The Blackstairs Mountains, South East Ireland; Investigating the Archaeological Potential of an Understudied Upland Landscape

Vol. 1 of 3

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Acronyms

ArcGIS – a Geographic Information System computer program

ASI – Archaeological Survey of Ireland

ASVF – Anisotropic Sky-View Factor (Lidar)

DEM – Digital Elevation Model

DLRCC – Dun Laoghaire-Rathdown County Council

DSM – Digital Surface Model

DTM – Digital Terrain Model

EU – European Union

GIS – Geographical Information System

GPS – Global Positioning System

KAP – Kite Aerial Photography

LFA – Less Favoured Area

LiDAR – Light Detection and Ranging

LRM – Local Relief Model (Lidar)

NFC – National Folklore Collection (Ireland)

NIR – Near Infra-red

NMP – National Mapping Programme (England)

NMS – National Monuments Service (Ireland)

NRA – National Roads Authority

OPW – Office of Public Works

OS – Ordnance Survey

OSI – Ordnance Survey of Ireland

PCA – Principal Components Analysis (Lidar)

QGIS – Quantum GIS

RCAHMS – Royal Commission on the Ancient and Historical Monuments of Scotland

RCAHMW – Royal Commission on the Ancient and Historical Monuments of Wales

SAC – Special Area of Conservation (Ireland)

SDCC – South Dublin County Council

SMR – Sites and Monuments Record (Ireland)

SNAPS – Scottish National Aerial Photography Scheme

SVF – Sky-View Factor (Lidar)

UAV – Unmanned Aerial Vehicle

Abstract

Based purely on the distribution of recorded monuments, it would be easy to conclude that upland landscapes in Ireland were as sparsely utilised and under populated in the past as they are today. Until recently, the Irish uplands have seen limited archaeological research; however, a growing number of intensive upland surveys have begun to indicate that the observed distribution is more likely to be a reflection of modern research patterns than a past reality. Despite the increasing interest in upland research there has been a natural tendency to focus on particular sites or periods in specific regions. By contrast, this thesis examines the Blackstairs Mountains, southeast Ireland, through a multi-period assessment of the archaeology of its uplands. Research in 2011 on a single mountain in the Blackstairs almost doubled the record of known archaeological sites for the entire upland region. The current thesis sets out to address the core question of whether this could be replicated across the entire mountain range or if it was an isolated incident. This project was more than a simple exercise in accumulating dots on a distribution map. A landscape-based approach was taken to the archaeological remains in order to interpret their spatial and temporal patterns in the context of the use of the uplands within the wider region.

This thesis takes a multi-faceted approach. It includes a critical examination of what it means to study the uplands and why they are important. The value of modern remote sensing datasets in the archaeological investigation of these landscapes is explored, namely open-source and multispectral satellite imagery and airborne laser scanning. Documentary evidence, archival records, field survey and interaction with local farmers and hillwalkers are combined to create a more nuanced understanding of the cultural landscape of the Blackstairs Mountains than was previously known. In particular, the nineteenth-century use of the uplands forms a special case study justified both in its own right, as a key period of Irish archaeology largely excluded from the national monument record, and as a bridge to understanding earlier uses of this under explored landscape.

Statement of Original Authorship

I hereby certify that the submitted work is my own work, was completed while registered as a candidate for the degree stated on the Title Page, and I have not obtained a degree elsewhere on the basis of the research presented in this submitted work.

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Buíochas mór ó chroí daoibh go léir!

For Grandad

“There’s rain coming over the hill…”

Chapter 1 – "The Mountain Rising Blue in the Distance"

"It is not of mountains that the stranger thinks when he imagines Ireland; not the bare rock, the driven snow, the dark lake cradled in the lonely corrie; rather of something green and pastoral. Yet, for the Irishman himself, the mountains rising blue in the distance across the level brown of the peat bogs or the green of the undulating fields, form an essential part of his picture of his country"
(Pochin Mould 1976, 15)

Introduction

Situated in South-East Ireland, divided between counties Carlow, Wexford and Kilkenny, the upland archaeological remains of the Blackstairs Mountains are at the heart of this project. Like most of the Irish uplands, these have been largely uninvestigated until now. Covering an area approximately 350km², only 130 sites were known here previously (11 of which were redundant records). By the end of this investigation 187 new features were added to the record. While such an increase is significant in itself, this project was more than a reconnaissance survey. Selected remote sensing techniques were used and their results critically analysed in order to assess the value of such datasets in these landscapes. Further examination of the archaeological remains has created a more nuanced understanding of the Blackstairs in the past as well as facilitating public engagement with local communities and interest groups. More broadly, the results here have provided the opportunity to reflect on how the Irish uplands have been understood and studied until now. Ultimately it is hoped that this investigation will contribute to a more informed approach to the long term use and preservation of the archaeological and natural environment of the Blackstairs and in turn influence the manner in which we regard Ireland's upland heritage.

Various complementary reasons led to the selection of the Blackstairs Mountain range. It is a landscape rooted deeply in my own background and identity. Familiarity with the area owing to its use for recreational purposes since childhood helped in a logistical sense, exploiting a pre-existing knowledge of access points, routes and areas of potential. Similarly, readily established links with residents and interest groups allowed for wider networks to be built across communities which could be harnessed both as a base for local knowledge and facilitating access permission. In terms of research, the current investigation follows on from a previous MA project in 2011 conducted over an area 2km² on Dranagh Mountain at the south-

western tip of the range. Fieldwalking identified 70 features in an area where only 16 had been previously recorded. Whether this was an isolated incident or could be replicated across the range was one of a number of research interests. Ancestral links also formed a considerable factor on a more personal level. Tradition holds that many of the families on the Carlow side of the range settled here on previously unoccupied lands following their eviction from County Wexford in the wake of the Williamite Wars 1688-91 (Childs 2007), of which the Murphy's (Ó Murchú) were just one branch. Resultantly, as a life-long resident of County Carlow; Mount Leinster and the Blackstairs chain form an important component of my mental image of home, towering above the flat low-lying River Barrow Valley – "rising blue in the distance".

Contextually, the project places the Blackstairs in a growing body of archaeological research targeting Irish mountain ranges in particular. Previous investigations however have focused on specific sites or periods for the most part (Condit 2006, 61). Conversely, the present study takes a holistic temporal approach to this landscape, seeking to understand the longue durée rather than a more targeted timeline given the extremely limited previous understanding of the Blackstairs. Collectively, research elsewhere hints at varied uses for the Irish uplands with recurring themes and patterns namely agriculture, settlement, ceremonies and resource procurement. To the first farmers the peaks and slopes offered centres of spiritual foci (Cooney 2000(a), 74; Stout & Stout 1992, 6) while their light free draining soils were exploited for agriculture (Cooney 1991, 123; Mitchell 1976, 106). This continued throughout prehistory despite changes in beliefs, practices, monument types and land quality (Condit 2006, 62; Walsh 2008, 3). In the medieval period they offered places of pilgrimage (Coyne 2006(a), 25; Hughes 2005, 21) while the lower slopes continued to be settled, the peaty higher soil now offering seasonal grazing sites (Gibbons 1990, 12; Kelly 1997, 43). More recent centuries saw the continuation of pilgrimages and the erection of shrines, churches and crosses on some summits and slopes (Hughes 2005, 41). Uplands were both the desperate last hope for the poorest members of society (Aalen 1978, 84) while the wealthy saw opportunities and profits in their drainage and enclosure (Nolan 1992, 181). Natural resources were exploited across all periods, the particulars dependent on the needs of the time (O'Brien 1994, 1; Madden 1997, 48). Such activities were not isolated but intrinsically linked and working in tandem with the surrounding and distant lowlands.

Upland remains have been largely preserved by low-intensity occupation and a decrease in landscape use in the 20th Century compared to the lowlands where the industrialisation and intensity of agricultural activity has levelled many sites and monuments (Condit 2006, 67). Few researchers have exploited these circumstances; however, those that have frequently identified unrecorded features associated with the time periods under investigation. SMR records for the Blackstairs uplands hinted at piecemeal and patchy evidence for prehistoric ceremonial activity, medieval settlement as well as multi-period agricultural activity. An episode of burning in 2010 on Dranagh Mountain led to the discovery of more archaeological features on a single mountain than was previously identified in the entire range (Ó Murchú 2012). Consequently, this suggested that the Sites and Monuments Record for the uplands was more reflective of modern research than past use and survival. Field survey in the uplands can be time consuming or problematic owing to issues such as access, visibility, area size and the terrain. Fieldwalking on the 2km² Dranagh study area took two months to complete. Survey of the entire mountain range at this pace would take decades. For this reason available remote sensing data was evaluated to establish which, if any, might reveal previously unknown archaeology. Unfortunately, modern resources such as lidar and multispectral satellite imagery, which have proven valuable in lowland landscapes, are not yet available for the Blackstairs region. In order to assess their applicability in upland landscapes, ten archaeological features in the Dublin Mountains were targeted where such resources are available. Those selected had a similar environment, habitat and landscape use history to comparative sites in the Blackstairs.

Despite the low intensity nature of upland farming practices, community knowledge of the landscape remains as strong as in the surrounding foothills and lowlands. A local perspective offers a different lens through which to view the landscape. Placename evidence indicates former land use practices; family names and histories are attached to relict field systems and settlements; folklore preserves traditions; and local history and legends are associated with prehistoric sites. Thus, local communities were engaged with in order to identify and better understand their knowledge of site and landscape use in the past and to aid the interpretative and recording process.

A special investigation was carried out on the nineteenth century as it highlighted a number of issues applicable to the wider understanding of the landscape. Documentary, cartographic and folkloric sources for the period expose numerous discrepancies between these sources and what survives in the landscape today which has broader implications for our understanding of earlier periods also. Conversely, the availability of such sources facilitates a more detailed investigation of a period which is often ignored in the Irish archaeological record. In summary the aims and objectives of the project were:

- A desk-based analysis of the lowlands around the Blackstairs to provide a context for the features on the mountains
- A characterisation of the archaeology within the Blackstairs uplands through desk based survey, on-site assessments, fieldwalking and an investigation of local knowledge and attitudes to the environments under examination.
- A creation of a more up-to-date Sites and Monuments Record for the Blackstairs
- A critical assessment of the application of remote sensing technologies to the uplands.
- A critical examination of the nineteenth-century upland remains as a case study for the value of local knowledge, the archaeological potential of this under-recorded period and our broader understanding of earlier periods
- An assessment of existing approaches and best practices to upland landscapes

Why Uplands?

Uplands are just one component of the wider Irish landscape which includes coastal areas, bogs, woodlands and urban areas so why target them for special attention? Ideologically, uplands hold a special place in the Irish landscape and psyche. Few places in Ireland are outside the view of at least one mountain range, either dominating the skyline or forming a thin line on the distant horizon (Fig. 1.1). Change and contrast is in their very nature. Sometimes shrouded in cloud, other times in full view, each season presents a different picture of the same landscape, a reflection of the ways various members of society look upon them. To artists and poets their underpopulated slopes make them beautiful and inspiring. To miners and wind farm developers, these same unoccupied lands offer resources with few neighbours to interfere with, their beauty of lesser interest. To Nationalists they were

both symbols of resistance and oppression, their seemingly untamed slopes contrasting with the managed lowland estates of the landlord class. To the gentry they were wild places either to be avoided or brought into the fold and improved. They act as places of retreat both for those seeking thrills and adrenaline rushes and those seeking calm and relaxation. Pagans and Christians have worshipped on them for millennia, monuments and pilgrimages reminding locals and passers-by of the ancestors and gods. These dualities have stretched back millennia as the archaeological and historical evidence suggests.

The sub-division of the uplands from the lowlands has been done by a variety of disciplines since the nineteenth century for multiple economic, social, environmental and physical reasons (further discussed in Chapter 2). Elevated landforms including hills, mountains, ridges and plateaux have been bracketed in these definitions, often based on height or ecological factors. In the case of this thesis, it encompasses all land above 200m OD. Many of these landscapes appear today as wild and untamed, seemingly the last surviving unenclosed, unspoiled and untouched natural places (Atherdan 1992, xiii). In contrast, fertile lowland areas have been cleared, enclosed and farmed intensively in recent centuries. Thus the latter can be regarded as a human product while the uplands largely escaped impact beyond piecemeal ceremonial activity and rough grazing. A wild image was certainly present in the eighteenth and nineteenth-century psyche although the way this was perceived saw a marked shift. Earlier travel writers of the period such as Celia Fiennes (1888), Noel Thomas Carrington & Charles Cotton (Atkins 2014, xviii) describe frightening, chaotic or lonely places which needed improvement and harnessing. By the mid-late nineteenth century, poets (e.g. William Wordsworth), writers (e.g. E. M. Forster), artists (e.g. John Martin) and mountaineers (e.g. John Tyndall) began to reflect on their beauty and power (Fig. 1.2) where nature could be experienced in its most natural state both to be enjoyed (Fig. 1.3), researched and conquered (Fig. 1.4). In reality, uplands are ecologically fragile and certainly not fully wild landscapes. What we see today has been shaped by thousands of years of human activity (Darvill 1986, 5; 1987, 148; O'Brien 2009, 1). Strip away the peat which covers most uplands and in many areas prehistoric field systems, settlement sites, burial features and lithic scatters are most likely revealed. In other cases dense vegetation and forestry masks the remains of extensive post-medieval field systems and settlements.

Upland sub-division in archaeological research originates in nineteenth-century Britain and has allowed for similar and distinguishing issues like preservation and land cover to be addressed akin to the sub-division for special investigation of urban, coastal or wetland landscapes (Coyne 2006(a), 9). Popular views of uplands as disorderly and unfavourable places contributed to the deterrence of antiquarian collectors prior to this. With the rise of the Romantic Movement in the nineteenth century, uplands took on a new importance and antiquarians began to record features in their localities, many of which were attributed to druids (Darvill 1986, 6). By the early twentieth century, distinctive highland and lowland populations were recognised, most famously discussed by Sir Cyril Fox (1932) in Britain and in Ireland by Emer Estyn Evans (1981). Towards the end of the 1980's upland archaeology was being increasingly accepted as a sub-division in Britain mainly as a result of concerns raised by the intensification of agricultural and forestry activities in these areas. Reconnaissance and fieldwork began to gain momentum at this time in order to assess the survival and nature of the remains in these landscapes and there was a notable rise in the number of targeted investigations into the following decade (Brown 1999; Leighton 1997; RCAHMW 2003). In 1986 Professor Timothy Darvill published a pioneering review of the state, threats and future of upland archaeology most notably commenting on how the uplands constitute the single largest area of preserved archaeological remains in Britain (Darvill 1986, 1). Since then upland areas have been the target of a multitude of research projects, many of which have been led on a national level by state bodies such as the Royal Commission for the Ancient and Historical Monuments of Wales (RCHAMW), the Royal Commission for the Ancient and Historical Monuments of Scotland (RCAHMS) and Historic England.

Ireland on the other hand apart from the Archaeological Survey of Ireland (ASI) in the 1980's, has seen little in the way of largescale upland survey or targeted mapping projects and those which have, were carried out in the twenty-first century (Coyne 2006(a); O'Brien 2009; McNeary 2014). Limited budgets and the absence of a mapping programme on the scale of those in Britain present significant constraints. Similarly much of the early recording was carried out on areas threatened by agricultural activity or development (Walsh 2013, 57) for which the uplands were not considered despite threats posed by both under and overgrazing of heathland vegetation. However, numerous projects since the 1980's have focused on particular

periods or monument types in the uplands (see below) some of which have led to new discoveries. Crucially these do not suggest that upland populations formed a distinct sub-culture or identity from their lowland neighbours, rather it is noted that the settlement and use of the uplands is intrinsically linked with the lowlands (Coyne 2006(a), 10), just one of numerous landscape units or sub-divisions to which sites, monuments and localities are connected (Cooney, Condit & Byrnes 1999, 66).

Attempts have been made in recent years in Ireland to better manage the uplands by various bodies such as foresters, farmers, hikers, miners and ecologists. Public paths are constructed and maintained to facilitate hillwalkers, blanket bogs are protected as Special Areas of Conservation (SAC's) and wind farm developments are proposed for many areas. Grazing legislation and commonage management are being debated repeatedly and forestry activity continues either in expansion into new ground or replanting of felled areas. Agricultural intensification in upland Britain led to targeted investigations by archaeologists across the three countries. Forestry, wind farm developments and the over and under grazing debate in Ireland led to no such activity. Without fully understanding the past human effects on natural resources and landscapes, state bodies cannot make accurate decisions on current and future management (Roberts 2003, 61). Investigations in Britain led to an increase in previously unknown sites and features. Multiple projects in Ireland either targeting specific periods or small scale areas suggest a similar case including Dranagh Mountain in the Blackstairs.

All of these aforementioned threats and opportunities exist in the Blackstairs Mountains. Forestry has blanketed large areas, wind farms have been built, rough grazing varies in intensity from place to place, mining sources have been identified and attempts made to exploit them, an SAC has been defined and hillwalkers frequent the slopes. Similarly the surrounding foothills and lowlands offered a context for the activity identified in the uplands. While it may have been marginal, this was not an isolated landscape but part of a wider network of settlement, navigation, resource use ceremonial activity and agriculture.

Blackstairs Uplands in an Irish Research Context

Apart from research conducted by the present author in 2011, no previous archaeological research has been conducted in the Blackstairs Mountains beyond

basic recording by the ASI. A fire in 2010 stripped away both peat and vegetation on Dranagh Mountain in the southwest of the range revealing a multitude of previously unrecorded sites which were mapped and recorded before regrowth could mask them once more. The current project follows in the wake of this and the following research.

Large scale reconnaissance and intensive upland research has been rare in Ireland despite its widespread use and productivity in Britain (O'Brien 2009, 1). Consequently, uplands are not only distinguishable by their dramatic heights and vegetation differences to the surrounding lowlands, but they can also be identified in archaeological distribution maps where fewer sites are recorded (Fig. 1.5). In most cases, the archaeological record often presents a land use which does not extend beyond the construction of ceremonial features such as cairns or standing stones, often placed in areas of prominence such as summits or near boundaries and routeways (Fig. 1.6). The relationship between prehistoric sites and boundaries is probably explained by the use of the former for marking the latter in later centuries owing to their inter-visibility in a landscape often devoid of natural and man-made boundaries in contrast to the lowlands. Since the uplands were regarded as unproductive, the mapping process conducted by the first Ordnance Survey of Ireland (OSI) in the 1830's and 40's was much less intense meaning many features in these areas were left out unlike the lowlands where archaeological sites were often recorded. Even settlements appear to have been ignored (further discussed in Chapter 6) resulting in a seemingly unused landscape which was as devoid of activity throughout the past as it is today. Increasingly however, targeted survey and investigation has shown that the previous archaeological record for the uplands is a poor reflection of what survives in the field.

Approaches to the growing number of upland projects (Fig. 1.7) have varied but primarily consist of field survey and excavation. Particular periods or site types have been focused on for the most part rather than largescale or holistic surveys over space and time. For example Stefan Bergh has published a number of papers on Knocknarea in County Sligo, focusing in particular on the Neolithic social and ritual activity on the mountain as well as the tombs on the Cúil Írra Peninsula (Bengtsson & Bergh 1984; Bergh 1995; 2002; 2009). These projects have included field survey and some targeted excavation. The Neolithic of the Dublin Mountains has also been researched using these methods (e.g. Cooney 1985; 1991; 2000, 138-145; Rynne & Ó

hÉalaidhe 1965; Rice 2006; 2015). Targeted field survey and excavation has also focused on the Bronze Age features such as field systems and settlement in The Burren, County Clare (Jones 1995; 1998) and Achill Island, County Mayo (Rathbone 2009), copper mining areas at Mount Gabriel, County Cork (O'Brien 1994) and ritual activity in the Monavullagh Mountains, County Waterford (Moore 1995). Excavation of particular sites has been conducted in areas such as Reyfad, County Fermanagh where post-medieval field walls and Bronze Age rock art were identified (Excavations.ie number: 1999:281) and the Glendalough region where both research projects (e.g. Excavations.ie number: 2006:2149; 2011:642; Warren et al. 2013) and development led excavations (e.g. Excavations.ie number: 1996:411; 2002:1993) have been carried out. A number of projects have centred on the more recent past largely focused on particular themes such as the transhumance and booleying tradition in the Galtee Mountains (Costello 2012; 2015), Achill Island (McDonald 2006), the Mourne Mountains (Gardiner 2011) and North Antrim (Horning 2007). The coal mining industry has been the focus of research in the Slieveardagh Hills (Richard Clutterbuck, pers. comm.) while the rundale and clachan settlement and land use pattern had a brief focus of attention among some academics from the 1950's to the 1970's following Emer Estyn Evans's pioneering publication in 1939 (e.g. Estyn Evans 1951; 1981; Flatrès 1971; Graham 1971; Johnson 1963; McCourt 1950; 1971; 1981) with few studies since (Anderson 1995; O'Donnell 1993; Whelan 1994; 1997; Yager 2002).

There have been some projects in Ireland which made use of remote sensing techniques as part of their strategies but these are few and far between in comparison to projects which have utilised field survey and excavation. Those projects which have been carried out include the investigation of lidar data on the multi-period North Antrim Plateau (McNeary 2014). A high resolution digital photogrammetry survey of Mullaghfarna Enclosure, County Sligo by NUI Galway and the Discovery Programme identified 153 hut sites of Neolithic and Bronze Age date (Comber & Jones 2008, 23). The Discovery Programme has been at the forefront of technical innovation in Ireland, including aerial reconnaissance and remote sensing techniques. Many of their investigations have incorporated upland areas as part of broader studies while others have targeted upland areas specifically. Alongside the aforementioned Mullaghfarna project, the upland Ballyhoura Hills in Counties Cork, Limerick and Tipperary were

the centre of research. This project involved a multi-disciplinary approach using aerial photography, geophysical and topographical surveys to identify Bronze Age and Iron Age sites (Doody 1999; 2008). Those projects which have included upland areas as part of wider landscape studies include the Western Stone Forts Project (Cotter 1996) and the North Munster Project (Grogan 2005).

Uplands have been central in a number of unpublished PhD theses and ongoing projects in Irish universities especially at NUIG including Andrew Whitefield's research investigating a number of upland landscapes in the West and Teresa McDonald's, Eugene Costello and Noel McCarthy's PhD research on Achill Island, Co. Mayo, Galtee Mountains, Co. Tipperary and Slieve Gamph, Co. Sligo respectively. This growing focus at NUIG is also supported by Michelle Comber's research on the Beara Peninsula, Co. Cork and Richard Clutterbuck's investigation of the Slieveardagh Hills, Co. Kilkenny. Similarly in UCC, James O'Driscoll has focused on the hillforts of County Wicklow. Research from UCD includes Kim Rice's investigation of the Dublin Mountains during the Neolithic and Christine Grant's research on Bronze Age field systems in the Burren Co. Clare. Most of these have targeted landscapes which have a tradition of research or where the archaeology of particular periods is better recorded leaving understudied landscapes in the dark.

Few major Irish publications exist with an entirely upland focus. In most cases, the uplands feature as chapters in edited books, as journal articles or as part of a discussion on a wide study area. This has been changing in recent years with the publication of research on the Cúil Írra Peninsula (Bergh 1995), Slieve Donard (Moore 2012), Beara Peninsula (O'Brien 2009), Mount Brandon and the Paps of Anu (Coyne 2006(a)) and most recently the Dublin Mountains accessibility study (Ní Lionáin & Davis 2014). In terms of the scale of the study area, the Beara Peninsula is similar to the present project and has seen some of the most intensive research into an upland range in Ireland through field survey, excavation and palaeoenvironmental analysis on prehistoric and early medieval remains. Similarly, the Cúil Írra survey focused solely on the prehistoric landscape. The Brandon Hill, Paps of Anu and Slieve Donard were much smaller in scale and focused on specific mountains.

Blackstairs Uplands in a European Research Context

Since the uplands were initially sub-divided in England, the history of research has been far more extensive here. Much of this stemmed from excavations by clergymen and the gentry in the eighteenth and early nineteenth centuries which targeted prehistoric burial mounds on summits and ridges for their pots and other funerary offerings (RCAHMW 2003, 4). As research became more scientific, excavation and field survey were among the methods initially utilised. Dartmoor and Bodmin Moor for example have seen research using these techniques since the nineteenth century and new evidence still comes to light (Fyfe et al. 2008; Johnston 2005; Newman 2007; Topping 2011). Such approaches have been supported in recent years with remote sensing and environmental investigations with the National Mapping Programme (NMP) at the forefront providing a multi-disciplinary approach (Horne 2009).

Site specific research projects in England have made use of targeted excavation and geophysical survey. An example of the former includes the Iron Age hillfort at Castle an Dinas, Cornwall (Bishop 2011), Neolithic earthworks on Hambledon Hill, Dorset (Mercer & Healy 2008), Mesolithic sites in the North York Moors (Innes, Laurie & Simmons 2012) and medieval farming and settlement features in Chapel-le-Dale, North Yorkshire (Johnson 2015). Geophysical survey was used at another Iron Age hillfort at Ham Hill, Somerset (Payne, Linford & Linford 2012), Priddy Circle on the Mendip Plateau (Linford, Linford & Payne 2013), prehistoric features on Dartmoor (Armstrong, Darvill & Cheetham 2009) and Mesolithic sites on the North York Moors (Tees Archaeology 2012).

Field survey and fieldwalking provide information on a broader scale and an area of any size can be taken within the constraints of the available workforce and time. Such methods were carried out on a deserted medieval settlement (Jamieson 2006), Bronze Age field systems (Johnston 2000; 2005) and hut sites (Newman 2007) on Dartmoor. Exmoor has also seen extensive research over the years including pollen analysis (Fyfe 2009), site specific investigations (e.g. Riley 2007) and a targeted fieldwalking survey of the National Park area (Riley 2009). The South East Cheviots were initially targeted for detailed survey in the 1980's and the data gathered was re-analysed in 2008 using GIS to clarify and contextualise some issues surrounding the chronological stages and development of the area (Pearson & Topping 2008).

Discussions have also centred on the results of upland field survey; drawing upon a wider range of evidence to understand it in the social, regional and cultural context of its time (e.g. Baker & Brookes 2015; Johnston 2000; Kitchen 2001; Pillatt 2012).

Remote sensing techniques have been used in some cases to counter survey limitations such as time, cost and labour force. Aerial photography is one such example which has been used in the survey of upland areas since the 1970's (Darvill 1986, 13). Combined with field survey, this has revealed a multitude of new sites. Initially, aerial reconnaissance focused on searching for crop marks followed by investigations on the upland/lowland fringe (Cowley 2005, 268). Projects mainly targeted particular features such as settlement and hillforts rather than the wider landscape (Brown 1999, 231; Cowley 2005, 268). It was not until the 1980's that the potential of aerial photography for upland research was fully recognised (Cowley 2005, 269). Winter flights became regular, taking advantage of low vegetation, low light angles and snow cover (Cowley 2005, 270). Both archived photos as well as those taken as part of the ongoing research to fill in gaps or to survey the extent of damage are exploited (Cowley 2005, 273). These have been extremely influential when investigating settlement and cultivation patterns (Brown 1999, 233). Similarly historic satellite imagery has also been used to monitor the damage to archaeological sites such as a project on Alston Moor in the North Pennines (Kincey et al. 2014).

Historic England (formerly English Heritage) has led much of this research and published the results in various forms including its *Research Report Series*. One of the most recent upland investigations was on the North Pennines where the National Park area was surveyed using aerial photography combined with site visitations, ground survey and a small LiDAR survey (Oakey, Radford & Knight 2012). This is the only case of LiDAR used in an upland environment in England (Jones 2010, 18) and covered an area of 96km² (Oakey, Radford & Knight 2012, 4). Other projects which took a holistic approach to an upland landscape, recording and interpreting the remains through aerial photography include: The North Cotswolds and The Cotswold Hills (Stoertz 2012; Janik, Dickson & Priest 2011), The Southeast Cheviots (Pearson & Topping 2008), The Marches Uplands (Stoertz 2004), Bodmin Moor (Johnson & Rose 2008) and Hadrian's Wall World Heritage Site, some of which runs through extensive areas of upland (Small 2008; Oakey 2009).

Intensive and targeted research projects similar to those in England have also been carried out in Scotland. The main bodies for archaeological research here are the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) and Historic Scotland. Archaeological research was initiated in the late nineteenth/early twentieth century through the publication of archaeological inventories for certain counties. Most of these focused on the border and coastal counties so many of the upland areas such as the Cairngorms were not completed but some regions such as the Lowther Hills in the Southern Highlands were surveyed and published (RCAHMS 1920). Aerial survey has since become a key part of the recording technique with up to 100 flying hours completed on average annually (rcahms.gov.uk.). The images taken (up to 5,000 a year) are used to aid interpretation and mapping and for inclusion in publications ranging from those aimed at the general public (Cowley & Crawford 2009; Crawford 2012) to more detailed site reports. The latter include an investigation of the area surrounding Bennachie in north east Scotland (RCAHMS 2007) and to complement extensive field survey on the Isle of Bute which also encompasses an upland area (Geddes & Hale 2010). Historic Scotland and the RCAHMS have also collaborated on a number of detailed surveys which have been brought to publication. These analyse existing archaeological records and provide historic land use assessments and case studies on individual sites. A number have been completed for upland areas including Loch Lomond and the Trossachs (Boyle 2000) and The Cairngorms (Cowley & Govan 2001).

Recent collaborative research has been conducted in the Cairngorm Mountains by University College Dublin, Rose Geophysical Consultants, Aberdeen and Stirling Universities and National Trust Scotland, centred on the early prehistoric landscape (Fraser et al. 2013). Shetland and its uplands have also been the focus of considerable research especially in the prehistoric period both in the use of the landscape and of specific sites and features (Mahler 2011). Upland archaeology is of such importance to university research in Scotland that a postgraduate course targeted specifically at the history of the Highlands has been provided at the University of the Highlands and the Islands, Inverness. It offers Mlitt's and Postgraduate Certificate and Diplomas on the topic of the history of the Highlands with modules covering aspects such as identity and land use (uhi.ac.uk).

Despite being recognised for their importance since the eighteenth century, it was not until the 1940's that detailed and targeted investigations by amateur and professional archaeologists began intensively in upland Wales (RCAHMW 2003, 4). Since then, widespread research into these landscapes has been carried out through projects conducted by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW). This came about as a response to a sudden agricultural intensification during the 1980's in areas which had largely escaped until then. Under the Uplands Archaeology Initiative, several archaeological Trusts established their own surveys into selected areas which have led to the publication of many reports (RCAHMW 2003, 5). Other institutional or freelance research has focused on both specific sites and the wider landscape. A conference held in Aberystwyth (2001) addressed the current and future research themes, frameworks and strategies of the country (Briggs 2003) which included discussion of the uplands as part of prehistoric landscapes (Johnston & Roberts 2003), environmental analysis (Caseldine 2003) and post-medieval archaeology (Locock 2003) among other landscape types. This laid the foundations towards a national strategy which included extensive and multiple upland areas, the like of which has not been carried out in Ireland.

Initially the RCAHMW focused on reconnaissance, with recording programs leading to the discovery of thousands of new sites much like the ASI. Most of this work had been carried out as part of 'rapid identification surveys'. This is done by fieldwalking at 30m intervals followed by recording the location of the archaeological features using GPS, aerial photographs and Ordnance Survey maps (RCAHMW 2003, 7; Darvill 1986, 13). Following a decade of this approach, the Commission began to evaluate its results leading to computerised mapping and evaluation of aerial photography to build up a landscape context for the various sites (RCAHMW 2003, 2). Research into the Welsh uplands has led to many publications both general, and addressing specific sites or areas. These include Fforest Fawr, Powys (Leighton 1997), the Denbigh Moors (Silvester, Barker and Leighton 2011) and the metal mining mountains of North and West Wales (Jones, Frost and Walters 2004). The wider landscape has also been the subject of research (e.g. Brown & Driver 2001; Browne & Hughes 2003; Burnham & Davies 2010; Driver 2013; Edwards 2006)

combining the results of reconnaissance and recording of features from all periods as well as more targeted investigations.

