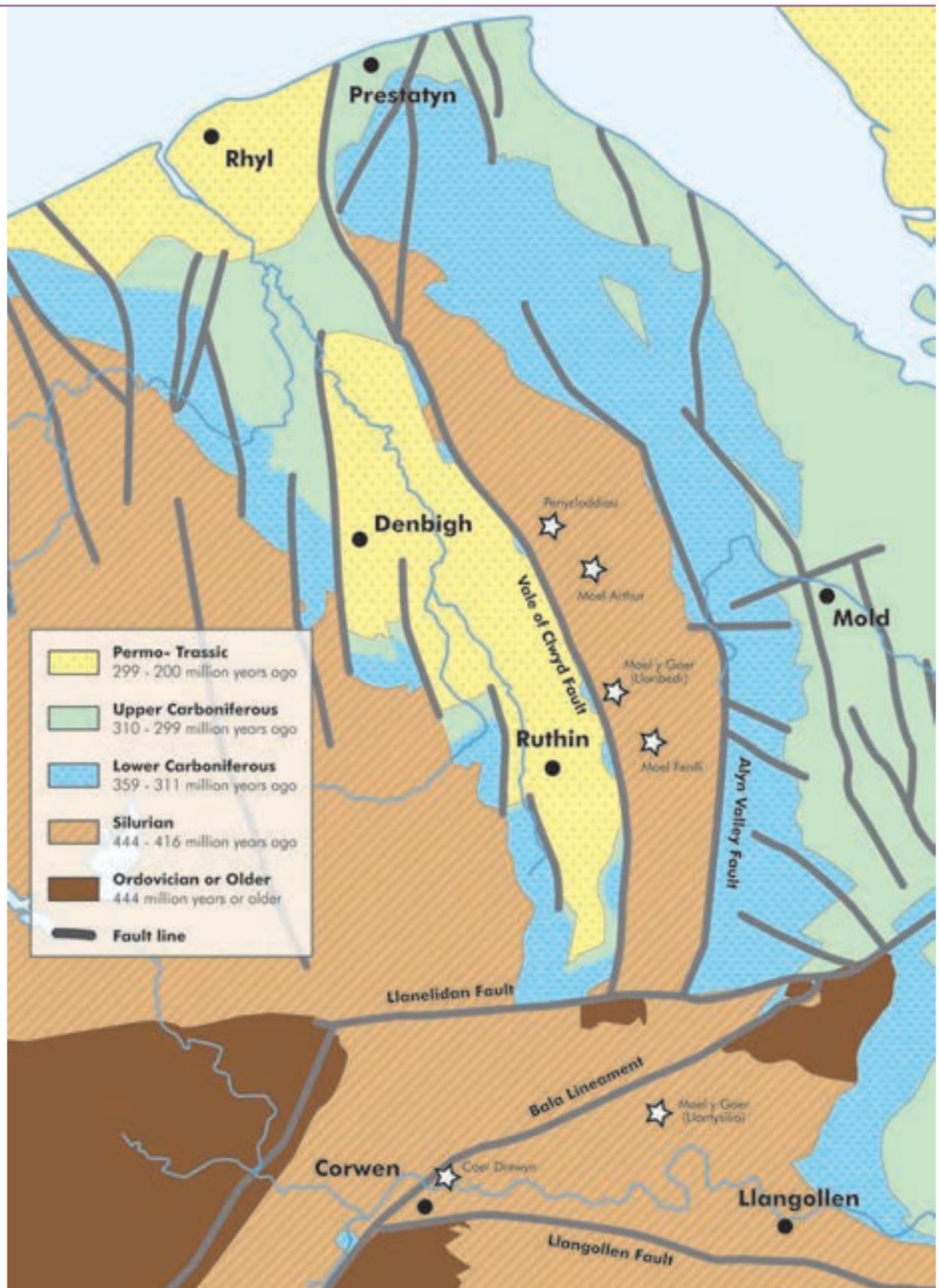
An examination of the rocks of north east Wales tells the story of their northward migration from the southern hemisphere, through changing climates and environments, to where we are today. For the Heather and Hillforts area the story began some 420 million years ago, during the Silurian Period, when Wales lay in the southern hemisphere at a latitude of 30°S. The mudstones, siltstones and sandstones that now make up the Clwydian Range and Llantysilio Mountains were once mud, silt and sand that were deposited in a deep sea called the Welsh Basin. These rocks are called turbidites and consist of repetitive sequences of sandstones, siltstones and mudstones, occurring in varying proportions, that were deposited from sediment-laden currents which repeatedly flowed in to the Welsh Basin from surrounding shallower shelf areas. The small quarries on the flanks of Penycloddiau show good examples of turbidites. Between the influxes of turbidites, a steady 'rain' of black mud accumulated on the sea floor. Some of this mud contained the remains of graptolites, which are an extinct group of free-floating animals. They are now preserved as fossils and provide geologists with an important means to accurately date and correlate the rocks. The Silurian mudstones of the Clwydian Range have an important place in the history of geological research and were used as a study area by the pioneering female geologists Ethel Woods and Margaret Crossfield.



Turbidites exposed at Penycloddiau.

By the Lower Carboniferous (around 350 million years ago) the climate was very different because Wales had continued its journey northwards and was just south of the equator. During this time much of the area was covered by a warm, shallow tropical

A generalised geological map.





Penycloddiau.
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1154).

sea which lay north of an area of land called the Wales-Brabant High that stretched from Ireland through mid-Wales and England, to Belgium. This shallow sea was rich in life, including corals and molluscs, and these organisms together with accumulations of lime rich mud led to thick limestone deposits. The limestone escarpments of Eglwyseg, Loggerheads and Bryn Alyn, and numerous limestone quarries can clearly be seen from the Heather and Hillforts area. The middle part of the Carboniferous Period (around 325 million years ago) saw the development of large deltas along the edge of the Wales-Brabant High with the accumulation of vast thicknesses of mud and sand belonging to the Millstone Grit Group, forming the deltaic sandstones that can be seen at Moel Findeg. During the Upper Carboniferous (310 million years ago) the deltas stabilised and swamps and extensive forests formed, which eventually led to the formation of the coal which was mined in the Denbighshire and Flintshire coalfields.

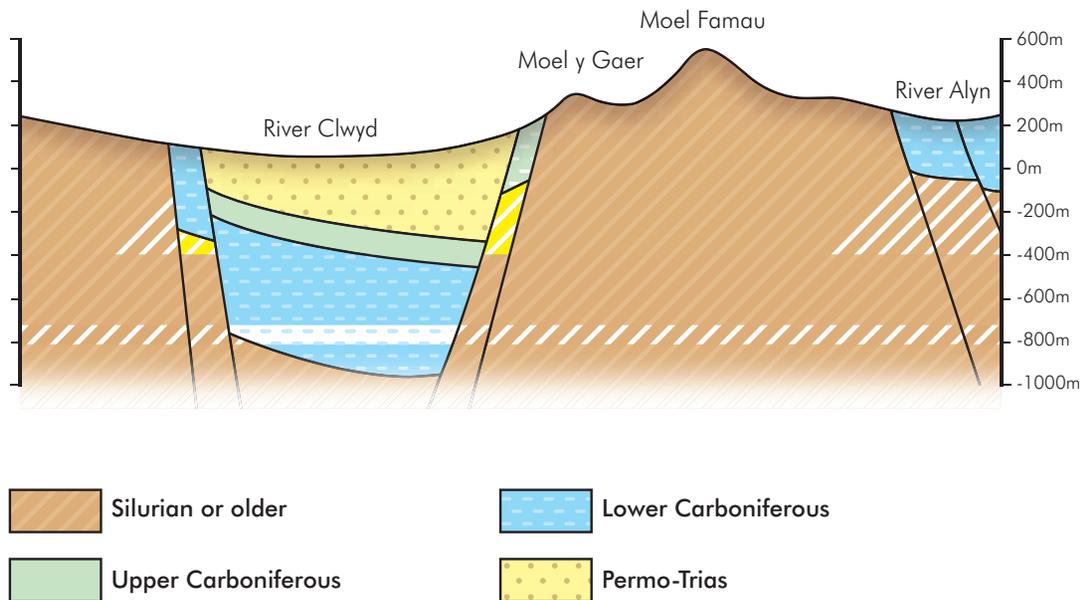
Between 300-200 million years ago, during the Permian and Triassic periods, Wales was at the

same latitude as North Africa, and the area was a hot and arid desert. During this time great thicknesses of wind blown sediment were deposited in massive sand dunes. Looking westwards from the Clwydian Range the flat, fertile Vale of Clwyd is underlain by Permo-Triassic rocks and various road cuttings and buildings display the distinctive red sandstone.



*Monograptus -
Silurian graptolite.*
Copyright: British
Geological Survey
(P549555).

Generalised geological cross-section of the Vale of Clwyd.



EARTH FORCES

Another major influence on the shape and orientation of the Clwydian Range and Llantysilio Mountains are lines of weakness caused by faulting and folding. The Llantysilio Mountains are bounded to the north by the Bala Lineament, and to the south by the Dee Valley Fault, whereas the Clwydian Range

is bounded to the west by the Vale of Clwyd Fault and to the east by the Alyn Valley Fault. In more recent times these faults have been exploited by rivers and glaciers to form major valleys. The folds and faults were formed by earth movements related to periods of tectonic activity and mountain building. North east Wales was affected by four distinct periods of earth movement and this tectonic activity has influenced the geology we see today. For example, the buckling and fracturing of Silurian rocks created a cleavage in the finer-grained mudstone. The slate quarries of the Horseshoe Pass area have exploited the cleaved mudstones for flooring and slabs leaving the enormous waste tips as a legacy. Faulting and uplift caused by earth movements had an important effect on sedimentation. For example, the Vale is separated from the Clwydian Range by the Vale of Clwyd Fault, and movement along this fault during sedimentation has led to a thickness of more than 525m of sandstone. The cross-section illustrates the greater thicknesses of sandstone in the eastern side of the Vale of Clwyd.

Horseshoe Pass quarries and slate tips.

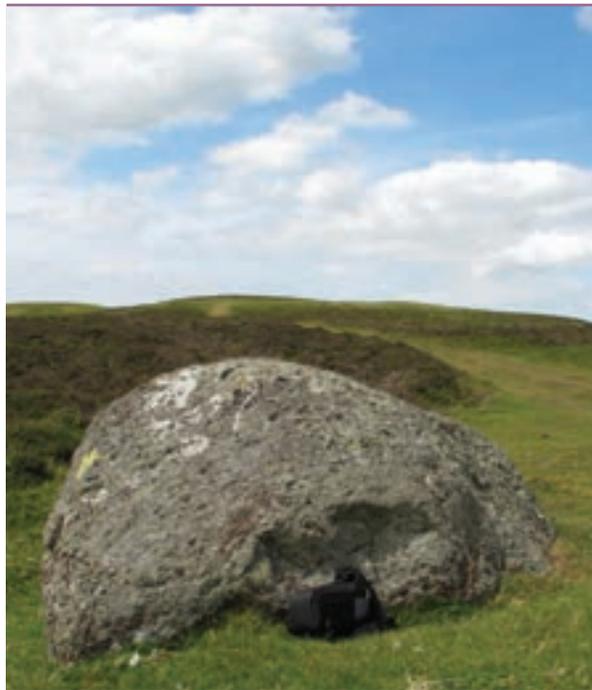


THE ICE AGE

The landscape of Denbighshire was radically re-shaped by several episodes of glaciation that occurred over the last 2 million years, although only evidence from the Late Devensian glaciation still exists (115,000 -10,000 years ago). During this final episode of glaciation, north east Wales was affected by two major ice streams, namely the Welsh Ice Sheet from the mountains of Snowdonia in the west, and Irish Sea Ice which flowed from the north. The direction of ice movement is recorded by glacial striations (scratches), erratics (large boulders) and ice moulded landforms. The distribution of erratics is particularly informative, for example volcanic rock from the Arennig area near Bala has been found on Penycloddiau, Moel y Parc, Moel Arthur and Caer Drewyn, which shows that Welsh Ice passed over the Clwydian Range, rounding the relatively soft mudstones. Similarly, the distribution of erratics made of Scottish and Lake District rocks indicates that the Irish Sea Ice reached Denbigh and skirted around the northern margin of the Clwydian Range pushing down the Wheeler Valley and reaching as far as Shrewsbury. Further physical evidence from the last Ice Age can be seen in the form of drumlins (ice-moulded mounds of glacial sediment), and particularly fine examples can be viewed from Caer Drewyn.

Through time people have exploited the geology of the land. In addition to the strategic positioning of the hillforts in prominent and defensible positions, the local stone has been used by people to build defences. Caer Drewyn differs from the other hillforts in the area through the use of the local stone to build the ramparts. The use of stone here reflects the underlying geology where there is a band of sandstone, which is much more suitable for building in comparison to the thin fissile mudstone which underlies the majority of the other hillforts. The sandstone was quarried on-site, keeping transport to a minimum. The prominent step or change in levels within Caer Drewyn may represent part of the quarried area.