On the continent uplands and mountains have also been targeted although like Ireland, these have centred on specific topics or sites. The Alps have been used almost continuously since the 1800's for summer grazing, much like the booleying system in Ireland which has contributed to the shaping of the landscape to its current form. Evidence for earlier landscape use from the end of the Last Ice Age around 10,000 years ago is extensive yet little archaeological research or reconnaissance has been carried out (Walsh, Mocci & Palet-Martinez 2007, 9). One example of the latter includes the investigation of former Alpine pastoralism between Switzerland and Austria in an area known as the Alpwirtschaft. Satellite imagery and LiDAR are used as part of this project. Object detection processing tools which identify particular features by their surface texture are being tested with huge success (Walser & Lambers 2012). Another, the Stanford Alpine Archaeology Project (1994-2006), took a detailed period surveying the landscape to identify Hannibal's pathway through the range towards Rome (Hunt 2007, 109). Lithics from the Alps at the Mesolithic-Neolithic transition are being investigated as part of a PhD at the University of Zurich (prehist.uzh.ch). Similar research has also been conducted in the southern French uplands (Chang & Koster 1986). Combined with targeted fieldwalking, palaeoenvironmental work and excavation across the range, these have revealed a waxing and waning of agricultural and industrial intensification over time which has the potential for much future research (Walsh, Mocci & Palet-Martinez 2007, 10). Beyond the Alps, extensive long-term landscape use has been the subject of extensive research in the uplands of Spain (Barton et al. 2004).

As in Ireland site specific research has been carried out across the European uplands as well. Roman hillforts in the Orastie Mountains, Romania (e.g. Pupeza 2012), Roman and Iron Age sites of the Velebit Mountains, Croatia (Glavas 2011), and medieval settlement in Sweden (Hornberg & Liedgren 2012) are all examples of the intensive investigations carried out, rather than holistic surveys. Of the few reconnaissance projects with an upland focus outside the Alps, one has taken place on Crete. Described as "a mountain emerging from the sea" (Matton 1957, 13), aerial based technologies have been combined to tackle issues presented by the terrain which reaches heights between 1500-2000m (Cantoro 2015). Uplands have been

included in fieldwalking and aerial based surveys in Italy although not intensively and it is suspected that many sites go unidentified as a result of current land-use. This is despite the upland focus of settlement by pre and post-Roman period population groups (Campana et al. 2015).

Collectively, the above projects highlight the wide variety of approaches and techniques available to an investigator the results of which vary depending on the scale of intensity. Given that the previous understanding of the Blackstairs was so poor, it was decided to combine multiple reconnaissance methods emulating approaches in Britain in order to establish and better understand the baseline archaeological narrative of the landscape, an approach hitherto not taken in the Irish uplands.

Methodology

Targeted investigations of periods or features, while leading to a detailed understanding, contributes little to knowledge on the wider temporal narrative of a region especially one as poorly researched as the Blackstairs. Similarly, intensive surveys over small areas will only provide a snapshot view for that particular locale and not the full range of use for an upland region. Such surveys can also be constrained by land use practices unique to that area in later centuries affecting the visibility and consequently the understanding of earlier periods. In contrast, wide-scale reconnaissance surveys provide a baseline understanding of the landscape on which future targeted research can be built with a greater understanding of continuity and change over time (Grady 2015, 2; Horne 2009, 2). Crucially this should be lifted beyond basic recording in order to better understand a regions social history. Only by knowing what survives in the landscape can we understand its research potential. From this other more specific and theoretical research themes can be investigated such as meaning (e.g. Bruck 2005; Ingold 1993; Johnston 1998; Muir 1999; Roberts 2003; Tilley 1997), identity (e.g. Bruck 2009; Edmonds 1999; Horning 2004; Johnston & Roberts 2003; Thomas 2012), ancestry (Johnston 2005), regionality (Cooney 2000(b)) and territoriality (e.g. Stout 1994).

Desk based research and landscape characterisation was carried out at the outset in order to establish the physical make-up of the study area, identify zones of high and low archaeological potential and recognise the varying nature of the ground

cover within the study area which would facilitate or impede access or visibility of remains. Similarly, historic maps and local historical publications (e.g. *Carloviana*, *Old Kilkenny Review*) were studied for records of the landscape use and change in the more recent past. GIS software (ArcGIS 10 & QGIS 1.6-2.10) was crucial in the collation and analysis of the various datasets such as vegetation cover, soil maps, the SMR record and historic mapping. This phase also helped to narrow the geographical scope for the project to all townlands (the smallest geographical unit in Ireland; see Chapter 3 for more detailed description) which contained an area of land above 200mOD in the Blackstairs Mountains. Thus the uplands could be compared to the archaeological record for the immediate foothills and lowlands. Once a current understanding of the landscape had been established, survey could be initiated.

Fieldwalking carried out as part of the Dranagh Mountain survey was conducted following a large fire (Fig. 1.8) which stripped the mountain of its peat and vegetation cover exposing the bedrock and stone archaeological remains. This was an opportunistic approach which is difficult to predict or replicate. For this reason a different recording strategy was needed in order to extend the research across the rest of the mountain range in a cost and time-effective manner. Windows of visibility beneath the dense vegetation offered by burning whether controlled or malicious were also exploited although these were few and far between and none to the extent as occurred on Dranagh. Therefore, selected remote sensing data were used to identify areas and features of archaeological potential and as a cost effective means of rapid reconnaissance. Aerial photo archives from flights conducted in the wider region were assessed, namely those carried out by Dr Gillian Barrett, the Irish Air Corps and the Cambridge University Collection of Aerial Photographs (CUCAP) project in the 1960's (for a full comprehensive list of archives in Ireland see Lambrick 2008). Each of these was of no value to the project, having not collected any imagery for the Blackstairs uplands. The widespread availability of open-source satellite imagery from Google and Bing today and the ability to import these datasets into GIS programs offers a free and relatively good quality resource where aerial photographs are lacking. While resolution and image acquisition timing can be an issue, these datasets offer an alternative to commissioning reconnaissance flights.

Once the Bing and Google Imagery were imported, the area was divided using the townland boundaries and survey began one townland at a time with both imagery

datasets visualised one after the other. Possible features were initially marked using points in the GIS. When both datasets were completed, each site was returned to and features marked initially as possible were assessed for a second time. Once it was accepted that these had archaeological potential, the feature was logged as such, and redundant features removed. Ordnance Survey (OS) first edition six inch maps (1839) were also used to identify structures not immediately visible in the open-source imagery. Changes in routeways, settlement patterns and field walls compared to what survives at present could also be assessed. This was especially useful in areas now covered by forestry. All man-made features which dated from prehistory up to the twentieth century were recorded in line with the model used by the English Heritage National Mapping Programme (NMP). This brought the project beyond the limitations of the National Monuments Service (NMS) of Ireland whose cut off point is 1700AD.

With no other remote sensing sources such as LiDAR or multispectral satellite imagery available for the Blackstairs, the project was entirely limited to open-source satellite imagery from Bing and Google for rapid reconnaissance. Conversely, the Dublin Mountains had these resources available which were acquired for testing on a number of sites under similar conditions to those in the Blackstairs. Only known features were targeted and reconnaissance was not used in this case. A Relief Visualisation Toolbox (RVT), made available by the Archaeolandscapes Europe Network[1], was utilised in the processing of the LiDAR data. ArcGIS and Global Mapper were also used for data processing and visualisation. Multispectral satellite imagery provided by Digital Globe (formerly GeoEye) as part of a successful data grant application was also used, all imagery in this case processed and visualised in ArcGIS. The potential of these resources is assessed in Chapter 4.

Following the open-source and historic mapping survey, site visits and field survey were carried out. An attempt was made to visit every definite or possible feature in order to confirm its digital identification. In some cases this was not possible due to access issues presented by dense vegetation and to a lesser extent, permission. Numerous features not visible in the imagery were also identified during this phase, most of which consisted of those masked by vegetation cover or small sites. Measurements, photographs and field notes were taken at each site. This also

[1] http://iaps.zrc-sazu.si/en/rvt#v

helped to identify a number of flaws in the use of such imagery mainly created by modern farming practices or erosion. These included concentrated patches of grazing giving the appearance of enclosures as well as sheep paths being mistaken in the digital imagery as man-made access routes. In some instances kite aerial photography was used to assist in the interpretation of those sites either difficult to trace on the ground or where vegetation presented an issue.

Local hillwalking clubs had been requested to report sites they identified during their use of the landscape, to the project. Where this occurred, sites were visited with the discoverer and either discounted or included within the survey where necessary. Local landowners in the area were also visited and interviewed providing direct information for certain sites, monuments or enclosures while also providing some accounts of the nineteenth century in the area. This call for information was initiated following the digital open-source imagery reconnaissance survey and a handful of features identified in the latter were also reported by hillwalkers indicating the value of these groups where imagery resolution may be poor. This was not the first time local information had been recorded in the region as the National Folklore Collection (NFC) had carried out a number of interviews between the 1930's-70's now housed in UCD. All of these records were assessed most of which related to late nineteenth and early twentieth century activity.

Other documentary evidence for the region is mainly limited to the nineteenth and twentieth centuries also which include the first edition OS maps and letters, and traveller's notes. Limited documentary evidence is available for the wider area in the medieval period from the monastery at Duiske in Graiguenamanagh on the Carlow/Kilkenny border. Similarly the *1641 Depositions* include some references to events in the southern foothills as well as a record of land holders and forfeitures. These provide a keyhole view of agricultural activity in the area at the time. The 1659 Census gives us a sense of the population figures at the time and their identity. Historic census information was also assessed where it was available for the years 1841, 1851 and 1901 and 1911. Similarly Griffith's Valuation in the 1850's was also used and the corresponding maps where they differed to the earlier first edition ones. Each of these records was analysed in depth as part of the recording and interpretative process.

Once each possible feature had been confirmed, interpretations were assigned based on the NMS classification list. Survey numbers unique to the Blackstairs were applied which continued from the initial survey in 2011 and are used throughout this thesis (catalogued in Volume 3). New classifications were created in some cases where a feature did not fit into any of the accepted groups such as festival sites and turf-cutting areas. These were sequenced with other features to build a chronological narrative for the Blackstairs based on morphology, folklore, documentary evidence and research elsewhere in Ireland. This timeline will remain provisional as excavations or further research may alter our understanding of some of these sites in the future.

Thesis Structure

This thesis is made up of seven chapters. Chapter 2 will address the issue of upland definition and how various groups including politicians, environmentalists, local groups, archaeologists and people in the past have approached, defined and perceived the uplands according to their various needs and traditions. This is aimed towards identifying a definition of upland and providing a wider context for the Blackstairs at a regional, national and international level.

Chapter 3 introduces the Blackstairs Mountains. This consists of a landscape characterisation including its geological formation, the soils which have overlain this and the vegetation which has come to dominate the various habitats it supports. Any previously recorded sites are presented and briefly discussed along with a description of the history of use based on knowledge prior to survey.

Chapter 4 focuses on the methodological approaches. It compares the results of the desk-based open-source imagery survey of the Blackstairs to ground truthing and fieldwalking. The extra resources available for the Dublin Mountains are also discussed. Here, the open-source imagery for known features is compared to their visibility on the ground and in the lidar and multispectral satellite imagery.

Chapter 5 discusses the results of the survey in the Blackstairs Mountains. While dating remains an issue, an attempt was made to construct a chronology for the Blackstairs and establish a narrative based on site morphology. Not only is this the first time such a discussion has been done for the Blackstairs, it also highlights the

change in our understanding of an upland landscape following intensive survey and places the remains in the context of the surrounding region.

Chapter 6 looks at the more recent past in the Blackstairs and has a twofold purpose. First it investigates the archaeological potential of a given period for more detailed research, in this case, the nineteenth century. Secondly it draws on the knowledge of local communities as well as documentary evidence; the availability of which highlights issues surrounding preservation which have implications for our overall understanding of the landscape in earlier periods.

Chapter 7 summarises the issues highlighted in the previous three chapters, brings them together and discusses how these affect our approaches to the landscape under its current and future management. It also questions whether similar results could be repeated elsewhere and raises issues for future research in the Blackstairs and the Irish uplands as a whole.

Images, charts, tables and appendices are included in Volume 2. A full and updated site catalogue for the Blackstairs townlands is available in Volume 3.

Chapter 2 – "Going to the Mountain": Defining the Uplands

"There is no precise definition of 'uplands'—they are semi-natural habitats, including wet and dry dwarf shrub heaths, blanket bog and other mires, scrub, bracken and grasslands (including acid, calcareous and neutral). The uplands are largely, but not exclusively, above the upper limits of enclosed farmland and have to some extent been formed by generations of agricultural activity" (Great Britain, Parliament, House of Commons 2011, 4)

Targeted investigation and sub-division of the Blackstairs uplands requires an exploration of the concept of "upland" as a construct in the first instance. What is meant by upland and why is it important? In simplest terms, upland encompasses all elevated areas; but where do these end and become part of the lowlands or other landscape forms? Why not bracket the Blackstairs into a wider study of the landscape of south-east Ireland as a whole? Conversely, how do we compare the archaeological remains in these uplands to the wider use of similar landscapes in Ireland and abroad? This was partly explored in Chapter 1 but is further expanded here. Uplands hit the senses in different ways to the surrounding and distant lowlands and other landscape forms. We see and hear things differently to the lowlands caused by elevation and resultant atmospheric conditions. The sound of wind rushing through heath and gorse is certainly different to a pasture field and the smell of peat hangs in the air; sharp and distinctive. The physical, natural, processes and factors which affect our senses and shape these landscapes (further explored in Chapter 3) have influenced the human use of the latter not just in the present but also in the past with a knock on effect on the range of monuments that are found today. Similarly, these same processes affect the visibility of the remains in the present day and our methodological approaches (see Chapter 4) and future management (see Chapter 7). Thus the archaeological remains and our approaches to them are intrinsically linked with the landscape. Yet some of these same conditions can extend at some distance from the slopes to the flat surrounding lowlands. How do we quantify, define and bound the uplands and its differences so we can find commonalities and points of discussion and comparison from which other issues such as regionality can be drawn apart? Addressing this issue provides an intellectual, legal, historical and research context for the uplands.

Uplands and mountains are often attributed with a different meaning, symbolism or definition at local, regional and national levels. Not only is this true today but was also relevant in the past as addressed by archaeologists, geographers,

historians and artists in Britain (e.g. Andrews 1989; Atkins 2014; Fox 1932; Holland & Errington 1978; MacFarlane 2003; Nicolson 1997; RCAHMW 2003; Schama 2010) and in Europe and around the world (e.g. Barnes 1999; Brady & Ashmore 1999; Clark 1953; Muir 1999; Price 1981; Schama 2010) but less so in an Irish context (e.g. Horning 2007). Definition of the uplands and mountains is pertinent in political policy formulation especially when it comes to sustainable development and grant schemes (Price, Lysenko & Gloerson 2004; SCNAT 2012). It is also of interest to members of various disciplines such as geologists and botanists who use landscape definitions to bound their project investigation areas, understand habitats and the natural environment and investigate the relationship between human activity and natural processes; all of which are relevant to archaeologists as well.

Despite the multi-disciplinary interest in these landscapes both past and present, there is still no general agreement of what mountains or uplands are or how they are defined (Great Britain, Parliament, House of Commons 2011, 4; Ives, Messerli & Spiess 1997, 2; Price 1981, 506; Price, Lysenko & Gloersen 2004, 75). Instead, various groups set their own parameters based on what is applicable to them. For example, botanists use plant species or height bands, geographers use physical attributes, and government legislators use land quality; however this is more difficult for archaeologists. No feature type is completely unique to the uplands and in a rare case where this might occur, regional, social and cultural influences also present factors. Similarly, the absence of a site classification cannot be used either as this may be applicable to a wide variety of other landscape sub-divisions. Instead archaeologists tend to take their definitions from other disciplines. While there is some uniformity to this in Britain, there is little in Ireland as will be further discussed below. Consequently, the meaning and boundaries of upland vary from study to study.

While some definitions are appropriate for the aims of certain groups, these same definitions are less suitable for others with a knock on effect on the archaeologists who use them. Also, definitions aiming to address the very same issues have varied across national boundary lines. Many definitions, whether for legislative or research purposes, are often broad and over-arching and sometimes higher land, important at a local level, is excluded. Hills are an example of this which can fall outside these broad definitions. If they were placed beside a mountain range, many of them would not be considered part of the mountain range but their placement within

certain local landscapes can make them appear as impressive and imposing landforms to which much meaning and symbolism may be attached. Even mountain ranges placed beside other mountain ranges calls definitions into question. Compare for example the Irish mountains, the highest of which, Carrauntoohil, reaches 1,038m - to the Alps where peaks exceed 4,000m.

Upland archaeological research is starting to grow in Ireland but common ground is yet to be established in the absence of a national strategy. This chapter will outline and investigate some of the multi-disciplinary definitions of mountain and upland that have been utilised historically and in the modern day in order to provide an Irish and European context for the Blackstairs uplands. This does not represent an entire account of upland definitions in the various states, but rather highlights some of the more commonly used examples. How these have been selected and used in archaeological research will also be discussed. Finally a definition for the current study is selected based on a critique of the earlier examples used. This then offers a more informed point of comparison between the landscape context of the Blackstairs archaeological remains and those researched elsewhere.

Historic and Common Use of "Upland"

Before addressing national and international definitions of upland it is worth briefly considering the common use of the term and how locals identify and delineate the upland of the Blackstairs Mountains. Local communities are in constant and direct contact with the region and part of its long history of use; potentially providing a localised definition for a localised research project. Such an investigation only demonstrates how fluid and open the terms are. Distinguishing between a mountain, hill and upland is often vague and linked with local or personal preference, one person's hill is another person's mountain. For example Brandon Hill, County Kilkenny (515m) in the Blackstairs is a mountain by any definition (see below) but is named and referred to as a "hill". "Mountain" in this region is a commonly used term but "upland" is not. The former has a dual purpose. First it is used to identify the area above the limits of enclosure where sheep are grazed. "I graze sheep on that mountain" or "I have/own the rights to that mountain" are common phrases when referring to commonage. Generally, it is only to a specific townland on a given mountain that these grazing rights apply; however, the mountain as a whole is what is referred to by the speaker. Secondly, "mountain" is taken to identify a particular

locality in its entirety. Living in the foothills means that one lives on the mountain and the boundaries of this are vague. As a child playing football matches against village teams such as St. Mullin's or Myshall brought a warning that we would be beaten by "the mountainy men". Similarly a conversation about ancestral links partly leading to a research interest in the area with one local farmer brought the phrase "the mountain always calls you back" (Martin Shannon, pers. comm.). Thus in this case, mountain is sub-consciously based on site appraisal rather than any physical line or boundary; they are just one component of the wider landscape. Mountains are defined by local perception although this is unhelpful in defining mountains in a national or global geographical context (Kapos et al. 2000, 4) or for comparative purposes. This is not an issue known only to the Blackstairs but one that is rooted in history and etymology.

Etymology

The *Oxford English Dictionary* today defines upland as "An area of high or hilly land" (Soanes & Hawker 2008, 1144). Historically however, the word defined a much broader area, either "The parts of the country outside the towns; the rural district" or "Living out in the country; rustic, rural". Its earliest use dates to the twelfth-century *Anglo-Saxon Chronicle Part 6* when the word "uppelande" appears in an account of the year 1087AD. Following the wishes of William the Conqueror, King William II distributed his late father's riches amongst the monasteries of England, with between six to ten marks of gold divided amongst the monasteries and sixty pence to every "uppelande" church (Anglo-Saxon Chronicle (Peterborough continuation) 1122, 111). While indicating the greater power of the monasteries over localised churches it gives little in the way of suggesting activity in a hilly or mountainous region as all rural church sites are being referred to. The word does however suggest a marginal area, a rural church being less influential than a monastery or urban centre and consequently receiving less money. A later account referenced in the *English Historical Review* describes overcrowding in the city of London during the reign of King John in the year 1209AD in comparison to the uplands. In this case upland refers to "open country" (Bateson 1902, 720). For the next few centuries, where the term does appear in texts, it is again referred to as that area outside the urbanised settlement, presumably also outside the hinterland of these towns and cities and is a term which also signifies poverty. For example, the anonymous sixteenth-century poem *The World and the Child* refers to the "poore men

that come from the upland" (Farmer 1909). A second poem written in 1518 by the poet Alexander Barclay (1484-1552) appears to distinguish between upland and lowland when it refers to the forbidding of building "in countery or in vplande" (Barclay 1885, 79). In the context of the earlier sources however, this is likely just another word for countryside.

The terms "mountain" and "hill" on the other hand have a more descriptive yet still broad definition. The *Oxford English Dictionary* describes mountain as "a large natural elevation of the earth's surface, *esp.* one high and steep in form (larger and higher than a hill) and with a summit of relatively small area". "Hill" refers to "a natural elevation of the earth's surface rising more or less steeply above the level of the surrounding land". The term "mountain" first appears in the literary tradition in the thirteenth-century poem and history of Britain, *Brut* by Layoman. It tells of thousands of men pouring out of their hiding places in pits, woods, heath and fens in the mountains towards London to repel the invasion of Constantin (Madden 1999, 2). The idea of mountains as places of military refuge is repeated again in Froissart's fifteenth-century chronicles of the Hundred Years War between France and England when both sides took refuge from each other in the mountains and planned attacks (Bourchier Berners 1914, 70; 436). This medieval description of military resistance being upheld in mountains is also found in Ireland, with the Wicklow Mountains acting as the refuges of Irish lords such as the O'Byrne's and McMurrough Kavanagh's (Fig. 2.1) (Maginn 2005, 5). Like the uplands, mountains are referred to in a wild and marginal sense over the following centuries. This could be portrayed positively such as a king's pursuit of a werewolf across mountains and mires in a fourteenth-century French romantic poem translated into both Latin and English (Skeat 1867, 114). Often however their marginality associated them with poverty and backwardness such as in Shakespeare's comedy, *Twelfth Night* when Olivia refers to Sir Toby as "Fit for the Mountains, and the barbarous Caves, Where manners ne're were preach'd!".

Early Scientific Definitions

From the eighteenth and nineteenth centuries onwards, "mountain" and "upland" began to be viewed and defined scientifically. At this point uplands can be distinguished from the rest of the surrounding countryside in the literature. Perhaps until this point in a world where travel was primarily done by foot the constant

undulations of the countryside required little need to distinguish what was higher from what was lower. Field enclosure too would not have been as extensive as it is today with the large areas of undrained bog, scrub and woodland creating a similar landscape to what is confined to the higher slopes at present. The growing distinction also stemmed from the accounts and writings of travellers who visited areas of higher elevation and began to reflect on them and their impact on the person one of the earliest of which was White's account of the Sussex Downs as a "chain of majestic mountains" (1789, 163). This was followed by one of the first scientific definitions of "mountain" by Kirwan at the end of the eighteenth century:

> "In common language, mountains are distinguished from hills only by annexing to them the idea of a superior height, not assigning to either the exact height that should entitle it to its particular denomination. Geologists have aimed at greater precision; Pini and Mitterpachter call any earthy elevation a mountain whose declivity makes with the horizon an angle of at least 13°, and whose perpendicular height is not less than 1/5 of the declivity" (1799, 156).

Detailed scientific definitions for the words "upland" and "mountain" have continued to be refined and used by various groups since the nineteenth century thus encompassing many regions while eliminating others. These will be critically examined next.

National Definitions

Uplands, mountains, elevated areas and their foothills are widely settled across the world today. The land on which these communities live is often classed as "disadvantaged" as a result of natural processes which include shorter growing seasons or less productive land qualities. To assist these farmers and to compensate for the poorer quality of their produce, national governments and the EU award grants and monetary aid. Here begins the contentious issue of what constitutes a "disadvantaged area" and in turn where they begin and end. To address this, definitions of upland are required, some of which have altered over time. These definitions have not only affected grant aid legislation but also how we have come to view the uplands as well as archaeological disciplinary approaches. Not every nation has the same broad or tight definition of upland and all have come to define uplands based on the characteristics of those within their own borders. This presents another issue when it comes to the EU which oversees legislation of countries ranging from

the flat plains of the Low Countries to the Alps. How such definitions compare to Ireland and the Blackstairs is presented in the accompanying imagery.

Ireland

Uplands and mountains form a significant part of the geography of Ireland with higher ground often a key point of focus on any map of its physical features. In the primary education system we are taught to imagine Ireland as a great bowl, with the mountains forming a large ring around the coastline enclosing the lakes and bogs of the midlands (with the Slieve Blooms and the Silvermines being the only exception). Of course the topography of Ireland is far more complex but it shows that from an early age, mountains and uplands are engrained in our conscience and form an important part of our mental aerial view of the island. When an Ordnance Survey map is opened, the landscape is coloured according to various height bands rising from light green at the coast through various shades of green and brown to the white on the highest peaks of the MacGillycuddy Reeks. Browns mark the higher altitudes and draw the eye amongst the wide expanses of greens and purple (urban areas). The point at which these begin is the 200m OD line; the first definition of "upland" here.

Irish legislative bodies and groups have defined the uplands in various ways based on their own requirements and the repercussions these definitions could have on themselves. Based on these definitions, the amount of land which is considered upland varies considerably. For example the Irish Uplands Forum and Mountaineering Ireland define upland as land above 300m OD (Stelfox 1996, 18) meaning only a mere 5% of the country falls under this bracket (Fig. 2.2). This definition is used in their environmental protection policies, cooperation with State bodies and land owners and the conservation of paths and habitats (www.mountaineering.ie). In his discussion on the various habitats of Ireland, Cabot highlighted the difficulty in defining 'upland' but settled on a botanist's definition as all land between 300 and 600m OD (Fig. 2.3) since this topographical zone has 'extreme ecological conditions'. Around 4.85% of the country is delimited in this way. Anything above 600m is considered "mountain" which makes up 0.3% of the island (Cabot 1999, 86). Not all definitions however have been all encompassing. For the purpose of "summit baggers" or those who want to climb the highest peaks in Ireland, Dillon in his comprehensive guide to Irish mountain walking routes settled on anything above 2,000 feet (610m) as mountain (2010, 10). However he did not deem all "humps and

bumps above 2,000 feet to qualify as a separate mountain summit", instead he based the inclusion of a summit in his review completely on on-site appraisal of those mountains above the contour line leaving a total of 212 summits (Dillon 2010, 11).

Equally, the Irish government has settled on an open definition to encompass all upland habitats. This definition from The Department of the Environment is quoted at length here:

> "upland habitats are defined as unenclosed areas of land over 150 m altitude, and contiguous areas of related habitats that descend below this altitude. The main upland habitats comprise blanket bog, heaths, flushes, dense bracken, habitats of exposed rock and scree, and semi-natural acidic grasslands. Several of these habitats regularly occur together as mosaics, with transitions resulting from changes in topography, edaphic conditions, drainage, management and climate. Unenclosed lands are defined as those outside man-made boundaries that are unimproved and not used for agriculture other than extensive grazing. Unimproved lands demarcated by old or defunct boundaries (e.g. some pre-famine walls) or boundary fencing are not regarded as enclosed and are thus within the remit of this project" (Perrin et al. 2009, 1; Perrin et al 2010, 3; NPBR 2012, 15).

This definition covers 19% of the land mass of Ireland (26% of County Wicklow alone), constituting the largest semi-natural habitat in the country (NPBR 2012, 15) (Fig. 2.4).

Historically, uplands have had an important role in Irish agriculture. With winter fodder production methods such as hay and silage unused in the prehistoric and medieval periods, transhumance acted as a means of preserving grassland especially in areas where land was of poorer quality. Cattle were brought to the higher ground for the summer months allowing the lowland fields to be conserved for the harder winter months (McDonald 2006, 267). As agriculture became increasingly mechanised in the inter war years and following the Second World War, the need for separate summer and winter grazing land was no longer required and so the practice died out. This led upland areas to become increasingly marginalised agriculturally and many of the grasslands became overgrown with dense vegetation such as heather, suitable only for sheep and goats. In other cases upland pastures were subjected to increased fertilisation and an area of land which was once so sparse, it took up to three acres to support one cow was now lush and green and completely transformed (Duffy 2007, 15). These changes in land quality have come to the forefront in the Department of Agricultural policy in recent decades. In 1975 three categories of disadvantaged

areas were drawn up in Ireland following on from an EU directive (see below) based on the degree to which the land was seen as "handicapped", either less severely handicapped or more severely handicapped. The third category was "Mountain Sheep Grazing Areas" but with various reviews in 1976, 1981, 1985, 1991 and 1996 this category was gradually absorbed into the other two and today there are few areas designated as such. There are various criteria farmers must meet to qualify for payment but those which refer to upland include: rough grazing, commonage shares and certain grazing rights. Upland is not specifically referred to but is dealt with in case by case submissions from farmers backed up by government inspections (DoAFM 2012, 3). The broad definition of all unenclosed land above 150m would be taken into account during these inspections.

With implications such as large payout sums, the Irish government have kept the definition broad with many associated factors in order to keep farm payouts down in upland areas under the Single Payments Scheme. Equally, Mountaineering Ireland hold a strict definition as mountaineers like to target high summits and also to keep costs and resources down in their environmental policy. Similar landscapes are found in Britain where upland investigation has been much more intensive. For this reason it is worth briefly reviewing how British uplands have been defined to contextualise the Blackstairs and other Irish uplands.

Britain

Just as in Ireland, uplands have an important role in the collective public image of the British landscape. In England, the central placement of the Pennines range has led to their dubbing as "the backbone of Britain". More significantly, the Highlands of the north and west are essential to the popular image of Scotland. Traditionally the landscape is seen as having shaped the culture and history of this area of Britain with clans forming amongst the valleys allowing the Gaelic languages and traditions to survive in pockets much like the West of Ireland. Uplands are also important in Welsh identity with the Black Mountains seen to present a natural division with England. With the main upland body concentrated in the north, the landscape seems to slope steadily upwards as one moves north. However, as is the case in Ireland, no statutory definition occurs for the uplands in Britain (DEFRA 2011, 9). To highlight the extent to which the definitions vary, the area categorised as upland in the whole of Britain ranges from 16.7 (>300m definition) to 42.1% (SDA

definition) of the country (Clark et al. 2010, 88) (Fig. 2.5) some of which are outlined here.

Height bands are the broadest definitions taken and in this case, as in Ireland, there is variation depending on the user. In England, all land above 250m OD (Fig. 2.6) is the most commonly used (Stoertz 2004, 2; Atherdan 1992, 1) which encompasses around 9% of the total land area (Darvill 1986, 4). Others limit this further to all land over 300m which covers 6.3% of the land mass (Clark et al. 2010, 88). The predominant definition for the upland zone used in Wales is any land over 800ft or 244m applicable to 39% of the country (Darvill 1986, 4; RCAHMW 2003, 6) (Fig. 2.7). Altitudinal definitions are rarely used in Scotland as these leave little in the way of lowland areas since much of the country is above 150-200m (Fig. 2.8) (Brown 1999, 231). Exceptions are made in this regard for "Munro's", peaks above 914m (3,000ft), so named after Sir Hugh Munro who first defined them for the Scottish Mountaineering Club Journal in 1891 and have become widely popular with the aforementioned "summit baggers". This was used as the basis for many subsequent mountain guides written in Britain and around the world. Peaks above this height outside Scotland are known as Furth's (in which Ireland's Carrantuohill has been classed) (Wilson 2001, 91). While many of the previous height definitions in Britain are easily applicable to Ireland, this one can only be used in extremely limited circumstances and certainly not in the Blackstairs.

As in Ireland, habitats are also used to delineate and distinguish the British uplands. "Upland heathland" is one such example used in England. A minimum of 25% of the vegetation must be comprised of dwarf shrubs such as gorse and heather and can also include heathland, blanket bog, woodland, grassland and mountain habitat managed predominantly through rough grazing and burning (Natural England and RSPB 2014, 143). Around 4.7% of England has been mapped and classed by Natural England under this definition (Natural England and RSPB 2014, 88). Another demarcates the moorland line (5.9% of England and 20% of Wales), which encompasses all semi-natural upland vegetation used primarily for rough grazing (Clark et al. 2010, 88; DEFRA.gov.uk). A similar definition of all land above the limit of modern enclosure is favoured in Scotland rather than the height band definitions above. Covering 30% of the country, this is used as part of the Scottish biodiversity plan (Milne, Macchi & Price 2007, 10). Habitat based upland-lowland divisions are

rarely used in Wales however as the poor quality of the soils means many areas which are within the bounds of modern farm systems have upland characteristics such as rough grazing, blanket bog and rock outcrops and so height based definitions are most often favoured (Jones 2007, 7). Again such definitions could be applied to the Blackstairs where field walls enclose the lower slopes and enclose the entirety of the higher land.

With improvements in technology over the years, habitat classifications have become increasingly determined using remote sensing techniques. The Land Cover Map was first produced in the 1990's based on satellite imagery. Spectral quality of the individual pixels (25x25m) was used to automatically categorise the landscape. It recorded 25 different land cover types including developed land, bare ground, beaches, sea and inland water, arable land and 18 semi-natural vegetation types including upland bog, upland grass moors, rough grazing and upland dwarf shrubs (ceh.ac.uk). The map was further updated with finer resolutions allowing for tighter boundaries on the classifications in 2000 and 2007. Such a method has shown the huge variation in upland habitat areas across Britain. Under this definition, 5% of England is classed as upland, 49.7% of Scotland and 21% of Wales (Clark et al. 2010, 88).

While the above are suitable for the general public or for explaining the physical make-up of the country, the Government needs a tighter definition in order to deal with farm payouts and assist farmers in areas with poorer land. Departments have therefore developed a variety of definitions, one of which sub-categorises the uplands specifically while the others include them under broader terms. All of these centre on land quality which is generally poorer in elevated areas. The former is the "Less Favoured Areas" (LFA) definition, a term first proposed by the EU (see below). The British Government only uses Article 19 of the legislation to define their upland LFA's under the following criteria:

> "(1) Land of limited agricultural potential, i.e. rough grazing greater than 49% of combined permanent and rough grazing, stocking densities less than 0.78LU/forage ha, and farm rents less than 48% of the national average; (2) Low economic results of farming, i.e. earned income/man work unit less than 75% of the national average; (3) Low population density, i.e. less than 36 inhabitants/km² and (4) Dependence on farming,

> i.e. more than 19% of total working population engaged in agriculture" (DARD 2009, 55).

Into this has been designated nine upland regions in England; (1) Northumberland and North Pennines, (2) The Lake District, (3) Yorkshire Dales and Bowland, (4) North York Moors, (5) South Pennines, (6) Peak District, (7) Welsh Borders, (8) Exmoor, Dartmoor and Bodmin Moor and (9) The South West (DEFRA 2011, 9). These upland ranges cover 2.2 million acres or 17% of England, an area larger than Wales (DEFRA 2011, 25). For Wales, this defines 80% of the entire country and so is not used for distinguishing uplands (Jones 2007, 7). The Welsh National Assembly however accepts this definition as the area of upland in an attempt to support the land owners of Wales who have significantly less income than those in better lands in the lowlands and in southern England (assemblywales.org).

British definitions which encompass upland areas as part of other categories include the Severely Disadvantaged Area (SDA) definition (also used in Ireland) and Agricultural Land Classifications (ALC) (see Fig. 2.5). The former covers 13.4% of England in total both lowland and upland, 56% of Wales and 85.9% of Scotland given the harsh climate, high altitude and short growing season in much of the country (Clark et al. 2010, 88). Under the ALC definition, land in England along with Wales is subdivided into five grades according to the quality of the land for agriculture varying from excellent (Grade 1) to very poor (Grade 5). This system was first devised in 1966 to give special guidance and protection to better quality land when it came to planning applications. Grade 5 is defined as "Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops" and it is into this category that mountainous areas fall (MAFF 1988, 10). Under this definition 8.4% of England is classed as upland and 30.8% of Wales, most of which is located above their 244m height band definition (Clark et al. 2010, 88; DEFRA.gov.uk). This definition is used for England and Wales exclusively and not in Scotland since Grade 5 would account for almost every acre of the country (Clark et al. 2010, 88). Much of these definitions like Ireland's, have been influenced by membership of the EU and so some of these will briefly be discussed next.

EU Legislation

European peaks, in comparison to Ireland are quite formidable, reaching dramatic heights to the point that individual mountains can hold numerous habitat classifications. Similarly, while some upland areas may be comparable to Ireland and Britain, most are distinctively different and stretch well beyond the altitudinal range found in these islands (e.g. Jura Mountains, France; Cantabrian Mountains, Spain; Tatra Mountains, Slovenia/ Poland; Balkan Mountains, Serbia/ Bulgaria). Again, mountains form a central role in the public image of the landscape with the Pyrenees forming the border between France and Spain, the Alps dominating Central Europe and the Scandinavian peaks running off into the Arctic Circle. The immense geographical area the EU now covers creates many issues in terms of supporting its member states and maintaining equality. Areas which were economically less productive as a result of human or natural influences were identified early on and policies put in place to tackle them. Uplands and mountains were identified as one such case and specific legislative policies were developed which influenced some of the definitions discussed above in Ireland and Britain.

In 1975, two years after Ireland, Denmark and the UK joined the EU, a directive was drawn up which implemented special measures to support farmers and land owners in areas which were economically less productive; the aforementioned LFAs. Aspects of the definition were taken up in many government departments in Britain and it influenced policy and decisions in Ireland. Broadly speaking, a less favoured area was one with a low or dwindling population density who relied predominantly on agriculture and areas with poor soil fertility where the returns were significantly lower than the national average (Gordon Simmons 2003, 17). Uplands and mountains were directly addressed in a number of the articles within this directive and subsequent revisions. Three distinct types of LFAs were identified (1) Mountain regions, (2) "Less favoured areas in danger of depopulation and where conservation of the countryside is necessary" and (3) "Areas affected by specific handicaps". Mountain regions are defined as any area above 600m and were initially recognised as an LFA as their extreme altitudes and steep slopes limited productivity, machinery use and growing seasons. Depopulation and conservation areas were based on the population density of an area (50% below the national average or less than 75 people/km^2). Farm incomes were also considered under this category if they were

80% or more below the national average income. Handicaps were recognised as areas with poor soil fertility or legal restrictions on production because of conservation (EU Directive 75/276). In 1999 these categories were slightly amended with a fourth category added. Mountain areas (Article 18) remained the same but a latitude north of 62º was added as it was recognised that extreme northern latitudes had similar effects on growing seasons as increased altitude. The second type was renamed as "Other LFAs" (Article 19) and it was recognised that agricultural abandonment could have severe implications for future settlement in an area. Handicaps were split into two categories. The first, "Areas affected by specific handicaps" (Article 20) focused on regions where farming had to be maintained to manage the environment or to generate tourism. The second was "Areas subjected to environmental restrictions", (Article 16), and this categorised those areas where agriculture was restricted by EU environmental policies (Council Regulation (EC) 1257/1999).

"Other LFAs" and the agricultural abandonment and depopulation that characterises it accounts for almost 60% of the EU today. Mountains make up the majority, comprising 36.1% of the EU land cover. Specific handicaps, where agriculture is a vital necessity, accounts for 4.8% of the EU, while environmental restrictions on agriculture covers 0.6%. Evidently, these are not spread evenly across all member states. For example 80% of Slovenia and Austria falls into the "Mountain regions" category. "Other LFA's" vary considerably from 1.1% in Denmark to 51% of Italy to 100% of Malta (DARD 2009, 59). New changes are currently being proposed which would see the term "LFA" no longer used replaced instead with "areas facing natural or specific constraints" or "ANCs". These will be determined by eight soil and climatic criteria including slope, soil and air moisture, stone content, temperature, and drainage (Orshoven, Terres & Toth 2012, 19). Naturally, a change in definitions and criteria will lead to border and boundary shifts. Only the "Mountain Regions" category will remain the same; any area above 600m excluding here the latitudinal definition (Orshoven, Terres & Toth 2012, 12). "Upland" is not specifically referred to as a term by the EU. Instead, many of the characteristics individual nations associate with their own uplands fall under various LFA criteria.

Altitudinal Zonation

Altitudinal zonation is commonly used to define mountains and uplands in the modern day (Fig. 2.9) as has been seen in the Irish and British definitions above. Vegetation also has a natural zonation in that it struggles or can no longer survive above a certain altitude due to wind severity, increased precipitation and lower temperatures. Many of these are used as definitions of upland and mountain ranges yet even here confusion occurs as terminology and lines vary from country to country (Fig. 2.10). Generally speaking, however, altitudinal zones fall into the following. At the base or foothills are the enclosed field systems and agricultural land usually below 300mOD. This area can be cultivated relatively successfully depending on other factors such as slope, aspect and soils. Above this, the lower slopes have come to be known simply as the "forest habitat zone" as it is here that forests, trees and shrubs will still survive naturally. The upper limit of this area is generally between 300-600m (depending on the localised climatic conditions and latitude) and known as the "timber-line". Trees will still survive beyond this point however their wood will not be commercially suitable due to their deformed and stunted growth caused by the climatic conditions. Regional and national limits of this line can differ hugely. Higher again is the sub-alpine zone which defines the area between the timber-line line and 900mOD (Crawford 2008, 364; Horsfield & Thomson 1996, 2). This is the highest sub-division applicable to the Blackstairs as its highest peak, Mount Leinster only reaches 796m and is true for most of the Irish uplands.

Beyond 900m are the Alpine zones which have no Irish examples except in extremely limited circumstances namely Lugnaquilla, County Wicklow (925m), Galtymore, County Limerick/Tipperary (918m) and Mount Brandon (952m) and parts of the MacGillycuddy Reeks, County Kerry. Three sub-categories divide the Alpine Zone; low, middle and upper and these examples fall into the former only. Vegetation bands as affected by soils and climate are the main divider meaning localised conditions and even slope and aspect can impact on the transition from one zone to another. For example the beginning of the low alpine zone can vary from 600-1200m between the Alps and Scandinavia (Crawford 2008, 364; Horsfield & Thomson 1997, 2; Mani 1968, 158; Walser & Lambers 2012, 56). The middle alpine zone from 1000-2000m (Crawford 2008, 364; Horsfield & Thomson 1997, 4; Virtanen 2003, 33), upper alpine zone 2000-4000m (Crawford 2008, 364; Horsfield & Thomson 1997, 4;

Poore & McVean 1957, 401) and nival zones 4,000m and up (Crawford 2008, 354; Nagy & Grabherr 2009, 10) are not found in an Irish context.

Archaeological Approaches

Upland projects by the archaeological profession have been touched on in brief in Chapter 1; however, the definitions of upland used by these same projects are discussed here. Given the varied definitions outlined above, the archaeological practice of accepting definitions from other disciplines has led to an equally varied use not just between countries but particularly in Ireland. For the most part archaeologists have taken all land above a particular contour line in their definition of upland. The treatment of uplands as a sub discipline also varies between countries.

In Ireland, the use of the term upland varies widely. Some projects such as the Beara Peninsula survey used above the 244m line (O'Brien 2009, 1) in line with the commonly used Welsh definition while the Brandon and Paps of Anu survey rounded this up to 250m (Coyne 2006(a), 14) as used in England. Others like the recent Dublin Mountains survey lowered this limit to unenclosed land above 150m (Ní Lionáin & Davis 2014, 1) accepting the Irish Department of Environment definition. With most upland projects concerned mainly with particular features or time periods, the term upland is often not directly addressed. Similarly the ASI of the 1980's targeted the island in its entirety with little landscape sub-division. The fragmentary nature of these projects in that they are conducted on an individual basis rather than with collective aims has led to these differences in definitions between projects. Britain however, where national surveys have been more common, has seen a more collaborative approach to the issue.

In England the preferred archaeological definition is land above 250m, used in projects conducted under the umbrella of the National Mapping Programme (NMP) by Historic England (Stoertz 2004, 2). In Scotland, specific height lines are generally not used. Instead, land above the modern enclosed field system is most often taken as the definition for upland in archaeological research (Brown 1999, 231). Many relict field wall systems survive in upland Scotland which are included in the upland bracket (Cowley 2005, 268; Ritchie & Ritchie 1991, 183). Much like England, the collective national approach of the RCAHMS has led to this agreement. The predominant definition of upland used in Welsh archaeological research is all land

above 244m (Darvill 1986, 4; Silvester 2003, 9) again brought about by a national strategy headed by the RCAHMW. This distinction between upland and lowland remained largely irrelevant in Welsh research until the 1980's and may partly be due to the entire area being regarded as an LFA or the continuous undulating topography of the country with one hill or mountain rolling into the next.

With the rugged, dramatic and steep nature of the European mountains, vegetational growth bands and altitudinal zonation are often focused on by archaeologists (Walsh, Mocci & Palet-Martinez 2007, 9). This is a consequence of either the methodologies employed or the nature of land-use as affected by growth patterns. For example, the timber-line is used in the on-going Silvretta Archaeological Project by the University of Zurich in the Austrian and Swiss Alps due to the survey techniques involved (Walser & Lambers 2012). With most research focused on specific landscapes or sites rather than a collective approach as in Ireland (see Chapter 1), upland or altitudinal zones are often referred to but not particularly defined (e.g. Fedele 1999; Pupeza 2012; Van Leusen et al. 2014; Vining & Wiseman 2006).

Defining the Blackstairs Uplands

This chapter has highlighted some of the issues and problems with defining "upland". No agreement has ever been reached and this is mainly because of the rich diversity which characterises the world's elevated places. No two mountain ranges are the same just as no two urban centres are the same. Even within mountain ranges there are arguments over what constitutes a different altitudinal zone especially on the continent and around the world (Troll 1973, A20). There may be similarities in the species of plants and animals which have come to grow and reside on their slopes but the area these same species cover depends on localised conditions. Defining an upland or mountain on a local level is also fluid and varies from place to place or the context in which it is being used. The one thing each definition has in common is that they capture the uplands as a distinctive sub-category, not one that is isolated but one which is part of a wider landscape. They define areas that are less densely settled, have poorer quality soils and shorter growing seasons so they are notably different from the rest of the countryside.

An area needs to be defined for the present survey both to bound the project and ground it within the context of similar and any future studies here and elsewhere.

There is a wide variety of approaches available to choose from (Fig. 2.11) but while each helps to define a study area, each carries with it its own problems.

1. Defining a study area either by habitat or as the area above the modern limit of agriculture, provide natural or semi-natural boundaries. However, given the fragile nature of the uplands, habitat can be a problematic definition to rely on. Relict field systems extending above the modern enclosed landscape indicate that at one time the enclosed landscape was much higher. In the same way, higher field systems today could be abandoned allowing upland vegetation to encroach. Alternatively, an area under rough grazing or scrub today could easily be ploughed and fertilised in the future meaning this definition relies too heavily on human influence (Clark et al. 2010, 89). Thus the boundaries of what is defined as upland can fluctuate within a matter of years. (Fig. 2.12)
2. Using economically determined Less Favoured Areas as a definition while accounting for the natural differences in land use strategies caused by the poorer soils and climate, confuses the distinction between uplands, coastal zones and lowland bogs some of which can blend into one another.
3. As the Blackstairs Mountains are an Irish range, alpine zonation is not applicable.
4. Strictly defining land above a certain point (e.g. 150m, 200m, 300m) while easy to distinguish from maps, is not always easy to distinguish on the ground. Another issue is that a hill on a flat plain could in theory be classed as upland as it is significantly higher than the surrounding landscape but may not fall into the height band. Darvill points out that many areas in Britain do not rise above the 244m cut off line but their topographical and archaeological nature in the context of the surrounding landscape would include them as upland areas (Darvill 1986, 4). It does however allow for modern and historic changes in land management within its boundaries.

This issue will continue to remain problematic and there may never be an all-encompassing definition. But that is what makes each area unique and different and allows each to tell a different story about the past as those who utilised these landscapes were forced to vary their approaches and land management strategies to account for the conditions they faced.

To ground the project within the context of previous Irish studies a definition which is similar to those already undertaken needs to be decided upon. This project therefore, will take the 200m contour line as the point above which is considered upland (Fig. 2.13) (this definition was also used as part of the Dranagh 2011 survey). Defining it as such places it between the lower point of 150m used in the Dublin Mountains and the higher 250m used in the Brandon Hill and Paps of Anu survey. 200m is the point at which higher ground is more clearly distinguished from the green of the lower altitudes on OS contour maps. Thus it is a simple point that can be pictured and defined by most members of the public. Excluding habitat and the limits of enclosure from the definition allows for the diversity of land-use (e.g. rough grazing, fertilised pastures, forestry, open moor-land) and issues presented not only by slope and aspect but also fluctuations in modern abandonment and extensions which characterise upland landscapes. As previously stated this definition does not single out the uplands as isolated and unique. Sites in the surrounding foothills will be included in the discussions to provide a context for the upland activity and to place the Blackstairs in the wider landscape. Thus the study area is bound by all townlands in the Blackstairs range which include an upland portion – an area of land above 200m. The uplands form the primary focus with the lowland portion offering a localised context for the upland activity. Sites within the wider region of south Carlow/ Kilkenny and North Wexford will also be drawn in the discussion. Chapter 3 now introduces the Blackstairs uplands and presents the natural and archaeological character of this landscape as it was understood before intensive survey.

Chapter 3 – Characterising the Blackstairs Mountains

"Stuadh Laighean agus Stuadh Leithghlinn,
An dá stuadh is aírde an Éirinn,
Dá mbeidheadh Cruicín Bhréannaill air Stuadh Leithghlinn"

The above poem was recorded by John O'Donovan in the Ordnance Survey letters relating to County Kilkenny in 1839. It translates as "The Peak of Leinster (Mount Leinster) and the Peak of Leithghlinn (Blackstairs Mountain), would be the highest mountains in Ireland, if Brandon Hill was on top of the Peak of Leithghlinn" (Healy 1893, 216) and notes the three main divisions in the Blackstairs range. Knowledge of the landscape character is essential to the archaeological investigation of the Blackstairs Mountains. This is what has shaped the region for millennia, both the natural processes and the human reaction to it, represented today by the archaeological remains. Understanding the geological background indicates the main source of stone in the region which affects architectural styles and construction as well as identifying the human introduction of non-local material. Glaciation can also account for introduced soil and stone material and can create pockets of differential character to the wider region. Soil characteristics influence the human use of the landscape; limiting or encouraging agricultural activity or turf cutting for example. Resultantly this also affects the vegetation which covers the region today. Such characteristics can also be a product of past activity themselves. Not only do these features inform us on and help to characterise past landscape use, they also affect our investigative processes identifying areas of potential and limitation which is central to the discussion in Chapter 4. For example the presence of forestry can result in a different level of visibility to heathland and different site types might be expected between the latter and enclosed pasture. Similarly, a wide open mountain terrace would be expected to have a higher archaeological potential than steep scree covered slope. This chapter outlines the character of the Blackstairs Mountains focusing on its location, geology, soils, vegetation and previous archaeological understanding to provide a context for the discussion in the following chapters.

Location

The Blackstairs Mountains are situated in South-East Ireland (Fig. 3.1) made up primarily of two main spines running northeast-southwest separated by the Scullogue Gap. This ridgeline forms the boundary between counties Carlow and

Wexford. The northern spine is dominated by Mount Leinster (796m) while the southern spine is dominated by Blackstairs Mountain (735m). Mount Leinster acts as a central high point from which ridges radiate in all directions while Blackstairs Mountain is the highest point on a long ridgeline. Both spines have a number of protruding spurs and mountains off the central ridgeline. To the West, on the opposite side of the River Barrow is Brandon Hill, County Kilkenny (515m) which is sometimes grouped into the Blackstairs Range but is separate to the main spines. This collective grouping is a recent one based primarily on proximity and geology. Originally they were identified as three separate divisions (Fraser 1844, 185; Lewis 1837, 258) and this is still maintained to some extent locally today (Dalby 2014, 197).

Mountains and Placenames

Like any mountain range, the Blackstairs and its numerous features have been named and its land divided into a variety of units. Mountain names and ridges can be seen in Fig. 3.2 while rivers and drainage are depicted in Fig. 3.3. As well as being split between three counties, the range is also sub-divided into smaller administrative units; baronies, civil parishes and townlands. Baronies (Fig. 3.4), while largely unused today, functioned historically for local taxation and property registration purposes. Civil Parishes (Fig. 3.5) were a smaller administrative unit with similar uses in the nineteenth century. Townlands (Fig. 3.6) are the smallest land division and function today as address identifiers. All three divisions have historical origins from the Anglo-Norman era or earlier and are referred to throughout this thesis and in the site catalogue in Volume 3.

Geology

Few investigations have been carried out on the formation of the Blackstairs uplands owing to the presence of blanket bog in most areas (Chew & Stillman 2009, 168). From the research that has been conducted, we know that the bedrock in the region as a whole is Ordovician Metasediments (mudstones of slate and shale) which formed c.510 million years ago on a warm ocean floor. These dominate the geology of the northern and eastern extremes of the range (Conry 2006, 38). Granites which formed 400 million years ago during the Devonian period in a phase known as the Caledonian Mountain-building Orogeny intruded upon this bedrock and today these rocks dominate the geology of the western part of the range (Conry 2006, 24). This

uplifting occurred when the ancient continents of Baltica (now north-west Europe) and Laurentia (now North America) collided (Williams & Harper 1999, 23) The range is part of the largest continuous area of granite in Ireland which "runs from the coast at Dun Laoghaire and Dalkey, south-south-westwards across County Wicklow and into Carlow and Kilkenny, forming the central belt of what is often called the Leinster massif" (Hepworth Holland 2003, 23). This granite band terminates at Brandon Hill where intruded slate and shale bedrocks dominate the local geology again (Wright 1834, 129) (Fig. 3.7). Leinster Granite formed simultaneously from five different plutons or intrusions, (1) The Northern (Dublin), (2) Upper Liffey Valley (Dublin/Wicklow), (3) Lugnaquilla (Wicklow), (4) Tullow (Carlow, Wicklow) and (5) Blackstairs (Carlow, Wexford, Kilkenny) giving the rocks from each pluton their own characteristics unique to that area (Chew & Stillman 2009, 170).

Blackstairs granite is characteristically medium-grained with some veins of coarse and fine grained granite (Fig. 3.8). Weathering in many instances has eroded the stone to coarse sand which can sometimes be found in between joints of solid granite blocks. Much of this sand however has been washed off the mountain slopes leaving behind large granite boulders as scree on the mountainside (Fig. 3.9). Thermal action as a result of the molten magma from which granites are formed caused a 400metre wide band of mica-schist to form at the contact zone between the granites and the mudstones in the Blackstairs (Hepworth Holland 2003, 27; Williams & Harper 1999, 29) which is particularly evident in exposed surface outcrops to the north of Mount Leinster and the summit of Slievebawn (Conry 2006, 24). The differences in geology are often quite stark as large boulders and thin soils are strewn across the granite areas while peat blankets the slate and shale areas. These in turn impact on the agricultural capabilities and productivity of the region.

Glaciation

Between 300,000-130,000 years ago, a period known as the Munsterian Cold Phase saw large masses of ice pushing across the Irish landscape. In the Blackstairs region these moved from the north towards the Celtic Sea (McCabe 1987, 259; Mitchell & Ryan 1997, 39). Ice-flows stripped and plucked material up to a height of 350m from the landscape dumping limestone and other rocks at the foothills of the Blackstairs Mountains. These glaciers pulverised the rock and deposited glacial tills on top of the underlying bedrock up to a height of 360m. Limestone bedrock on the

western side of the range was also removed in places and redeposited as large erratic boulders across the steep west slopes of the mountain range (Conry 2006, 32). Tors dominate the southern Blackstairs ridgeline (Fig. 3.10). These formed during warmer climatic conditions millions of years ago when exposed rock weathered at different speeds. The softer rocks eroded away thus leaving the harder, more resistant rock resting on the ridgelines. Most of the Blackstairs tors consist of the same granite as the surrounding areas but with higher concentrations of schist. Their presence indicates that glaciers and ice flows did not cross the mountains (Conry 2006, 33). Known locally as "Brans", each one is named individually (e.g. Branmore [*Big Bran*], Dhó Bhran [*Two Bran's*], Bran na Chró [*Byre Bran*]). Bran was the hound of Fionn Mac Cumhaill and it was from her the name derives as it was said she would jump over each one with one leap (Michael Byrne, pers. comm.). A corrie on the north-eastern slopes of Blackstairs Mountain may date to this or a slightly later glacial phase (Farrington 1938, 70)

The Blackstairs were largely unaffected by the last glacial phase known as the Midlandian Cold Phase. At its peak 25-20,000 years ago large ice sheets pushed from the midlands south-eastwards. This deposited a large amount of limestone till over the underlying bedrocks in the lowlands however it only penetrated around 10km into the granite bedrock. Here it terminated in what has become known as the Midlandian End Moraine which stretches across the centre of County Carlow from Goresbridge, County Kilkenny and through the villages of Fenagh, Tullow and Rathvilly, County Carlow far to the North and West of the Blackstairs (Conry 2006, 31). Snow is estimated to have covered everything above 500m. Small glaciers formed on the north side of the range around the slopes of Blackrock Mountain and to the southwest of Mount Leinster in the Mountain River valley although their terminal moraines short distances from the corries suggests that they had little impact on the surrounding soils (Farrington 1938, 65).

Soils and Peat

Soil cover has a major impact on landscape use. Intensive soil surveys by An Foras Talúntais in the 1960's led to the localised sub-division of many broad national soil types (Fig. 3.11). Lowland subsoils surrounding the Blackstairs are made up primarily of granite tills. This was formerly a mixed composition of limestone, granite and other rock on account of the glacial action. Weathering and leaching, has since

removed the limestone component from the soil. Combined with the granite bedrock, most of these soils today consist of acidic podzols (Conry 2006, 32). Small differences in each have led to their further sub-division. Those in the immediate Blackstairs foothills are known locally as Slievedurda soils after one of the Blackstairs Mountains. They are a black podzol in the plough soil with yellow subsoil. Due to high levels of rainfall these soils are severely leached, despite attempts over many generations to improve them. Yields are generally low due to their poor fertility. Many farmers in former times were forced to drive their sheep from here to better lands in Counties Wexford and Kilkenny (Conry 2006, 60).

Upland podzols to the north of Mount Leinster have been termed the "Black Rock Mountain Series" after the mountain here. These are limited to the steepest slopes above 300m which were not subjected to glacial drifts and so are entirely derived from the underlying bedrock. They stretch from the Killbrannish hills, across Slievebawn, Tomduff, The Black Banks and parts of the northern slopes of Mount Leinster. High rainfall and low temperatures has had a negative effect on the soils fertility contributing to a peaty horizon overlying a tough ironpan which means there is a large amount of water retention. Given their poor productivity, the land is only suitable for forestry or extensive grazing (Gardiner & Ryan 1964, 37; Conry & Ryan 1967, 42).

Like most uplands, peats are a major part of the Blackstairs. The soils on the moderately steep slopes to the west, east and south of Mount Leinster, the slopes of Brandon Hill, the north, east and west of Blackstairs Mountain and south of Dranagh Mountain are peaty podzols derived from the underlying granite bedrock and were largely unaffected by glacial action. These have been labelled as the Blackstairs Series and are the predominant upland soil (Gardiner & Ryan 1964, 52; Conry & Ryan 1967, 42; Conry 2006, 66). They occur on slopes between 15º and 20º ranging in elevation from 150m to 400m and consist of a peaty layer over a heavily leached podzol and a thin ironpan. The depth of this peat varies from 15-40cm. This series is very similar to the Carrigvahanagh Series (below). Their peaty nature and extremely poor fertility has meant that their agricultural use has been limited to sheep grazing traditionally (Conry & Ryan 1967, 43).

The Scullogue Gap divides the northern and southern spines of the Blackstairs Mountain range. The soils in this valley are largely split between three series; the acidic brown podzolic Kiltealy and Knocksquire Series and the Belmont Series gleys. The Kiltealy Series occur in patches around the foothills of the southern spine but its largest concentration occurs in the Scullogue Gap. It is a coarse textured granitic till with shale inclusions. These well drained soils have a moderate fertility suitable for a limited range of tillage but they are particularly noted for their sheep grazing suitability. Recent decades has seen considerable attempts at improving these soils especially for barley cultivation although near surface boulders and bedrock in places still act as an impediment for ploughing (Gardiner & Ryan 1964, 51; Conry & Ryan 1967, 37; Conry 2006, 61). The peaty podzol Knocksquire Series is limited to the steep slopes immediately surrounding Knockroe Mountain and descending into the Scullogue Gap. These are entirely derived from the granite bedrock. They are noteworthy for their high amount of granite outcrops between deep sandy well drained soils. The steep slopes and incredible rockiness means they have almost no agricultural value. Issues with access despite advancements in machinery means attempts at improvement have been extremely limited. Thus the land has been more or less neglected allowing extensive tracts of ferns and gorse to spread. Tillage and grassland is only suitable in very small patches leaving them mainly utilised for rough grazing.

A small pocket of peaty gley soils occurs in the Scullogue Gap. Here under the County Carlow survey they are known as the Belmont Series. The majority of these soil types occur on the east and west slopes of the southern spine where the Wexford soil survey labelled them as The Ballywilliam series. Peaty gleys occur in the areas with the lowest topography and which have a high water table for the majority of the year. They are derived from glacial till made up of granite and chert. Poor drainage is a major issue and they have a peaty surface which ranges in depth from 15-40cm. Their waterlogged nature for much of the year means they are limited to summer rough grazing in an unimproved state. In places where attempts to increase fertility have occurred, drains need to be dug almost a metre deep and these have proved successful despite the difficulties presented by the presence of large granite boulders. With the addition of fertilisers, grasslands have proven quite successful although their

seasonality is limited with the need to limit poaching (Gardiner & Ryan 1964, 51; Conry & Ryan 1967, 48).

Climbing back upslope onto the southern spine brings one back in contact with the Blackstairs Series on the northern slopes of Blackstairs Mountain before reaching peaty lithosols known as the Carrigvahanagh Series which almost dominates the southern spine entirely. This is also found between the comparatively deeper peats and the Knocksquire Series on the northern spine and the area around the summit of Brandon Hill. The Carrigvahanagh Series consists of a lithosol, made up of skeletal, shallow soils and rock fragments with ill-defined horizons on a near surface bedrock with large outcrops and boulders visible on the surface (Conry & Ryan 1967, 58; Gardiner & Ryan 1964, 51; DOEHLG 2006, 12). They occur on the steepest slopes on higher elevations and because of this, they are entirely devoid of any glacial material. The peaty soils, where they do occur between patches of bare bedrock, range in depth from 2-25cm with vegetation limited to rough undergrowth such as heather, ferns, and gorse. Given their nature, agriculture is entirely limited to rough sheep grazing.

The final series, Blanket Peat, occurs mainly on the highest slopes of the northern spine around Mount Leinster, the north of Brandon Hill and a small area around the summit of Blackstairs Mountain. The 1960's Soil Survey asserted that peat was beginning to form in hollows on the higher peaks of the Blackstairs Mountains around 3000BC (Conry & Ryan 1967, 13); however, no investigations have been carried out to support this. Attempts are currently being made, however, to identify suitable peat deposits for dating and palaeoenvironmental work (see Chapter 7). Blackstairs blanket peat ranges in depth from 60cm-2m. It is grazed in summer months by sheep and otherwise has limited agricultural value (Gardiner & Ryan 1964, 77; Conry & Ryan 1967, 63). Blanket peat once covered many areas of scree, bare bedrock and thin peaty podzols, with oral tales indicating that most of this peat has since been lost to prolonged periods of burning and extensive turf-cutting practices (Conry 2006, 68). Coverage today is mainly restricted to the highest summits and ridges or in thin and sparse layers amongst the rocks and boulders. Indeed, Carrigvahanagh the southernmost mountain in the Blackstairs range gets its name from the Irish 'Carrig Bánach' or 'White Rock' as it is strewn with large granite blocks. A local man "Laurence Byrne (1875-1962) often heard his elderly cousin, Thomas Boyle of Drummond, saying that it was once covered by a layer of bog and

that the bare rocks only appeared after the bog burned for a whole year" (Conry 2006, 41).

Poor fertility is a major feature of the Blackstairs soils. Climate, lack of improvement techniques and the predominant agricultural practice of rough sheep grazing have influenced the vegetation cover which occurs in the range and the habitats which are present today.

Vegetation and Habitat

Habitat definition based on vegetation classification can be a complex process. Artificial processes such as abandonment, overgrazing, burning and land reclamation combined with natural ones such as erosion, precipitation and temperature can fluctuate over time meaning a definition of habitat a year ago may not be the same now. Coupled with this is the fact that many habitats can form mosaics, blending into one another or appearing as pockets dotted across the landscape as a result of factors both above and below ground. Therefore, uplands often have habitat structures far more complex than the surrounding lowlands. This complexity however is not always recorded or noted as can be seen when comparing published reports and visiting the landscape on the ground. There are two datasets available for the Blackstairs; the Special Area of Conservation (SAC) strategy report published by the Department of Environment and the European Environmental Agency report compiled under the CORINE programme (Fig. 3.12). Discrepancies exist between the classifications of both bodies, a consequence of the detail to which surveys were carried out. The SAC survey was more intensive, classifying a range of habitats however the CORINE programme has blanket designated most of these as Peat bog habitats. Attempts are being made to sustainably manage the uplands by the newly formed Blackstairs Farming Group (see Chapter 7) to which this project has been a contributor and as part of this a highly detailed habitat survey is currently being undertaken, the results of which are not yet available. Habitat has a major impact on the visibility of archaeological remains in the landscape today and consequently our approaches to them which is explored in detail in Chapter 4.