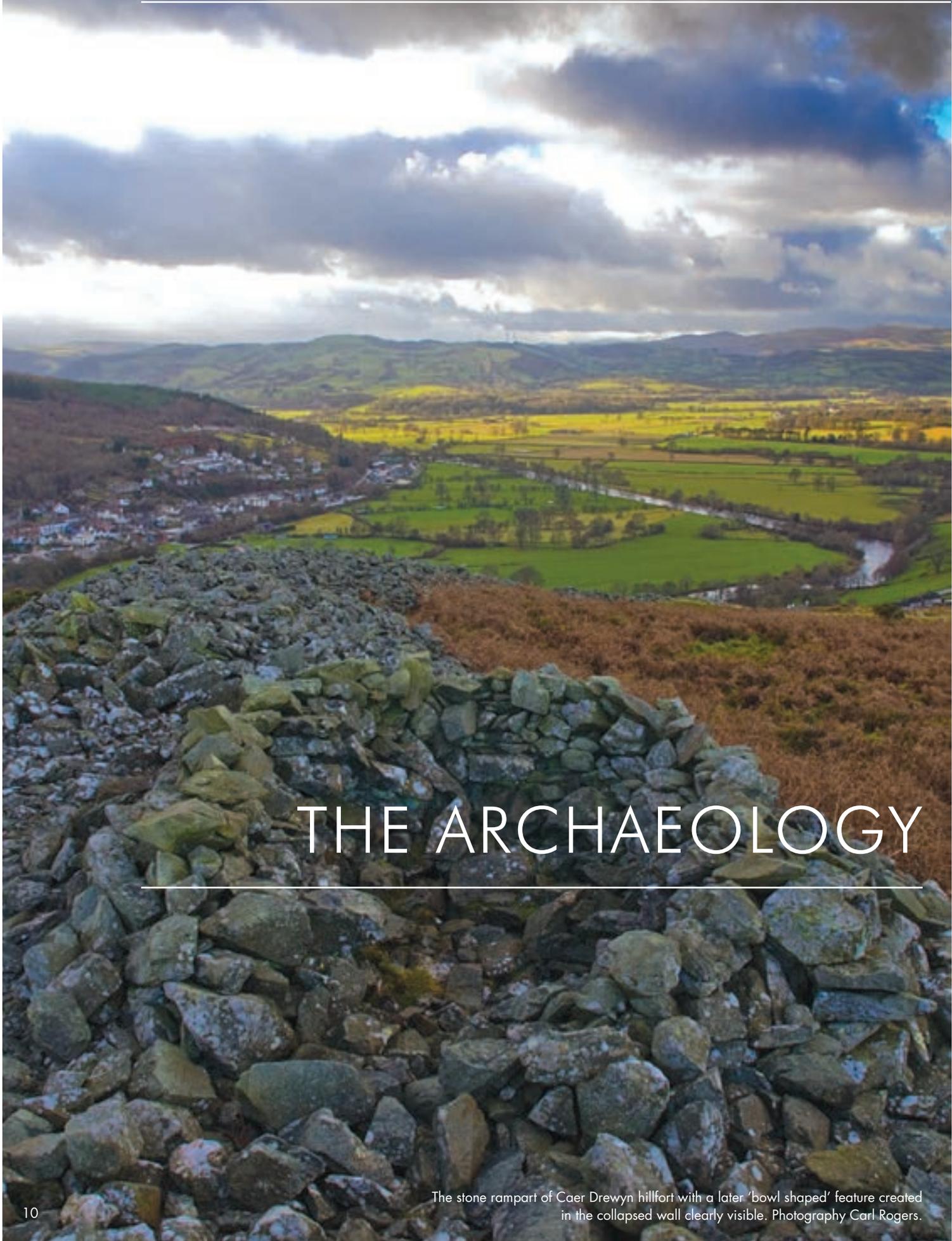
The geology and geomorphology of the Clwydian Range and Llantysilio Mountains has had a profound effect on the landscape and history of the area, and the chain of hills tells a story spanning more than 420 million years. The tale includes changing climates and environments ranging from the ancient deep seas and later shallow tropical seas, to the relatively recent Ice Age. Every episode of the story can be read in the landscape and the Heather and Hillforts project has helped to highlight how geology and geomorphology not only influences our landscape, but also underpins many aspects of society and where and how people live.



A glacial erratic of volcanic rock transported by ice to Penycloddiau from Arennig near Bala.



Drumlins viewed from Caer Drewyn.



THE ARCHAEOLOGY

The stone rampart of Caer Drewyn hillfort with a later 'bowl shaped' feature created in the collapsed wall clearly visible. Photography Carl Rogers.

Archaeology is the study of the material left by people. It extends from the origins of human life, to recent history. As no written records exist for the prehistoric period, and with few written records from the Roman and Early Medieval periods relating to North East Wales, most of our knowledge about these times is derived from archaeology.

Archaeological time periods describe technological and social change. The prehistoric period is divided into different stages: the Palaeolithic [Old Stone Age]; the Mesolithic [Middle Stone Age]; the Neolithic [New Stone Age]; the Bronze Age, and the Iron Age which leads into the Roman Period. This chronological timeline describes technological change with people making use of a greater range and variety of materials for tools. Following on from the Roman Period comes the Medieval Period, or Middle Ages, and then from about 1500AD, the Post-Medieval and Industrial periods.

THE EARLIEST EVIDENCE

The oldest evidence for people in North East Wales is to the north west of the Heather and Hillforts project area at Cefn Meiriadog, to the west of St Asaph. Here in a limestone cave, Pontnewydd, excavations have taken place over the last 150 years or so, with suggestions that Darwin visited the site in 1831. Most recently, Professor Stephen Aldhouse Green led excavations which found the remains of Neanderthal people who were in the area 230,000 years ago. Neanderthals are a different species of human from *Homo sapiens*. The remains found at Pontnewydd, predominantly teeth, have come from at least five individuals. Around 1,000 hand-axes were also found, suggesting that people may have visited the site over a number of years.

For much of the Stone Age, people were hunter-gatherers, moving about their landscape following game. To the north of the Heather and Hillforts area, at Tremeirchion, there are similar limestone caves, Cae Gwyn and Ffynnon Beuno. Here evidence of early human occupation has also been found in the form of stone tools, which were made around 30,000 years ago. Until around 10,000 years ago Britain underwent a series of ice ages. At times most of Wales was covered in ice, sometimes to a depth of one kilometre. People must have occupied the caves at Pontnewydd and Tremeirchion during warmer times, when the ice had retreated.

Following on from the end of the most recent Ice Age the climate improved and people were at last able to move into the area on a more permanent basis. They were still hunter-gatherers but perhaps moving around a more restricted geographical area. In this period, the Mesolithic (6,000-10,000 years ago), there is evidence of camp-sites at Brenig, Prestatyn and close to Kilford Farm (near Denbigh). Tools dating from the Mesolithic have been found in the Moel Arthur area. It is likely that people may have moved around the landscape seasonally, perhaps up onto high ground in the summer and to the coast in the wintertime. It is thought that the area of Kilford Farm, west of the Heather and Hillforts area, may have been on the edge of some wet boggy land, a remnant of a post-glacial lake which existed in the Vale of Clwyd. People increasingly exploited the

Artists reconstruction
of people at
Pontnewydd Cave.
By Nicole Davies.



Gop Cairn near
Trelawnyd.
(Crown Copyright
RCAHMW,
AP_2009_2975).



natural resources of the land, and perhaps began to create glades in woodland where grazing animals would gather, making it easier to hunt them. At this time the Heather and Hillforts area was covered in scrubby woodland. Left to nature, the upland areas here would still be woodland today. It is often forgotten that it is the actions of people and domesticated animals which have kept the uplands open over perhaps the last 4,000 years.

It is from the Mesolithic Period onwards that people really began to have an impact on their landscape and environment, a process which was accelerated when people began to settle and farm around



The Mold Gold Cape dating from the Bronze Age. (Copyright The Trustees of the British Museum).

3000BC, in the Neolithic Period. Whilst there is little evidence of settlements within the Heather and Hillforts area during this period, it has been suggested that Gop Cairn, near Trelawnyd to the north, may date from the Neolithic. Burials found in a limestone outcrop below Gop Cairn and in limestone caves at Llandegla date from this period. There is, as yet, no trace of the farmsteads and houses in which people lived; stone tools, including arrowheads have been found and hint at where people may have been living during the Neolithic Period. Recently part of a broken polished axe was found next to the Offa's Dyke Path National Trail between Bwlch Pen Barras and the Jubilee Tower on Moel Famau, having been perhaps carried there by early farmers.

THE METAL WORKERS

People first used metal in Britain around 2000 BC; initially copper and then bronze, which is a mixture of copper and tin. Three very fine, early Bronze Age copper axes have been found on Moel Arthur. These were buried as a hoard and similar hoards of bronze metalwork have been found nearby at Maes Mynan and Gwernaffield. Sometimes bronze objects are

found in graves, and there are a large number of Bronze Age burial remains in the area, often seen as mounds or barrows. In the Heather and Hillforts area, Moel Gamelin, Moel y Parc, Penycloddiau and Moel Fenlli provide excellent examples. Cefn Goleu Bronze Age burial mound was excavated by Bevan Evans before Coed Moel Famau was planted in the 1950s. Here the remains of individuals were found, mostly cremations buried in large pottery urns. Despite the introduction of metalworking, people still continued to use stone tools, particularly flint and chert arrowheads.

Archaeologists try to build up a picture of life at different times in the past, from the material people have left behind. It is worth remembering however, that a lot of the material people left behind may not survive. Organic materials such as wood, leather and textiles decay in the soil, and even metalwork and bone can disappear if the soil conditions are right (or wrong!!). Archaeologists are limited to the materials that remain. Stone tools nearly always survive, but remains of organic objects are rare. As a case in point, loom-weights are found but rarely the textiles made. Earthenware vessels were introduced and made in Britain when people first began farming and settling in the Neolithic Period. In the Bronze Age pottery was used extensively, both in

the home and for funerary ceremonies, but the clothes people might have been buried in or the leather and wooden vessels used, do not survive. Other barrows disturbed in the area have been found to contain valuable objects, most notably a barrow on the outskirts of Mold opened in the 1840s, contained a magnificent gold 'cape'. Many burial-mounds in the area have depressions in their centres as a result of antiquarian exploration, the results of which are rarely available.

A mound located within the hillfort of Penycloddiau was being gradually worn away by walkers following the Offa's Dyke Path National Trail, the long distance footpath from north to south Wales. Archaeological excavation of the mound found a hole in the middle, thought to have been dug in the Victorian Period judging by the glass and clay pipe stem which was found, hinting that someone else thought it was a burial mound too. Further excavation over two thirds of the mound completed in 2009 did not find a burial, however the bed rock was cut and a series of stones that may have been the remains of a cist were found. It is likely that any burials had been removed by the earlier 'excavation' in the Victorian Period. Enough evidence was found to be confident that it is a Bronze Age feature. The mound has now been reconstructed, with the dual purpose of protecting the remaining mound and interpreting what it may have looked like.

Artists painting of the excavation at Moel y Gaer (Llanbedr). (Bill Kneale).



There is a lot of information about what happened to people when they died during the Bronze Age, but little information about where they lived. There is some evidence of occupation during this time from Maes Mynan, outside Denbigh. The complete opposite is true of the Iron Age; the remains of many hillforts are found in the area, but no information about what happened to people after they died. The Iron Age started around 800BC and continued until the arrival of the Romans in Wales. It is likely that farming settlements were to be found in the lowland valleys during the Iron Age, possibly around Denbigh and in the Prestatyn area; perhaps the evidence of these lie underneath the modern farms and villages.

THE ROMANS

The Romans landed in southern Britain in 43AD and around 77AD had finally established control in north Wales, a major attraction being the mineral reserves of lead and the silver often associated with it. To the east of the Heather and Hillforts area, at Halkyn, it is thought that lead was mined, and there are certainly Roman lead smelters in Flint, these were found at the end of the 19th and early 20th Century. It has been suggested that the Romans mined lead in the Llanferres area, although no direct evidence has been found. Gold working also took place near Cilcain. The Victorians tried exploiting gold, both at Penmachno near Cilcain and on the slopes of Moel Arthur, but there is no direct evidence of working having taken place in the Roman Period. Chester (Deva) is the nearest major Roman settlement and there is likely to have been a road running from Chester to Ruthin, where there is also evidence of Roman settlement. It has been suggested that the toll road which cuts through Bwlch Pen Barras follows the line of a Roman road, and there is certainly an earlier route just below the modern road, but its age is yet to be proven. The 19th Century excavations on Moel Fenlli, Moel y Gaer (Llanbedr) and Moel Arthur were reported to have found Roman pottery inside the hillforts, and prior to this a massive hoard of 1,500 Roman coins was found on Moel Fenlli. It seems Roman activity was taking place within the hillforts, or perhaps it was the native Britons adopting Roman ways.

RECENT TIMES

As we move closer to the present day the history of the Heather and Hillforts area comes more into focus. In the north, much of the Clwydian Range from Moel Fenlli to Moel y Parc was under the control of Ruthin Castle from the 13th Century, and this remained the case until the 19th Century. It is in this period that the rough heathland we see today became established. The land management was for animals, whether deer and boar to hunt or cattle and sheep to graze. The fact that much of Llantysilio, Moel y Parc and Moel Famau are Common Land will date back to the Medieval and Post-Medieval periods, when people had rights to graze, collect wood, to cut peat and cut bracken. Valle Crucis Abbey also has had an effect on the landscape during the Medieval Period, with granges and large farms dating from this time found in the Llantysilio area.

Written in Stone

A stone was found during the excavation of Penycloddiau hillfort with an inscription from a soldier from the First World War. The message read: Carlyle D Chamberlain, Canadian Army, Prospect, Kentucky, USA.

After an appeal for information, David Chamberlin, his grandson, came forward and wrote a letter about his grandfather:

"Although my grandfather was born in Prospect, Kentucky, he joined the Canadian Army and served with them during the war. My grandfather was an avid hiker, outdoors man, and had a keen interest in natural history, archaeology and photography. While camped with the soldiers nearby, all it would have taken to spark his interest would be to hear of a trail leading to an ancient burial ground and he would have certainly done his best to check it out. He would look for fossils and arrowheads every chance he got. When he was 70 years old, he hiked down into the Grand Canyon, camped overnight and hiked back the next day. He loved to travel and explore."

Railways and toll roads also changed the character of the landscape indirectly. These routes tend to follow level ground and therefore skirt around the hills, leaving many routes through the passes, like the Llangynhafal track and the Conquering Hero track. However they remain as rough paths rather than the major routeways that they once were. In the 20th Century both the Clwydian Range and Llantysilio Mountains played their part in the world wars. There was a rifle range in the Moel Famau area, dating from the end of the 19th Century. During the Second World War, decoy sites were located on top of the hills; the control building of one of these is found at Ffrith, Cilcain and still survives. These decoy sites were designed to be lit to draw enemy airfire away from places like Liverpool and the munitions factories at Marchwiell, Wrexham.

The area's iconic status and its continuing importance to people is shown by the choice of Moel Famau to celebrate King George III's Golden Jubilee, with the foundation stone of the Jubilee Tower placed in 1810. Today thousands of people walk to the summit of Moel Famau and the Jubilee Tower, gaining views over the Vale of Clwyd in Snowdonia and the Pennines.

People have left a lasting impression on the landscape of the Heather and Hillforts area. Evidence of past burials, homes, farming, mining and routeways can all be found. It is certain that new evidence and information about the people who have passed through the landscape will continue to come to light and continue to capture the imagination and help us to understand the lives of our predecessors.



Inscribed Stone found on Penycloddiau left by an American in the Canadian Army during World War 1.

PLACE NAMES

Place names often relate to the landscape, they can be descriptive, relate to history and even mythology:

Moel Famau – ‘Moel’ is the word in modern Welsh for bald/bare and is very appropriately used for mountains with bare tops, upper areas with no trees or dense vegetation. The ‘Famau’ part of this place name has been the subject of much speculation. Antiquarians ‘corrected’ the local pronunciation of ‘Fama’ to make it make some sort of sense as Mamau (or mothers): mountain of mothers. A meaning connected with the Brythonic language word ‘mamma’ or breast would be very appropriate considering its shape, but experts tell us this would have changed over the years to Mam as in Mam Tor in Derbyshire. So, for the time being, we shall have to be satisfied that Famau comes from an unknown personal name.

Moel Arthur – Arthur, a personal name, could either be an unidentified local individual or, more likely a reference to King Arthur used to ‘explain’ the antiquity of the place.

Moel Fenlli – Benlli Gawr or Benlli the Giant was reputedly the fifth-century tyrannical lord of Iâl (or Yale). Moel Fenlli has been described as his citadel, which was destroyed by Saint Garmon. However, this is probably another example of people associating ancient earthworks with bygone folk from myth and legend.

Moel y Gaer – It is not surprising that this name is not unique in Wales or even locally, as it combines ‘moel’ or bare mountain, and Caer which means fortress or citadel. Caer is connected with the Latin ‘castra’ and is the Welsh name for nearby Chester, founded by the Romans. So ‘fortress mountain’ is the meaning.

Moel Dywyll – ‘Dywyll’ or ‘tywyll’ meaning dark. As you can imagine there are many places called Moel or Mynydd Tywyll or Moel or Mynydd Du (black mountain) in Wales. You will have noticed that they look even darker on a rainy day!

Penycloddiau – This place name unites two elements. ‘Pen’ which means top or end and ‘cloddiau’, which is the plural of ‘clawdd’ signifying earthwork or dyke (as in Clawdd Offa or Offa’s Dyke). So the name simply and aptly means the mountain at the top of the earthworks, or earthwork at the top of the mountain. Pen can also be taken to mean principal, and the name could be a reference to the status of the site.

Bwlch yr Oernant – Bwlch in modern Welsh means gap. In topographical terms a gap means a pass between two mountains. This pass was formed by the stream or rivulet called the Oernant, probably a

tributary of the river Eglwyseg. ‘Nant’ is the watercourse part of the name and ‘oer’ means cold. Therefore, ‘cold-stream pass’. As you can imagine from the name, this oernant is not the only one in Wales!

Llantysilio Mountains – Llantysilio is the name of the ancient parish which gives the mountains their name. As with very many Welsh place names the word ‘Llan’, signifying a church, is combined with a saint’s name. In this case, Saint Tysilio, a seventh century bishop and prince. Mynydd/mynyddoedd is modern Welsh for mountain/s but at one time a mountain was any area of land, even quite low-lying, which looked like a mountain as it wasn’t divided into fields or enclosures.

Caer Drewyn – ‘Caer’ for fort or citadel is easy but ‘Drewyn’ is less common. Some have said that the place name combines ‘dre’ or ‘tre’, for town or settlement with Wyn: Wyn’s town. The Wyn is said to be Wyn ap Nudd, a magical character, King of the Fairies, no less! A more down-to-earth, explanation however comes from ‘trewynen’ or ‘trewyn’, the Welsh for the plant loosestrife, which may have grown in areas of dampness and partial shade. A further alternative meaning suggested by local people interprets the name to derive from tre win, with win being wine in Welsh, linking the name to a possible past landuse of growing crops for producing wine.

Moel Gamelin – Gamelin, a word that doesn’t look Welsh at all but is probably a combination of Gam (or cam) meaning bent or crooked and elin (or penelin) meaning angle or elbow. An aerial view of the area shows that ‘crooked elbow mountain’ is a good description.

Moel Morfydd – We do not know the specific Morfydd who gave this bare mountain top its name but it is a still a common Welsh personal name for girls. Morfydd appears in the famous tale Culhwch ac Olwen, one of the folk tales known as Mabinogion, and the story has a particular connection with the Llanferres area, not far away.

Moel y Plas – This is ‘Moel’, bare mountain, combined with ‘Plas’ or mansion. At the foot of Moel y Plas is Plas Llanarmon, a building which dates from the seventeenth century and which was a gentry house before it became a farm.

Moel y Parc – ‘parc’, not surprisingly is the Welsh for park. The parkland referred to is probably that of Maesmynan, in the valley below, a residence in the early middle ages of the princes of Gwynedd notably Prince Gruffydd ap Cynan, a key figure in Welsh resistance to Norman rule. Parc could refer to a deer park where important households had their supply of fresh meat. There are some indications that Maesmynan had one, as did other nearby mansions.



Caer Drewyn
hillfort.



THE HILLFORTS

'Hillfort' is an all-encompassing term for the many hundreds of defended farms, forts and small villages built in Wales, and across Europe, during the later Bronze Age (c.1100 BC-700 BC) and Iron Age (c.700 BC to AD 70). It is such a broad term that it can describe the smallest group of round houses enclosed by a bank and ditch to the largest Iron Age settlement like Penycloddiau.

WHAT IS A HILLFORT?

The more we learn about hillforts the more complicated they become. Survey and excavations carried out by the Heather and Hillforts Project have revealed many new and hidden aspects to these familiar forts. Although it is thought the majority were built and occupied in the Iron Age, many were reoccupied during Romano-British or even Early Medieval ('Dark Age') times. The earliest were begun 1,000 years before the Romans came to Wales. This is an incredible timespan, equivalent to the gap between Medieval times and our own, and we must expect the meaning, use and appearance of hillforts to have altered time and again during these centuries.

The hillforts of the Clwydian Range and Llantysilio Mountain are some of the largest and most famous in Wales, and they are also among the most diverse group of hillforts anywhere. They show that hillforts were not all the same, but were sometimes very different from one another. We can study their shapes and learn more about these old structures. A clue to possible contemporary occupation of two forts can be found in the very similar shape of annexes built outside Moel y Gaer, Llanbedr and Caer Drewyn, Corwen. Their in-turned gateways are also similar. Perhaps these forts were owned and built by the same communities.



Caer Drewyn, Corwen, showing the unusual annex to the right of the main gateway (centre).
Crown Copyright RCAHMW, AP_2007_4584.

While some hillforts in the high mountains may have been 'refuges' for retreat in times of conflict, the majority were undoubtedly year-round settlements with springs for water inside the fort, or a short walk away. The people living in the forts would have farmed the hills around them and cultivated crops in nearby fields. Not all the forts would have been occupied or even built at the same time. Some may have been abandoned and forgotten while others thrived.

A possible small Iron Age defended farm below Caer Drewyn, showing the rural landscape which existed below the more visible hillforts. (Crown Copyright RCAHMW, AP_2007_4591).



BUILDING BARRIERS: HILLFORT CONSTRUCTION

The hillforts we see today are the derelict ruins of once grand fortified enclosures, now overgrown and part of the countryside. Originally they would have stood out as new, imposing structures. In our world of buildings it is difficult to appreciate how special these places would once have been. Building the largest forts would have had as much social impact as the construction of a Medieval cathedral. Iron spades and picks were not common until the Romans arrived, so the rock-cut hillfort ditches would have been excavated with antler picks, shoulder blades from oxen and perhaps fire and wedges to break up the hardest bedrock. This would have been brutal, back-breaking work, but similar scenes are described by chroniclers of Wales' early metal and coal mines, which were dug in the most basic of working conditions from the later Middle Ages until the Industrial Revolution.

On approaching a hillfort in the Iron Age, one would have seen the towering stone-walled ramparts, probably capped by an upright palisade of sharpened timbers or even a solid fence of flat planks or wattle hurdles. Outside would have been a deep ditch, usually dug out of the solid rock and providing stone for the ramparts. The main gate was the most impressive part of the entire hillfort, probably flanked by the best stonework. Massive posts made from logs would have stood at each corner of the gateway supporting a crossing bridge which continued the line of the rampart walk. It is not fanciful to imagine human or animal skulls, flags or banners hanging from the gateway or raised above it. A great wooden gate would have swung open, allowing access through the dark, stone-walled passageway and into the noise, smoke and bustle of the interior. The largest forts of North Wales and the borders had guard chambers flanking the gateway, perhaps to provide shelter for guards but possibly also acting as shrines for those entering or leaving the fort. The overall effect on any visitor would have been awe-inspiring and intimidating.

Although hillforts may have been designed for defence, Iron Age society was not always at war. There would have been plenty of inter-clan rivalry and competitive raiding, with sporadic raids on neighbouring forts to steal cattle – a great source of wealth – and even to enslave men. However, for much of the year hillfort defences would have stood merely as status symbols to intimidate neighbours. The more formidable the walls and ditches appeared, the better they acted as a deterrent to attack by making an assault look utterly impossible.

MUD, SMOKE & NOISE: LIFE INSIDE THE HILLFORT

The interiors of the hillforts of the Clwydian Range today are quiet, peaceful places, but when occupied they would have been quite different. Parts of the interior were crowded with thatched roundhouses arranged along basic streets, some family homes with perhaps the largest being reserved for the leader and his kin. Other huts would have been used for crafts and industries, like weaving and potting, while smaller buildings on short stilts ('four-

posters') may have provided protection from rodents for the storage of grain, foodstuffs and other products. More open parts of the hillfort would have housed livestock at different times of year, while vegetables and cereals were also cultivated. It is possible there were shrines within the hillforts, and places of pre-existing ritual importance, like the Bronze Age cairn inside Penycloddiau. These were respected by later occupants and remain today. Everywhere there would have been noise, smoke, barking dogs, chatter and mud.

Standing in these forts today, try to imagine them as occupied places – as villages. In their long lifetimes these would have been places of births and deaths, where they returned home after long absences, and where there were ancestral memories. As the Iron Age was a time before written histories, we have sadly lost all the original names of the hillforts and their leading families and any sense of the dynasties who may have built and re-built them. Only the very general, overarching tribal names from Wales were preserved by Roman authors before and during the conquest of Britain.



A reconstruction of the gateway at Moel Arthur. The entrances to these hillforts would have been well protected and impressive sights.

The great hillfort of Penycloddiau represents an astonishing feat of Iron Age design and construction. (Crown Copyright RCAHMW, AP_2007_4651).



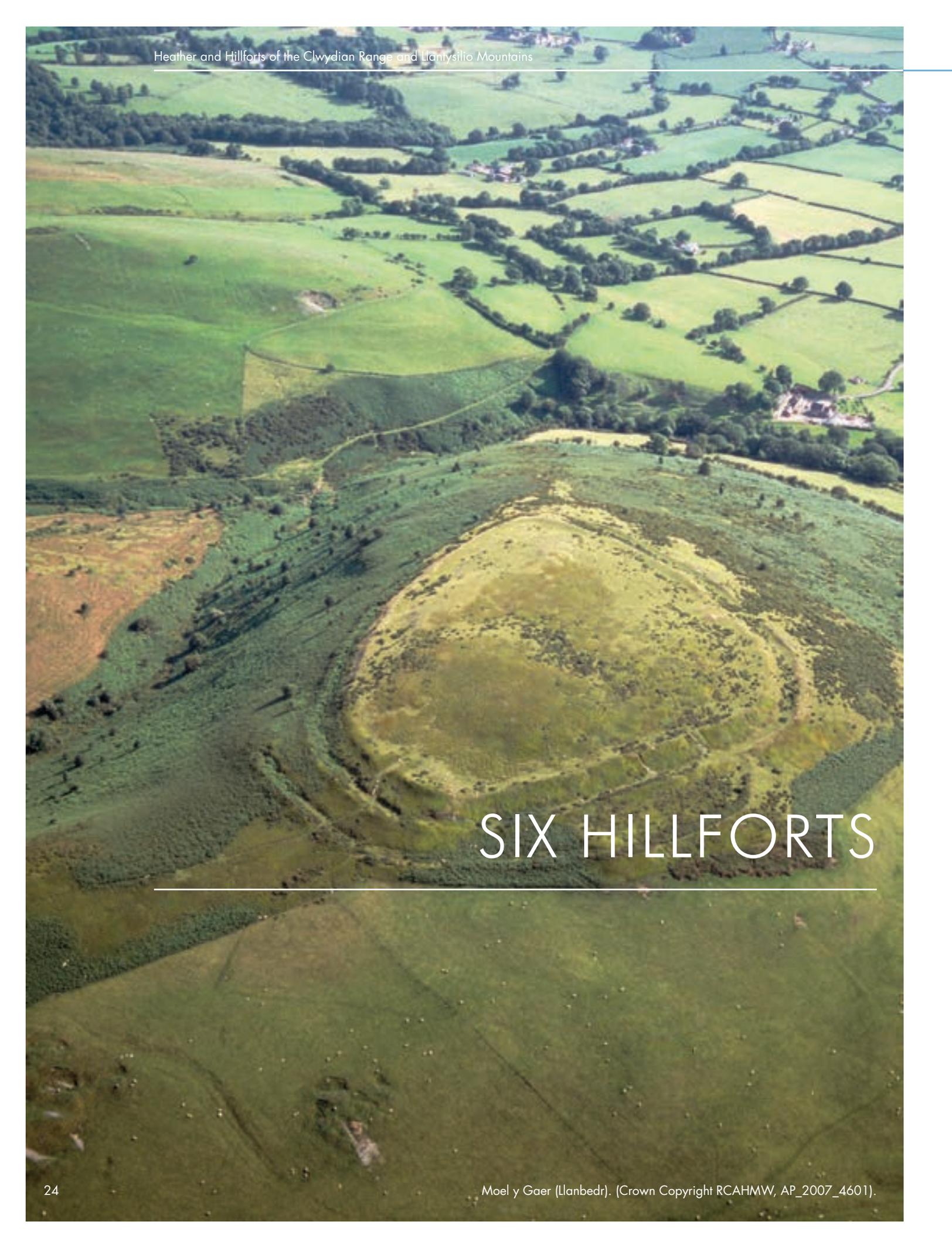
HILLFORTS & THE WIDER LANDSCAPE

The hillforts we visit today were part of a wider Iron Age landscape, drawing on a vast array of resources that the countryside offered. Crops and livestock would have been cultivated and reared on nearby farms, with some perhaps located on the fertile floor of the Vale of Clwyd. Woodlands were carefully managed for their products; hazel and willow for hurdles and fencing, timber for carpentry and building. Hunting parties roamed the high moors and upland lakes. Trade routes linked forts to places hundreds of miles away supplying salt, fine pottery and other precious commodities in return for food, animals, woollen garments and other products. There is also some evidence of religion and worship in the landscape. A Romano-British temple, identified from cropmarks on the valley floor at Plasnewydd, Llanfair Dyffryn Clwyd, may have been built on the site of a pre-existing Iron Age sacred enclosure, possibly used by people from the surrounding hillforts.