The Blackstairs Mountains are designated as an SAC due to the presence of European Dry Heath and North Atlantic Wet Heath Habitats. The SAC (Fig. 3.13) is limited to the hillside and semi-natural areas above the modern field boundaries and

forestry plantations of the two main spines separated by the Scullogue Gap and a number of surrounding pockets (Brandon Hill is not included). It forms an extremely valuable site for these habitats as 17% of total area of Dry Heath in Ireland is located in the Blackstairs while the presence of Wet Heath means it is an outlier of a habitat almost exclusively limited to the west coast (DOEHLG 2006, 7). The main purpose for designating the area as an SAC is to maintain these habitats and their species diversity. Threats include burning, overgrazing, erosion, a decline in red-grouse bird population (a protected species) and the effects of off-road vehicles (DOEHLG 2006, 2). Combined with these habitats are Blanket bog, Cut-over Bog, Eroding Blanket Bog, Dry-humid Grassland, Dense Bracken, Eroding/Upland Rivers, Non-Calcerous Springs, Exposed Siliceous Rock, Siliceous Scree and Loose Rock Scrub, Conifer Plantations, Drainage Ditches, Buildings and Stone Walls which together form a diverse tapestry across the landscape.

Dry Heath makes up 84% of the Blackstairs Mountains according to the SAC report while Wet Heath covers 1% (DOEHLG 2006, 14). Both habitats have an extremely similar vegetation composition as they host dwarf shrubs which must make up a minimum of 25% of the vegetation mass. Dominated by Ling heather for the most part, their species list also includes Crowberry, Bilberry, Mat-grass, Bell heather, Common bent, Cross-leaved Heath, bedstraw and a variety of mosses. The presence and density of these species especially Ling Heather will vary depending on the burning history (Fig. 3.14). While Dry Heath occurs mainly as a blanket, Wet Heath forms as pockets on steeper slopes or lower levels where peat has begun to accumulate. The main way to differentiate the two habitat types is (i) by the presence of Purple Moorgrass which grows on Wet Heath along with a wider variety of mosses and (ii) by the depth of peat on which they grow. Dry Heaths will only form on skeletal soils or on peat up to 15cm in depth. Wet Heaths on the other hand form on peat depths ranging between 15cm and 50cm with any accumulations above being classed as blanket bog. Gorse can be present on Dry Heath's as long as it is low growing. If it comes to dominate the vegetation or forms a canopy, then the area is classified as scrub (DOEHLG 2006, 14; Fossitt 2000, 35). Dry heath is extensive across the upper limits of Kilbrannish North and Cruaghaun while wet heath can be found in the area west of John's Hill.

There are two main types of blanket peat, (i) upland and (ii) lowland Atlantic, differentiated by the 150m topographical line so in this case the Blackstairs fall under upland blanket bog. High rainfall levels, humidity and impeded drainage combine to form deep accumulations of peat which in their natural state will be covered with rough grasses (e.g. Deergrass and Cottongrass), shrubs (e.g. Ling heather and Bilberry), and mosses. While peat depths vary and can be greater, they generally do not exceed 1-2m. In some cases, blanket bog can be difficult to distinguish from Wet Heaths because of the similarities in the vegetation species but again the peat depth is the main indicator. In cases where the bog is undisturbed, sphagnum moss levels will be high. Damage to blanket bog is considered severe in areas where more than 5% of the peat is either exposed or eroding (DOEHLG 2006, 15; Fossitt 2000, 42). Centuries of peat extraction, burning and drainage has severely limited the number of intact and undisturbed blanket bogs in Ireland. Erosion and afforestation has also destroyed, damaged or degraded many of these habitats (Fossitt 2000, 40). Examples of Blanket Bog in the Blackstairs can be found west of Cloroge More and the area north of Knockroe Mountain. Where a bog has been damaged by cutting it is classed as cut-over bog while bog where damage has occurred naturally below the roots is classed as eroding blanket bog.

Cut-over bog is characterised by vertical bank faces or rectangular ramparts where the level of cut peat is considerably lower than the uncut area. These banks can vary in height and remain evident on the surface for decades after the last cutting even becoming overgrown themselves. Visually, this habitat is extremely varied most often appearing as a mosaic of bare peat, bedrock, re-vegetated heath and grassland. In some cases a fraction of the original peat cover may exist. Their appearance and survival also depends on hydrology, the underlying bedrock and the depth of peat remaining. Stagnant water can also be present in drains and pools (Fossitt 2000, 44). The ridgeline of Blackrock Mountain is a renowned area for turf extraction and where cut-over bog is visible. The remains of turf banks and turf cutters huts are still evident on the summit today along with a major roadway constructed during “The Emergency” (WWII) to facilitate turf extraction.

Eroding blanket bog, while similar in many ways to cut-over peat, is only used to define areas where the original peat mass has been lost to erosion or where large areas of peat are exposed on the surface. The processes which lead to this habitat

forming are generally natural however, overgrazing especially by sheep has either sped up or even initiated the process in many areas (Fossitt 2000, 44). These habitats can be identified by narrow networks of gullies cutting through the vegetation and exposing the peat. Over time these gullies widen and deepen until the bedrock becomes exposed leaving behind blocks of peat known as “hags”. Once initiated, this process is almost entirely irreversible (Fossitt 2000, 45). The summits of Mount Leinster and Blackstairs Mountains are areas where eroding blanket bog can be seen and peat hags here are a familiar site to many hillwalkers.

Dry-humid grasslands are unimproved or semi-improved grassland on free draining acidic soils. They are generally most extensive at the upper limit of field enclosure and can also blend with dry heaths giving the landscape a mosaic appearance. Most of the grasses which form in these pastures are short narrow-leaved swards such as bents and mat grass. Moss can also be extensive and in some cases small shrubs will grow in patches (Fossitt 2000, 30). This habitat is often the first to reclaim an area after extensive burning so in some cases dry-humid acid grassland will occur on a site which was formerly dry heath (DOEHLG 2006, 15). This can be seen at Dranagh Mountain and on the slopes of the Black Banks east of Mount Leinster most recently. Field systems close to the uplands are also dominated by this grassland unlike the more fertile pastures in the lowlands.

Dense bracken is another habitat type which can come to replace Dry Heath after periods of burning and can also engulf dry-humid grassland. This classification is used for areas where ferns exceed 50% of the vegetation cover. While the ferns die out in the autumn their remains usually last throughout the winter creating a blanket which is difficult for other species to penetrate (Fossitt 2000, 38) an example of which is found on the northern slopes of Dranagh Mountain. Scrub is another damaging and dominating habitat which can often replace dry-humid acid grassland and dry heath. It is most often found on the fringes of farmland or in areas of abandoned farmland. To use this classification the vegetation must have a minimum consistency of 50% brambles, shrubs and stunted trees and the canopy must not exceed 5m in height. This habitat can expand rapidly and replace dry heath and grassland. In some areas scrub was the precursor to the forestry which now exists as the vegetation includes hawthorn, gorse, blackthorn and juniper (Fossitt 2000, 55). Areas with this vegetation

include the east slopes of Brandon Hill and the area above the farmland in Cloroge More.

The Blackstairs is the source of numerous rivers and streams (see Fig. 3.3) which form from non-calcerous springs. These habitats are kept irrigated and constantly moist by acidic water and are often found on skeletal or peaty soils. Their surrounding vegetation generally consists of mosses and grasses (Fossitt 2000, 25). Those rivers which emanate from the springs on the east side of the mountain range, including the Clody River, River Urrin, Rathduff Stream, and Askinvillar stream, flow into the River Slaney while those on the west meet the River Barrow such as Killedmond River, Aughabrisky River, Mountain River, River Burren, and Aughavaud River. The rivers and streams which flow from Brandon Hill also flow into the River Barrow with the exception of the Clodiagh River on the south side of the mountain which joins the River Nore. The presence of large numbers of pearl mussels in the Mountain and Aughabrisky Rivers has led them to be designated as part of the River Barrow (DOEHLG 2006, 12) although in this thesis they will be referred to by their original names. Most of the streams and rivers in the Blackstairs are classed as eroding or upland rivers. Their nature as fast-flowing, turbulent, narrow gullies on steep gradients has meant they generally do not support their own vegetation and the vegetation on their banks is dominated by the habitats in which they flow through. In some cases aquatic mosses will grow on submerged boulders while lichens can grow on rocks along the bank (DOEHLG 2006, 15; Fossitt 2000, 21).

Another common habitat in the Blackstairs Mountains is exposed siliceous rock, found where bedrock becomes exposed on the surface. These can have patches of other habitats amongst them such as dry heath, scrub or grassland. Lichens are generally extensive on the bedrock and boulders which litter the surface (Fossitt 2000, 60). This habitat has become more frequent in the Blackstairs in recent decades, a result of extensive burning. Areas with this habitat include Dranagh Mountain, the summit of Knockroe, and Carrigvahanagh. The other exposed rock habitat type is siliceous scree and loose rock. These are large accumulations of broken stone which occur on steep slopes. The rocks are generally angular and vary in size from gravel to large boulders. Exposure, the constantly changing nature of these habitats, and their steep slopes, means vegetation has difficulty in taking hold and dominating the

landscape. In some cases dry heath or acidic grassland will form in small pockets although lichens, ferns, mosses and shrubs such as bilberry will grow patchily (DOEHLG 2006, 15; Fossitt 2000, 61). The west side of the Blackstairs Spine, the slopes of Knockroe and the east side of Mount Leinster are littered with scree which can make access difficult and dangerous for hillwalkers.

While the above habitats are formed by natural processes or natural reclamation of former agricultural land, there are a number of artificial habitats in the Blackstairs also. The most obvious one in the case of the uplands are the Conifer plantations which dominate large swathes of the mountain range. The sole purpose of these plantations is commercial timber production. They are characterised by an even aged set of trees usually organised in linear rows. Diversity of species is generally low although mosses and ferns are often evident and the majority of trees are non-native species including Sitka Spruce, Norway spruce, Larch trees and lodge pole pine. In some cases the plantations are ringed with broad-leafed trees which are also planted as part of the plantation (Fossitt 2000, 54). Conifer plantations are found in the area around White Mountain, Slievebaun, the east, north and south of Brandon Hill and the to the southwest of Mount Leinster to name but a few examples. By creating plantations, a wide range of habitats can be obliterated and most will never recover due to the damage caused by the planting process. Another damaging effect humans have had on the landscape is the construction of drainage ditches. These are linear channels of water which are either entirely artificial or sections of modified natural channels. In order to keep them open, they need to be constantly monitored and maintained (Fossitt 2000, 23). Water levels can fluctuate with the seasons and in some cases they are combined with hedgerows. Examples include those at the limit of agriculture on the slopes of Blackrock Mountain and on the slopes of Knockroe. The presence of these ditches can cause natural or semi-natural habitats of dry heath to be transformed into acid grassland.

Construction of stone walls and buildings has not only created habitats in themselves but influenced surrounding ones also. Since prehistory, human activity in the Blackstairs and other upland areas accelerated peat growth (Cooney and Grogan 1999, 99) and caused habitats to fluctuate between grassland, scrub and dry heath. The construction of field wall systems and the reclamation of land have meant that the uplands we see today are dramatically different from how they would appear if left to

natural processes. By altering other habitats, humans also created entirely new ones in that the stone walls and the ruins of the buildings they left behind have come to support a variety of wildlife and the older they are, the more important they are for this purpose. Grasses, ferns, lichens and mosses abound on these enclosures and structures (DOEHLG 2006, 16; Fossitt 2000, 68) which litter the entire landscape with the exception of the steepest slopes and scree habitats. The cairns on the summits of the highest peaks also support these species.

Hare, sika deer, badger, feral goats, stoat and fox are among a multitude of wild animals which reside on the slopes of the Blackstairs maintaining and surviving off these habitats. Sheep grazing is carried out on many of the open commonage areas. The lower slopes are also used for sheep grazing within controlled field systems. Cattle are also released periodically in some areas including forestry plantations. Birds include red grouse, hooded crows, cuckoo, pheasant and starlings. Interestingly, the Blackstairs Mountain range may well take its name from this little bird, as starlings are known as stares in many parts of Ireland. Blackstairs Mountain itself is known locally as Sturra and there may be a link between this and the Latin name for starlings, '*Sturnus vulgaris*'. To add to this suggestion, a local woman, Cis Rapple of Killedmond, would refer to starlings as black stares (Conry 2006, 40).

The wide variety of habitat types and the way they blend into one another across the landscape, often in a mosaic style pattern is the result of centuries of natural and anthropogenic processes. Habitat needs to be constantly monitored across this vast landscape because of its constant state of alteration and a more detailed investigation into the environmental and ecological history is desperately needed in order to fully understand habitat change and formation in this landscape. By looking at OS maps and walking through the range we can see that areas of conifer forestry stand on extensive eighteenth and nineteenth-century field systems and agricultural land which in turn was imposed on what probably consisted of dry heath on peaty soils, blanket bog or some other natural habitat. This in turn may have formed on once free draining prehistoric field systems which were claimed from natural grassland or even woodland (see Overland & O'Connell 2009). While this presents a picture of habitat change on a millennial scale, the immediate and short term changes are also profound.

Land reclamation and abandonment is an ongoing and fluctuating process. Scrub land is cleared or dry and wet heaths are drained to make way for acidic dry grassland. Land is also abandoned and reclaimed by the former especially on the fringes of scrubland or on steep slopes which become increasingly difficult to access as farmers get older. Large and small scale burning to facilitate sheep grazing affects the growth pattern and consistency of dry heaths. Increased precipitation facilitates bog growth in some areas while erosion and landslides elsewhere reduces them or increases the spread of scree. Vegetation and habitat and the processes which lead to their development has profound implications as we have already seen in Chapter 2 for the definition of upland or the management of SAC's. By looking at the vegetation pattern on the ground, we can see that almost no corner of the Blackstairs has been unaffected by human hand either directly or indirectly. This is not an unspoiled natural landscape. This is an area with a deep rooted human history which is still being reshaped today.

Archaeology

Little previous archaeological research has been carried out in the Blackstairs and this has been almost entirely limited to field survey initiated by the Archaeological Survey of Ireland in the 1980's (Brindley & Kilfeather 1993). A survey in 2011 using similar methods was carried out by the author on Dranagh Mountain, a south-westerly facing spur on the southern spine. This revealed that the number and density of recorded sites in the National Monuments Records may not be an accurate representation of the true number of archaeological remains on the mountain slopes. A fire which stripped the underlying vegetation revealed 70 'new' features where there were 16 previously recorded bringing the total number of known sites on that particular mountain to 86.

The NMS record for the Blackstairs uplands as a whole was quite scant prior to the Dranagh survey in comparison to the surrounding lowlands and to areas where intense research has been carried out (Fig. 3.15). Only 47 sites were recorded in total on the two main ridgelines with a further 13 on Brandon Hill. Of these 11 were classed as 'Redundant'. Thus, more features were recorded on one mountain (2km²) than across the entire mountain range, suggesting that the Blackstairs had many more archaeological features waiting to be discovered. To add to this in the summer of 2011, a wooden deer trap was identified by a hillwalker (Michael Monahan)

protruding from a peat hag on the summit of Blackstairs Mountain. Excavated by the author along with the National Museum, the object was subsequently radiocarbon dated to 2102 ± 33 BP, which calibrates (at 95% probability) to 336–42 BC (Andrew Halpin pers. comm.). Direct evidence for Iron Age activity has thus been identified in the Blackstairs Mountains. Previously recorded sites are included in the discussion in Chapter 5 however a summary is provided here.

Artefactual evidence for the Blackstairs Mountains is extremely limited owing in part to the lack of archaeological investigation or excavations (Fig. 3.16). Only one targeted excavation has been carried out in the uplands; the rescue excavation of a deer trap by the National Museum of Ireland (NMI). A number of other features from the surrounding foothills are housed in the NMI and these comprise solely of small rock art panels and bullaun stones. Archaeological monitoring of soil removal during the construction of one-off houses was carried out close to a number of sites in the foothills below 200m (05E0893 30m S of ecclesiastical enclosure WX018-001; 07E0050 SW of ringfort RF27/WX014-005) however nothing of archaeological significance was uncovered. The only exception was in the case of excavation 07E0075 to the north of a ringfort in Monamolin (RF22/WX024-001) where possible traces of agricultural activity of an unknown date were identified. The National Monuments Service also supervised the retrieval of a split rock art panel (CW023-031) from a field wall in the foothills of Knockroe Mountain. This previous lack of artefacts made the discovery of two stray finds during the present survey out of eroding peat even more significant (see Chapter 5).

The features which had been recorded prior to the present survey hinted at a multi-purpose use for the mountain range since at least the Neolithic (Fig. 3.17). Ceremonial, ritual or monumental sites include standing stones (e.g. Dranagh & Knockymulgurry), summit cairns (e.g. Slievebawn, Brandon Hill, Mount Leinster), a portal tomb (Knockroe) and rock art (e.g. Crannagh, Knockroe, Brandon Hill). Two cursus monuments had also been identified, one on the slopes of the Black Banks (Condit 2003, 2; Conry 2008, 16) and the second on the nearby slopes of Slievebawn. Agriculture is represented in a myriad of field walls both pre-bog (Dranagh) and later which sub-divide large swathes of land especially on the lower slopes. Similarly a number of pre-bog hut sites in proximity to the Dranagh pre-bog wall suggest prehistoric transhumance activity. A stone row at Coolasnaghta known locally as

"The Nine Stones" may indicate Bronze Age activity while a hillfort enclosing a section of the summit of Knocksquire Hill suggests a Late Bronze Age presence. A hilltop enclosure recorded on Brandon Hill may have been used as another ceremonial enclosure also although this is on a slope rather than a summit.

With the arrival of the Early Medieval Period, upland activity in the Blackstairs seems to wane with few recorded features despite its presence in the foothills as indicated by ecclesiastical enclosures and associated features at Askinvillar Upper on the eastern slopes and Myshall and Killoughternane to the north. Numerous ringforts surround the mountain range with three just inside the upland line. Many of the sites classed as "earthworks" by the NMS in the foothills may be the remains of levelled ringforts (Brindley & Kilfeather 1993, 40). A number of the ringforts on the Wexford side of the Blackstairs, such as those around the village of Kiltealy are particularly close to the upland zone which may suggest that they used the nearby slopes for upland grazing. With the arrival of the Normans and the establishment of towns and defensive features within the landscape, direct evidence for human activity in the Blackstairs begins to appear in the archaeological record again in the form of a series of moated sites. Two of these are located on Brandon Hill overlooking the Barrow Valley. A further three are found on the slopes of Blackstairs Mountain in Co. Wexford at Askinvillar Lower, Knockatober and Mocurry East.

Sites which cannot be dated by typology such as hut sites, field systems and enclosures are scattered sporadically across the range which may date to any period. Apart from the above, no other recorded sites existed in the Blackstairs prior to this survey. Most striking was the absence of any indicators of eighteenth-twentieth century landscape use and thus, the period which is closest to us, is the period which is least recorded and understood.

Summary

Understanding the characteristics and physiography of a region is essential to any landscape investigation. In this way potential opportunities and limitations to the survey process can be identified. In the case of the uplands, areas of deep peat such as blanket bog, eroding peat and cut-away bog can be observed and monitored for the exposure of previously unrecorded features. Soils quality can also indicate areas where agricultural activities may have been carried out or stone sourced for quarrying

or building. Conversely, plantations of mature conifer forestry can be almost discounted for field survey as access will be difficult and most sites and features removed as part of the planting process. Areas of scrub and heath are both of potential and barriers to access depending on the growth stage of the vegetation. Each will affect the visibility of a site in a certain way and consequently our approaches to them. Understanding the previous archaeological record (however small) both in the uplands and the foothills is also important for a number of reasons. Firstly, at the most basic level it highlights the periods for which there is evidence for the use of the uplands and its locations. Secondly and leading on from this, the presence of one feature may indicate others in the surrounding area which were not detected at the time of recording especially where the record states vegetation was dense. Thirdly, it helps to establish a social and temporal framework into which newly discovered or more intensively researched sites can be placed. Fourthly, their records also highlight the range of detection methods used in the landscape so far, which for the Blackstairs have relied on historic OS maps, local reports and limited fieldwalking. Understanding how the landscapes characteristics has affected the recording strategy, visibility and interpretation of the known record, better informs the understanding of any newly identified features. These feed directly into the current archaeological survey of the Blackstairs which relies on these same resources and the application of a range of new techniques which are largely unassessed in the Irish uplands. The results and value of these processes are directly affected by the landscapes characteristics and are discussed now in the following chapter.

Chapter 4 Revealing the Hidden Past; Methodological Approaches to Upland Landscapes

Introduction

Methodological approaches were a key component in the assessment of the archaeological potential of the Blackstairs uplands. The choice of technique used by a surveyor and timing can form a significant factor in whether a site is detected or not as aerial photographic surveys of the nearby lowland River Barrow Valley has demonstrated (see Barrett 2002). Survey in the Blackstairs in 2011, as well as the reporting of a number of features to the ASI in the 1980's which could not be identified by the archaeologists because of vegetation cover, suggested the same was also true for the uplands. As a consequence, large blank patches in archaeological distribution maps indicative of upland areas as demonstrated in Chapter 1 were more likely a reflection of modern research patterns rather than a product of survival or use in the past. Small scale or site specific investigations elsewhere (see Chapter 1), also support this; however a largescale reconnaissance survey targeting an entire mountain range had not yet been done in Ireland prior to the present survey, reflections on which are presented in this chapter.

Of major concern in the current investigation was speed and time given the large project area. How could the archaeological remains be assessed rapidly & cost effectively without the need for intensive fieldwalking for fruitless results? How are features in dense vegetation identified without having to wait for episodes of controlled or accidental burning or seasonal windows in bracken growth? While burning is a useful and proven means of recording previously unknown features (Ó Murchú 2011; 2012) it is not ideal or systematic. Modern methodological developments on the other hand offer a solution to counter these issues, more specifically remote sensing techniques; the remote viewing of a site or landscape through photographs, videos or computed visualisations (Due Trier et al. 2009, 1; Schott 2007, 2). This project made full use of open-source satellite imagery as part of the initial reconnaissance phase for the Blackstairs. The earliest indications of its value as a resource was the visibility or lack thereof of sites already mapped on the SMR. Follow up ground visitation of newly identified sites added to this assessment but also highlighted a number of limitations, many of which were concerned with resolution. In some cases historic open-source imagery was the only means of

accessing and viewing a site as vegetation formed a barrier or mask at the time of field survey. Local communities, hillwalkers, systematic fieldwalking and historic mapping also contributed to the identification, recording and interpretative processes. Satellite imagery proved in some cases to be crucial for identification during the ground based assessments as some sites could not be discerned clearly on the ground because of damage, vegetation growth or preservation. Use of low-level kite aerial photography helped to counter some of these issues but was itself impeded upon by atmospheric and technological conditions.

While the above techniques are of excellent value they are also restricted by the visual limitations of the human eye. As humans, we can only see within a defined range of the electromagnetic spectrum. If we could see the world in other ranges such as infrared, thermal or microwave our understanding of past landscapes would be very different. By not seeing in these ranges of the electromagnetic spectrum, countless archaeological sites or features go unnoticed (Verhoeven & Doneus 2011, 267). As technology has advanced, new methods of visualising the landscape have become available. Remote sensing techniques now offer the archaeologist a window through which to view the landscape which was almost unimagined a decade ago, and further possibilities are expanding rapidly. Multispectral imagery allows us to see vegetational stress in visual spectrums outside the limits of the human eye giving an edge over traditional aerial photography (which itself is an advancement and luxury unimagined by early archaeologists (Barber 2011, 8)). Airborne laser scanning (ALS) or LiDAR (Light Detection and Ranging) provides us with a detailed topographical image of the landscape highlighting subtle and low level changes often indicative of plough levelled, buried or disturbed features. These technologies have excellent and proven value in lowland studies; however, their use in upland research has been limited until now. Unfortunately such datasets were unavailable for the Blackstairs Mountains. Instead a special case study investigation was carried out on a select number of known archaeological sites in the Dublin Mountains, where lidar and multispectral satellite imagery is available. The character of this mountain range is very similar to the Blackstairs in terms of geology, soils, vegetation and land use history. Understanding their value and limitations on known features in similar physiographic conditions contributes to our future approaches, should similar data become available in the Blackstairs and other Irish uplands.

Background to the Blackstairs Sources

Open-source satellite imagery, kite aerial photography, fieldwalking, historic mapping and local reporting were the main sources used in the survey of the Blackstairs range. Open-source imagery could be further sub-divided into that which was licenced and provided through *Google Earth* or *Bing Aerial-View*. Each source is discussed separately below before the results of its application are discussed.

Open-Source Imagery

Open-source imagery such as Bing and Google provide mapping of the world's surface which does not rely on subjective hand-drawn or digitised cartography. Both Bing and Google imagery was used as part of the current project. OSI orthophotography from the years 1995, 2000 and 2005 was also assessed at the outset, however; it was found that the resolution was poor in comparison to the imagery licenced by Bing and Google. Huge swathes of bracken visible in the OSI orthophotography also suggests that this imagery was gathered in the height of summer when vegetation was at its densest, which would mask many archaeological features. In comparison, the resolution of the former two sources differed greatly. Bing imagery, licenced from Geo-Eye (now Digital Globe), was of a higher resolution than the Google imagery provided by Digital Globe for the Blackstairs at the time of survey (2012-2015). Similarly the latest Google Imagery is older (April 2009), than the Bing Imagery captured in November 2011[2]. Parts of the north-eastern end of the Blackstairs were not covered by Google 2009 imagery and instead were captured in April 2011 (poor resolution 2005 imagery available until then).

Open-source imagery has seen a dramatic rise in popularity over the last number of years. Its ease of use, coupled with no charges and the 'magic' of seeing ones locality and the wider landscape from above has meant that a multitude of archaeological features have been identified using this method. Often this has been done by the public or archaeologists using it casually and not as a systematic methodological approach (e.g. discovery of; an embanked enclosure (ME037-043) by Professor Aidan O'Sullivan near Tara, County Meath using Google Earth (Monaghan 2012, 7); a series of features in the west Wicklow uplands using Google Earth (Darby 2007)). It has also been proven as a valuable systematic prospection technique

[2] http://mvexel.dev.openstreetmap.org/bing/

internationally (e.g. Kaimaris et al. 2011; Smagur & Hanus 2012; Yu-Min Lin et al. 2014). Resolution remains a constant issue for these sources as will be demonstrated both in the recording and interpretative process. To counter this, techniques which provide closer contact to the features under investigation or imagery of better resolution are needed. Such remote sensing datasets were unavailable for the Blackstairs as previously mentioned, and so low-level aerial photography was used instead.

Kite Aerial Photography

Kite aerial photography (KAP), which first appeared in the late 1800's (Aber et al. 2010, 5), is a method of capturing low-level aerial images of the landscape. The system was further developed during the First World War as a means of capturing images of enemy lines and the accuracy of artillery fire for which the French army had a dedicated unit. Most significantly it offered a cost-effective means of complementing aerial photographs captured from planes many of which were increasingly subjected to improving anti-aircraft weapons (Finnegan 2006, 11). Developments continued throughout the twentieth century especially in landscape survey and it remained closely linked to the military. Public popularity grew in the late twentieth/early twenty-first century as equipment costs reduced combined with computer and technological advancements (Aber et al. 2010, 8; Wells & Wells 2009, 50).

The application of KAP in archaeology has been patchy at best despite its potential as a cost-effective means of photographing landscapes, specific sites and for monitoring excavations. The first aerial images of archaeological sites captured using kites were by Sir Henry Wellcome on his excavations at Segadi, Jabel Moya, Sudan in 1913 but it would be another 50 years before the technique was used again for such purposes (Ridd & Hipple 2006, 447). Multiple archaeological projects in the last few decades have made use of kite aerial photography successfully (Verhoeven 2009, 237). One of the most immediate examples of this is the ever growing number of members of the Scottish National Aerial Photography Scheme (SNAPS) (see www.armadale.org.uk/groupmembers.htm) which boasts a large international network. While it does have its disadvantages (e.g. weather reliant, tree cover, power cables), there is little cost and time involved in getting the camera airborne so it can be used almost anywhere and does not suffer the same restraints as commissioning a

plane flight or using a UAV (the use of which can be subject to licence). It can also deliver a higher payload than UAV's which are severely restricted by battery life or cost in the current technological market. Its growing success lead Perkins (2000, 186) to comment that "in the hands of scientists, a toy does serious data gathering".

This project made use of a KAP system in order to better understand the layout of a number of sites across the Blackstairs uplands which were initially identified by other means. While not used for prospection purposes, potential advantages and drawbacks were encountered which offer potential for further experimentation as a reconnaissance tool in the future. Equipment was supplied in full by Dr. John Wells of the West Lothian Archaeological Trust in Scotland as part of SNAPS in memory of Rosie Wells. The initiative provides free KAP kits to children as a priority followed by students and anyone else involved in archaeological research. An initial kit was provided which included a 9ft Mylar Delta Kite, reel, a Pentax WG-10 camera, and rig. This was later added to with a Power Sled Kite which provides greater lift.

SNAPS kits are easily operated owing to their primary target audience. The kite is attached to a reel and allowed to soar to a height of approximately 20m. The size of the kites being used means that there is generally enough air trapped to lift them without having to begin with a run as is required with smaller kites, something which is extremely beneficial in upland landscapes given the slopes involved and the rough ground underfoot. Once the wind strength and direction has been judged and the kite stabilises, the camera is attached. This is done by sitting it into a metal frame which is attached to a rig known as the "Picavet rig/system" (Fig. 4.1). It is composed of a rigid cross which is hung from two points on the kite line about 3ft apart (Fig. 4.2). One piece of thread makes up the whole rig running between hoops on the four points of the cross and the attachment clips for the kite line. These hoops allow the thread to run freely and so the weight of the rig and frame enable the camera to settle into a level position naturally. This, combined with its attachment 20m from the kite, give the camera increased stability. The frame can be adjusted for oblique or vertical shots of the target site. Camera shutters can be operated using a number of methods. The first and simplest (which was used by this project) is a time-lapse system by setting the camera to take a photograph at a set interval (10 seconds on the Pentax camera). Alternatively, kits can be purchased providing a live feed between the

operator and the camera screen. These allow for the operator to release the shutter remotely and to adjust the angle of the shot (Asia Pisz; Michael Pisz; Piotr Wroniecki, pers. comm.).

Fieldwalking

As well as ground assessments of sites identified in open-source imagery or local reporting, systematic fieldwalking was also carried out. This was done based on similar approaches by the Royal Commission in Wales whereby lines were walked at 30m intervals across the landscape (RCAHMW 2003, 7). Any feature that was spotted was recorded using GPS. In denser vegetation the distances between these lines was shortened to reduce the loss of smaller features. Measurements were also taken as well as an assessment of the surrounding area all of which was recorded on a survey sheet for consistency (Appendix 1). Targeted fieldwalking areas were selected based on burning incidents as in the 2011 project, of which there were only a limited number, as well as site assessments based on favourable ground conditions. In the case of the latter, areas which had few or no identified features from other methodological sources as well as low vegetation and a potential for past activity (e.g. a wide open terrace suitable for agriculture) were targeted. Similarly, areas in which a one feature had been identified (e.g. hut site/ isolated enclosures), were also fieldwalked in order to detect any small features which may not have been identified in the open-source imagery because of resolution.

Other Sources

Public lectures and walking tours were conducted at the projects outset targeted at local communities and hillwalkers. From this an already established network was widened which could be called upon to investigate land use practices in the recent past as well as a local understanding of the natural and mythological landscape both of which can contribute to the identification of archaeological features. Hillwalkers were also encouraged to report features to the project. Citizen science and the harnessing of local knowledge and voluntary recording methods is found across a wide variety of disciplines including ecologists (e.g. the National Biodiversity mapping of Ireland), astrophysics (e.g. the "Sunspotters" project in Trinity College Dublin) and botanists (e.g. The Botanical Society of Britain and Ireland) as well as the archaeological profession. The ASI relied on local knowledge as an important source of information as the records for many features now on the SMR attest to. A more

recent archaeological project which has successfully included local knowledge and community-led surveys is the Hillfort Atlas Project conducted by the University of Oxford (see http://www.arch.ox.ac.uk/hillforts-atlas.html). The present project emulated these approaches, relying on local information as part of the interpretative and recording process. A comprehensive hillwalkers map had been completed and published by Barry and Clive Dalby of EastWest Mapping for the Blackstairs region in 2012 which included an invaluable record of local placenames. This information was also assessed as many placenames indicate former land use.

Historic mapping was also analysed although it was found to be of little value for the uplands except for changes in settlement and field system patterns in the foothills and lower reaches of the uplands. For the majority of the upland area only height and administrative boundary information was recorded on the early OS maps while Griffith's Valuation in the 1850's only added property owners to this. Similarly, the seventeenth-century Down Survey maps recorded a broad brush natural land cover and agricultural use. Despite their poor value as a prospection tool, these sources did contribute to the overall understanding of the landscape when combined with others. In a few cases early OS maps helped in the interpretation of a feature for which there were questions over its authenticity based on ground survey. Their most significant contribution however was in the recording of settlement and dwelling sites for which there is no topographical trace today which has wider implications for our understanding of earlier periods (see Chapter 6).

Results of Blackstairs Survey

A total of 232 possible features were initially identified as a result of the Blackstairs survey. Sources of discovery included open-source imagery, fieldwalking, historic and modern maps, hillwalkers, folklore and placename evidence (Chart 1). The areas of coverage for these differing scales of survey were not uniform across the landscape (Fig. 4.3). Open source imagery and historic maps were used on the entirety of the survey area through GIS. Systematic fieldwalking was limited by dense vegetation cover and forestry as well as steep slopes and areas of scree which were difficult to access (see discussions below). Of these total number of sites initially identified, 32 were later discounted as redundant leaving an end result of 200 (Chart 2). Thirteen of the newly discovered sites were in the foothills surrounding the range leaving a total of 187 new upland sites (Fig. 4.4). Site classifications included hut

sites, clearance cairns, cultivation ridges, enclosures, sheepfolds and turf cutting sites (Chart 3). A number of possible features were identified in open-source imagery but these could not be confirmed owing to access issues. For this reason their location was marked and classed as "Unclassified". The archaeological remains are discussed in Chapter 5 however the methods of discovery are reflected upon here.

Open-source imagery was central in the rapid reconnaissance of the Blackstairs. As outlined above the two main sources used here were Bing and Google Imagery which have different resolution quality and capture dates; most apparent in the method of new feature discovery. An early indicator of this was the visibility of sites already on the SMR. Of the 269 previously identified sites in the Blackstairs townlands (both upland and lowland), 69 are identifiable in Bing and 61 Google Earth (Chart 4). Of these 56 are visible in both sources while 13 are visible in Bing only and 5 in Google only. This gives Bing a success rate of 25.65% and Google 22.68%. When redundant features (18) are discounted, Bing and Google identify 27.49% and 24.3% respectively. Taking the upland only SMR sites excluding "Redundant" features (119), the results are statistically similar. Only 26 are visible in Bing while 20 are visible in Google accounting for 21.85% and 16.81% of the record respectively (Chart 5).

When it came to using Bing Aerial as a prospection method in the Blackstairs, the results were dramatically different to the SMR. Of the 232 new and potential sites (including 32 redundant), 193 were visible in this resource (83%). Of these, 154 were initially identified using this method (Chart 6). In contrast, 130 (56%) were visible on Google Earth and only 10 potential sites (1 later discounted) were identified initially with this resource (Chart 7). Of these, 8 were later identified on the Bing imagery following a reassessment although only with 'the eye of faith'. Conversely, 2 features were identified through Google Earth which were not visible on Bing imagery. The sole reason for this was that the Bing imagery was captured with shadows on steep north facing slopes which shrouded the landscape in these areas in darkness (Fig. 4.5). One advantage of Google imagery over Bing imagery is the time slider tool which provides easy access to historic imagery. In this case it was not valuable as a reconnaissance tool as it was not captured after any major burning incidents where it may be of value in the future or in uplands elsewhere. In one instance, the previously recorded cursus CU01 saw a noticeable difference in the vegetation cover and

consequently, visibility, between the 2009 and 2011 imagery. Unfortunately coverage of the better resolution 2011 Google imagery was not complete which would have been useful for assessing its value on the Dranagh site burnt in 2010. Its results on the cursus however, suggest it may have potential in uplands elsewhere or in the future as new imagery is captured and highlight the value of historic imagery where resolution is good. It is also useful as a means of tracking changes in current land use as well as documenting the destruction of some larger archaeological sites. The best example of this is in the case of the Hilltop Enclosure (HE01) in the townland of Myshall which is visible in every imagery source (Bing, Google and OSI) until 2010 when it was entirely levelled.

Success rate in terms of ground-assessments varied between the sources (Chart 8). Only 1 of the 10 potential sites identified through Google was discounted as a natural and redundant feature during ground assessments. In contrast, 31 potential sites identified in Bing were later discounted as natural or modern. Redundant features mistakenly identified as being of archaeological potential included modern animal tracks, areas of animal poaching or erosion and fortuitous heather growth. Only two features, a cursus monument (CU02) visible in OSI 2005 orthophotography (Kenny 2014) and a possible ringfort (RF31) visible as a cropmark in OSI 1995 orthophotography were identified in the Blackstairs which were not visible on the other open-source imagery sources. Despite the higher successful identification rate of Google (90%) compared to Bing (79.74%) as a reconnaissance source, the Bing Imagery remains superior for this landscape until the Google Imagery is improved.

Fieldwalking identified 50 features (both foothills (4) and upland (46)) and of these 29 could later be identified on Bing Imagery while only 13 could be seen in Google Imagery (Chart 9). In most of these cases however their identification relied on ‘the eye of faith’ making it unlikely that they would have been identified had access been difficult. Only 5 features were initially identified by hillwalkers however, a further 10 features were reported by this same group which had already been identified by the project using other sources. Such a low figure is partly explained by the tendency of this group to use already established tracks and routes. However, where these were deviated from, sites were found and reported which is an indicator of their future potential if their use of the landscape could be harnessed more systematically. Placename evidence and local folklore together identified 8 features

(e.g. transhumance activity and festival sites) none of which would have been found otherwise as they have left no visible topographical trace.

The results of this survey indicate that no recording method should be prioritised but multiple approaches brought together to work in tandem. Good resolution open-source imagery can offer a means of rapid reconnaissance and where it is available should be used in future investigations. However, resolution remains an issue for open-source imagery and while the Bing imagery in the Blackstairs was of good quality, Google imagery was less so. Ground assessments of potential features visible in open-source imagery also highlighted other limitations whereby false-identifications can be made caused by natural vegetation growth or animal activity. Field survey while slow and time-consuming is also one of the best methods of identification. While the numbers here do not reflect this, most of the sites identified in open-source imagery would have been identified if fieldwalking had been the only method used albeit at a slower pace. Areas of dense vegetation also present difficulties surrounding access which can be countered in some cases with good quality historic open-source imagery. This should be continually monitored as burning activity can offer windows of visibility through which sites can be identified. Large swathes remain in the Blackstairs which have not yet been systematically fieldwalked owing to vegetation density as evident from Fig. 4.3 which may be surveyed in the future. Communication with local communities is also important as not only can sites be identified but knowledge of features can also be enhanced, examples of which are explored in Chapter 5. While the above methods were used for prospection purposes, kite aerial photography was used for enhancement or clarification, the merits and drawbacks of which are discussed next.

Kite Aerial Photography

A wide variety of sites were surveyed with kite aerial photography providing a better image and understanding of sites which were difficult to interpret on open-source imagery or could not be seen clearly on the ground due to vegetation cover or scale (Fig. 4.6; 4.7; 4.8). These included the prehistoric cairns on Slievebawn and Mt Leinster, early-modern turf-cutting remains and post-medieval structures under varying visibility conditions.

As previously stated, photographs were taken using a timelapse system. The drawback with this method however, is that the operator cannot see what is being photographed or adjust the shot until the camera has been returned to ground. Many of these will be blurry or include photographs of the rig being released. To counter this, the camera can be set to capture video and stills can then be removed although the quality of such images is poorer than those captured as photographs. A further drawback is that the lightweight nature of the system means that it is more susceptible to wind sway which can cause blurred images. For the most part however, it offers a cheap and cost-effective means of capturing images of a targeted site. More advanced remotely operated systems can be quite costly and require a minimum of two-three operators whereas the time-lapse system can be operated by one person (preferably two). Consequently, the risks and effects of loss are also greater if these systems fall to earth (which can often happen as a result of changes in wind conditions) compared to the cheaper options. Finally a steady wind is a constant requirement for use and on calms days the system cannot be operated. In such cases, balloons could be used in order to achieve the desired imagery.

Drones or UAV's were not used as part of this project for a number of reasons. Firstly, their use is being increasingly restricted by licence and training; most recently by new laws in Ireland as of the 21st December 2015. The area of use is restricted and any system above 1kg requires registration[3]. New legislation from the European Aviation Safety Authority (EASA) is currently under review and standardisation also which could see further limitations on their use[4], something which the use of kites is not inhibited by. Secondly, drones are high-cost systems offering little more than what can be achieved using kites. Thirdly, and most significantly there is still a wide disparity between their payload and cost. Cheaper drones generally have a poor battery life (lasting only a few minutes in some cases) or a poor flight range. An increase in either of these incurs greater cost. While their use is less labour intensive, the only other benefit the use of a drone would provide over the kite system currently used in this project is the ability to capture low-level imagery of the landscape for reconnaissance purposes to be followed up by fieldwalking in the same way as the

[3] https://www.iaa.ie/docs/default-source/misc/drones-questions-and-answers.pdf?sfvrsn=2

[4] https://easa.europa.eu/easa-and-you/key-topics/civil-drones-rpas

open-source imagery was used. This is not possible with a time-lapse shutter given that it is impossible to see what the camera is capturing. In many cases, featureless images will be taken which are impossible to fix in real time unless the area is covered in ground control points and this cannot be done in areas of dense vegetation. Photogrammetry may help to counter this issue and could be explored in the future. Similarly, a remotely operated shutter system as was used in the survey of a coastal area in The Netherlands to construct a DEM and monitor erosion (Smith et al. 2009) and a similar project could be devised for the uplands also using either this method or photogrammetry.

Weather conditions were also a major factor in the use of kites, something which drones would equally be susceptible to. Wind is an obvious factor in kite and drone use, but their use in the uplands is also more limited than the lowlands by increased cloud cover, stronger winds and more exposed conditions. Conversely, if the target site is on the sheltered side of a ridge or mountain, there may be no wind at all. Given the remoteness of many upland sites and the huge distances that need to be covered before many sites can be accessed, it is recommended that kites are used over drones (until battery life increases and cost decreases) as their use is not confined to time or licence and they are less susceptible to loss or damage.

Exploring Other Techniques: A Case Study

The above results were derived from low-cost and freely available resources as well as traditional fieldwalking surveys in the Blackstairs Mountains available to most researchers. New technologies, however, are coming to the fore with proven success in the lowlands but less so in the uplands such as high-resolution multispectral satellite imagery and airborne laser scanning data. Unfortunately these resources are not available in the Blackstairs Mountains and so could not be applied to the study area. This issue is not unique to the Blackstairs as other upland projects which were limited by and forced into using alternative remote sensing methods include a survey of the Bronze Age use of Leskernick Hill in Cornwall (Eve & Crema 2014). Conversely however, they are available in the Dublin Mountains which has a similar landscape character and historic land use to the Blackstairs. For this reason a special case study was carried out on these datasets in order to understand their applicability in landscapes like the Blackstairs as potential reconnaissance tools in future investigations. What follows is a characterisation of the Dublin Mountains followed

by the introduction of the investigative sources. An overview of their historic use elsewhere is provided before a discussion on the results of their application to the Dublin Mountains.

Characterising the Dublin Mountains

Located in south County Dublin, the Dublin Mountains join the Wicklow Mountains (Fig. 4.9) to form the northern limit of the largest area of continuous upland in Ireland. Politically, administration of the range is divided between South Dublin County Council (SDCC) and Dun-Laoghaire-Rathdown County Council (DLRCC) and it was the uplands of the latter which formed the target of this case study. Like the Blackstairs Mountains, the Dublin Mountains form part of the Leinster granite massif. While the Blackstairs makes up the terminal end in the south, the sudden rise of the Dublin Mountains from the county Dublin lowlands marks its northern edges (Hepworth Holland 2003, 23; Hoare 1975, 209; Williams & Harper 1999, 23) (Fig. 4.10). Soil mapping was carried out in County Dublin in the 1960's, as part of the National Soils Survey of Ireland. This has not been surveyed or published as comprehensively as those of Carlow and Wexford (Fealy & Green 2009a, 2). A number of authors however have published on targeted areas within the mountain range and Teagasc and the Environmental Protection Agency (EPA) have produced data relevant to the area (Fig. 4.11). The dominant soil type in the immediate foothills to the north, east and west of the mountain range are acidic brown podzols (Fealy and Green 2009a, 93) just as in the Blackstairs. The slopes surrounding the Dublin Mountains are almost entirely made up of peaty podzols (Fealy and Green 2009b, 12) again a similar occurrence as in the Blackstairs. These have a high iron content; and high rainfall combined with leaching has led to the development of a thick iron pan which has contributed to waterlogging (Rice 2006, 9; Ó Dubháin 1978, 1). Like the Slievedurda soils on the Blackstairs, these soils are known for their poor fertility and drainage. Blanket peat now dominates the upper peaks and ridges today (Fealy and Green 2009b, 12). Turf cutting was a common practice as occurred in the Blackstairs until relatively recently meaning large areas of cut-away bog exist. The construction of the military road through the mountain range in 1802 in the wake of the 1798 rebellion helped to facilitate this activity (Pochin-Mould 1976, 91). Turf cutting increased during the Second World War as alternative fuel sources were required especially in Dublin where the large population led to increased demand.

According to the Corine vegetation report, the Dublin Mountains area is almost entirely dominated by upland blanket peat habitat (Fig. 4.12). Flanking this are areas of pasture and forestry. Like the Blackstairs however, this is a broad brush definition and pockets of other habitats form a mosaic pattern across the landscape. These include dry grassland, heath and areas of dense bracken. Both wet and dry heaths are found across the range, although the latter is most dominant, occurring on the shallow peaty soils on steep slopes with good drainage and shelter such as the summit of Two Rock and Three Rock Mountain. Examples of Wet Heath can be found on the southern slopes of Kilmashogue Mountain where unsuccessful attempts were made in the eighteenth and nineteenth century to enclose this area (SDCC 2010, 28). Areas of Blanket Bog habitat do occur as the broad brush CORINE map suggests although these are mainly found above the 350m contour line, the most famous site being in the area known as The Featherbeds (DOEHLG 2006, 15; Fossitt 2000, 42; SDCC 2010, 28). Upland grazing is not as common in the Dublin Mountains as it is in the Blackstairs meaning huge swaths of commonage have become heavily overgrown with the dense foliage of the heather species which characterise these habitats. Episodes of burning do occur periodically which affects the density, composition and sometimes the definition of these habitats. The Dublin Mountains also support forestry habitats, both man-made plantations and semi-natural woodland. Coillte Teoranta have enclosed and planted large swathes of forestry in this landscape including the northern slopes of Two Rock and Three Rock Mountain, Tibradden Mountain and Cruagh (Fossitt 2000, 54).

The archaeology of the Dublin Mountains has been relatively well researched although this has been the result of numerous projects on particular periods and sites rather than holistic reconnaissance surveys (e.g. Ball 1905; Carey 2009; Cooney 1991; Cooney 2000(a), 138-145; Cotter 2004; Doyle et al. 2005; Farrington 1933; Healy 2005; Healy 2006; Joyce 1912; Kilbride-Jones 1954; Ní Lionáin & Davis 2014; Nolan 1992; Ó hEochaidhe 1957; Rynne & Ó hÉalaidhe 1965; Rice 2006; Rice 2015; Stout & Stout 1992). Much of this research was recently collated for the first time as part of an accessibility study (Ní Lionáin & Davis 2014). For the purposes of this project, ten test sites were targeted (Fig. 4.13). These were selected on the basis that they are under similar physiographic conditions as the sites in the Blackstairs (Table 1).

Sources of Investigation in the Dublin Mountains

As this case study was focused solely on investigating the visibility of known test sites in two specific remote sensing sources, fieldwalking, local interviews and historical documentary as reconnaissance and interpretative techniques were eliminated. Conversely, open-source imagery was used on the test sites as in the Blackstairs as a comparative to the main investigation. Most significantly in this regard, open-source satellite imagery captured in November 2014 was available through Google for this region providing a snapshot of the landscape as it was during the survey rather than in the years before as is the case for the Blackstairs. This is also supported by a large amount of historic imagery accessible through the Google Earth application. The quality of some of this imagery is as good as the Bing Imagery (the most successful resource in the Blackstairs) and in some cases is even sharper.

Airborne laser scanning or LiDAR was the first of the additional techniques explored. The OSI, NRA and OPW are at the forefront of lidar data collection in Ireland as part of mapping, road corridor assessments and floodplain surveys respectively. Uplands are of little concern to the latter two and so the availability of lidar for these areas is limited. This issue is not unique to Ireland but is found in other parts of Europe also where areas that are not considered for development are left unscanned (Risbol 2013, 57). DLRCC commissioned a 1m resolution lidar survey of their administrative county in order to make available a detailed topographical map for planning purposes (Malachy Hevehan, pers. comm.). The survey not only included the lowland portion which was of primary interest to planners but also the upland section covering a total area of approximately 160 km². This was provided to the project free of charge. Visualisation, processing and interpretation were done using the Global Mapper software, ARCGIS 10.1 and a Raster Visualisation Toolbox (RVT) made available by the Archaeolandscapes Europe network. The latter provides a means by which lidar data can be processed using various algorithms for visualisation by investigators and is particularly targeted at less experienced users. The tools provided are hillshading, hillshading from multiple directions, PCA of hillshading, slope gradient analysis, simple local relief modelling, sky-view factor, anisotropic sky-view factor and positive and negative openness (see Kokalj et al. 2011; Kokalj et al. 2013 & Appendix 2 for technical discussion). While the toolbox eliminates much of the manual processing required in GIS, it still requires the user to

manipulate and establish the parameters. Some issues concerning the accuracy of the Local Relief Models produced by the toolbox were raised at the most recent Aerial Archaeology Research Group (AARG) conference 2015 (Dr Steve Davis, pers. comm.) and consequently these were produced using ArcGIS instead (see Davis 2012, 15 for method).

Satellite imagery, beyond that provided by Bing and Google, was the second additional resource investigated. The major imagery types available are panchromatic and multispectral imagery. Panchromatic satellite imagery is captured in black-and-white in the human visual spectrum and is sensitive to all visible light. It is of varied resolution however this is generally greater than multispectral imagery, which it can be merged with to provide full coloured imagery. Its sub-meter resolution can make it an excellent resource for a rapid assessment of the landscape identifying both cropmarks and upstanding remains (Fowler 2002, 61). Multispectral imagery has proven more useful in archaeological surveys. This imagery captures not only the human visual spectrum but also light reflected from near infrared (NIR) or ultraviolet bands on either side of the visual spectrum. Crucially this highlights stress in crops and pasture land long before it is visible in the human visual spectrum reflecting the light from chlorophyll (Lasaponara & Masini 2007, 217). Humans see light in three bands; red, green and blue. Satellite imagery will capture light in these bands but also in other bands and the number and type vary from company to company (e.g. Quickbird, SPOT, ASTER, Worldview, Landsat, Digital Globe, Google Earth). Bing and Google are provided only in the three visible bands but DigitalGlobe satellites also capture in NIR meaning some imagery has four bands (five including panchromatic) while others such as Landsat satellites capture eight bands. When viewing multispectral satellite imagery the user specifies three bands at once and the various blends either enhance or inhibit the visibility of a site (Lasaponara & Masini 2007, 43; 91). Processing can also be carried out on satellite imagery to assess the density and health of vegetation cover over a given area in a process known as Normalised Difference Vegetation Index (NDVI). Archaeological features can thus be identified in some cases through the comparative stress in the covering vegetation to the plants in the surrounding area. While working on a similar basis to cropmarks in aerial photography, the process of NDVI makes use of the NIR band to identify plant stress outside the human visual spectrum giving it an edge over the former, more

traditional method. Crucially, however, its success relies on the resolution of the captured imagery from which it derives (Bennett et al. 2012b, 210; Lasaponara & Masini 2006, 325). In an upland context, NDVI also offers the potential for identifying areas with higher or lower potential for fieldwalking surveys based on the density of the vegetation cover. The successful application of this approach would require the date of imagery acquisition to be as recent as possible given how quickly these landscapes can change. This was not the case for this study however as the imagery provided dates from 2003 (see below).

Given its free availability, Landsat is one of the most commonly used sources of satellite imagery (Fowler 2002, 55; Parcak 2009, 58); however, an analysis of coverage showed that it was too cloudy for use over the Dublin Mountains as well as the Blackstairs Mountains (Fig. 4.14) or was of too poor resolution (Fig. 4.15). The Digital Globe Foundation offers an imagery data grant of up to 500km² to students. This was sought and received as part of the project for an area over the Dublin Mountains to be used as a testing ground in the same way as LiDAR. Any imagery available for the Blackstairs region was covered in cloud (Devon Libby (GeoEye), pers. comm.) and so was of no use for prospection purposes. The received imagery, which was captured by the IKONOS satellite, was then applied to the ten test sites for analysis.

Launched in September 1999, IKONOS was the first commercial satellite to collect panchromatic (Black and White) and multispectral imagery (colour). It orbits 680km above the earth's surface giving it a revisit time of once every three days collecting up to 240,000km² of imagery a day. The resolution of the imagery is considerably different with a ground resolution of 0.82m in the panchromatic and 3.2m in the multispectral although both can be merged to provide 0.82m resolution colour imagery[5]. A short description of the imagery relating to the Dublin Mountains can be seen in Table 2. All processing in this case was done through ArcGIS 10.1.

Overview of Airborne Laser Scanning in Archaeological Research

Airborne Laser Scanning (ALS) or LiDAR (Light Detection and Ranging), as it is commonly known, is a technique which has seen an explosion in popularity, use

[5] http://global.digitalglobe.com/sites/default/files/DG_IKONOS_DS.pdf

and awareness in the last decade within archaeological research (e.g. Bugarski & Ivanisevic 2015; Hermann et. al 2014; McCoy et al. 2011; Oltean & Hanson 2014; Oltean & Hanson 2015; Riley & Tiffany 2014). It has even been described as one of the most important developments available to the archaeological profession for the collection and interpretation of data and information as to achieve the same metre and sub-metre resolution would require hours of laborious ground survey or photogrammetry (Bewley et al. 2005, 637; Corns et al. 2008, 38; Opitz & Cowley 2013, 1). The ability to see features invisible to the naked eye, such as subtle humps and hollows in the topography or beneath forestry cover provides a resource of immense potential. Not only can it transform our understanding of the landscape by revealing previously unidentified features or those only visible under certain circumstances and times of the year, but it also has the potential to enhance our understanding of known landscapes and features (Jones 2010, 5). Lidar has been applied to a variety of landscapes including woodland, open pasture and scrubland. It has informed landscape characterisation, conservation, land use management and the mapping of palaeo-features. In some cases it is the only means by which a landscape can be accessed for detailed survey (Opitz & Cowley 2013, 3). Despite its obvious potential and capabilities, lidar is also offset by a number of challenges which can sometimes be overcome by manipulation of the data but in other cases remain as drawbacks of the technique.

Lidar is one of a number of laser scanning technologies (for a more detailed discussion on the various types of 3D laser scanners see Opitz 2013) which measure distance repeatedly and accurately using a known location and a precise measurement of time. This provides a series of coordinates over an object or landscape which is then made into a point cloud and smoothened to create a 3D image of the scanned feature (Davis 2012, 4; Opitz & Cowley 2013, 1). The processed image can then be used as an interpretative, informative, teaching or display tool. Lidar scanners operate on a Time of Flight (TOF) basis whereby thousands of laser light pulses are emitted each second from a scanner attached to the base of an aeroplane which flies over and back across the landscape. These pulses reflect off the surface of the landscape and return to the scanner where the time between emission and return is measured. (Opitz 2013, 13-14). Lasers are generally in the infra-red (IR) bands (Crutchley & Crow 2010, 5). GPS and IMU (Internal Measurement Unit) allows for the plane's pitch,

yaw, roll and position to be known at all times allowing the return of each pulse to be fixed to X, Y and Z coordinates (Fig. 4.16). The return or 'echo' of the pulses will vary depending on what it illuminates. As the flights are carried out at overlapping intervals across the landscape, in much the same way as stereo photography is captured, the features of the landscape below are illuminated multiple times. The full point cloud is known as a Digital Elevation Model (DEM) which can be processed to create a Digital Surface Model (DSM). As this technology is based on light, it cannot penetrate through objects such as structures or tree trunks. Forestry also presents a problem although this can be overcome in some cases. For smooth surfaces such as roadways, a pulse will return relatively evenly with perhaps subtle changes in height. If a pulse hits a surface of vegetation such as a tree, it will split and parts of it will reflect off the canopy (known as the 'First Return'). Other parts may penetrate the tops of the foliage and reflect off various pieces of the tree ('Second; Third; Fourth; etc. Returns'). If the canopy and foliage is not too dense, some or part of the pulses may reach and reflect off the ground ('Final Return') (Fig. 4.17). In these cases vegetation cover can be stripped from the data by removing the first number of returns in the point cloud (which correspond to the vegetation) and only display the final return (which corresponds to the surface); a process known as "filtering". This is known as the Digital Terrain Model (DTM) and is what provides the archaeologist with the ability to see beneath vegetation giving lidar an advantage over traditional aerial photography and open-source imagery such as above (Fig. 4.18). Unfortunately however, it will be coarser than data captured from open agricultural land (Jones 2010, 18).

One of the drawbacks of lidar is that it is a surface based technique. This means that many buried features such as those only visible as cropmarks which do not have a topographical trace will not be highlighted (Challis et al. 2008, 1061). The processing of the captured data can also introduce flaws whereby ghost features can be introduced either in the data or by natural occurrences (much the same way as aerial photographs). Similarly, filtering the point cloud to remove vegetation can also remove low-lying archaeological features. Even at the capturing phase, the choice of resolution can mean that smaller features do not appear in the data (Opitz & Cowley 2013, 6).

Although it has proven values in a lowland landscapes (e.g. Brady et al. 2013; Corcaran 2014; Corns & Shaw 2013; Curran 2012; Davis 2012; Davis et al 2013; Jones 2010, 44), there has been less of an uptake on lidar as a methodological approach in upland landscapes despite its potential as a rapid reconnaissance tool in these difficult to access landscapes (Davis 2012, 5). This is partly due to a lack of data as many flights will be commissioned for development purposes, something the uplands are generally not considered for. Similarly if the lidar data has been gathered in the spring and summer, the vegetation types found in these areas (gorse, bracken, heather) will prove too dense and mask features just as they do in ground surveys (Jones 2010, 18).

Upland archaeological investigations have been carried out using lidar surveys in the North Pennines and Snowdonia in Britain as well as the Dublin Mountains and Antrim Plateau in Ireland. However, these differed to the current project in their approaches, resolution and techniques employed, or were carried out on drastically different landscapes. For example the North Pennines survey took place on limestone, sandstone and shale bedrocks overlain with moorland and farmland (Oakey, Radford & Knight 2012, 1). Similarly, the Antrim Plateau consists mainly of open pasture and limited woodland with the summits covered in moor grasses (which are limited in the Blackstairs and Dublin Mountains) and bracken on basalt bedrock (McNeary 2014, 264). In terms of resolution, the North Pennines survey had 0.5m data (Oakey, Radford & Knight 2012, 65) while FLI-MAP lidar was captured for the North Antrim survey; the acquisition and point density of which was controlled by the archaeologists (although natural influences such as wind on the day of capture had some effects on the final results). This gave a much more detailed view of the landscape at 0.5m resolution and was combined with 1m data already available for the entire county (McNeary 2014, 265). The Snowdonia lidar survey was less successful however, relying more so on traditional aerial photography (Kenney 2014, 5).

In terms of visualisation, this has generally been limited to hillshading and one other technique varying from project to project. In the North Pennines, hillshading alone was used although the direction of light was manipulated and the results were generally successful (Oakey, Radford & Knight 2012, 11). Data for the Antrim Plateau was analysed using hill-shading and local relief modelling only, with the latter found to be the most efficient (McNeary 2014, 265). Hillshading was also used in the

recent Dublin Mountains project along with sky-view factor (Ní Lionáin & Davis 2014, 44). The current project, while using the same data as the latter, instead analysed a wider range of visualisation techniques and on a landscape dramatically different to the other projects.

Overview of Multispectral Satellite Imagery in Archaeological Research

It was the launch of the Skylab project in the 1970's which began the public appreciation for non-military satellite imagery of the earth (Aber et al. 2010, 8). Since then, the rise of Google Earth in the early twenty-first century has brought this engagement to levels unseen or unimagined before. Satellites offer much more than a top-down view of the earth; they grant us ways of seeing the landscape in conjunction with computer software which would otherwise be invisible to the naked eye (e.g. multispectral or hyperspectral). Each of these will provide imagery in different resolutions and capture different wavelengths of light including those far outside the human visual spectrum. The ever increasing resolution of this imagery means that for many areas, they are as clear as aerial photographs (Beck et al. 2007, 161). Satellites not only reveal the hidden remains of the past, but can help to place them in and better understand their relationship to the wider landscape. Archaeological surveys in recent decades have used these with varying degrees of success in landscape types which range between deserts (Beck & Philip 2012; Chyla & Ejsmond 2013), agricultural lands (Ciminale et al. 2009; Fowler & Folwer 2005; Parcak 2009, 151-154; Trier et al. 2008) and forested areas (Garrison et al. 2008).

Cropmarks in traditional aerial photography rely on changes in the moisture or fertility of the soil caused by sub-surface archaeological features which put the overlying crop at a differential stress level to the surrounding vegetation. Humans cannot see these changes until they enter the visual spectrum when the crop is ripening. The time window in which these signs of stress are visible can often be very short and may only ever appear once. Some crops such as cereals (e.g. barley, wheat) are particularly sensitive to moisture stress while others such as grasses and potatoes are poor (Wilson 2000, 234). In certain conditions such as wet summers the stress may not be visible at all as the entire crop receives enough moisture throughout (Wilson 2000, 78). Similarly, certain soil types such as clay soils are poor for identifying cropmarks as they retain water better than well drained soils (Wilson 2000, 70). This stress however is always present and since multispectral imagery can

highlight plant stress outside this time window it offers an alternative means of surveying a landscape for buried and plough levelled features (Doneus et al. 2013, 85).

The use of these resources by archaeologists for site detection is a relatively recent one owing to former stricter regulation on satellite imagery availability and resolution. Most imagery until the last decade was of such poor resolution that the field in which a site was located could be identified but not the archaeological remains (Beck et al. 2007, 164; Fowler 2002, 66; Bill Hanson pers. comm.). What it did provide however was a record of changes in vegetation and land use practices which could be used to either monitor a site or to target further investigations or aerial photography (Barlindhaug et al. 2007, 232). The decommissioning of former military satellite imagery and the loosening of restrictions on resolutions available to the public has seen a rise in its use amongst various disciplines, including archaeology (Lambers & Reitmaier 2010, 543; Parcak 2009, 33). Sub-meter resolution of modern imagery combined with their availability in the NIR spectrum also gives them a slight edge over traditional aerial photography (Lambers & Reitmaier 2010, 543).

While most of these surveys have focused on lowland areas, a number have targeted upland landscapes although like lidar, these have differed to the current project in their approach or landscape type. For example prospection survey was carried out on Bronze Age, Iron Age and Turkish monuments in the Altai Mountains of Central Asia, an extremely arid landscape with low levels of vegetation most of which consists of small shrubs and grasses (Blyakharchuk et al. 2007, 522), a landscape quite different to the Blackstairs. Similarly a project in the highlands of the Atacama Region of Northern Chile also deals with extremely arid conditions with almost no vegetation cover (Parcero-Oubiña et al. 2013). Conversely, an ongoing investigation, The Silvretta Alpine Project, centres on the grasslands above the tree-line in the Swiss Alps (Lambers & Reitmaier 2010, 544), again a landscape which not only differs to the Blackstairs in terms of its vegetation cover but also its extreme altitude. Approaches to the Silvretta project also differ in that automatic feature detection algorithms are being utilised and tested (Lambers & Zingman 2012, 789; Zingman et al. forthcoming, 9). In an Irish context, satellite imagery is currently being used as a prospection tool in the Burren uplands of County Clare to map Bronze Age field walls (Christine Grant, pers. comm.). Again this is a landscape dramatically

different to the Blackstairs due to its limestone bedrock and calcareous grassland, hazel scrub and ash and hazel woodland (Kirby 2009, 3).

The Dublin Mountains Survey

The application of the various remote sensing techniques available to the project has been discussed so far in relation to sites elsewhere in Ireland, Europe and the wider world. What follows are the results and a discussion of their assessment as part of this project.