Each hillfort used considerable tracts of the surrounding landscape in order to provide materials for construction and repair. Calculations by Professor Manning of Cardiff University showed that a large hillfort like Penycloddiau, enclosing 21 hectares (51.8 acres), may have required as many as 10,400 trees in its construction, for upright posts, tie-beams in the rampart and facing planks. The construction of Penycloddiau would have needed access to around 170 hectares (420 acres) of woodland in the surrounding landscape, and would have needed the coordination of people and animals to fell and transport the timber to site. When we then think about the task of feeding and housing the workforce on a daily basis, as well as tending to all the other business of food production and defence of the hilltop, we have renewed respect for the now forgotten possible chieftain or leader, their architects, and perhaps the council of elders who conceived, designed and completed any one of the hillforts of the Clwydian Range and Llantysilio Mountains.



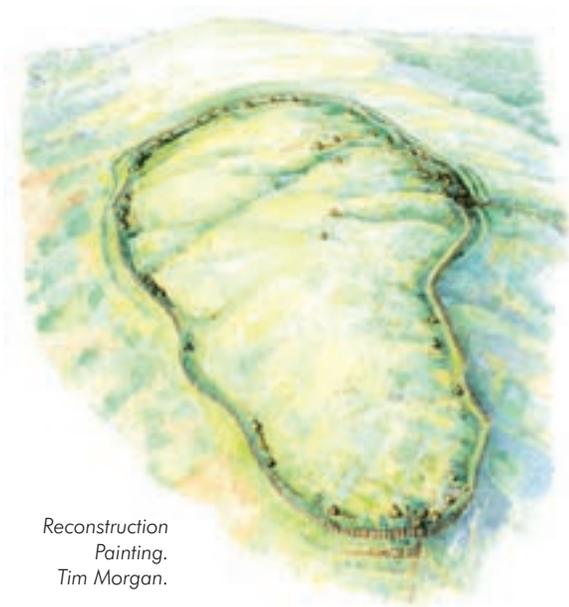
Caer Drewyn hillfort, Corwen, commands a prominent valley junction in the North Wales hills and may have been sited to control trade and livestock movement from its vantage point. (Crown Copyright RCAHMW, AP_2007_4585).

An aerial photograph showing a large, circular hillfort in the center of the frame. The hillfort is a prominent, rounded mound with a distinct, slightly raised perimeter. The surrounding landscape is a patchwork of vibrant green fields, separated by dark stone walls and hedgerows. In the background, there are clusters of small buildings and more fields, all under a clear sky. The overall scene is a typical rural Welsh landscape.

SIX HILLFORTS

PENYCLODDIAU

- 21 hectares enclosed, 52 acres
- Multivallate for much of the circuit
- Highest point 440m, 1444 feet
- Spring within interior
- Vegetation: heather
- 33 round house platforms, 49 'circular hollows'
- Bronze Age barrow located within the fort



Reconstruction
Painting.
Tim Morgan.

Penycloddiau is the northern most and largest fort in the Heather and Hillforts area, one of the largest hillfort in Wales. A large rampart/bank and ditch surrounds the whole of the hilltop, for much of its length there is a double rampart (multivallate). To the north there are four lines of banks, presenting a massively impressive and imposing set of defences. 33 possible round house platforms have been identified within the interior and a further 49 platforms tucked in close to the ramparts. One large group of round house platforms cluster around a spring. It is in this area that geophysical surveys found evidence of further roundhouses with attached yards or 'gardens'. Penycloddiau has two inturned entrances, one at the southernmost point, where it has been suggested that there are the remains of a possible 'guard' chamber, and one on the line of the eastern defences.



Penycloddiau.
(Crown Copyright
RCAHMW, 2004
CS 1154).

MOEL ARTHUR

Moel Arthur is very close to Penycloddiau, less than two miles to the south as the crow flies, but the two hillforts are very different. On its north eastern side it has substantial ramparts, two massive banks and ditches, but to the south and west there is virtually nothing more than a very slight bank to be seen. Moel Arthur is a relatively small hillfort and the topographical survey completed found very little sign of house platforms, only two or three clustering around the inturned entranceway. The survey did however demonstrate that the outer rampart was constructed before the inner. Excavations in the 1840s found Roman pottery and traces of stone walls. In the 1960s, three copper flat axes, dating to the preceding Bronze Age were found close to the ramparts and Mesolithic worked flint was discovered in the vicinity. There is evidence both within and outside the ramparts of later quarrying.

- 2 hectares enclosed, 5 acres
- Bivallate (a double bank and ditch) on the northern side
- Highest point 456m, 1525 feet
- Vegetation: primarily heather
- Sparse evidence of roundhouse platforms
- Possible Bronze Age barrow within the fort

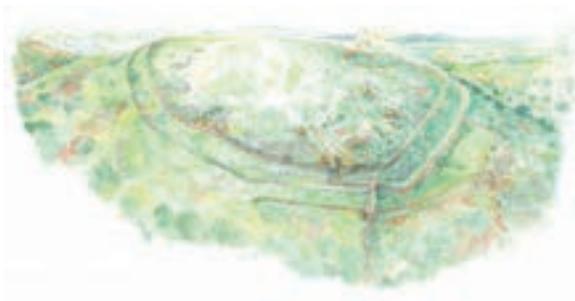


Moel Arthur. (Crown Copyright RCAHMW, AP_2007_4635).



Artist Reconstruction of Moel Arthur.
Tim Morgan.

- 2.63 hectares enclosed by main ramparts, 6.5 acres
- Bivallate (double bank and ditch) with additional 'annexe'
- Highest point 345m, 1132 feet
- Vegetation: rough grass, bilberry & some gorse
- 15 house platforms identified



Artist Reconstruction of Moel y Gaer (Llanbedr).
Tim Morgan.



Moel y Gaer (Llanbedr). (Crown Copyright RCAHMW, AP_2007_4601).

MOEL Y GAER (LLANBEDR)

Moving south along the Clwydian Range from Moel Arthur the next hillfort is Moel y Gaer (Llanbedr). The ramparts create a hillfort similar in size to Moel Arthur, but its position is very different. It is located on a spur of land which juts into the Vale of Clwyd, completely overlooked by the highest peak of the Range, Moel Famau. If hillforts are thought about simply in terms of defence and warfare, this location does not work. Moel y Gaer (Llanbedr), like Moel Arthur and Moel Fenlli, was excavated by W Wynne Ffoulkes in the 1840s. Roman pottery was again found, together with evidence of burning in the rampart close to the complicated eastern entranceway. More recent topographical and geophysical surveys have found evidence for over 15 house platforms and the survey hinted at different phases of building. As we add on extensions and alter our houses today, the Iron Age people also developed and changed their forts. Here at Moel y Gaer it appears that the eastern entranceway was enlarged and made more complicated at some time after the initial building phase.

In 2009 a small scale excavation took place at Moel y Gaer in a sheep scrape, focusing on an area where evidence suggests burning reaching 1300°C. The excavation was completed by Professor Raimund Karl, students from Bangor and Vienna universities, together with members of the local community. The excavation found that the rampart in this part of the fort had just one phase of building, that it was faced with stone on the exterior, and that there was a very discrete deposit of burnt material. Was the material deliberately placed in the rampart during its construction? Was it an offering? The excavation also found a wall within the interior of the fort, close to the rampart which could be part of a building, a house perhaps. Unfortunately not enough was excavated to be certain. Pieces of burnt wood found at the base of the rampart during the excavation have been radiocarbon dated to late Bronze Age / early Iron Age which gives us a potential construction date for part of the fort.

- 9.5 hectares enclosed, 23.5 acres
- Bivallate (a double bank and ditch) for much of the circumference
- Highest point 511m, 1677 feet
- Internal spring
- Vegetation: primarily heather
- Topographical survey identified 61 roundhouse platforms
- Bronze Age barrow located within the fort



Artist Reconstruction of Moel Fenlli.
Tim Morgan.

MOEL FENLLI

Moel Fenlli is the southern-most hillfort in the Clwydian Range, it is big but not as large as Penycloddiau. Although, like Penycloddiau, it is not a true contour fort, it is dipped with the highest area to the east with a Bronze Age barrow on the summit.

There are massive ramparts to the east and north of the fort and one inturned entranceway to the west. Again, like Penycloddiau, there is a spring in the interior of the site and it is here that many of the 61 possible house platforms are clustered. In 1816 and 1847 hoards of Roman coins were found within Moel Fenlli and it is the discovery of these which partly led Wynne Ffoulkes to excavate three of the hillforts in the ownership of the Ruthin Castle Estate. Wynne Ffoulkes in the 1840s apparently excavated 'trench after trench', some across possible house platforms before eventually finding Roman pottery, possibly linked to the Roman coin hoard found earlier in the Century. There are references to Mr Bevan Evans, Archivist in Flintshire in the 1960s, excavating at Moel Fenlli prior to a visit by the Cambrians, but no record of what was found has been located.

Moel Fenlli. (Crown
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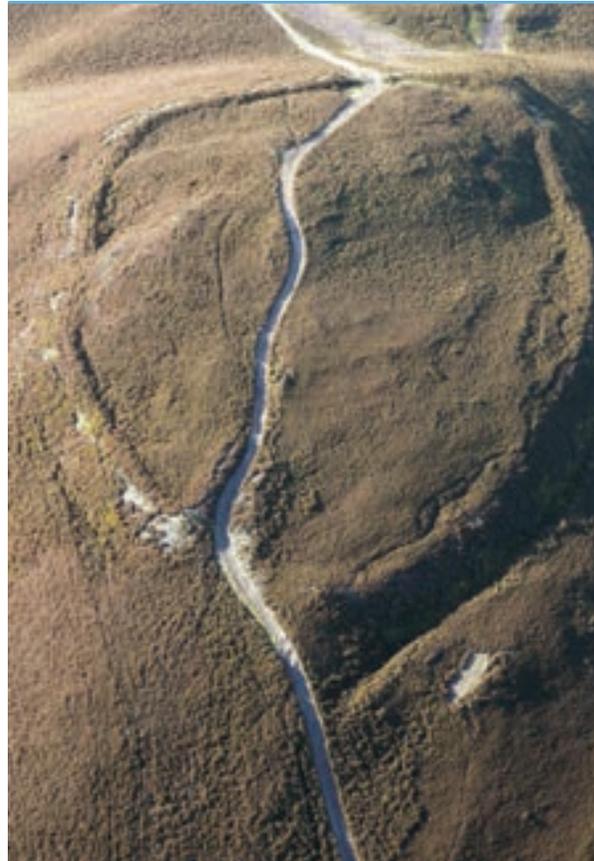


MOEL Y GAER (LLANTYSILIO)

Of the six hillforts in the Heather and Hillforts area, Moel y Gaer (Llantysilio) is the smallest and perhaps the most simple in its construction. It has a single rampart and a single inturned gateway. Recently, the hillfort has suffered severe damage from 4x4s and off-road motorbikes using the area illegally. A track eroded through the western and eastern ramparts and across the interior, as well as an illegal circuit which developed very close to the fort on the western edge. Work to repair the heathland has taken place on this circuit and vegetation has returned. A topographical survey identified 11 roundhouse platforms within Moel y Gaer and a complete geophysical survey has identified many more.

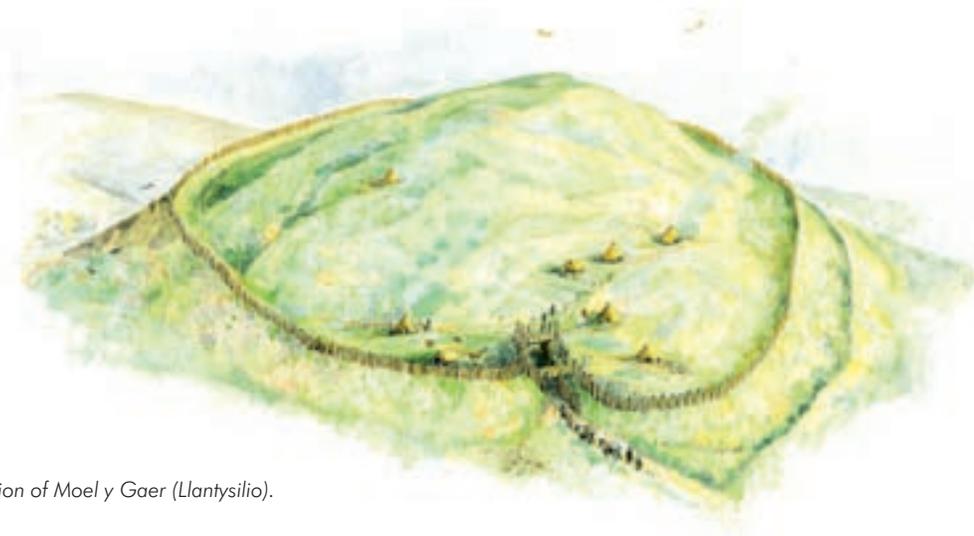
Topographic survey results identified possible roundhouses and possible rectangular structures. Rectangular structures are extremely unusual at Iron Age sites, providing us with tantalising questions.

- 0.95 hectares enclosed, 2 acres
- Univallate (one bank and ditch)
- Highest point 504m, 1654 feet
- Vegetation: primarily heather
- 11 roundhouse platforms



Moel y Gaer (Llantysilio). (Crown Copyright RCAHMW, AP_2007_4601).

"If I had to choose my favourite hillfort it would be Moel y Gaer, Llantysilio. Maybe because it's the smallest, that it's off the beaten track, and that the views are breathtaking. It's all of these and more. Ultimately it's because it teaches you never to judge a book by its cover. As the smallest and simplest of all the forts it's easy to overlook it for the grander ones but as the results from the geophysical survey show there is more to this fort than first appears."
Samantha Williams, Hillforts Conservation Officer



Artist Reconstruction of Moel y Gaer (Llantysilio).
Tim Morgan.