Test Site 1: Pre-Bog Features

Similar to Dranagh Mountain, pre-bog walls and cairns exist on Kilmashogue Mountain, Co. Dublin. First identified through field walking; a photogrammetric survey in the 1980's by Prof. Gabriel Cooney mapped these features which were eroding from peat (Cooney 1985; Cooney 1991) (Fig. 4.19). Currently they are intermittently visible on the ground, depending on the vegetation, and subtle traces of some walls are visible on open-source imagery on the northern side of the mountain top. As the walls have been previously mapped, they offer an excellent case study for the testing of lidar and satellite imagery data as well as assessing and monitoring changes in their survival and extent in the intermittent decades.

An initial survey using open-source imagery was relatively unsuccessful at revealing the Kilmashogue features (Fig. 4.20). Most of the field walls could not be discerned clearly in Bing imagery and those that could have the appearance of pathways across the landscape rather than enclosures. Google imagery had a far greater clarity and detected some enclosures as well.

Analysis suggests that, where the walls have been exposed enough, lidar is a useful tool not only for visualising what is already known but potentially as a reconnaissance tool. For example, it indicated that the walls mapped in the 1980's continued over the top of the mountain to the southern side also (Fig. 4.21 & 4.22). Hillshading was useful for identifying the extent of the walls although this visualisation highlighted one of the major limitations when working with remote sensing data in upland environments. Field walls extended across all sides of this rounded summit top. Azimuths from one side of the mountain meant that the opposite side was shrouded in darkness. For example, an azimuth from 240º only rendered the mountain between 350-120º invisible. Raising the altitude of the beam to cast light

over the top of the mountain created a wash-out effect on the side of the mountain the light was coming from. This meant that the light angle had to be changed numerous times for basic hillshading to visualise everything. It also demonstrated the importance of combining visualisation techniques which can help to counter this issue.

Hillshading from multiple angles and PCA of hillshading were two methods which did this successfully, allowing light to be cast in a number of directions and picking up features on all sides of the mountain. Slope Gradient analysis rendered most of the walls almost invisible. This is likely due to their low nature and the natural slope. Those walls and the cairn on the relatively flat summit and the field walls at the base of the mountain were visible showing that this technique would be useful for such features where they are on terraces or mountain summits but not on steep slopes. One of the best responses was the Simple Local Relief Model, although there was a strong "salt and pepper" effect on the imagery. SVF and ASVF were also of poor value giving a wash-out effect. This did not occur in the valleys surrounding the mountain where the walls are higher suggesting that the change in height between the pre-bog walls and the ground was too low to affect the visualisation of the data. Although the open-positive visualisation was also successful in displaying the walls, they were not as clear as in open-negative. Of all the visualisations, the latter was most successful in revealing and highlighting the walls (Fig. 4.23), enhancing the visibility in a far better manner than in any of the hillshade methods.

The application of multispectral and panchromatic satellite imagery to this site had mixed results mainly to do with resolution (Fig. 4.24). Visibility of the walls was extremely poor in the RGB multispectral imagery. Altering the ordering of these bands did nothing to assist the visualisation. The only features visible throughout were the cairn close to the summit which was visible as a grey lump devoid of vegetation in contrast to the brown of the surrounding heather and the large curvilinear wall on the northeast side of the mountain. NIR coverage for the mountain was not complete and a large gap was missing for the south side although it did highlight some of the walls not visible on the RGB imagery. The walls that were visible were the curvilinear ones which contour around the slope rather than running with it. This is probably due to the denser build-up of peat on the upslope side of these walls which would make them more visible. The R, B, NIR band combination was marginally the best for visualising

these features. NIR also highlighted differential vegetation pockets on the mountain summit although these had no effect on the visibility of the walls. Given its sub-meter resolution, the panchromatic imagery was the best for highlighting these features along with some of the lidar visualisations. It highlighted a multitude of walls, not only those already mapped in the 1980's, but also some which were not visible at the time on the southern side of the mountain (the cairn is also clearly visible). A number of circular features caused by erosion or vegetation growth but giving the false impression of hut sites were also visible which would highlight the importance of ground visitations and follow up assessments if the method were to be used for prospection purposes. NDVI production in this case (Fig. 4.25) helped to highlight where this might have been most successful with the densest vegetation on the summit and southern slopes while traces of field walls are slightly discernible on the less vegetated northern slopes.

Test Site 2: Upstanding Summit Cairns

The construction of summit cairns on mountain tops is a long standing tradition dating to at least the Neolithic (Coyne 2006(a), 21) especially in the case of the larger examples. Most of the smaller examples are more likely the marking of summits by hillwalkers. Some of the former may contain the remains of passage tombs (Carrowkeel, Co. Sligo) or overlie cist type burials (e.g. Poulawack, Co. Clare). While a number of these across the country have since been levelled (see Test Site 3) many more still survive, often visible from a great distance, the most famous being Knocknarea, Co. Sligo (Bergh 2002). This is true for two of the Blackstairs cairns today, Brandon Hill & Cullintra. These sites stand out prominently both on the ground and the surrounding landscape.

The Dublin Mountains site chosen was the summit cairn on Tibradden Mountain. Excavated during the 1850's by the Royal Irish Academy it was found to overlie a Bronze Age cist burial (Farrington 1933, 252). The centre of the site was considerably altered at this time with the removal of the cist roof and the construction of a now partly infilled passage. Despite these alterations much of the cairn material remains unchanged and is still composed of granite boulders on granite bedrock surrounded by dry heath vegetation just as in the Blackstairs examples.

Given their prominence, the identification of new examples of such features is relatively slim. Thus, lidar and multispectral imagery would be useful as an enhancer or as a means of revealing subtle traces of other features surrounding the site which might not be visible at ground level. In this case, the cairn occurred on a narrow ridgeline which banked away steeply to the north and south. An initial analysis of the open-source imagery identified the site as well as the exposed chamber at the centre and the nineteenth-century passage with great clarity. This turned out to be the best tool for the latter two features although other tools were better for detecting the cairn as vegetation on and surrounding the site rendered its outline hard to detect in open-source imagery. Google Imagery was slightly crisper than Bing Imagery although both displayed the same amount of information (Fig. 4.26).

Lidar data, as at all test sites, had mixed results (Fig. 4.27 & Fig. 4.28). Simple hillshading revealed the site from most directions although given the surrounding vegetation it was best illuminated from lower azimuths. Hillshading also revealed that the site was located on a relatively wide terrace which is not clear on the ground or in open-source imagery due to the density of the vegetation. Hillshading from multiple-directions revealed much the same information as single-directional hillshading although it also gave a better idea of the slope and its aspect. PCA also detected the site although its individual features were least clear using this tool in comparison to the above. The mound was also clearly visible in Slope Gradient analysis although the passage was not revealed. LRM was useful for highlighting the site although the terrace was not immediately obvious. Positive and negative openness were especially useful for identifying the cavity in the centre of this mound and the passage. In contrast the terrace on which the site is placed, which is clear in all the other visualisations, was not visible in either of these tools. SVF and especially ASVF (Fig. 4.29) from which openness analysis is derived were probably the best for this site revealing all the small features as well as the larger terrace on which it sits. This may not have been the case however if such a feature occurred on the lower slopes as from here it had a 360˚ view of the sky which is what effects this visualisation.

The application of panchromatic satellite imagery to this site showed that there was some value in using it as a survey technique (Fig. 4.30). The site was clearly visible as a large circular feature with a hollow centre although its interpretation may not have been entirely obvious without prior knowledge. The extent of the feature is

visible as is the damage caused by modern trackways running to its north along the ridgeline. Using the hillshading effect gave a slight edge to its visibility although there was no major difference. The application of multispectral imagery, however, was not as successful. RGB resolution was just too poor and the site appeared as a grey patch in the imagery caused by the stone in its make-up. The application of the NIR band in place of one of the RGB bands showed that the site was a raised circular feature although the hollow centre was not visible. Most significantly, the site would not have been obvious as major Bronze Age burial monument if this had been the sole means of interpreting the landscape especially given that there are other areas of bare bedrock in the surrounding area which it could have been confused with.

Test Site 3: Levelled Summit Cairns

The large summit cairns of Slievebawn and Mount Leinster today consist of a small later cairn overlying the base of a much larger, earlier, and possibly prehistoric cairn which has been robbed of its material for use elsewhere given the absence of scattered stone in the vicinity of these sites. Their size and location suggest that these sites contain passage tombs, traces of which are not visible on the ground today.

A similar example occurs in the Dublin Mountains on the summit of Two Rock Mountain. Just as in the Mount Leinster and Slievebawn examples, an earlier cairn was levelled, leaving only the base behind which was later topped with a smaller mound of stones. Given that much of the base of the site is visible today it was possible that lidar or satellite imagery could highlight the subtle traces of an extant passage tomb thus adding to the value of such investigations in the Blackstairs and elsewhere. Just as is the case of upstanding summit cairns (see Test Site 2) however, the identification of previously unknown levelled summit cairns is relatively slim. Instead lidar and satellite imagery can help to enhance knowledge not easily identifiable on the ground or detect unknown features in the wider vicinity. The small cairn at this site was visible on both the Bing and Google Imagery although the outline of the earlier cairn was difficult to identify (Fig. 4.31). This was due to the chaotic nature of the erosion caused by footfall surrounding the site. A recent wooden walkway (visible in the 2014 Google Imagery) will go in some way to alleviating this issue and vegetation may take hold again surrounding the site.

In this case, the application of lidar (Fig. 4.32 & Fig. 4.33) and satellite imagery was extremely successful. Single-directional hillshading was of excellent value, revealing the extent of the site from almost every azimuth although as was the case at other sites, raising the altitude angle created a wash-out effect due to its relatively flat summit location. Hillshading also revealed what may be the remains of a passage in the cairn on its south-eastern side. There is some trace of this in open-source imagery although it is difficult to deduce whether it is original to the feature or if it is the product of modern hillwalking as one of the paths almost aligns with it. No such scars are evident coming from the other two paths and so this would suggest that it is indeed the remains of a passage.

Multi-directional hillshading revealed little more than was clear from the single-direction and the possible passage was clearly visible again. PCA of hillshading had similar results, clearly outlining the extent of the site and possible passage while masking the chaotic remains of the surrounding footfall erosion. This did highlight the issue however, of how some archaeological remains may be drowned out by resolution as this damage has caused the bedrock to become exposed on the surface in contrast to the surrounding vegetation covered mountain. Slope Gradient analysis was useful for highlighting the feature but the more subtle passage was rendered almost invisible. LRM was not only useful for highlighting all the features visible above but also some of the damage around the site which was not clear in the other visualisations. As well as their derivations (positive and negative-openness), SVF and ASVF (Fig. 4.34) were also particularly useful for giving a texture to the landscape and distinguishing between the heather and the pathway. The pitting visible in the former however shows that this method would drown out any small features. Similarly the smaller and later cairn topping the large cairn was not visible in any visualisation highlighting the importance of resolution.

Panchromatic imagery was excellent at identifying the extent of this site in contrast to the open-source satellite imagery although the lidar visualisations were still far superior (Fig. 4.35). Its sub-meter resolution, however, highlighted the existence of the cairn built on top of the earlier tomb although its interpretation may not have been entirely obvious without prior knowledge. Despite its sharper resolution, the traces of the possible passage highlighted in the satellite imagery were not completely clear. A faint line is visible with the eye of faith although this would probably not

have been recognised had the panchromatic imagery been viewed or interpreted without the lidar imagery. Alternatively it may have been interpreted as the remains of erosion caused by footfall over the cairn platform given the near-alignment between the passage and the modern. Panchromatic imagery in this case was best visualised without the hillshade effect as this gave the imagery a slightly washed-out appearance.

Despite the value of the panchromatic imagery, the multispectral imagery as in all cases was too poor in resolution to be used as an interpretative aid. Given its large size and the lack of shrubbery on top, the cairn was visible as a grey lump in contrast to the brown heather surrounding it. Its interpretation without prior knowledge would not have been immediately clear and if used as the only means of understanding this landscape, it could have been interpreted as an area of erosion on the summit caused by the convergence of three mountain paths. The application of the NIR band showed that this was a raised circular feature in contrast to the lowered pathways leading to it and in this case it would have been recognised as being of archaeological significance although there is absolutely no trace of the possible passage. As at most sites the R, B, NIR band combination worked best at highlighting this feature. The presence of dense vegetation cover both surrounding and on top of the cairn made it unidentifiable in NDVI although with greater resolution the differential density between both areas might have been more easily discerned.

Test Site 4: Post-Medieval Houses

Surviving nineteenth-century houses in the uplands are unroofed for the most part and in various states of collapse ranging from complete walls and pitched gables, to piles of rubble, to bare overgrown footings. These are largely unrepresented in the archaeological record despite their importance to the interpretation of a range of social and political issues in the nineteenth century (see Chapter 6). Many are visible in the open-source imagery however in some cases, vegetation or shadows in the imagery make them difficult to discern. In some upland areas such as those in the West of Ireland (e.g. see Slieve Callan, Co. Clare in Bing & Google), the imagery is of a poor resolution and so the remains of these structures cannot be identified. The availability of good quality open source-imagery, lidar and multispectral imagery for these sites in the Dublin Mountains offered the possibility to test their detection in a variety of sources.

The test site in this case consists of two low-level upstanding structures on the slopes of Kilmashogue within a late eighteenth-century regular, improved field system now under dense heather vegetation (Test Site 6). Multiple comparative sites in the Blackstairs include those in the townlands of Knockymulgurry, Raheenleigh and Slievegar. Both are marked as roofed structures on the first edition OS map however they are recorded as ruins on the 25" map from the early twentieth century. They sit on the east and west side of a small enclosure within the surrounding field system with a relict pathway offering access. Heather has now built up against the sides of these structures. It is possible that these were the houses of estate labourers rather than tenant famers (as in the Blackstairs) given their positioning on a managed estate. Both of the houses are clearly visible in the open-source imagery with the Google 2014 imagery providing a sharper image although prior to this, Bing provided a better resource (Fig. 4.36).

Lidar had mixed results on this site (Fig. 4.37 & 4.38). Given that they are rectangular and raised, they are visible in most single-directional hillshading azimuths where they are not in the shadow of the mountain. While some of the surrounding field walls vanished when the landscape was illuminated at angles parallel to them, this did not affect the houses although their clarity did wane at certain azimuths. Multi-directional hillshading brought the sites out more prominently although they did not add much else to the archaeological understanding apart from a better sense of the surrounding topography. PCA of hillshading brought the houses out slightly more prominently while also providing a greater sense of the surrounding topography. Slope Gradient analysis impaired slightly on the visualisation of these features in comparison to the others tools. Their northern side was most prominent where they were flanked by a deep pathway which would create a larger height difference than on their southern, eastern and western sides where they were more similar in height with the surrounding heather. The occurrence of such a pathway does not exist at most of the Blackstairs house sites, especially those which were built by cottiers which, judging by the mapping, were accessed across open mountain or fields. The surrounding topography is quite clear using Slope Gradient Analysis however the sites themselves are better visualised in other tools. Simple LRM production was extremely successful (Fig. 4.39) in highlighting these features as it has been for most of the other sites. The undulations in the surrounding topography were not obvious; however, the

site itself was highlighted prominently. SVF and ASVF were also useful for visualising the site however some of the other techniques as previously discussed, were far more beneficial. The textured nature of the surrounding heather vegetation, giving the illusion of a pitted landscape, was immediately obvious again. ASVF was far better than SVF at highlighting the features but for reconnaissance, these visualisations would probably fall short. Open-negative and positiveness were a little poorer for visualising these sites. The pitting caused by the surrounding heather vegetation almost masked the cavity caused by the missing roofs which were more clearly visible in other visualisations. Without prior knowledge, this site could easily have been passed over using this technique as a reconnaissance tool. The houses rendered in black (open-negative) were slightly more prominent than when rendered in white (open-positive) giving the former a slight edge over the latter.

Multispectral imagery alone was poor at highlighting these structures (Fig. 4.40). While they were visible in RGB, it was only as grey indiscernible patches amongst a large expanse of brown heather and linear walls. Their interpretation without prior knowledge would have been impossible and they could have easily been mistaken for a rock outcrop or an area of erosion. The application of panchromatic imagery helped to rectify this and highlighted the sites and their interpretation very clearly although a number of lidar visualisations were sharper. When the NIR band was used, the sites were even more visible than in the ordinary RGB but only with the panchromatic layer underneath. The NIR band also highlighted the differential growth immediately surrounding the site. Again the panchromatic imagery offered an excellent reconnaissance tool however the multispectral imagery was more useful as an indicator of vegetation growth.

Test Site 5: Levelled Post-Medieval Houses

Analysis of the first edition OS maps for the Blackstairs indicates that the uplands were once far more extensively settled than the surviving few occupied and ruinous remains on the ground suggest today (see Chapter 6). Many of the mapped sites have been levelled beyond trace and today lie overgrown by upland vegetation or within managed pasture lands, the stones likely used in the surrounding field walls. Examples are found in Bantry Commons, Ballycrystal, Slievegar and Rathanna. A similar occurrence is found in the Dublin Mountains in the townland of Ticknock. Lidar as previously mentioned has been used successfully in the lowlands to identify

features with topographical traces too subtle to be identified in fieldwalking. With habitats in this one townland ranging between acidic grassland and dry and wet heaths, it offered a comparative test site to the multiple examples in the Blackstairs.

Single-directional hillshading was used on all the houses mapped on the first edition OS maps in the Ticknock townland with no above ground traces today. As these sites were levelled sometime in the nineteenth century, the chances of identifying any remaining features without excavation were slim. There was a possibility that some topographical or vegetational trace was left by the base of some structures which lidar or multispectral imagery could detect. An initial survey using open-source imagery revealed no such evidence (Fig. 4.41) and the lidar survey was equally unsuccessful. Hillshading at Altitude 40, Azimuth 100 (Fig. 4.42) suggested that one house was constructed on a small and slight terrace which might have been a factor in its choice of location which is not clearly evident from open-source imagery or in other lidar visualisations. For this reason it was useful as an informative tool only under very specific parameters and not as a reconnaissance tool in any way. While plough-levelling has likely removed the remains of many in grassland, modern forestry plantations impair visibility of others (see Test Site 7). Similarly, those on rough ground may be masked by vegetation or resolution. This may have consequences for our future understanding of upland landscapes elsewhere if house features that we know existed from mapping can be entirely erased from the landscape; an issue which is further explored in the Blackstairs in Chapter 6.

Satellite imagery was equally poor in highlighting these sites and given that the technique cannot identify minor topographical changes, the aforementioned slight platform on which one house may have been built was indiscernible. Replacing an RGB band with an NIR band also did nothing to indicate the presence of a former settlement (Fig. 4.43). The current pasture over this same site which has probably been subjected to a number of decades of fertilisation may have rendered any crop stress invisible in this vegetation type. The non-identification of this site was not an isolated occurrence as the same was true for all of the other levelled house sites in this valley including those now under conifer forestry.

Test Site 6: Post-Medieval Field Systems

Relict field walls systems litter the lower reaches of the commonage of the Blackstairs. These were once part of the field systems which stretch up from the lowlands today but were likely abandoned as the population shrank. Thus the present limits of actively-used farmland were not the same as in the past. The best examples of this in the Blackstairs occur in the valley of Ballycrystal, east of Mount Leinster, the southern slopes of Knockroe Mountain, and the western flank of Blackstairs Mountain in the area around Knockymulgurry. Most of these walls today are still upstanding although overgrown with heather. As the surrounding vegetation grows denser it can mask these walls almost entirely except for their visibility as large vertical rises in the foliage.

Similar cases also occur in the Dublin Mountains. One of the best examples of this is the regular field wall system which was managed and laid out by the progressive local landowner Calbeck in the late eighteenth century around Kilmashogue (Healy 2005, 85). Much like Ballycrystal, Knockymulgurry and Knockroe, these walls are almost entirely overgrown at present. They are clearly visible on open-source imagery (sharper in Google) (Fig. 4.44) and on the ground although the surrounding vegetation which has played havoc on a number of other lidar visualisations (Fig. 4.45 & 4.46) offered a good test site.

Single-directional hillshading was of varied use, limited not only by slope as at other sites but also by the angle at which these linear features ran at. If a wall ran parallel to the light azimuth it was rendered invisible. Multi-directional hillshading revealed all the walls however it also enhanced the visibility of a number of other lines across these fields, which appear to be modern animal paths. Subtle traces of cultivation ridges are also visible in one field under this visualisation. PCA of hillshading was not only useful for highlighting the walls but was the best visualisation for providing a sense of the topography on which they were built. Nearby, the wide catchment area where the River Glyn is sourced and later flows into a narrow gulley is very clearly visible using this tool. Slope gradient analysis was useful for enhancing those walls on the sides of slopes, however, where they occurred on the more level terrace top, they were almost rendered invisible by the white-out effect caused by lesser changes in slope. The wide river valley visible in PCA is also visible in this visualisation. Local relief modelling was one of the best for highlighting

the walls although not the surrounding topography, an issue encountered across many of the test sites. Despite the height and density of the vegetation, the linear walls are still clearly visible throughout. The possible traces of ridge and furrow are also visible under this visualisation. SVF rendered the walls visible as well as in its derivative positive-openness although they were far clearer in negative-openness. Positive-openness rendered the possible ridge and furrow lines invisible while they were slightly visible in negative-openness. ASVF was probably the best visualisation of all (Fig. 4.47). Not only were the archaeological features clearly visible, but also the details of the topography on which they were built. Even subtle traces of ridge and furrow were visible although these were less clear than in LRM or negative-openness.

Panchromatic and multispectral satellite imagery (Fig. 4.48) was also useful for highlighting these features. Given their size and regular pattern, this was one of the only test sites where RGB multispectral imagery was able to identify the features despite the dense surrounding vegetation albeit blurry and poorer than lidar. Using the NIR band made the walls even clearer with the best being the R, G, NIR combination. The traces of former cultivation visible on some of the lidar visualisations however were not discernible. Given that the resolution was too poor to highlight them on a pasture field (see Test Site 8); it was unlikely that they would be visible in an enclosure covered with dense vegetation. Relict ridge and furrow remains also went undetected in the sub-meter resolution panchromatic imagery despite the clarity of the field system. Given that almost ten years elapsed between the capture of the lidar and satellite imagery, their visibility may also be linked to the maturity of the vegetation cover. An advantage the NIR band had over the other visualisations was that it did highlight differential growth in the heather with greener and less densely populated areas appearing lighter; perhaps an indicator of either moisture or past fertilisation. Similar results occurred in NDVI production with the walls visible in some places as lines of lesser vegetation cover (Fig. 4.49). As a reconnaissance tool however the panchromatic imagery had a clear edge over the multispectral imagery as it highlighted all of the target feature clearly (despite leaving the land use techniques invisible).

Test Site 7: Forested areas

Forestry plantations have become more commonplace in the Blackstairs region since the 1970's. Large tracts of once enclosed farmland and commonage have

been deep ploughed and planted with rows of conifer trees. In the 40 year interim, these have matured creating a dense blanket canopy over undulating ground caused by roots and the remains of the ploughing activity. This work can be especially damaging to archaeological remains. In some cases former field systems have survived more or less intact or are levelled but still identifiable by the lines of stone. Examples include plantations in Crannagh and Rathanna and large swaths of forestry covering the south-eastern flank of the Blackstairs ridgeline on the area known as White Mountain in the townland of Bantry Commons. Coillte plantations in the Dublin Mountains have also focused on former farmland, evident both on the ground and on historic OS maps. An example includes field wall systems on the western slopes of Kilmashogue Mountain which form the subject of this test site. There was no trace of these features in either of the open-source imagery (Fig. 4.50). Despite its successful use in places such as Baden-Württemberg, Germany (Hesse 2010(a), 636; Hesse 2010(b), 67), Savernake Forest, England (Jones 2010, 32), Eastern Austria (Doneus & Briese 2011, 68) and Norway (Risbol et al. 2006, 107) the lidar survey undertaken in the current project was unsuccessful in revealing the archaeological remains under forestry. Such a result was not unexpected as the detection of upstanding features such as field walls has long been identified as problematic in woodland and forestry owing to the filtering process (Crow et al. 2007, 241; Doneus & Briese 2011, 59; Jones 2010, 26; Opitz 2013, 20). In the case of the present survey, this is most likely due to the density of the forestry, where all the branches still remain close to the ground, coupled with a 1m lidar resolution which gives all areas of forestry a diamond effect in the outputs (Fig. 4.51 & 4.52).

Since the 1m resolution of the lidar data was too poor to highlight any features in dense forestry, a similar result was expected with the 3.2m resolution multispectral imagery. The RGB imagery met with expectations and no linear features were indicated (Fig. 4.53). Some lines were slightly visible with the replacement of one of the bands with an NIR band although these did not match with the pattern mapped by the OSI and appear instead to be a product of the plantation. NDVI production indicated a relatively even growth across the forestry suggesting little stress from underlying walls. Interestingly, however, forested areas under shadow in the imagery returned values indicative of light or no vegetation cover (Fig. 4.54) Panchromatic imagery with its half metre resolution, despite being poor overall, was the best means

of highlighting these features other than on the ground. One of the walls which was not visible in any other imagery source was clearly visible running up to and through the forestry to its border which matches that on the OS maps. Overall, panchromatic imagery would have suggested that some features existed under the forestry if it had been used as a reconnaissance tool but the multispectral imagery would have given no such indication.

Test Site 8: Relict Cultivation Ridges

Initial analysis in the Blackstairs survey indicated a surprising amount of surviving cultivation ridges in the upland region. These likely represent the remains of nineteenth-century agricultural activities and their limited area of coverage suggests they were primarily for personal or familial consumption (see Chapter 6). Examples in the Blackstairs are found in the townlands of Cloroge More and Coolasnaghta and on Knockroe and Blackrock Mountains. Similar features were identified in the Dublin Mountains on the southwest and western side of Kilmashogue. They vary in visibility from subtle undulations to clear rises and falls in the topography. In one field they run northeast-southwest (subtle) while in the neighbouring one they align northwest-southeast (clear).These sites were selected in order to test if their low-lying nature still creates a positive response in lidar imagery. It was also possible that the disturbed ground and changes to the soil properties could leave a trace in vegetation stress and so this site also offered a testing ground for multispectral satellite imagery. Ridges are clearly visible in Bing imagery running in both directions. Conversely, they are difficult to discern on the Google imagery as the vegetation appears to be thicker. This highlights issues surrounding the timing of image acquisition as imagery captured in June (Google) has less clarity than that captured in November (Bing) (Fig. 4.55).

Lidar proved relatively useful as a prospection tool at this site (Fig. 4.56 & 4.57). Simple hillshading encountered those problems which were previously identified in the literature in that illuminating the area from an angle parallel to the ridges rendered them invisible. As these were running in opposite directions it was almost impossible to get an angle which revealed both sets, further inhibited by the slope aspect which limited illumination to the southern range of the compass. Their low-lying nature meant that, raising the angle of the azimuth rendered them invisible. Multi-directional hillshading helped to counter this issue and revealed both sets of lines although the fainter ones were more difficult to make out and appeared washed-

out. This suggests that the tool would be better used as a follow-up rather than for reconnaissance. Similar results occurred for PCA of hillshading, slope gradient analysis, SVF and positive and negative-openness in that the more subtle remains were visible but were more difficult to make out than the stronger set. The best lidar results came from ASVF (Fig. 4.58) and LRM where the faint remains were clearest while also revealing the bolder set.

With the enclosing field walls appearing as blurry lines, it was no surprise that the resolution of the IKONOS RGB imagery rendered these ridge and furrow remains invisible (Fig. 4.59). Even the application of the NIR band did nothing to highlight these lines although the field walls were more clearly visible due to the differential vegetation growth (especially in the R, B, NIR combination). The panchromatic imagery was far more successful and highlighted most of the ridge and furrow traces. This was best done with the hillshade effect turned off. Using it gave the lines a much more patchy appearance almost as if the field was covered in shrubbery rather than pasture. While these features would probably have been identified using panchromatic imagery as an initial reconnaissance tool, they would have been entirely missed by multispectral imagery alone.

Test Site 9: Turf Cutters Huts

Numerous turf cutters huts are found across the Blackstairs many of which are unrecorded on the ASI. These are generally small features not more than a 3-4m in width, only a few stone courses high, and surrounded by dense heather vegetation. Such small sites thus can become masked quite easily in such circumstances or where peat cover may have taken hold. There is only one site in the Dublin Mountains under these conditions and its likely more recent date has meant that it is not recorded on the SMR. Located on Kilmashogue Mountain it bears a striking similarity to many of the surviving Blackstairs examples on the summit of Blackrock Mountain. In uplands where there are extensive regions of blanket bog, fieldwalking may be limited. Lidar coverage for this site offered a testing ground for identifying similar remains under such conditions.

While clearly obvious both on the ground and in open-source imagery (Fig. 4.60), this site was entirely invisible in the lidar data under all visualisations (Fig. 4.61 & 4.62). This was likely caused by one or both of two reasons; (i) its low height of

only one stone course high gave it the same height return as its immediate surroundings and; (ii) its small size rendered it invisible in the 1m resolution data. Low height would account for its absence in hillshading, multi-directional hillshading and PCA of hillshading as shadows could not be cast due to its equal height with the surrounding vegetation. Height would also account for its absence in slope gradient analysis and LRM as there would have been little change in cell height between the site and its immediate surroundings. Given its low height also on a relatively flat terrace, the same amount of sky would be visible from this point as from the surrounding area rendering it invisible in SVF, ASVF and openness analysis. At only 2m in width, its size likely played a factor in all of the processes.

Multispectral and panchromatic imagery were equally unsuccessful at highlighting or recognising this feature despite the sub-meter resolution of the latter (Fig. 4.63). As the imagery is almost a decade older than the most up to date Bing Imagery (2012), differential vegetation growth appears to be the cause. Despite it being in black and white, the pattern and texture of the heather on the panchromatic imagery appears to indicate a higher density at the time of capture than there is at present which would mask this very low site. Similarly, NDVI indicates a slightly denser vegetation cover than the immediate surroundings (Fig. 4.64). Indeed the current vegetation on the ground would suggest that this heather has only been growing for less than a decade, most likely since a fire incident and is not well established. This would indicate that fire incidents should be monitored and dense vegetation is a strong hindrance on the visibility of smaller archaeological features.

Test Site 10: Turf Cutting Remains

Turf cutting was once a major part of the Blackstairs as evidenced by the traces left in the landscape today, as well as the folklore record. This activity leaves deep linear scars in the blanket bog, sometimes forming an ant-nest-like network. Some are plainly visible such as on the summit of Blackrock Mountain and their exposure has left them open to erosion. In other cases such as in the Mountain River Valley and the upper Crannagh ridgeline, heather has become extremely dense in recent years making them difficult to access for survey. In other cases the depth and scale of the cuttings makes them difficult to map on the ground or to monitor erosion. The summit of Glencullen Mountain was taken as a test site in the Dublin Mountains in order to test the visibility of such activity in various remote sensing datasets. Turf-

cutting was carried out here in the nineteenth and early twentieth centuries before being intensified during the Emergency Years (just as on Blackrock Mountain). Both exposed cuttings and overgrown sections occur here contributing to its choice. Should this be successful it had the potential to be used to identify areas of erosion in poorly understood uplands in the future both for conservation and for monitoring the exposure of pre-bog features. In this case the greener summer vegetation allowed the areas of turf cutting to be delineated in Google imagery (2013) better than the brown heather in Bing imagery captured in winter (although the latter is clearer than the latest Google Imagery (2014)) (Fig. 4.65).

While most of this site was clearly visible in open-source imagery, lidar was even more successful in its identification (Fig. 4.66 & 4.67). Single directional hillshading gave the cuttings a better 'pop' on screen and some of the more subtle traces of cuttings (shallow trenches now overlain with heather) were clearly visible. However, these were the first to disappear if the light altitude was heightened or the azimuth shifted to one which was less favourable to that part of the mountain. Turf cutting remains, like field systems, were sensitive to illumination angles. In comparison to other test sites, however this was one of the best for the use of hillshading. Even shallow paths surrounding the site and leading to some of the cutting sections are visible. Multi-directional hillshading helped to counter the issues presented in single directional hillshading and highlighted all the features of the site in one image. It also gave much more of a contrast to the cuttings in comparison to the surrounding higher ground. PCA of hillshading not only highlighted the archaeological features but gave a greater sense of the surrounding topography, indicating that most of the turf cutting was split between two terraces. Slope Gradient analysis on many of the other test sites ended up masking the features. While some of the more subtle cuttings and banks were rendered invisible in this visualisation, it still gave a broad sense of the extent of the site as well as the surrounding topography on which it occurred. LRM was one of the best visualisations for this site bringing out the cuttings at their clearest. The only drawback of this tool, like in many other cases is that it gives a poor sense of the topography on which the site is located. SVF and ASVF (Fig. 4.68) were excellent for picking up the turf cutting remains as well as the surrounding topography giving them a slight edge over LRM. Openness analysis also picked up the traces of most cuttings however they were less clear than in the SVF

and ASVF visualisations (with open-negative having an edge again over open-positive).