CAER DREWYN

Caer Drewyn is completely different in character to the other hillforts of the Clwydian Range and Llantysilio Mountains, with its stone ramparts. The five other hillforts in the Heather and Hillforts area all have earthen ramparts. These earth ramparts may originally, as in the case of Moel y Gaer (Llanbedr), have had stone facings but today they appear as earth and grass clad banks. The first impression of Caer Drewyn is of a hillfort built entirely of stone, a giant dry stone wall (10,000 cubic meters of stone remain), which over the last couple of thousand years has collapsed. On closer inspection the remains of an earlier earthen bank can be seen which is crossed by the later stone rampart. Although this now appears to be a haphazard heap of stones there are a few glimpses of the original, very neat, facework of the wall. This was uncovered by the Reverend Pritchard and Willoughby Gardner working in the late 19th and early 20th centuries. The original wall was stepped, producing an effect rather like the wall walk of a Medieval castle. The topographical survey identified some house platforms, but not perhaps as many as expected. Geophysical survey of the hillfort has not added much information, although it is possible that the geology of the site has affected these results. There are, however, visible foundations of roundhouses in the small annex area on the eastern side, a later feature located in the area between the earliest earthen bank and later stone rampart.

- 2.9 hectares, 7 acres enclosed plus attached 'annexe'
- Univallate large stone rampart
- Highest point 294m, 965 feet
- Vegetation: primarily rough grass and bracken
- 8 roundhouse platforms

*Artist Reconstruction of Caer Drewyn.
Tim Morgan.*





Caer Drewyn.
(Crown Copyright
RCAHMW,
AP_2007_4572).

THE MOORLAND LANDSCAPE

Stand on the Clwydian Range or Llantysilio Mountains in late summer and you will be surrounded by a sea of purple heather. Looking down the ridge you may be able to pick out the dazzling yellow of gorse in flower on the lower slopes. In the winter the heather-clad ridges appear dark against the skyline whilst the lower slopes are cloaked in the deep russet-red of dying bracken. In the spring these same lower slopes will appear almost luminous green as the young bracken fronds start to unfurl, the same colour mirrored by fresh bilberry leaves in amongst the heather. The distinctive colours and patterns of this outstanding landscape are formed by the seasonal changes of the moorland vegetation, which in turn has been shaped by centuries of management by people who have depended on this land for their livelihood.

If you had stood on the same spot 10,000 years ago the picture would have been very different. Then, much of the landscape would have been tree covered with the natural tree-line lying above 600 metres - higher than the summit of Moel Famau. Heather and other shade-intolerant heathland plants would largely have been confined to open areas where tree growth was inhibited, such as on thin soils, rocky outcrops or forest clearings grazed by wild herbivores. Some heathland plants such as bilberry, which can survive under the tree canopy, would have formed part of the forest shrub layer in more upland areas.

The development of heather moorland began between 10,000 and 6,000 years ago when Mesolithic people started to clear the primary forest. Evidence from areas such as the South Pennines shows that repeated burning by Mesolithic hunting populations permanently suppressed the tree cover and created an open upland landscape. People's activities during this period also led to profound changes in soil characteristics with the onset of podsolization, a process by which minerals are leached from the upper soil horizons to leave an acidic, infertile topsoil, ideal for the expansion of heather moorland. Climate change during the Neolithic hastened the process of podsolization throughout upland Britain and it was during this time that the extensive blanket bogs on the nearby Berwyn Mountains would have been formed. A peat core taken from Moel Llys y Coed near Cilcain has provided a picture of the vegetation change in the landscape over the years to the heather moorland we see today. The results showed:

- **Mesolithic Period, The Middle Stone Age 8000-4000BC** – Woodland is burned to create open clearings to attract animals making them easier to hunt.
- **Neolithic Period, The New Stone Age 4000-2200BC** – Animals are grazed on the hills and people are beginning to cultivate cereals.
- **The Iron Age 750BC-43AD** – Increased grazing and an expansion of the grassland. Farming is now commonplace.
- **The Medieval Period** - Dramatic expansion of heather moorland begins around 660-810AD.



A peat core taken from Moel Llys y Coed, in partnership with the RCAHMW's Uplands Archaeology Initiative.
© Photograph courtesy of Fiona Grant.

For many centuries the open moorlands were largely maintained as rough grazing, as crop cultivation was easier and more rewarding on richer soils in the warmer lowlands. The heather moorland would have been important to local farmers as a place to graze their livestock whilst they grew crops and winter feed in the lowlands. In the past the moorland was greatly valued for many products such as game meat, honey from heather flowers, bilberry fruit, heather for rough thatching, bracken for livestock bedding and gorse for livestock fodder.

At the end of the 18th Century agricultural innovation allowed farmers to start cultivating poorer, more difficult land and from this time onwards heathland declined across Britain. Initially effort was focused on rough grazing land in the lowlands but over the next 200 years agricultural improvement moved into the uplands. The most rapid changes occurred during the second half of the 20th Century when improved farm machinery allowed the drainage, ploughing and liming of the roughest land on the most difficult terrain. The introduction of artificial fertilisers improved the nutrient status of the soil, enabling agricultural grasses to be sown on former heathland sites. Today you can clearly see areas of agriculturally-improved pasture on the slopes of the Clwydian Range and Llantysilio Mountains where once there would have been heathland.

The remains of grouse butts can be seen on both the Clwydian Range and Llantysilio Mountains, testaments to the use of the moorlands for grouse shooting. The development of grouse shooting as a sport began as early as the 17th Century, probably in Scotland; however it was not until the 19th Century that driven grouse shoots were introduced and the commercial value of moorlands for game

shooting was established. In north east Wales shooting estates were developed much later than in Scotland and northern England - for example the Gwylfa Hiraethog Estate was established in the late 19th Century and grouse shooting reached a peak in the early 20th Century on estates such as Ruabon Moor. Moorland management became focused on producing large numbers of game birds by regular patch burning of heather to promote young growth.

Game keepers were employed to manage the moors and to control predators such as foxes and birds of prey in order to protect the grouse. Whilst the Clwydian Range and Llantysilio Mountains cannot be compared with the vast and highly profitable moorlands of Scotland and northern England, there is no doubt that management for grouse would have had an impact on the vegetation, creating a patchwork of old and young heather dominated heath. Grouse moor management waned over the 20th Century as the cost of labour required for management increased and the focus of farming changed. As a result, management practices such as patch burning of heather declined and consequently the condition of the moorland deteriorated. The patchwork structure created by burning disappeared and large areas of the moorland became dominated by old and 'leggy' heather. This decline of heather moorland was exacerbated by the huge increases in sheep numbers in the 20th Century encouraged by agricultural subsidies. Heather is unable to withstand repeated heavy sheep grazing which removes the plant's growing tips and so, over time, the heathland gradually changes to grassland. As sheep tend to graze most heavily on the lower slopes, the heather moorland on the Clwydian Range (as in many upland areas) is now largely restricted to the upper slopes and ridges.

View of the Clwydian Range south from Penycloddiau.





Heather management through controlled burning.



UNDERSTANDING COMMON LAND

Much of the moorland within the Heather and Hillforts area is registered Common Land. Such commons have been part of the rural landscape since the Medieval Period. Over the centuries thousands of hectares of open Common Land have been lost, initially by parliamentary enclosure and more lately through failure to register land under the 1965 Commons Registration Act, by legal deregistration or by illegal enclosure. The remaining open Common Land represents some of the least agriculturally managed areas of the countryside and often has very high wildlife value.

Today many people are unaware of Common Land or misunderstand its status, often believing it to be public land with public rights. This is not the case; Common Land is usually owned by an individual or organisation. Where there is no known owner the land is in the care of the local authority. Only registered individuals, known as commoners, are

entitled to exercise certain rights on the common and these rights are usually attached to their property. Examples of the variety of rights exercised by commoners are:

- **Right of herbage** – to graze livestock
- **Right of estovers** – to collect firewood
- **Right of turbary** – to cut turf or peat
- **Right of pannage** – to graze pigs on acorns in autumn

The 1965 Commons Registration Act registered both the commons and the associated rights - so for example, the owners of a particular property were granted the right to graze a certain number of animals. The register of rights is maintained by the local authority. The only universal public right was granted under the Countryside and Rights of Way Act 2000 which entitles people to walk on all Common Land.

Over the centuries agricultural use of Common Land has changed but less markedly than on the adjacent enclosed land. During the 19th and 20th centuries agricultural intensification largely bypassed Common Land which was protected by its very nature as a shared resource between owners and graziers. Throughout this period the commons provided a refuge for wildlife as the surrounding land became more unsuitable due to intensification programmes. In the late 20th Century, agricultural subsidies encouraged farmers to increase livestock numbers and many of these animals were grazed on Common Land, resulting in very heavy grazing in some areas. More recently this process has reversed and fewer farmers are turning out animals to Common Land. Whilst this has redressed the balance, in some areas there is a real concern that Common Land is increasingly becoming marginalised from mainstream agriculture and as a result commons have become under-managed and neglected. Projects such as Heather and Hillforts are working with farmers to promote and safeguard traditional Common Land management.

Sheep near Moel
Famau.



THE MOORLAND VEGETATION TODAY

Today the main components of the moorland vegetation on the Clwydian Range and Llantysilio Mountains are heathland, acid grassland and bracken. Heathland vegetation is found primarily on the higher slopes, ridges and plateaux. Heathland is defined by the presence of woody shrubs, known collectively as dwarf-shrubs, which can form a closed canopy, like a miniature woodland, ranging in height from about thirty centimetres to greater than a metre.

At first glance the heathland on the Clwydian Range and Llantysilio Mountains appears to be dominated by a single dwarf-shrub species, common heather also known as ling. This forms the vast bulk of vegetation and gives the hills their distinctive purple colour when in flower. However, look closer and you will find other species growing alongside the heather. Bilberry is usually hidden amongst the heather on the higher ground. On the lower slopes where there are more sheep grazing, bilberry can replace heather in dominance, forming a continuous canopy of large

rounded bushes. Bilberry heath can be seen at the north east end of the Moel Famau ridge and close to the Horseshoe Pass on the Llantysilio Mountains. Bilberry is also the first species to appear after the vegetation has been burnt, even on higher ground, and it may be abundant for several years before the heather grows tall and dense and overshadows it. Unlike heather, bilberry is deciduous, producing paper-thin lime-green leaves tinged with red in the spring, which are dropped in the autumn, to leave spiky green and brown shoots. Bilberry has a small pink, flask-shaped flower and is famed for its delicious purple-black berries, produced in the late summer which are popular with both visitors and wildlife.

The third common dwarf-shrub species found on the Clwydian Range and Llantysilio Mountains is western gorse, a short to medium height, dull green spiky shrub which produces brilliant yellow flowers in late summer and early autumn. This species is not to be confused with its much taller and bulkier relation, common European gorse, which flowers throughout the growing season and often into winter. Western



Bilberry.

Red Grouse.
Mark Sisson
(rspb-images.com).



gorse is generally a plant of lowland heathland, preferring warmer, deeper and richer soils and therefore tends to be found only on the lower slopes of the uplands. It may grow alongside heather, forming a mosaic of purple and yellow, or where heather cover is reduced by repeated burning or heavy grazing, it may become the dominant dwarf-shrub forming dense spiky patches impenetrable to people and livestock. Western gorse is sensitive to cold weather and frost and there is some evidence to suggest that as winters have become warmer it has moved higher up the slopes. It also responds to burning and its seeds can germinate faster than heather seeds, so that repeated burning favours the spread of the gorse at the expense of the heather.

Of the remaining four dwarf-shrubs, bell heather, named for its purple-red bell-shaped flowers, is more typical of warmer oceanic lowland heaths in the west of Wales. It is found scattered amongst the common heather particularly on the lower slopes of Moel Gamelin, Moel Morfydd and on some of the slopes of Moel Famau. Cowberry is an uncommon plant in north east Wales - it is more commonly seen on the

high mountains of Snowdonia. Similar to bilberry in general appearance, it is an evergreen shrub with glossy, dark green leaves and a small, pale pink bell-shaped flower. It produces red rather than black berries in late summer and early autumn. It occurs on the higher summits of Llantysilio Mountains and on Moel Famau. Crowberry, an evergreen shrub with small pointed leaves, tiny pink flowers and a very small black berry is also less common in the north east, but occurs in scattered patches across Llantysilio Mountains and on Moel Famau. The final species, cross-leaved heath is a species more typical of wet heath, a habitat which does not occur within the Heather and Hillforts area. Cross-leaved heath has been found in a wet flush on Moel y Parc and on a small area of blanket bog on Llantysilio Mountains. It is easily distinguished from other heathers by the cross-like pattern of its pointed leaves arranged in whorls of four and its pale pink flowers.

Other heathland species may not be easily visible unless you search under the dwarf-shrub canopy. Mosses are particularly abundant and can form a luxuriant soft green layer smothering the ground.

Commonly found species include *Dicranum scoparium*, *Pleurozium schreberi* and *Hypnum jutlandicum*. Of the heathland grasses, wavy hair grass is the most distinctive with its silvery flower heads which shimmer in the breeze. It is often found in areas which have been recently burnt. A few flowering plants are found amongst the heathland with three species being fairly widespread and common - these are heath bedstraw with its tiny white flowers, tormentil with its four-petalled yellow flowers and heath milkwort with its cylindrical deep blue flowers. One rare plant in particular found within the Clwydian Range heathland is a small liverwort commonly known as bog paw-wort which was found amongst damp moss under heather on Moel Dywyll in 1984. This was the first Welsh record of this arctic-alpine species.

Grassland is an important component of the moorland particularly for local farmers who graze livestock on the hills. It is referred to as semi-natural acid grassland which describes the acid nature of the soil and the fact that it has not been agriculturally improved by the use of fertilizers and lime. Acid grassland, which appears pale yellow-green at a distance, is distinctly different from the bright green improved grassland you can see below in the Vale of Clwyd. This improved grassland has been managed by seeding, fertilizing and liming to produce highly nutritious forage for livestock but has far less value for wildlife. The acid grassland sward consists primarily of bents and fescues grasses. Where grazing pressures are high, mat grass tends to spread because it is unpalatable to livestock and is therefore avoided by the sheep. Mat grass has a distinctive flower head with black seeds arranged along one edge giving it the appearance of a small toothbrush. Other grasses include sweet vernal grass which has a distinctive hay smell in spring. Although grasses dominate the sward, if you look carefully you will find flowering plants such as tormentil and bedstraw in the heathland. Acid grassland may be produced by the heavy grazing of heathland, as dwarf-shrubs are easily damaged by livestock. In some areas you will find tiny bilberry and heather plants, just managing to survive amongst the grass.