Satellite imagery was useful as both a potential reconnaissance and interpretative tool in this case (Fig. 4.69). Each cutting was immensely clear in the panchromatic imagery and given its clarity in the 1m resolution lidar imagery, this was to be expected with sub-meter resolution satellite imagery. The RGB multispectral imagery also identified the site and most of the cuttings although these were not as clear in the above visualisations. Greater clarity was provided with the application of the NIR band and this was further enhanced when overlaid on the panchromatic imagery. Replacing one of the RBG bands with an NIR band also provided further clarity as it highlighted differential growth in the heather caused by exposed bedrock or peat cutting. NDVI also indicates areas of exposed bedrock through the absence of vegetation in the deepest cuttings (Fig. 4.70). Comparing the lidar imagery to the satellite imagery shows that there have been changes in the extent of this site over the last decade. Many of the peat sections are now smaller than they were a decade ago, especially those on the periphery where the cuttings are more exposed to the elements.

Results from the Dublin Mountains Survey: Discussion

The visibility of Dublin Mountains test sites in the only complementary remote sensing technique to the Blackstairs, open-source imagery, offer some interesting points of comparison. In the Dublin Mountains (see Table 3 this discussion), 7 of the 10 test sites are visible in Bing imagery. Those 3 which are not visible are; forested, levelled or densely low-lying. Google Imagery, while in some cases revealing a site in more detail than the Bing Imagery, varied in visibility depending on the year (and month of capture). For example, Google Imagery from July 2013 was best for highlighting seven sites while it could not detect three sites at all. In contrast, ridge and furrow (visible in most sources) was entirely unidentifiable in this same source due to the pasture vegetation which grows on the site. Similarly, Google imagery from January 2005 was best for visualising two sites, Test Site 1: Pre-Bog Walls and Test Site 8: Relict Ridge and Furrow however half of the test sites could not be seen with this source. Of all the Dublin sites, two were undetectable in any imagery (Test Site 4: Levelled Post Medieval Houses & Test Site 7: Forested Areas).

Overall the LiDAR survey on the test sites revealed little beyond what was already known about a site or was visible during ground assessments or in open-source satellite imagery (except in the case of Test Site 3). In some cases, features which were visible in the latter two sources were entirely invisible in lidar. The size of the feature was a crucial factor as the lidar had a resolution of 1m. Consequently, small low-lying features such as the one-stone-course-high hut site were invisible. Similarly, vegetation density was also a major factor in some cases. For example, conifer forestry presented a significant issue as sites which had been planted were rendered invisible and it would appear that this was due to the density of the plantation which did not allow the pulses to reach the ground. Data processing also introduced a number of issues some of which were unique to each visualisation.

Despite its popularity, hillshading had a number of drawbacks in this project all of which were expected based on previous projects in the archaeological literature (e.g. Deveraux, Amable & Crow 2008; Forlin 2012; Kokalj et al. 2010; Kokalj et al. 2011; Kokalj et al. 2013). Firstly, low-level linear features which run parallel to the angle of the light were rendered invisible (Kokalj et al. 2013, 104). This was especially true for routeways and ridge and furrow features (Fig. 4.71). Secondly, the technique is limited in upland landscapes because of slope severity and aspect (Fig. 4.72). Lower angle altitudes (e.g. 10-15º) were often found to be best for highlighting features. If a feature on the northern slopes of a mountain is illuminated with an azimuth from the south at a low angle it will remain under total darkness. For light to reach the feature the altitude must be raised to the point where shadows are lost and so these are no longer reliable. Therefore the available azimuths are limited to the aspects on which the feature sits, something which is not as much of an issue in lowland settings.

Hillshading successfully highlighted the field systems, both pre-bog and post-medieval, although only at certain illuminations. Ridge and furrow had similar results although it was often difficult to find an illumination which captured both the surrounding field system and the cultivation ridges together due to the narrowed illumination range caused by slope. Raising the altitude rendered the more subtle ridge and furrow invisible while still providing the field walls with some visibility. Lowering the altitude caused the image to darken and masked the field system or other related features. Similarly, turf-cutting remains were much more clearly visible

in lidar than in open-source imagery. As the latter site was located on a mountain summit, it was less restricted by the effects of slope on the azimuth angle. Hillshading revealed no trace of platforms or a topographical outline of nineteenth-century levelled house sites even on areas of pasture where dense vegetation would have less of an influence on the imagery. However it did display upstanding remains of houses of the same period. Where hillshading did reveal new information was on the levelled summit cairn on Two Rock Mountain and the identification of a possible passage on the northeast side of the tomb. This could be potentially revealing as there is a possible subtle trace of a former passage on the Slievebawn cairn in the Blackstairs at ground level and in the future, lidar may help to confirm this.

Hillshading from multiple directions had generally successful results across the ten sites, although it did wash out smaller features such as subtle cultivation ridges. In some cases, it countered the issues presented by single direction. The most obvious is in the case of shadows cast on the opposite side of the mountain to the one illuminated from a single direction. Multi directional hillshading in this case illuminates the entire landscape and presents it in its entirety. Another advantage is that it can give a better sense of the topography than single directional hillshading. It also counters the issue where features parallel to the angle of light are removed allowing objects such as field systems to be presented in their entirety. The edges on some features were enhanced a little further by this method also in comparison to single-directional hillshading. Overall, multi-directional hillshading would be one of the more useful visualisations for a rapid reconnaissance for larger features although smaller ones could be missed.

As it is also based on illumination across the landscape, the value of PCA of hillshading was limited by low-lying features not casting enough shadow to be detected by the imagery. In most cases this visualisation detected the sites however in every instance there were better visualisations which either picked up details PCA did not or presented the site with greater clarity. The greatest contribution by PCA of hillshading however was its ability to provide information on the micro-topography on which these sites were located, something which the other hillshading techniques were less useful at detecting.

Another technique which had excellent results at highlighting the topography but was less useful for detecting archaeological remains was slope gradient analysis. This was one of the poorest prospection tools and in almost every case it masked sites rather than enhanced them. Only the larger sites which are very clear both on the ground or in other imagery sources were detected. Despite this, its usefulness as a topographical interpretative tool was almost unparalleled. In complete contrast, LRM was excellent for highlighting archaeological features (even the most subtle traces of cultivation ridges or field wall lines in dense vegetation) however it was one of the poorest techniques as a topographical indicator. Where LRM did fall short was on features in very dense vegetation and major differential topography such as turf cutting remains where the imagery can appear quite chaotic. Although it was not always the best tool for visualising a site, in almost every case it detected most if not all of the archaeological traces under inspection. This makes LRM one of the few areas where lidar would be useful as a reconnaissance tool rather than solely as an interpretative tool. Processing would take longer however as smaller areas need to be done either individually or in batch form in order to minimise the range of differences in topography on which the technique relies.

Sky-View Factor and Anisotropic Sky-View Factor highlighted and detected more of the test sites and their details than any other technique. Not only could they detect more subtle remains located on slopes, but they were excellent indicators of topography also thus combining the two advantages of LRM and slope gradient analysis into one visualisation. While they highlighted most of the same features, ASVF had an edge in every instance over SVF; providing greater clarity as well as the texture of the landscape. This could be both an advantage and an inhibitor depending on the site. In some cases, the texture of the vegetation caused by differential growth helped to highlight smoother areas such as field walls and pathways. In other cases this was an issue as it could either produce false returns if it were used as a prospection technique with natural growth misidentified as potential circular features or smaller remains masked in the chaotic imagery. Location and the size of sites was also an issue. While it detected larger remains on summits, more subtle remains such as pre-bog walls were drowned out which was less of an issue on slopes where less of the sky, which this technique relies upon, was visible. Finally, openness analysis both positive and negative, had mixed results from site to site. While either one or both

detected almost all of the features, open-negative had an edge over open-positive in terms of clarity for the most part. This tool was much like LRM in that it detected the archaeological remains but was poorer as an indicator of slope and topography. In the cases of larger sites it smoothed the landscape to reveal the feature thus reducing issues caused by texture. This was best demonstrated in the case of the Fairy Castle summit cairn on Two Rock Mountain. Reduction of texture however may remove subtle and low lying remains and this was demonstrated on the upstanding post-medieval houses where these sites which were swamped with dense heather growth are almost masked by the surrounding topography.

While resolution was a major factor in the lidar survey, it had an even greater influence on the satellite imagery survey given the stark differences between the two sensors provided by the IKONOS satellite. Despite the resolution of the panchromatic imagery being unequalled by any other potential reconnaissance source, it struggled with dense vegetation. Subtle and small features were difficult to identify if there was a thick layer of shrubbery around them. In contrast to lidar where topographical information could be manipulated in order to detect a feature, this could not be done to panchromatic imagery. Smaller sites on the grassland areas or larger sites were detectable however, and in some cases this sensor provided the best clarity. It was also useful for detecting walls along the edges of forestry where the other sources had failed. Field systems, both large post-medieval walls and exposed pre-bog walls in light vegetation cover were very clear, as were the remains of turf cutting, demonstrating that these sites with unusual patterns not ordinarily found in nature can be detected. It also picked up a number of other remains showing that this resource has some potential into the future as a reconnaissance tool especially with improved resolution.

Despite the value of the panchromatic sensor, the multispectral imagery was less successful in identifying the test sites although this is almost certainly related to resolution of the available imagery. Given that it had the poorest resolution at 3.2m per pixel any small features, especially those in dense vegetation could be presumed undetectable and this followed through in the survey. Even some of the larger features such as upstanding summit cairns were not very clear and details of their construction such as chambers or passages in the cairns or smaller sites such as pre-bog field walls, ridge and furrow or turf cuttings were not detected. What this imagery did provide

however was a good indication of the vegetation growth at the time of capture which could be used into the future with additional data to monitor changes. Replacing one of the RGB bands with an NIR band made areas of denser shrubbery appear darker while less growth appeared lighter. In the case of field wall systems this may be due to soil fertility while in other cases it may be linked to burning or soil cover. The only drawback in this case however is that this imagery is twelve years old and so the current growth pattern will not always match what is in the imagery. NDVI production indicated a similar pattern although it was unsuitable for detecting cropmarks owing to resolution. Where more up-to-date imagery is available, it could be used as a valuable tool to indicate areas of potential for fieldwalking where the vegetation is lightest. As an example, this occurred in open-source imagery at Test Site 10 where the hut site was not visible in the Google 2003 imagery but was in later sources after burning. The visibility of each site varied greatly depending on which band was replaced with an NIR band although in most cases the R, B, NIR combination was the best.

Throughout the lidar and satellite survey, vegetation density and its effects on subtle and low lying remains has been very clear. In some cases certain tools can detect the site however in others; the filtration of the first number of returns has probably removed any trace of the site. This is a major issue in all types of scrubland which has been noted in a number of projects and is something which is currently under investigation as part of a dedicated research project (Crozet et al. 2014). Another issue presented by lidar is that the imagery must be manually visualised by the operator and parameters need to be continually changed in order to detect sites. Automatic feature detection algorithms have been developed to counter this. These are also under investigation as part of a number of ongoing projects although preliminary results have met with debate (e.g. Bennett et al. 2014; Lambers & Reitmaier 2010; Lambers & Zingman 2012; Lasaponara & Masini 2012; Trier et al. 2009). While automatic feature detection speeds up the process of reconnaissance, computers cannot distinguish between archaeological sites and modern or natural occurrences which follow the patterns under investigation such as lines with right angles or circular objects. Automatic feature detection algorithms are also viewed with suspicion amongst many in the archaeological community despite their widespread use in environmental studies (Bennett et al. 2014, 896).

Flaws aside, automatic feature detection offers a much more rapid assessment of the landscape than a manual trawl through satellite imagery, aerial photography or lidar. Compare for example 600,000 potential sites discovered in 6 years in Baden Wuttenberg, Germany by one operator through automatic feature detection in lidar (Hesse 2013) with 100,000 sites discovered by the NMP in England in 20 years by a large workforce mostly using aerial photography (Horne 2009). On the flip-side, many of the former require confirmation while the majority of the latter are accepted sites which have been interpreted and fitted into the landscape narrative (Bennett et al. 2014, 901). Similarly, automatic feature detection can be useful in areas where the landscape is difficult to access, or to identify areas of potential for fieldwork such as in the Silvretta Alps (Lambers & Reitmaier 2010; Lambers & Zingman 2012). Since there is now a greater understanding of the distribution of archaeological remains in the Blackstairs Mountains, they offer an interesting testing ground for the value of automatic feature detection in an Irish upland context as part of future research should these datasets become more readily available.

Summary

Taking both the Blackstairs and Dublin Mountains surveys together not only demonstrates the value remote sensing techniques offer today compared to if the project had been completed a decade ago but also a series of limitations and comparatives. Detailed images of features can be provided in cases where access can be an issue however, resolution can also limit visibility. For lidar and satellite imagery, no two sites were the same and required different parameters or settings. What enhanced the visibility of one site inhibited the visibility of another. Putting aside issues of resolution, vegetation and timing which can plague lidar datasets in any landscape, the uplands offer a further issue; slope. This is less of a problem for most of the other remote sensing sources although topographical information, which can also play a major part in site detection or interpretation, is not as detailed in these and therein lies their drawback to lidar.

Lidar and multispectral satellite imagery are large datasets and the imagery needs to be in constant change in order to enhance features in the landscape in the best possible way. What highlights one feature class may render another invisible. This is especially true as we have seen with field systems and ridge and furrow features (see Tables 4 & 5). In some cases, vegetation affects the visibility of the same feature type

between tools, as in the case of cultivation ridges at Test Site 6 and 8. While the features were visible but difficult to identify in ASVF in the former, this tool was best for visualising the latter. Uplands are also limited by slope severity and aspect which is less of an issue in the lowlands. These problems could be made even greater if lidar was the only means of seeing the landscape combined with a poor archaeological record. To counter this, a smaller area could be focused on for intensive study rather than capturing the wider picture. This will also have a knock-on effect on heritage management and development planning into the future as the areas cannot be prioritised or protection and decision making would be misguided (Opitz & Cowley 2013, 6). The unavailability of lidar and multispectral imagery to the project for the Blackstairs Mountains is perhaps a blessing in disguise. It directed focus on gaining a better understanding of the broad picture of the landscape, something which was poorly understood and documented until now, rather than focusing on particular parts. By using a case study on known features in the Dublin Mountains we now have a better understanding of how these technologies operate in the various upland vegetation contexts. Should these technologies come available in the future for the Blackstairs, they can be applied to an archaeologically better understood landscape and will act primarily as an enhancement rather than a reconnaissance tool although there may still be some value in the latter.

Bennett et al. (2012a) demonstrated that multiple ways of viewing lowland landscapes, which are subjected to different agricultural methods, are needed and a single technique is not enough. This survey has shown that this argument is just as applicable to the uplands. Even within tools, the parameters need to be tested and changed especially in the case of hillshading where a slight change in the altitude or azimuth can reveal or mask a site. Ground assessment is imperative to our understanding of the landscape. Although identifying sites remotely is important, we cannot fully understand them and their setting without confirming their presence and relationship to other sites on the ground. Many projects have viewed and interpreted the landscape remotely and not gone on to locate the site on the ground. We need to move beyond the aerial-based view to the ground-based in order to build up more meaningful understandings of the archaeological landscape under investigation. It is also important to remember that the use and interpretation of remote sensing techniques involves the process of mapping which is subjective rather than objective.

Even the means of capturing and processing are not objective as we have seen, since filtering or resolution can remove sites and features or give false impressions. Similarly what is recorded is based on the mappers experience and preferences (Scollar 2002, 166). Thus experience and teamwork may be imperative in many future studies. The number (32) of redundant features (see Volume 3) identified in the Blackstairs Mountains from open-source imagery also highlight the importance of follow up ground confirmation. Understanding the potential and limitations of the various means of seeing the uplands and the mapping process, acts as a reminder that the current record is not fully representative of survival on the ground or the extent of past use. The following chapter discusses and interprets the updated archaeological record for the Blackstairs Mountains in light of these discoveries, with the knowledge that it may alter in the future as new features come to light.

Chapter 5 – The Archaeology of the Blackstairs Mountains

Introduction

Archaeological investigation in the Blackstairs uplands has been limited to basic recording until now. Chapter 4 highlighted the results of the various methodological approaches applied to the landscape as part of this project, which was much more intensive than the earlier Archaeological Survey of Ireland. In this chapter, new upland discoveries are combined with the previous record (all of which are catalogued in Volume 3) to establish a chronological, social and interpretative narrative for the landscape for the first time. Features in the foothills as well as the wider region are also drawn upon to provide a context for the upland activity and to aid interpretation. This discussion does not represent the final word on the Blackstairs archaeological record; rather it is based solely on what has been identified to date. Further features may be revealed in the coming years as more research is conducted and changes come to land management. Similarly, the discussion is limited by the poor availability of documentary sources dealing with the uplands in later periods and the absence of environmental data or scientific dating. Instead the upstanding archaeological remains are presented, interpreted and discussed based on their morphology, similarities with more intensively researched sites elsewhere and their documentary records where they are available.

Summary of Archaeological Site Discoveries

A total of 187 newly identified features were added to the archaeological record for the Blackstairs uplands, the classifications of which are summarised in Chart 3. A further 13 sites were identified in the lowlands surrounding the range (Chart 10). Classifications were matched where possible to those used by the National Monuments Service (NMS) both for consistency and to provide a wider context for the features. In some cases new classifications were created where sites did not fit into any established categories or morphologies. These included festival sites and turf-cutting remains which are interwoven with the use and understanding of the Blackstairs and other accepted classifications such as dwelling sites. Find spots were used as a classification also as despite there being no identifiable archaeological remains in the immediate vicinity, they may hint at buried features which could come

to light in the future. Each classification is discussed below before presenting a temporal narrative for the landscape.

Vernacular house sites (VER--) are one of the most numerous feature types in this upland landscape and most likely date from the eighteenth to the twentieth centuries. Twenty-seven such sites were recorded in the uplands and two in the foothills. Cartographic evidence however suggests that the current survival is a poor representation of their original number. Similarly, hundreds of presently used farm houses in the foothills surrounding the range likely date to this period also although modern additions and modifications have been made to most. The classification encompasses stand-alone houses and cabins, houses with outhouses as well as clachans (a nucleated form of settlement – see below). This broad brush definition is used as in some cases preservation makes it difficult to distinguish a house with outhouses from a settlement of two or more houses. In others, cartographic records suggest former clachans were replaced by single farmhouses. This is the first time such structures are recorded in the Blackstairs and is done so in order to preserve by record, the vernacular architectural heritage of the uplands.

Despite being a form of settlement, hut sites (H--) were distinguished as their own classification because of the more seasonal or temporary nature of their occupation. Fifteen such features were identified over the course of this survey almost doubling the record to forty-one for the mountain range and its townlands (seventeen of which were recorded in the 2011 survey). The newly identified examples are either isolated (4) or in clusters on the summit of Blackrock Mountain (5) and the slopes of the townlands of Ballycrinnigan (3) and Ballygub New (3). Despite similarities in construction, the purpose for each individual site or cluster most likely varied. Those on Blackrock Mountain for example are probably associated with the nearby turf-cutting activity while the Ballygub New and Ballycrinnigan clusters appear to be booley huts owing to the presence of nearby enclosures and field boundaries. The purpose for the other examples may have been related to either of these two activities. Structures (ST--) were also distinguished as a separate classification where the primary function did not appear to be a dwelling place. Five such features were identified in the uplands, four nineteenth-century buildings scattered across the range and a mid-twentieth century concrete-built turf-cutters shelter on the summit of Blackrock Mountain.

Field systems (FS--) were the second most frequent site type in the uplands most of which are likely eighteenth century or later in date. Some field patterns may have earlier origins however, as suggested by the construction of a post-medieval wall on a pre-bog line on Dranagh Mountain (recorded in the 2011 project). Field boundaries (FB--) were distinguished where isolated field walls had been constructed away from a main field system; occurring in five cases. Townland boundaries have been sited on some of these, hinting either at their purpose or the convenient use of earlier features by latter mappers. Also related to livestock control were six sheepfolds (SF--) another feature type previously unrecorded not only in the Blackstairs in this case but in the three counties. All appear to be post-medieval in date. Unusually, SF03 on the slopes of Cullintra Hill is recorded on the first edition OS map but not on the later Griffith's survey or twenty-five inch editions. A similar instance occurs at SF04 in the townland of Raheenkyle. Conversely, SF05 in the townland of Knockymulgurry and SF01 in Bantry Commons appear on the later but not on earlier maps. None of the other examples are mapped on any of these sources. This highlights issues with these resources in this landscape which are further explored in Chapter 6. Similarly related to sheep management are three upland sheep passes (SP--) in post-medieval field wall systems, in the townlands of Crannagh (2) and Knockroe (1). The former two facilitate access from the field system to the commonage while the latter was located within a field system. Such features are not limited to the uplands as another three were recorded in the foothills two in Ballycrinnigan and one in Crannagh. While not an NMS classification, they were recorded here as they are an important indicator of field use and an example of built heritage. Other agricultural features include thirteen examples of cultivation ridges (CR--), the first such features recorded in the Blackstairs, all of which appear to be post-medieval/early modern in date.

Enclosures (EN--) were distinguished where their shape did not conform to the surrounding field systems or where the feature was isolated from the latter. Ten newly recorded examples add to the previously recorded nine in the upland zone. While most appear to be post-medieval in date some may be earlier. For example, one such enclosure in the townland of Deerpark Old (EN01) may be a ringfort. Measuring 48m in diameter, it appears to be associated with a field system to the north now overlain with vegetation. The site is entirely inaccessible today due to the density of the gorse vegetation; however it appears to be the remains of a univallate enclosure, possibly a

ringfort from Bing imagery. Given that the site cannot be confirmed, it remains classified here as an enclosure. One field on the slopes of Tomduff was recorded as a "military camp" (MC--) as a result of its use in 1798 as a temporary campsite by United Irishmen insurgents during the 1798 campaign. Physical traces of this event cannot be identified today however it is recorded in documentary evidence and folklore. Agricultural activity such as ploughing may reveal evidence of this event in the future such as artefacts or burnt spreads from campfires.

One of the most numerous feature types in the Blackstairs, cairns (C--) are found all across the mountain range in a variety of slopes and elevations with some organised into cairnfields (Fig. 5.1). A total of sixty-seven have been identified to date although the true number that might have existed is possibly much greater than this, diminished by later activity, erosion and damage or even buried by peat. Of these, fifty-one were previously recorded, twenty-seven of which were first identified during the Dranagh 2011 survey. Sixteen cairns were newly identified or recorded as part of this survey. In the absence of excavation and dating it is impossible to definitively attach a purpose to these features except in cases where surrounding features such as cultivation ridges or maps offer assistance. For this reason thirteen were classed as clearance, two as summit cairns and one remained unclassified. All of the former appear to be post-medieval in date and the latter two may date to any period. Some were grouped into cairnfields (CF--), defined as three or more cairns. Two cairnfields were the product of clearance while a third was applied to three summit cairns on Blackrock Mountain.

Seven standing stones (SS--) were previously recorded in the Blackstairs uplands of which two were recorded on Dranagh Mountain in the 2011 survey. Only two further possible examples were recorded as part of this survey bringing the total record for the uplands to nine. One of the newly identified examples is located in a nineteenth-century field system beside a possible drain feature and so appears to be post-medieval in date, possibly used as a marker or scratching post. A second stands in unenclosed land between Cloroge Beg and Cloroge More mountains and may have an earlier origin. A number of previously recorded standing stones have also been reclassified as redundant features by the NMS mainly on the east side of the range.

Roadways and routeways (R--) are extensive in the Blackstairs range although none have been recorded previously. Seventeen such networks were thus added to the record for the Blackstairs. Roads and routeways fall into a number of sub-categories under the NMS classification system including various classes of "toghers" (peatland trackways) and hollow-ways (medieval sunken roads). All of the Blackstairs examples are classed under the "Road - road/trackway" definition ("a way, or section thereof, which has been deliberately constructed between places"). While such features can date to prehistory, most of the Blackstairs examples appear to be post-medieval in date but some may have earlier origins. Cartographic evidence suggests that one (Knockymulgurry) dates to the Famine decade, constructed as part of a Poor Relief Scheme (see Chapter 6) while the Blackrock Mountain road was constructed in the 1940's to facilitate turf extraction. Some roads cross the range linking the foothills on either side while others terminate at turf-cutting sites indicating the importance of this resource.

As well as individual sites and monuments, largescale features were also recorded. Placename and documentary evidence indicate the presence of two deer parks (DP--), one on the northern slopes of Brandon Hill and the other on Greenoge Hill, as well as a medieval grange farm (GRA01) east of Blackstairs Mountain, each of which included an upland portion. Folklore records the presence of post-medieval festival and gathering sites (FES--) some of which may have earlier origins also. While the true number of past gathering sites has been lost to time, a number have been preserved down through the centuries in the surrounding lowlands and were still being carried out as late as the 1970's. Locations for two upland events were recorded during survey both of which formerly took place on the last Sunday in July, known as "Mountain Sunday"; at the Cooliagh Gap south of Blackstairs Mountain and on the summit of Brandon Hill. Folklore also indicates that the practice of turf-cutting (TC--) was extensively carried out across the range. Much of the physical evidence for this has been removed by erosion or burning however visible traces are evident at three sites in the range which were recorded despite this not being a NMS classification.

A number of features, while identifiable in Bing or Google Imagery, could not be accessed on the ground because of dense vegetation growth. While some, such as the aforementioned enclosure EN01 were clearly identifiable as an archaeological feature, others were not. Numerous potential features recorded in these sources had

later been marked as redundant (RE--) after site visitations as erosion scars or animal activity had created the impression of an archaeological site. Where the confirmation of a potential feature as an archaeological site was questionable, these sites were marked as "unclassified" (UN) of which there were twenty-three. These were recorded as such as future changes in the vegetation growth may facilitate access for confirmation.

Stray finds were almost absent in the record prior to this survey. For example, no stone axes are recorded from the Blackstairs region (ISAP Database). It is possible however that these were recovered by turf cutters, drain diggers or ploughmen (Cooney & Mandal 1998, 8) but were not reported to the NMI and kept as personal mementos or spiritual tokens (Evans 1996, 66) or inserted into the walls of dwellings or farm buildings (Cooney & Mandal 1998, 33; McCurdy 1996, 183). In other cases such objects might not have been recognised for their archaeological importance and thus remain unrecorded. Two stray finds (FIND--) were recovered from eroding peat in the uplands during the course of this survey as well as a third recorded in 2011 before commencement (an Iron Age deer trap (Fig. 5.2)). The newly recorded finds consisted of a clay pipe stem (further discussed in *Chapter 6*) and a flint core (Fig. 5.3).

Prior to this survey, the Dranagh Mountain project in 2011 more than doubled the archaeological record for the Blackstairs uplands from 49 (excluding 11 redundant records) to 119. The present project has more than doubled the known record again (Chart 11) although interestingly, the density of sites identified on Dranagh Mountain was not matched anywhere else. Possible reasons for this are explored in Chapter 6 and 7 but for now, the newly identified remains are combined with the previous record to present an interpretative narrative for the Blackstairs uplands as a whole for the first time.

Proposed Blackstairs Chronology

In the absence of absolute dating, the chronology outlined below and the designation of sites to particular periods is broadly based on morphological features and comparisons to similar sites elsewhere in Ireland. Down Survey Barony Maps (1656-8) and Ordnance Survey maps were also used to assist with interpretations. The first edition OS mapping was carried out in this region in the year 1839 with maps

published between 1840 and 1841 while the 25" maps were surveyed in 1906 and published in 1909 (Andrews 1993, 43; Andrews 2002, 333). Earlier maps which show the Blackstairs Mountains (e.g. Down Survey County maps; William Allen's 1824 map (Fig. 5.4); Lewis's 1837 Topographical Dictionary Maps (Fig. 5.5)) depict them stylistically and so are of little interpretative use.

The structure of the chapter whereby sites are discussed and ordered thematically and subdivided into broad chronological groups is based on the English Heritage National Mapping Programme (NMP) publication model. The broad prehistoric band below is taken as a result of the absence of fixed dating outlined above, the difficulty in narrowing down the dates for some features such as hut sites and the possible later reuse of earlier monuments such as cairns.

Prehistory: Mesolithic Period

In Ireland, the Mesolithic period (c.8000-4000 BC) represents almost half of the prehistoric period and 40% of the entirety of known human occupation (Driscoll 2006, i). However, the use of the Blackstairs in this period remains an enigma as no evidence has yet been identified. The nearby River Barrow was clearly an important communication route in the Mesolithic period and its shores a hub of activity as indicated by lithic remains found during the Barrow Drainage Scheme in the 1920's and 30's (Kador 2007, 14). Three targeted investigations have been carried out by various research groups on this watercourse; Zvelebil and Ramsden's Ballylough Archaeological Project (BLAP) and survey of the Middle Barrow Valley and Waterford Harbour areas (Zvelebil et al 1996), the Discovery Programme's Barrow Valley Project (unpublished) and Kador's reassessment of Zvelebil's work (Kador 2007, 15; Kador 2009 (a); Kador 2009 (b)) (Fig. 5.6).

The lack of identifiable features or activity from the period is not unique to the Blackstairs. Evidence for Mesolithic activity in the uplands is entirely absent in the Irish archaeological record. In contrast, numerous projects in Britain have either identified or focused on upland Mesolithic activity based on pollen analysis or the archaeological record such as the Pennines (Spikins 2010, 2), Dartmoor and the North York Moors in England (Atherdan 1992, 41), Black Mountains in Wales (Barton et al. 1995), and Ben Lawers (Denison 2001), Cairngorms (Fraser et al. 2013) and Chest of Dee (Fraser 2003) in Scotland. The lack of any evidence for the Mesolithic in the Irish

uplands has received comment in two publications. O'Brien (2009) suggests that a lack of large game for hunting or suitable knapping material would mean that there was no need for hunter-gatherer communities to use these landscapes. Conversely, Coyne (2006(a)) suggests that they might have moved through or carried out some activities however the nature of the remains they left behind renders it almost invisible today.

The latter interpretation is probably the more likely of the two. If upland peat can mask entire later prehistoric field systems and houses which are only revealed in the absence of excavation by erosion or fires (e.g. Cooney 1985; Cooney 1991; Coyne 2006(a); O'Brien 2009; Ó Murchú 2012; Rynne & Ó hÉalaidhe 1967; Rice 2006; SMR KK033-006) then the types of activity which one might expect to find from the Mesolithic period (e.g. lithics, the remains of wooden structures or small scale burning (Atherdan 1992, 62; Spikins 2000, 109)) would be even more difficult to identify. The Blackstairs Mountains are visible today along most parts of the River Barrow as it flows through County Carlow. While the forestry which covered much or part of what is today open agricultural land would have impeded this view in many places, the highest peaks such as Brandon Hill, Mount Leinster and Blackstairs Mountain would still have been prominent. Similarly, the sources for numerous rivers are located in the Blackstairs Mountains such as Mountain River, Drummond River and the Clashganna River. These join the River Barrow at major tributaries and so their courses would have likely been followed by Mesolithic communities. The proximity of the Barrow where Mesolithic activity has been identified (the summit of Brandon Hill is 2km west of the Barrow while parts of the southern spine are 4km east) and the number of its tributaries which flow out of the range would suggest that Mesolithic communities inhabited or moved through parts of this landscape. Targeted research and the monitoring of peat erosion scars, especially along upland river courses, may alter this absence in the future.

Prehistory: Neolithic – Iron Age

Despite the absence of Mesolithic activity, the record for the second half of Irish prehistory is far richer in the Blackstairs uplands although still notably less than the surrounding lowlands. Neolithic, Bronze Age and Iron Age (c.4000BC-400AD) are included here and this broad brush definition is chosen as a consequence of the absence of absolute dating. The only indication of date that we have for this period is

morphology and the possibility that sites which pre-date the peat are prehistoric. Even these are not reliable sources as the timing of peat onset probably varied across the landscape and many of the features under discussion (e.g. cairns, standing stones, hut sites, field systems) may date to almost any period. Archaeological remains from this long time-span take a variety of forms and appear to have been associated with burial, ceremonial activity, settlement and agriculture (Fig. 5.7). There were few new discoveries over the course of the survey that could be attributed confidently to the prehistoric period. It is possible however that much material lies buried under the extensive peat. This is suggested by discoveries on Dranagh Mountain following a fire incident which were previously overlain by peat and the identification of two artefacts from the period in eroding peat.