Bracken is a plant of warmer richer soils and therefore tends to flourish on the lower slopes. In the

summer the bracken canopy may be so dense that very little vegetation can be seen beneath. However both acid grass and heath species can survive under bracken so long as they are not smothered by a dense layer of dead bracken litter. Heather is easily shaded out by bracken so where the latter invades into heathland, the heather will gradually decline. Bilberry is much more tolerant of shade and the presence of bilberry under bracken is a good indication of where heathland formerly occurred. The spread of bracken can have a negative impact both on heathland wildlife, by reducing the total area of heather and on grazing livestock, by reducing the area of grassland available. Because sheep tend to avoid bracken areas, trees such as rowan, birch and hawthorn are sometimes able to germinate, and small saplings can be seen on the lower slopes. In time, without management, much of the lower slopes would revert to woodland.

Both the Clwydian Range and Llantysilio Mountains are reasonably well drained so there is little deep peat or wetland vegetation. Small flushes and pools occur across the Heather and Hillforts area but the only deep peat is found on Moel Gamelin on the Llantysilio Mountains, where there is less than a hectare of blanket bog. This is in stark contrast to the neighbouring Berwyn Mountains where there are thousands of hectares of blanket bog.



Looking towards the Clwydian Range.

"I love looking at the Clwydian Range and Llantysilio Mountains from a distance. The rolling hills against the skyline at dusk, showing the profile of the hillforts and the deep canvas of colours. I feel secure in the knowledge that these hills will always be here for me."

Helen Mrowiec, Heather & Hillforts Project Manager

WILDLIFE OF THE MOORLAND

Whilst heather moorland may not support an extensive range of rare plants, it is home to a variety of wildlife, some of which is dependant on the moorland habitat for its survival such as the red grouse, black grouse and mountain bee.

If you walk through the dense heather on Moel Famau you may well disturb red grouse, which will shoot out of the vegetation rapidly making their distinctive repetitive grating call. Typically they fly low over the heath, alternating beating wings with gliding flight and will come to land in another patch of heather not very far way. The red grouse is the iconic moorland bird. The male grouse is reddish brown with pale-feathered legs and feet and red eyebrow wattles which are most prominent in spring. The female is duller and has no wattles. Red grouse feed primarily on young heather tips, flowers and seeds but will also take bilberries and insects. As well as supplying the bird's staple food, the heather also provides nesting sites and protection from predators. Management of the heather is therefore crucial to create a patchwork of young heather for feeding and older taller heather for nesting and cover. The red grouse is in decline across Wales, primarily as a result of the lack of traditional moorland management practices such as heather burning, although disease is also a particular problem for this species.

The red grouse may be the most characteristic heathland species but its larger cousin, the black grouse, is the most celebrated bird of the Clwydian Range and Llantysilio Mountains' moorlands. The area has played a key role in efforts to reverse the decline of this beautiful bird. The male is easily recognisable with its striking jet black plumage, white wing stripes and scarlet wattle above each eye. The tail is lyre-shaped and, when in display, the black feathers are fanned out to reveal the white feathers below. The female bird is much less flamboyant with her greyish brown plumage which, although less colourful, provides ideal camouflage when nesting in the heather. The best time to see black grouse is at dawn in early spring when the males or blackcocks gather to display on areas of open ground referred to as leks. Here the blackcocks compete with each other

by posturing and calling, in a bid to attract females. After mating the females then disappear into tall vegetation where they can nest away from the attentions of aerial and ground predators.

Black grouse were historically birds of forest clearings and forest edge, but over the last few centuries they have become adapted to living on the moorland edge, preferring areas where there is a scattering of trees and traditionally managed grassland in close proximity. Black grouse have a much wider diet than red grouse, taking heather and bilberry shoots, the shoots and flowers of grasses, sedges, rushes and meadow flowers, birch buds, conifer shoots, buds, pollen and in the autumn the berries of rowan, bilberry and hawthorn. The adults get their food entirely from plants but the young feed on invertebrates, particularly caterpillars and sawfly larvae which are often most abundant close to wetlands and pools. Unfortunately, because of its demanding habitat requirements, the black grouse is very susceptible to changes in agricultural and forestry management and the species has undergone a very severe decline across the UK. This species, once found as far south as Dorset and Hampshire, is now confined to northern England, Scotland and north and central Wales. The remaining populations are small and fragmented and this makes them more sensitive to other harmful factors such as predation, poor weather conditions and disease.

Management of the moorland by burning or cutting to provide a mosaic of young and old heather is essential for both red and black grouse. In addition, the provision of pools for invertebrates, an increase in low intensity grassland management on the moorland edge and the thinning of adjacent coniferous forestry to provide a 'feathered edge', all help to provide the range of habitats specifically required by black grouse.

If you are really lucky you may see a hen harrier hunting low over the moorlands on Llantysilio Mountains. This large bird of prey feeds on small birds and mammals but will also take larger prey including grouse. The male bird is easily recognisable with its pale grey and white colouring and striking black wingtips. The female bird is less conspicuous being mainly brown with a white rump

Black Grouse – a Success Story?

By 1999, the decline of the black grouse was so severe across Wales that a group of voluntary and statutory organisations led by the Royal Society for the Protection of Birds (RSPB) launched the Black Grouse Recovery Project. The project focused on six key areas in north and mid Wales, including the Clwydian Range. The aim was to target moorland and forestry management within 1.5 km of known lek sites. The Black Grouse Project Officer also provided advice to local landowners on how to manage moorland and restore the diversity of land use on the moorland edge.

Since the launch of the Recovery Project individuals from across the partner organisations have taken part in early morning lek counts each year and the RSPB has used this information to determine what has happened to the grouse population. Across the six key areas

the number of lekking males increased from 131 in 1997 (Welsh Black Grouse Survey) to 243 in 2002 but then declined again to 211 in 2005. Since 2005 the numbers have fluctuated, possibly as a result of a number of factors including a reduction in heather management, adverse weather during the breeding season and changes in predator control.

Efforts in the Clwydian Range have had considerable success with numbers increasing from a single male in 1999, to 14 males on the moorland between Moel Fenlli and Moel y Parc in 2010, reaching an all time high of 25 in 2011.

The fluctuation of blackcock numbers within other key areas has shown that we cannot be complacent and that the effort has to be maintained if the long-term survival of this emblematic bird is to be assured.



and barred tail. She nests on the ground in patches of tall heather. Unfortunately the hen harrier is frequently seen as a threat to grouse populations and has suffered persecution across the UK. As a result the number of birds has declined dramatically to an estimated total of less than 800 pairs. Since the late 1990s hen harrier numbers have started to rise again in Wales.

Other birds which are typically associated with heather include the tiny merlin, our smallest bird of prey, and the blackbird-like ring ouzel, the male bird easily identified by its white collar. Both these species have been recorded in the area but are rarely seen. The buzzard is commonly seen flying above the moorland, with its distinctive 'meowing' cry.

The meadow pipit is the commonest of all the small upland birds and the one you are most likely to encounter when walking across the moorlands. Whilst their brown streaky colouring does not make them particularly conspicuous, their display flight, a rapid vertical ascent and parachuting descent accompanied by an accelerating trill, is very distinctive. Meadow pipits make their well concealed nest in heather, rank grass or other tall vegetation. This concealment, however, does not prevent the nests being parasitised by another summer visitor, the cuckoo, a bird you are more likely to hear than see on the moorland. Nest parasitism may be unfortunate for the individual meadow pipit but it is critical for the breeding success of the cuckoo, a bird which has become increasingly uncommon across Britain. Meadow pipits also have a vital role in the moorland food chain as a source of prey.

The skylark is a ubiquitous species found from the coast to the uplands. Like the meadow pipit it is renowned for its song and flight rather than its inconspicuous streaky brown plumage. Typically, during the song flight the bird rises vertically upwards often to a considerable height where it will hover for a few minutes before parachuting or fluttering down. This flight is accompanied by a continuous highly musical warble, a sound which epitomizes a summer's day in open countryside. Whilst skylarks are widespread, the national skylark population has declined dramatically, primarily due to changing lowland agricultural practices

such as the shift from spring to autumn sowing of cereal crops.

On the edges of the moorland you could encounter another small but more colourful bird, the yellowhammer. The male is unmistakable with its yellow head and chest and streaky chestnut rump. Although primarily a grain and insect eating species of lowland farmland, they may be seen on the moorland fringe perching on tall gorse or scrub. The male bird has a distinctive call which reputedly sounds like "a little bit of bread and no cheese".

Sadly some bird species once characteristic of moorland have almost vanished from the landscape. One example is the curlew, with recent data suggesting an 80% decline in numbers. The curlew, a large wading bird with a long curved beak, may still be seen or its bubbling call heard on Llantysilio Mountains, but has disappeared from the Clwydian Range in recent years.

Whilst many birds are closely associated with heather moorland, there are no mammals which can be considered an uniquely moorland species. The uplands are undoubtedly home to a variety of mammals including voles, mice, hares, stoats, weasels, foxes and bats, but all of these are also widespread in the lowlands. Large herbivores such as the red deer you see on the Scottish mountains have long since gone from this area to be replaced by domesticated livestock. Consequently it is unlikely that you will encounter many mammals on your exploration, except of course the grazing sheep.

Patches of warm open soil on paths and managed heath provide ideal basking spots for reptiles such as adders and common lizards, both of which are commonly found in heathland on the moor. Instantly recognisable by the dark zigzag along its back the adder is Britain's only venomous snake, although, for people, bites are rarely fatal. Adders are less shy than other British snakes and are best seen after they emerge from their hibernation dens in spring. Common lizards, which form part of the diet of adders, also like sunny places and may even be found basking on top of the heather. They feed on small insect prey amongst the heathland vegetation.

Invertebrates, which include insects, spiders and worms, are an important food source for numerous moorland species. Red grouse chicks, for example, feed on craneflies and the timing of breeding is linked to crane fly emergence. Sawfly larvae and caterpillars form the diet of newly hatched black grouse chicks. Meadow pipits feed on a variety of invertebrates including spiders, harvestmen, thrips, mosquitoes and midges, whilst common lizards take spiders, flies, moths, beetles and ants.

Some insects are highly dependant on moorland habitats. Two local examples are the heather beetle and the mountain bumble bee. The heather beetle is a particularly significant upland species because of the devastating impact it can have on heather moorland. It is a tiny pale greenish brown beetle, the adults measuring only 6 millimetres. The adults spend the winter in deep moss under the heather. In spring they emerge to climb to the top of the heather from where they can disperse to surrounding areas. After mating the eggs are laid at the base of the heather and at this stage most of the adult beetles die. Once the larvae emerge they climb to the top of the heather where they will feed on young shoots and leaves. The larvae go through a series of life stages before the adults emerge to return to the moss covered ground over winter. Heather beetles are present at low numbers in most heathland but in some years there is a population explosion resulting in vast numbers of larvae feeding on the heather.

Although the beetles themselves are rarely seen, the impacts of a heavy infestation are very apparent. Damaged heather plants initially start to turn orangey-red during the summer although later they appear bleached and grey. In particularly bad years vast areas of heather can show signs of beetle damage. The heather plants may recover from the damage the following year but if there are other stresses, such as severe weather or heavy grazing, some plants may die. The loss and suppression of heather by the beetle can allow grasses and other invasive species to encroach into the heathland.

The mountain or bilberry bumblebee is a restricted species in Britain but has been found on both the Clwydian Range and Llantysilio Mountains. The bee is quite distinctive with two lemon coloured bands on the thorax and an orangey-red abdomen. As the name suggests their main food plants are bilberry and other ericaceous shrubs.

"I feel privileged to be involved with the Heather and Hillfort Project. Having lived with a view looking out to the Clwydian Range for over 30 years it never ceases to amaze me - the beauty of the changing seasonal colours from the snow covered hilltops to the magnificent purple of the heather in late summer. I have walked in various places across the country but my heart will always be in the Clwydian Range with all its splendour, peace and tranquillity."

Ann Roberts, Heather & Hillforts Administration Officer



Bilberry Bumblebee.
Photograph Ray
Wilson.

MANAGING THE MOORS - A BALANCING ACT

Without management, the vegetation of the moorland would change with scrub and woodland extending up the slopes. Whilst these are important habitats in their own right it would in time, result in the loss of the characteristic assemblage of moorland species. Thus if we want to see black grouse, hen harrier and mountain bee we need to protect and manage the habitats they depend on. This in itself is complex, as within the moorland different species have different habitat requirements. For example, controlled burning has benefits for many species by promoting the regeneration of heather and producing structurally diverse vegetation. However, the frequency of the burning cycle can favour one species over another. Red and black grouse, for example, prefer a well managed moorland with a patchwork of short burnt plots to provide young heather for feeding and patches of tall heather for nesting and shelter. Increasing the frequency and intensity of heather management can significantly increase the number of both grouse species and in the past grouse moors were systematically burnt to maximise game bird production. Conversely, intensive heather management can be detrimental to meadow pipits, skylarks and wheatears which all fare less well on frequently burnt heather-dominated moor. This in turn can have an impact on predatory species. Merlin, for example, have been shown to decline when meadow pipit numbers drop. Reptiles are also vulnerable to fire particularly where hibernation sites are destroyed. On the other hand the right level of burning can produce the bare soil they require for sun basking.

Very frequent burning can reduce the diversity of the heathland vegetation with the more fire-tolerant species becoming dominant at the expense of other species. Some frequently burnt moors become almost a monoculture of common heather with little other vegetation. A combination of frequent burning and heavy grazing will, in the long-term, reduce heather cover, and will encourage the expansion of grassland.

The role of the Heather and Hillforts Project is to demonstrate how well-planned sensitive moorland

management can allow the full range of moorland species to flourish whilst supporting hill farmers to ensure traditional agricultural management continues into the future.

Grazing is an essential part of moorland management both for the local farmers and wildlife. Once again getting the balance right is difficult - too much grazing shifts the vegetation towards grassland to the detriment of the heather dependant species, whilst too little grazing allows the heather to become tall and leggy and encourages the spread of trees and scrub. Excessive trampling by livestock can also be a problem for ground nesting birds and reptiles.

The 21st Century will bring new challenges for heather moorland; currently the number of farmers grazing livestock in the uplands is in decline and there are now concerns that areas like the Clwydian Range and Llantysilio Mountains will become under-grazed and unmanaged, leading to a further loss of heather moorland. Climate change will also have an impact on the moorland. Research suggests that whilst heather will be able to maintain its current geographical range under warmer temperatures, invasive species such as bracken and gorse will be able to grow at higher altitudes and therefore could encroach further onto the moorland. As the human population rises, moorlands may also come under increasing pressure for food production and rising temperatures could make arable farming more realistic in upland areas. At the same time there are growing recreational demands on the uplands and a desire for these last "wild" places to be maintained for their cultural, spiritual and aesthetic values.



Adder.
Danny Green
(rspb-images.com).





OUR WORK

Over the past three years the Heather and Hillforts Project has succeeded to deliver a diverse range of work ranging from moorland management, archaeology, access, interpretation, education, transport and much, much more. However, the greatest success by far is the partnership that has been formed, which has enabled our collective achievements to surpass all expectations. The good will and commitment given from all sectors shows how special the Clwydian Range and Llantysilio Mountains are to so many people.

OUR LEGACY

The heather moorland of the Clwydian Range and Llantysilio Mountains has now a greater diversity of heather age, improving the conservation and agricultural quality of the moorland. Over the last three years the Heather and Hillforts Project has worked with graziers and local landowners to help them care for this area of special and fragile heather moorland. Parts of the uplands have now entered into the Welsh Government's Tir Gofal scheme, which will provide some financial assistance for habitat management. Moorland demonstration days have provided the opportunity for graziers to come together to share ideas and learn from each other.

Erosion management projects have been completed on hillfort and moorland areas. Work relating to the historic sites has involved the construction of innovative 'floating ramps' which not only make access to some of the hillfort sites easier, but also protect the archaeological interest of the site, by minimising erosion. The design means that the ramp sits on the surface, with no disturbance to the monument itself. Another area of work that has made a significant contribution to the restoration of



Geophysical survey of Moel y Gaer (Llanbedr) completed by EAS and volunteers.

Bwlch Pen Barras
Viewpoint.



the landscape is repairing areas of moorland that have been damaged by the illegal use of off-road vehicles. Two illegal moorland motorbike tracks have been harrowed, sown with a specialist upland grassland seed mix and covered with heather brash, with vegetation now returning. Officers have also been working closely with the police to act against the illegal use of the moorland by vehicles and six bikes have been seized.

The project has not only sought to conserve this wonderful landscape, but also to discover more about its special features. Notable findings include dating evidence for charcoal samples taken from Moel y Gaer (Llanbedr), confirming it as early Iron Age, the result of an excavation completed by Bangor University.

The stone found at Penycloddiau, the archaeological remains and the heather moorland all symbolise the relationship of people with this landscape through time. People continue to be an important part of the Heather and Hillforts Project. Numerous guided walks, talks, training days, archaeological skills days, art workshops and education visits have been held.

The equivalent to over £120,000 has been received from volunteer work. The project also encouraged groups that had not visited the area previously to experience this special landscape for themselves. The Heather and Hillforts Challenge involved school children of mixed ability working together to complete tasks related to the heritage of the area.

Around half a million people visit the Heather and Hillforts of the Clwydian Range and Llantysilio Mountains every year, many possibly not realising that they had visited an area of historic and natural significance. Projects that aim to raise awareness about the area's heritage include car parks that reflect the special character of the area, tables with information panels, a DVD and mobile phone trails, all designed to have maximum effect, without having an adverse impact on the landscape. The Heather and Hillforts Project has also worked with partners to promote people to travel by public transport. Support has been given to the Clwydian Ranger Service and the timetable is now combined with a free walking guide. Buses have been branded with images of the area, promoting people to visit the outstanding heritage on their doorstep.



Re-enactors walking on Moel Famau.



Moorland demonstration day with graziers

Heather management.



The success of the Heather and Hillforts Project is without doubt due to all the people who feel passionate about this landscape and want to share its special qualities with others. They include the farmers, teachers, community groups, professional officers, children, contractors, tourism businesses and many, many more. The project's success is due to people's commitment to this special landscape.

"To me the most satisfying aspect of the Heather and Hillforts Project has been the way that people with differing interests have been able to work together to provide long term benefits for the heritage of the Clwydian Range and Llantysilio Mountains."

Rod Williams, Chairman of the Heather and Hillforts Landscape Partnership Scheme

HEADLINE ACHIEVEMENTS

- 2021 acres of habitat management
- 710m of erosion management
- 4 archaeological excavations
- 12 interpretation projects
- 10 joint operations to clamp down on off-road vehicles
- 13 outreach events arranged
- £120,700 cash value equivalent made to the project in volunteer time
- 37 training events with 677 participating
- 11,412 total participants involved in the project
- 150 businesses involved in the project
- Establishment of the Clwydian Range Archaeology Group (CRAG)



Moel Arthur interpretation panel in the snow.



Archaeological excavation work completed by the Clwydian Range Archaeology Group (CRAG).



The Heather and Hillforts Audio Trail provides information to people about the landscape, without cluttering beautiful and sensitive remote sites with interpretation panels.



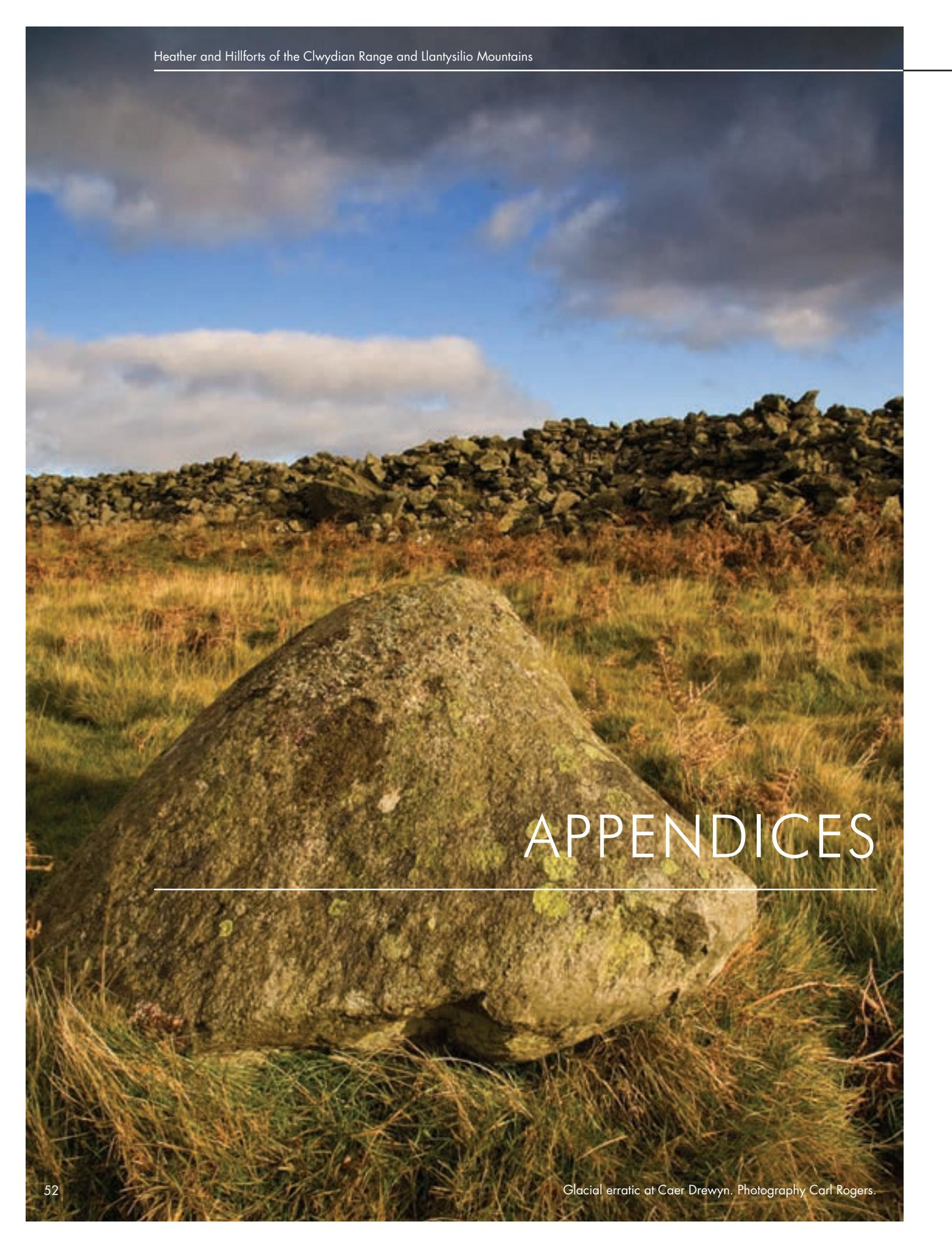
The Heather and Hillforts 'On your doorstep campaign' to promote people to visit their local heritage.



A school visit to Penycloddiau Iron Age hillfort.



Clamping down on the illegal use of the moorland by off-road vehicles.



APPENDICES

FURTHER READING

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Links to websites of interest available at:

www.heatherandhillforts.co.uk
www.denbighshirecountryside.org.uk
www.clwydianrangeaonb.org.uk

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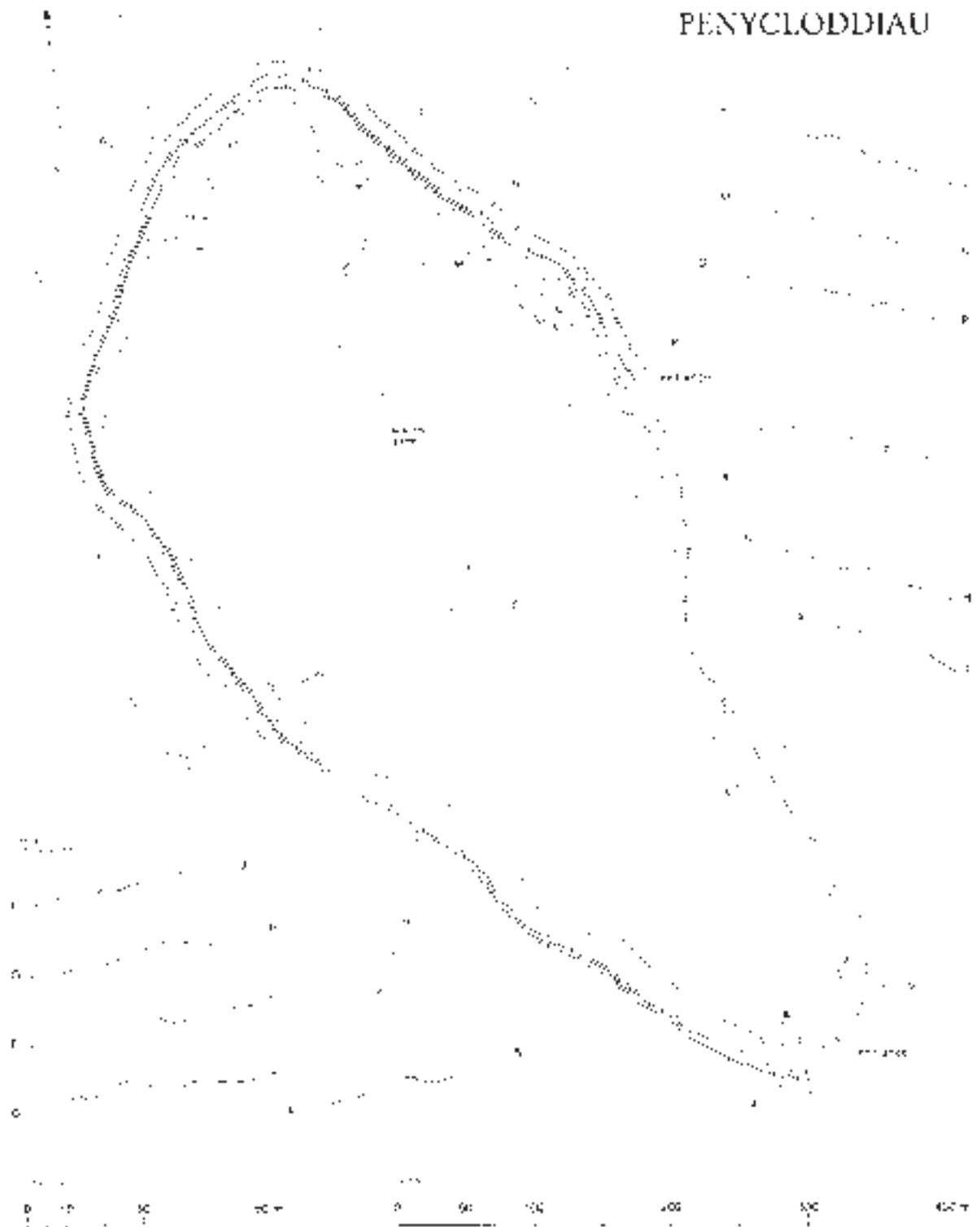
Place Names:

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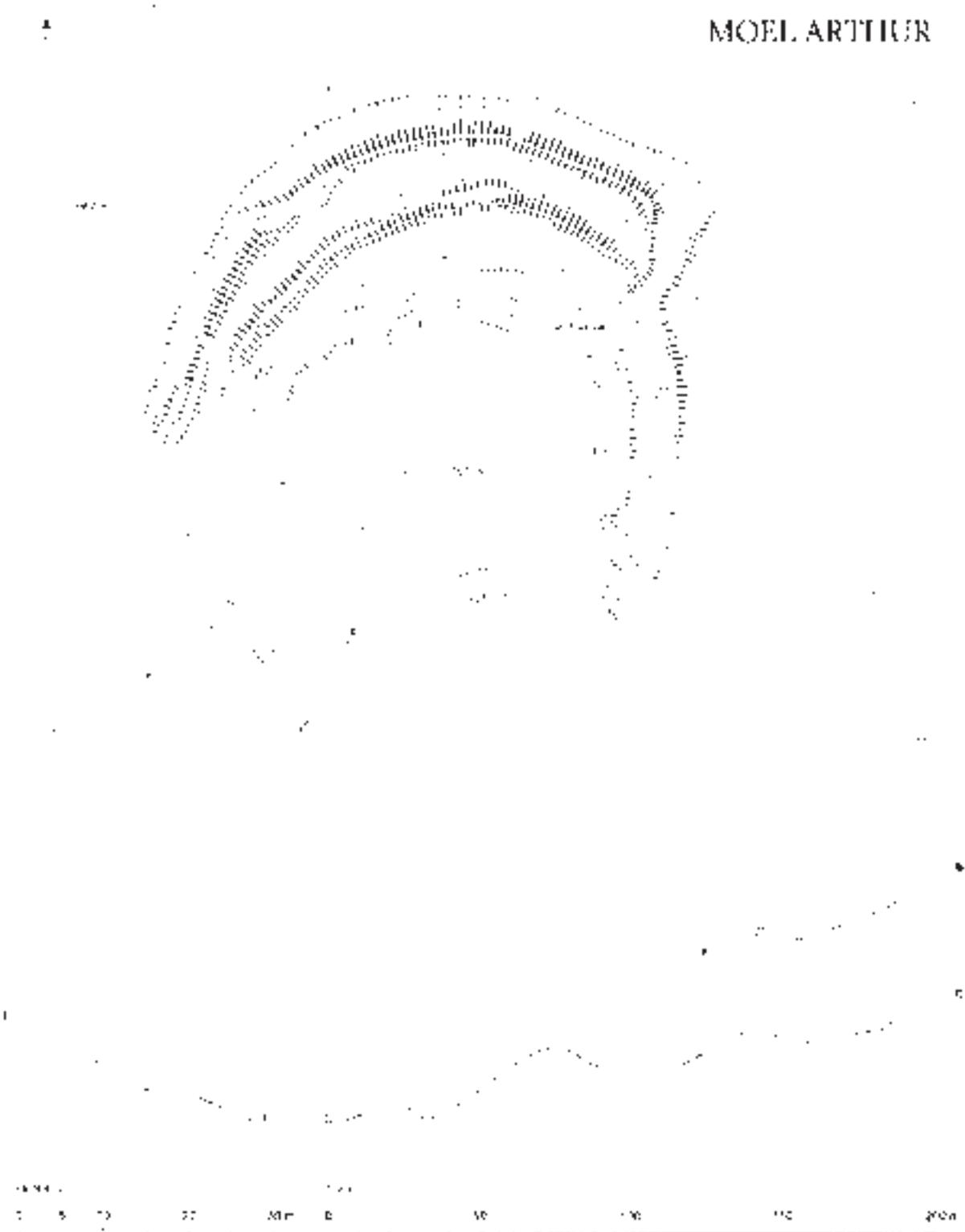
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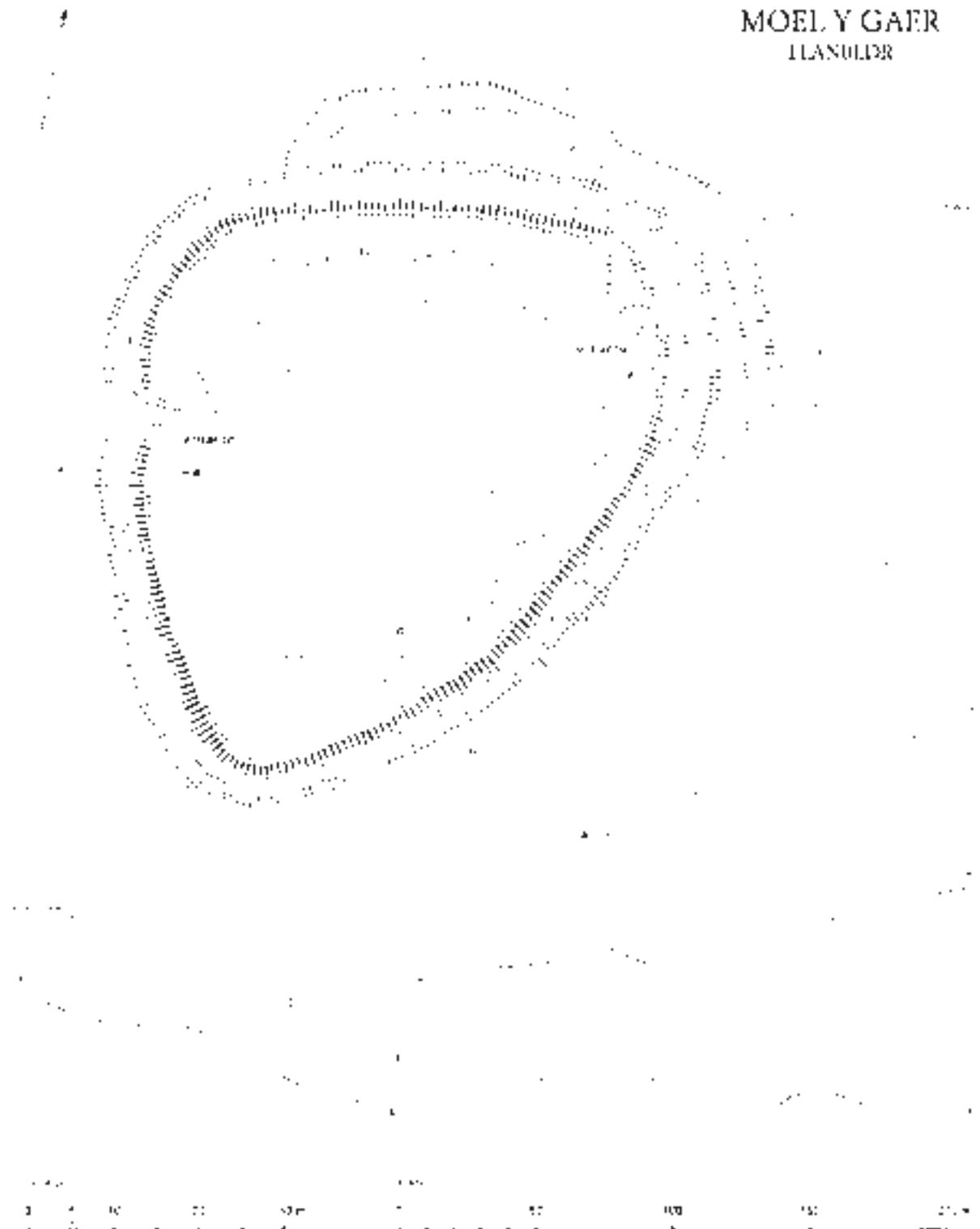
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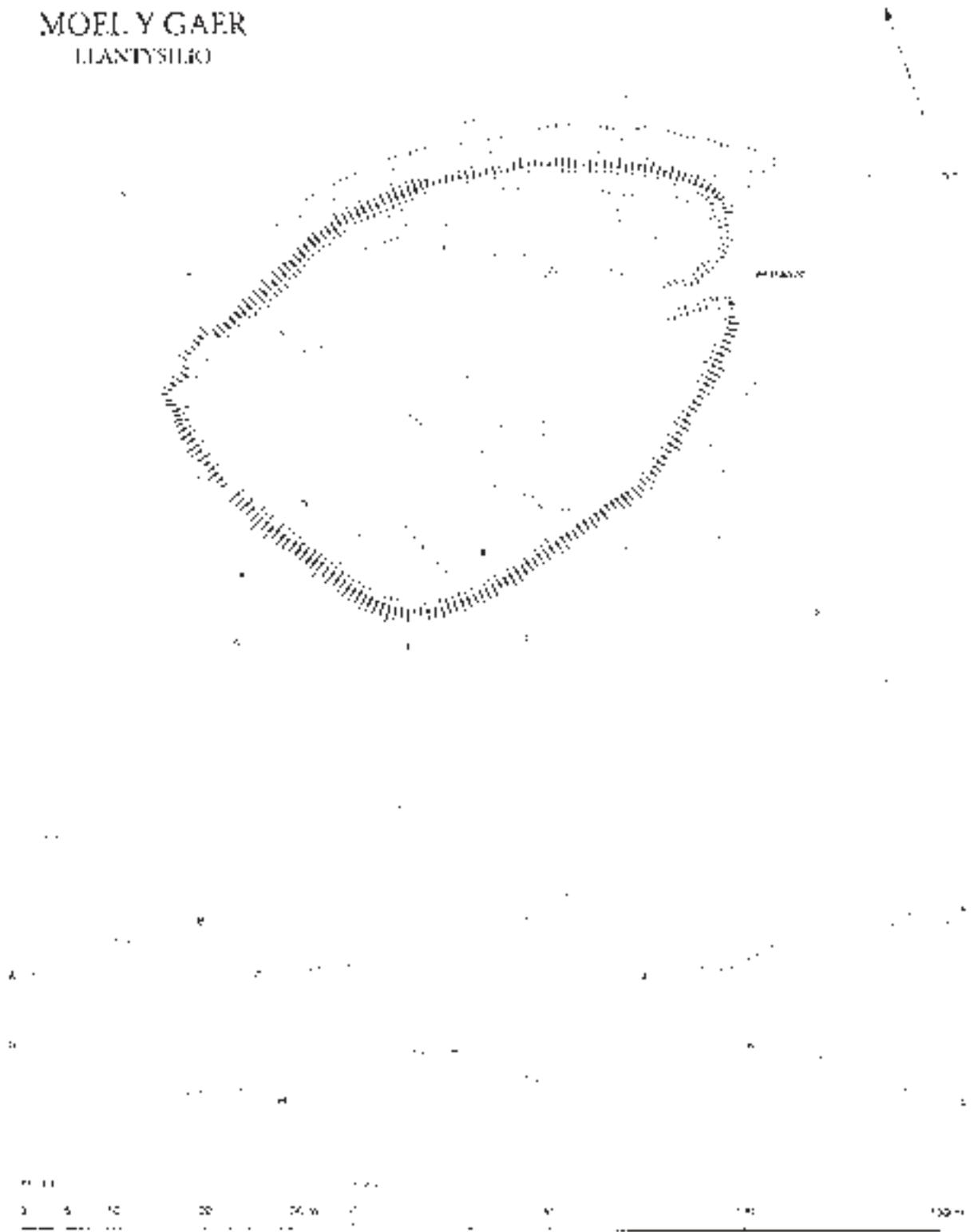
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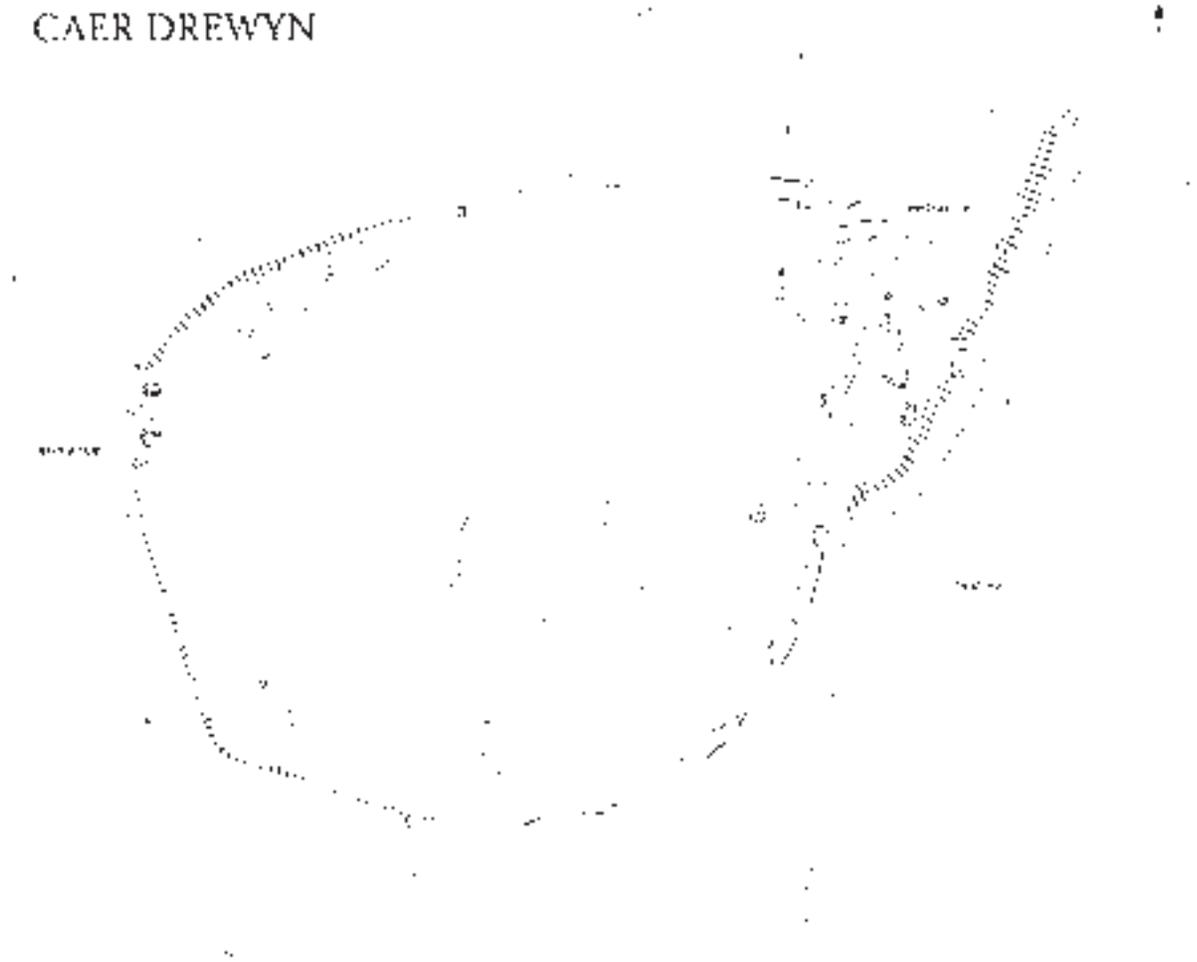




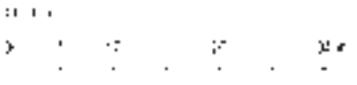
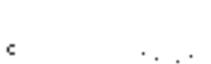
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