Funerary Monuments

Funerary monuments or possible funerary monuments are one of the most common features in the Blackstairs Mountains from this period, represented in the form of cairns (summit cairns, ring cairns & unclassified cairns) and a portal tomb.

Summit cairns are numerous in the Blackstairs, even occurring in one case as a cairnfield (CF04) on the summit of Blackrock Mountain. While their form and definition may be similar, their primary function may have varied and altered over time. The larger cairns on Mount Leinster, Slievebawn, Brandon Hill and Cullintra Hill could represent the remains of Neolithic passage tombs. Construction of large cairns and passage tombs on mountain summits is a widespread phenomenon in Ireland and is also seen for example in the Dublin/Wicklow Mountains (Cooney 2000(a), 143; Stout 1994, 24), The Cúil Írra Peninsula (Bergh 2002, 139), Mount Brandon, Co. Kerry (Coyne 2006(a), 6), The Mourne Mountains (Moore 2012) & The Cooley Mountains (Cooney 2000(a), 139). With two large summit cairns which might in fact house passage tombs on the Brandon Hill chain, this may explain the use for C59 located on the south western slopes of Brandon Hill which consists of a hoop of stones with what appears to be a passage tomb leading from the outer ring to an inner chamber, unroofed at present. A megalithic structure (MEG01) was reported to the ASI in the 1980's on the summit of Knockmore Hill to the west of Blackstairs Mountain which may have been another summit cairn however no trace survived at the time of their recording.

The smaller summit cairns, both newly identified on Cloroge More (C44) and previously recorded on Blackrock Mountain (CF04) have morphological and locational parallels with Bronze Age cist burials such as Tibradden in the Dublin Mountains (Farrington 1933, 252-3). Alternatively they may have been built in the Neolithic and cover Linkardstown type burials (Coyne 2006(a), 22) a feature type which was sometimes added to or reused in the Bronze Age for burial as at Poulawack, Co. Clare (Brindley & Lanting 1989/90, 1; Hencken 1935, 193; Jones 2004, 33-4; Jones 2007, 122-3). The placement of C44 on a mountain summit however may be fortuitous as a large field boundary (FB05) extends across the summit of the hill nearby. Consequently, it may have been formed as part of uncompleted clearance in more recent centuries.

Smaller less monumental cairns with a likely prehistoric origin also dot the landscape. Two cairnfields (CF01 & CF02) were recorded on Dranagh Mountain as part of the 2011 fieldwalking survey which form an important landmark on the mountain to sheep farmers today where they are known as "querns" (Peter Kealy; Michael Byrne pers. comm.). These are labelled "unclassified" by the NMS but it is proposed here that they were constructed as part of a Middle Bronze Age cairn cemetery. They do not appear to be the product of field clearance based on a number of factors;

1. kerbing is visible around a number of these features suggesting a formal construction
2. they are small and numerous in size while also being in close proximity to one another. Effective field clearance would heap the stones into larger piles or incorporate them into field walls.
3. there is still a large amount of scattered stone in the area indicating that areas were not sectioned off for clearance
4. there is an alignment in CF01 between cairns C32 to the south, C24 in the middle and C30 to the north something which has been previously identified in other Middle Bronze Age cairnfields (Eogan 2004, 60).
5. in the case of CF02, smaller cairns circle a larger central cairn which has a pit in the top possibly indicating the presence of a collapsed cist underneath.

There is also a striking similarity between the layout and construction style of this cairnfield and the one excavated at Piperstown, Co. Dublin (Rice 2006, 47-8) and

those surveyed in the Monavullagh Mountains (Moore 1995, 216) which were dated to the Middle Bronze Age. Another parallel Dranagh Mountain has with Piperstown is the placement of a cairn, separate to the cairnfields, on a pre-bog field wall (Rice 2006, 51) which was suggested as being either a product of clearance (Rice 2006, 52) or the later reuse for burial of an earlier wall representing ancestral ritual (Rice 2006, 53). It is also possible that the Dranagh cairn is merely the tumbled survival of the former wall which in its present state is only one coarse high. Further evidence for Bronze Age burial is the placement of a previously recorded ring cairn on the ridgeline above the townland of Aghnaglear as suggested by research elsewhere in Ireland (Bradley 2007, 198; Moore 1995, 220).

Megalithic tombs, apart from the possible passage tombs contained within the numerous summit cairns, are a rarity in the Blackstairs Mountains. A previously recorded portal tomb (PT01) represents the only known example, and this occurs on the east facing slopes of Knockroe Mountain, between Mount Leinster and Blackstairs Mountain which are clearly visible from its location. The tomb itself is small in size compared to many other examples across the country with the capstone measuring 3.4m in diameter at its widest point. Only one of the portal stones remains upright on the northeast side, the others having collapsed and lying under the capstone. Like numerous other features in the Blackstairs it is associated in folklore with the activity of supernatural creatures as it is known locally as “The Giant’s Table”.

Settlement

The evidence for prehistoric settlement is minimal for both the Blackstairs and the surrounding area (Fig. 5.8). This is more than likely a product of modern visibility rather than a reflection of the past as suggested by the huge increase in known prehistoric settlement across the country in advance of motorway construction (Smith 2010, 1) in the lowlands. Without such excavations in the uplands, evidence for settlement activity from the same period has gone unnoticed. Traces of prehistoric agricultural activity (see below) as well as the presence of funerary monuments and other features all suggest as yet unidentified prehistoric settlement in the Blackstairs uplands. Targeted excavations elsewhere also indicate that upland settlement is not unknown in the Irish prehistoric record.

Numerous hut sites are scattered across the Blackstairs range (Fig. 5.9) and while most of these probably date to the post-medieval period (see below), some appear to be pre-bog and as such are likely prehistoric in date. These include some of the huts identified on Dranagh Mountain in 2011 (H04, H05, H06, H07, H08, H09, H10, H11, H12 & H14) located near a pre-bog field wall on the final ascent to the top of the mountain. Similar examples were found at Piperstown in Co. Dublin and dated to the Neolithic (Rice 2006, 41). In both cases all that survives are the rings of stone footings protruding through the peat. These may have been used for seasonal cattle herding, the terraces of the mountain offering relatively flat grazing areas for cattle on light well drained upland soils before the onset of peat growth. The pre-bog nature of the hut cluster on Cullintra Hill (south of Brandon Hill) recorded by the ASI following a fire in the 1980's suggests that these are also prehistoric, perhaps contemporary with, the summit cairn to the southwest similar to Knocknarea, Co. Sligo where Neolithic hut sites were identified downslope of a large summit cairn (Bergh 2002, 141).

The area of extensive bog to the east of the path on which the flint core (FIND03) was discovered may overlay later prehistoric field systems (see below) and settlement activity. Similar evidence exists at Piperstown Hill where flint cores, tools and debitage were found with Neolithic hut sites next to a field wall all of which had been overlain with peat before their discovery by fire (Rice 2006, 32; Rynne and Ó hÉalaidhe 1965, 79). Likewise at Knocknarea, Co. Sligo, chert cores, tools and debitage were identified in excavations of hut sites (Bergh 2009, 107). Interestingly, all of the possible prehistoric hut sites in the Blackstairs uplands have been identified following burning incidents which removed peat cover suggesting that this is a significant factor in their identification.

Agriculture & Enclosure

Prehistoric agriculture is also poorly represented although this may be a result of later reworking of the land. The peaty soils and vegetation which still overlie many parts of the Blackstairs uplands especially in the more sheltered valleys might also mask further evidence. Pre-bog walls were identified on Dranagh Mountain in 2011 (FS01 & FS02) following an extensive fire as well as on the southern slopes of Brandonhill (FS42) although the latter may date to the early medieval period (see below). The presence of these systems may indicate the activity of Neolithic or

Bronze Age farming communities who favoured the lighter soils which existed before the onset of peat growth (Mitchell 1976, 138). Upland Neolithic field wall systems have been identified in the Dublin Mountains at Piperstown (Rynne & Ó hÉalaidhe 1965/66; Rice 2006) and Kilmashogue (Cooney 1991, 123), the Céide Fields, Co. Mayo (Caulfield 1978, 139; Caulfield et al. 1998, 629), Mount Brandon, Co. Kerry (Coyne 2006(a), 37), the Burren, Co. Clare (Jones 1998, 27) and the Antrim uplands (Cooney 2000(a), 47) showing that this was a widespread phenomenon. The later use of pre-bog field wall lines on Dranagh Mountain may suggest modern field walls overlie earlier ones on some slopes.

Other Prehistoric Features

Joining the various funerary monuments and settlement features are a diverse range of other site types including rock art, cursus monuments, a stone row, hilltop enclosures, standing stones, enclosures and a hillfort. While most of these likely date to the Neolithic (Fig. 5.10) and Bronze Age (Fig. 5.11), the Iron Age is rather more enigmatic in this regard as there are no diagnostic Iron Age features identified to date. Some features constructed in the period may be inhibited from identification by morphologies which could date to any period such as enclosures and hut sites (Cooney & Grogan 1999, 208; Corlett 1998, 5). Similarly, features with earlier origins such as hillforts or standing stones may have continued in use into this period (Herity & Eogan 1989, 253). Conversely, two annual upland gatherings on the last weekend in July (FES01 & FES02) which took place throughout the nineteenth and early twentieth century and recorded as part of this survey may have Iron Age origins (MacNeill 1962, 2). More importantly, no archaeological evidence for these gatherings has been identified, rather their location and presence is preserved in local folklore. These represent a use for the landscape in the past which, despite leaving little trace, was of huge importance to contemporary communities. Similar events likely took place in the uplands in all time periods under discussion. Consequently, a full understanding of the landscape beyond the construction of features and their associated activities is difficult to assess. The discovery of an Iron Age deer trap (FIND01) on the summit of Blackstairs Mountain certainly proves that the uplands were being used at this time. A number of holy wells in the surrounding foothills may indicate that the spread of this upland activity was more widespread as suggested by

Iron Age finds from holy wells elsewhere in Ireland (Ray 2012, 141; Hughes 2005, 44; Raftery 1994, 182-3) (Fig. 5.12).

Rock art is a widespread feature of the eastern side of the Blackstairs Mountains (Fig. 5.13) and one of the clearest signs for Neolithic activity in the uplands (Bradley 1997, 91; Corlett 2014, 1; O'Connor 2003, 16; O'Connor 2006, 195, Waddington 1998, 51). Of the thirty-nine records in County Carlow, fourteen examples (one-third) have been identified to date in the Blackstairs townlands. Four of these (RA03, RA04, RA06 and RA07) are in the uplands. The art which decorates these stones varies between cup and rings, cupmarks, concentric circles, rings and lines (Chart 12). No two stones are in any way similar; the size of the stone, positioning of the art and the numbers of each motif vary widely even where they exist in close proximity to one another such as at Rathgeran (RA11, RA13 & RA14) Crannagh (RA03 & RA04) and Dranagh (RA01, RA12 & RA16). Interestingly no rock art has been found on the County Wexford side of the range. While this may be a result of a modern visibility, it does conform to the pattern of identified prehistoric features in north county Wexford as a whole where there is a notable absence of sites compared to the west of the ridgeline. Only one example has been identified on Brandon Hill in County Kilkenny.

Cursus monuments are another Neolithic feature, found throughout Ireland and also in Britain, two of which occur in the Blackstairs uplands along with a possible third. Such sites are poorly understood and their purpose remains a matter of debate (Bradley 2007, 65; Smith & Walker 2013, 83; see also Barclay & Harding 1999). Consisting of two long parallel banks of stone or earth, they are often located close to other prehistoric features (e.g. Tara, Newgrange & Keadeen Mountain, Ireland; Rudston Cursus, Dorset Cursus & Dorchester on Thames Cursus, England). The Blackstairs examples each consist of two stone and earthen banks which are today overgrown with peat rendering them invisible in places. In the case of CU01 previously recorded on the Blacks Banks, slope severity means there are no visible alignments uphill as the course is ascended although from an aerial perspective it could be suggested that it is aligned on the cairn at the summit of Mount Leinster. Alternatively it could mark a processional routeway to a feature on the Black Banks ridgeline which is either buried under the extensive peat growth today or has since been removed. The second example CU02 identified using OSI orthophotography

(Kenny 2014, 22) appears to have been aligned on the summit of Slievebawn where a previously mentioned summit cairn exists.

These cursus sites highlight the importance of local testimony and knowledge in the recording process. Local tradition (Tommy Murphy, *pers. comm.*) in the village of Myshall to the north of the range states that CU01 was formed when a witch standing atop Mount Leinster, cast a stone in anger at a rival witch in Wicklow. The force of the act caused her to lose balance and slide down the mountain leaving the track in her path. She came to rest in the village of Myshall where a double bullaun stone (BUL01) in the graveyard (GY01) is said to have been made by her knees while a standing stone in the townland of Clonee is said to have been the cast stone. Folklore from Borris, Carlow in the National Folklore Collection (NFC) attributes her fall to St. Finian who pushed her from the mountaintop for her refusal to convert to Christianity (NFC MS946, 107). Similar tradition in the region also reported the existence of a further two such features (Tom Doolan, Andrew Jordan, *pers. comm.*) one of which, was confirmed by the discovery of CU02. Unfortunately the supposed site of the third example is located under an area of forestry planted by the commercial service Coillte Teoranta in the 1980's and as such is probably entirely removed and cannot be confirmed.

Further possible evidence for upland Neolithic activity is the previously recorded hilltop enclosure on Brandon Hill (HE02), sited on the southern slopes of the mountain. Gibbons has previously suggested that the shape, size and siting of this site is unique in Ireland with no known parallels (1990, 28). It forms a large plectrum shaped enclosure (not to be confused with much smaller early medieval features with the same shape identified in the lowlands (Coyne & Collins 2004; Coyne 2005; 2006(b)) well over 143m in diameter and cuts across the slope rather than being located on a hilltop as the classification implies. Its siting is indeed unusual; the slope on which it sits is extremely steep, there is no view of anyone approaching it from the northern side facing the mountain summit, while the area it encloses is rough and rocky. It seems to predate the onset of peat on this part of the mountain, the date of which has not yet been determined. Much like the hillfort HF01 (see below), it was constructed of drystone walling which has since collapsed and become overgrown with peat. It encloses one cairn, C59, on its northwestern corner which as mentioned, could be a collapsed passage tomb. It may have been a ceremonial enclosure possibly

defining a space around the cairn which would suggest a prehistoric date. The enclosure of prehistoric ceremonial or burial features located on mountain summits has been identified elsewhere such as at Knocknarea, Co. Sligo (Bergh 2002, 141) and the Dublin Mountains (Cooney 2000(a), 239-230).

The Bronze Age is represented in the form of a stone row, standing stones and later on, a hillfort. Stone rows or alignments are typically a Bronze Age feature (Thom et al. 1990, 380) mostly confined to two main groupings in the south-west and north of the country with isolated examples elsewhere (see SMR). The single upland example in the Blackstairs (SR01) represents the latter. Orientated east-west, there does not appear to be any visible alignment with a natural feature here although it may be aligned on celestial events. It is known locally as the "Nine Stones", a name which dates back at least to the early nineteenth century as evidenced by its inclusion on the first edition OS map (Sheet CW020). Numerous stories are associated with this site, one of which was recorded by the First Edition OS Fieldbooks which stated that they were erected to commemorate nine men murdered and buried at that site. A number of people in the present day suggest that this relates to an incident which occurred in 1798. Other stories state that they were placed to commemorate nine shepherds who were killed on the mountain while a further story attributes them as the inauguration site of the early Kings of Leinster (Dalby 2014, 199) called Cnoc-an-Bocha by Patrick Kennedy in one of his publications on the range (1867, 265). There are certainly commanding views to the north of the site dramatically framed by the natural “Coolasnaghta Amphitheatre” formed by Slievebawn and the Black Banks Mountains to the west and east respectively. No other such site has been identified to date in the Blackstairs although these may have occurred and since been damaged by natural or human activity.

The original function for standing stones is most likely varied and in some cases may have changed over time. The previously recorded SSO2 (Dranagh) and SS04 (Knockymulgurry) are suggestive of ceremonial purposes based on their location and alignment with the landscape and their unusual size and shape. If the tilt in SS02 was corrected, its long axis would be aligned on the summit of Brandon Hill and its large summit cairn. SS04 is an extremely large granite slab measuring 2.65m in height with a large quartz vein running through the top giving it a distinctive appearance, aligned towards the Cooliagh Gap Lughnasa festival site (FES01). Its

location to the south of a crossroads at least early nineteenth century in date if not earlier (see Medieval Movement below) may suggest prehistoric origins as a route marker before the formalised paved routeways, three of which converge above this point, were built.

There are two further upland sites which are listed here as standing stones although their upright positioning may be fortuitous. SS01 identified in 2011 on Dranagh Mountain is located near a large cairnfield (CF01) which as mentioned, may be a Bronze Age cairn cemetery. This has parallels with a similar occurrence at Piperstown, Co. Dublin (Rice 2006, 49). SS03 also identified in 2011 is an unusual site, located in a large spread of granite boulders. It consists of two large granite slabs set upright and supporting one another. While it may have occurred naturally, its upright positioning could be a result of human activity. A nearby pre-bog hut site (H11) may be associated with this feature. These recorded standing stones might not be a true representation of the original number of standing stones across the mountain range. Many could have fallen, been reused in field walls, or removed and dressed by stone masons for construction downslope.

The final piece of evidence suggesting Bronze Age activity is the enclosure of two of the lower peripheral summits with a hillfort and a hilltop enclosure. Both of these classifications are defined as large stone or earthen enclosures sited on hilltop locations; however, they are differentiated by size and the prominence of the hill on which they sit. Hillforts are typically larger sites enclosing many hectares and are located on strategic positions within the landscape while hilltop enclosures are usually smaller and located on less prominent hilltops. The Blackstairs hillfort site is located on the summit of Knocksquire or Knockscur Hill. Its enclosing walls are in a fairly ruinous state today although the amount of scattered stone and rubble would indicate that they were far more substantial in the past. There does not appear to be any trace of a ditch on either side of the stone enclosure although this may have been backfilled in more recent centuries as part of agricultural activity on the summit of the hill which saw the enclosure bisected by a number of field walls. Alternatively this internal division may have been carried out during a later phase of occupation such as at Caherconnell, Co. Clare (Hull & Comber 2010, 2). There is only one apparent entrance on the WSW side of the monument which until recently had been mistakenly classified as a megalithic structure (CW019-064). This hillfort is one of only two such

sites in the entirety of County Carlow the other being located in the townland of Ballinkillen (CW019-027) 5.92km to the northwest. Between both of these hilltops is a valley flanked by the Blackstairs Mountains to the east and the Nurney ridgeline to the west. Through this passage of lower ground run a number of modern roadways many of which may have medieval or prehistoric origins as they link south and north county Carlow between the historic and present-day villages of Borris and Fenagh.

The hilltop enclosure HE01 (reclassified by this project) in the townland of Myshall was entirely levelled between 2010 and 2011 although it is visible on a number of historic satellite images. It consisted of a 1-1.3m wide bank enclosing the entire summit of the hill and was 100m in diameter. There was evidence in some places for a fosse although this was not apparent all around the site. Despite its classification as a "Racecourse", the NMS interpreted it as a possible post-medieval tree plantation enclosure similar to other sites in County Monaghan which was never planted with trees (SMR CW017-041). While it may have been used or re-worked for either of these purposes in the post-medieval period, it may have prehistoric origins. The hilltop enclosure on Brandonhill has already been previously discussed and suggested as a possible Neolithic enclosure.

It is interesting that despite their similarities in size and form, all three of these sites are classified differently ("hilltop enclosure"; "hillfort"; "racecourse") by the NMS and highlights the subjectivity of the classification system. All are c.100m in diameter and enclose a hilltop or slope. Despite its small size in comparison to other hillforts across the country, it appears that the Knocksquire site was classified as such because of its strategic location overlooking a narrow valley. Similarly, Brandon Hill was classified as a hilltop enclosure because of its lower prominence despite its location on the side of a hill rather than a summit. Finally, the regularity of the Myshall example led to its classification as a modern landscape folly despite evidence for later reworking of the Knocksquire hillfort indicating that such activity did occur in the immediate surrounds. It is suggested here that the Knocksquire example should perhaps fall under the Hilltop enclosure classification as its size does not come anywhere close to the large sites typically associated with hillforts such as Spinian's Hill, Rathgall or the Baltinglass complex in County Wicklow.

Despite its visible absence in the landscape, the discovery of a deer trap on the summit of Blackstairs Mountain in the summer of 2011 by a hillwalker confirms the presence of Iron Age activity in the Blackstairs. The deposition of artefacts in waterlogged sites such as bogs is well known from prehistory (Menotti 2012, 12). This wooden object was discovered near the base of an eroding peat hag in a broken state and lying on its side as if deposited rather than being left in place for use and never returned to. Vegetative material appeared to surround the object also. Preservation was so good that the individual axe marks made in its construction were still visible on its surface. As previously mentioned, radiocarbon dating placed it firmly in the Iron Age at 2102 ± 33 BP with a 95% probability that it dates sometime between 336-42BC (Dr. Andy Halpin pers. comm.). Its deposition in a wet place on a prominent mountain summit might suggest that it was deliberately placed as part of a ritual or ceremonial event. This object also acts as a reminder that agriculture was not the only source of food for communities during this period. Equally, the extensively enclosed surrounding landscape we see from the slopes today was not what would have been seen in the past but rather a patchwork of cleared farmland, forested areas and scrubland.

Movement

There is little evidence for prehistoric movement in the Blackstairs although suggestions can be made based on later features. The Cooliagh Gap was an important mountain pass throughout the post-medieval and possibly medieval period (see below). This routeway may have its origins in the prehistoric period as suggested by the previously recorded standing stone (SS04) in Knockymulgurry which might have acted as a way-marker and the Lughnasa festival gathering at the pass. This is also the only means of crossing the southern spine from east to west without having to travel around through the foothills to the north or the south owing to the steep slope on the western side. Similarly the Scullogue Gap may have afforded a routeway between the two main spines on the range while the cursus monuments might suggest formalised access routes to the top of the mountains where the large summit cairns were built. The presence of a portal tomb on the slopes of Knockroe as well as the pre-bog field systems and hut sites on Dranagh Mountain indicate people moving into and through this landscape throughout prehistory although the tracks they would have followed have either been lost or are overlain by later routeways.

Early Medieval Period

The early medieval period which lasted from the fifth to the twelfth centuries AD (Edwards 1996, xiii; O'Sullivan et al. 2008, 1) is rather elusive in the Blackstairs uplands. Just as occurred with prehistoric sites which were damaged or overlain with peat in later centuries, the same probably occurred for features at this time and more may come to light in the future. Alternatively the uplands may not have been utilised beyond seasonal grazing or isolated settlement as there appears to have been a general reduction in extensive upland use from the later Bronze Age onwards in Ireland as a consequence of climate deterioration (Cooney & Grogan 1999, 99).

Settlement

Evidence for early medieval settlement in the Blackstairs region is slightly better represented than in prehistory namely through the widespread presence of ringforts, the most numerous settlement type from the period in Ireland (O'Sullivan et al. 2008, 48). As well as those known examples (listed in Volume 3), further sites may have existed in the foothills and the upland fringes which have either been entirely plough levelled or had their stone robbed out for the construction of later field walls. Similarly, less intensive upland habitation such as seasonal occupation as part of transhumance or animal herding (see below) carried out by slaves as described in St. Patrick's Confessio (Kelly 2000, 438) may have been practiced in the uplands for which there is little evidence today. Early medieval ecclesiastical settlement (Fig. 5.14) is also represented in the region by sites such as Askinvillar Upper (EE01), Killoughternane (CH01) and Myshall (CH07) although this is limited to the foothills. The name of Brandon Hill itself is attributed to Saint Brendan the Navigator who is said to have established a monastery at its foot in an as of yet unidentified area known as Shanakeel or Ballynevinoorach sometime after 512AD (Gibbons 1990, 28; Guiley 2001, 53). Despite their location in the foothills, it is possible that their use of the surrounding land included the uplands. The site at Askinvillar Upper is particularly interesting in this regard as it is approximately a kilometre distance from the current extent of the field enclosure (which reaches to 300m) and 600m from the 200mOD upland line. Two famous saints are also attributed with Blackstairs townlands which include an upland portion again an indication of early medieval settlement. St. Finian, founder of Clonard Abbey in Co. Meath was born in the Blackstairs townland of Rossacurra in the late fifth century (Murphy 2008, 237) while St. Columbanus,

founder of the monastery at Bobbio was also born in the region around this time (De Paor 2008, 88).

Three previously known ringforts are found on the upland fringes (Fig. 5.15) in the townlands of Crannagh (RF01), Coonogue (RF02) and Knockendrane (RF03) however the majority of sites are in the foothills. This lowland focus is generally consistent with their nationwide distribution. Examples in the Blackstairs include Killoughternane (RF04), Ballybeg Big (RF06), Aclare (RF07), Myshall (RF08) and Mandoran (RF30) and more interestingly, a tri-vallate example in the townland of Ballygalvert (RF15). Despite a poorly represented prehistoric period, one of the densest distribution patterns of ringforts and thus early medieval settlement in County Wexford is in the foothills and lowlands to the east of the Blackstairs range (Bennett 1989, 53). Two additional ringforts and one possible example were identified during the present survey in the townlands of Ballycrinnigan (RF05 & RF31) and Deerpark Old (EN01). While the former two were located in the immediate foothills, the latter is located in the uplands. Unusually however it is above the 250mOD line which is inconsistent with the distribution of ringforts across the country and in the south Leinster region which tend to avoid the uplands and valley bottoms (O'Sullivan et al. 2008, 58; Stout 1997, 62). For this reason it has been classified as an enclosure rather than a ringfort until ground assessment reveals otherwise.

Of the three previously identified upland ringforts, all were just above the 200mOD line and on the Carlow side of the range. RF01 in Crannagh is classified as a univallate cashel as it is enclosed by a single stone wall. Extensive damage has occurred to the site both by later robbing out of the walls as well as the surrounding commercial forestry plantation. Knockendrane ringfort (RF03) also consists of a univallate enclosure although in this case an earthen bank and ditch was constructed rather than stone walls thus sub-classifying it as a rath. The central space of both these sites is roughly the same at twenty-two and twenty-one metres diameter respectively. Both have been amalgamated into the later field systems in which they stand and both are on relatively fertile land in comparison to the less fertile blanket peat and skeletal soils above them (Fig. 5.16). EN01 is slightly larger but appears to be similarly attached to a newly identified rectilinear relict field system on its northern side (FS06).

RF02 in Coonogue is a rath but one which has two enclosing ditches making it a bivallate ringfort, much of which has been plough-levelled on its eastern side. It has been suggested that bivallate and more rarely trivallate forts are indicative of the higher status of the occupants during the sites use (Edwards 1996, 33; Stout 1997, 18). Its siting also suggests greater importance as the Scullogue Gap, in which the townland of Coonogue sits, is an important communication artery between County Wexford and County Carlow and one of the few passes through the range from east to west. The roadway between the village of Ballymurphy and Kiltealy which existed on William Allen's 1824 map of Carlow and in 1798 folklore (see below) may follow the course of an early medieval and possibly prehistoric routeway. RF02 is located to the south of this road and the placement of this bivallate ringfort at the entrance to the gap may have been an attempt to control movement through the area. The Blackstairs Mountains also formed the border of the Uí Cinseallaigh territory in Wexford (Toohey 2003, 12) and the ringfort may be linked with this as a frontier site.

Together these ringforts provide direct evidence for settlement on the upland fringes in the early medieval period which may have been part of a much wider network than is visible in the landscape today. Supporting these families would have been an agricultural system based on livestock and cultivation which has been identified in excavations elsewhere and in contemporary documentary records (Kelly 2000, 364).

Agriculture

Despite the presence of settlement features which are generally associated with agricultural activity, archaeological evidence for early medieval agriculture in the Blackstairs uplands is scant. In the case of the lowland Monamolin ringfort (RF22), nearby monitoring of topsoil removal in advance of house construction identified the possible traces of agricultural activity of an unknown date which may have been associated with the use of the ringfort (excavation licence number: 07E0075).

Early medieval law tracts inform us of the types of agricultural activities and crops grown around ringforts (see Kelly 2000) applicable to the aforementioned upland examples. Their locations today mainly in agricultural or forested land means that the topographical traces of any field systems are long removed. Since livestock

management was a main concern for early medieval farmers, the Blackstairs uplands would have afforded seasonal grazing grounds in order to preserve the lowland grass for winter feed (Ó Cróinín 1995, 101; O'Sullivan & Downey 2008, 32). Hut sites mentioned in the previous section may have been associated with this activity. In the absence of excavation, it remains impossible to attribute a date to these structures however examples of early medieval hut sites are known from Mount Brandon and the Paps of Anu, Co. Kerry (Coyne 2006(a)), the Beara Peninsula, Co. Cork and the Wicklow Mountains (O'Sullivan et al. 2008, 93). Such low intensity practices would have left little topographical traces which would be visible today.

Early medieval field enclosure is also difficult to identify as the morphology of these features can date to almost any period or have been reworked by later activity. Field walls (FS42) alluded to above, discovered on Brandon Hill following a burning incident were also associated with lynchets. The latter are not classed as an archaeological feature and so do not appear on the SMR. Where investigations have been carried out in Britain, many have been dated to the medieval period although some such as on Dartmoor are Bronze Age in date (Hall 2014, 247) and a prehistoric date has been previously suggested above.

Movement

There is one reference recorded in the *Annals of the Four Masters* (M1153), which implies a movement through the Blackstairs Mountains during the early medieval period. The Cooliagh Gap was an important pass through the southern spine of the range despite it being over 300m above sea level. Roadways were built over this pass in the post-medieval period to facilitate movement (e.g. R05, R06, R07, R08, and R09) and it is possible that these overlie medieval and possibly prehistoric trackways. Without the existence of this pass, travellers would have to follow the whole course of the spine in order to reach the other side which could add days to the journey.

Ireland before the arrival of the Normans was politically fluid with borders constantly shifting and kingships changing hands (Edwards 1996, 8; Toohey 2003, 12). In 1152, Dervogilla, wife of the King of Bréifne Tiarnan O'Ruairc, eloped with Diarmuit MacMurrough the King of Leinster to his seat at Ferns, Co. Wexford. The following year (1153) Turlough O'Connor the High-King of Ireland travelled to a

place called Doire-an-ghabhlain (the oak wood of the fork) which is modern day Old Gowlin on the western slopes of the southern spine below the Cooliagh Gap. Here Dervogilla and her cattle were handed over to him, by MacMurrough and his army as tribute (Orpen 1911, 57; Toohey 2003, 15). For both parties to have met at this point suggests that MacMurrough's army may have moved over the Cooliagh Gap. Otherwise his army would have had to march further north to the Scullogue Gap and then turn south to meet O'Connor who would have passed the Scullogue Gap on his march south from Meath (Fig. 5.17). This indicates that the mountain pass which was so important in the nineteenth century it warranted the construction of a Famine Relief Road (see Chapter 6), was used at least since the early medieval period.

Later Medieval Period

Definitive archaeological evidence for later medieval activity (thirteenth - sixteenth century) is also limited in the Blackstairs uplands and there are few documentary sources for the region in that time (Fig. 5.18). Those living in the shadow of the mountains may have continued to use them as in earlier periods, for seasonal grazing and isolated settlements. The similarity of the archaeological remains for these activities such as enclosures and hut sites, to the same practices in earlier and later periods, limits their identification, something which future excavations may correct. This period saw the arrival and the establishment of the Anglo-Norman influence in Ireland which left its impact on the archaeological record in the Blackstairs foothills as well as the uplands to a limited extent. This included the foundation of the Cistercian Duiske Abbey in 1204 at the foot of Brandon Hill in the village of Graiguenamanagh, Co. Kilkenny by William Marshall (Joyce 2009, 11). The latter had a major influence on the surrounding area including the uplands. Other events which are more difficult to recognise archaeologically but which are recorded in the historical record are the Black Death and plague incidents and the campaign of King Richard II through the region as well as the dissolution of the monasteries in 1546 which brought an end to the influence of Duiske Abbey on the region.

Settlement

There is little identifiable archaeological evidence for later medieval settlement in the Blackstairs Mountains apart from five previously identified moated sites (see below). This is not an issue unique to the upland area however, as medieval Irish rural housing in general leaves little above-ground traces (O'Keeffe 2015, 59).

Despite the absence of such evidence, contemporary documents and placenames can reveal some limited information. The townland name of *Ballynalour* to the south of the chain for example, suggests the presence of a medieval leper hospital (LH01) which remains unidentified somewhere in the region (Lee 1996, 45). This indicates a population group in the immediate foothills or even the upland fringes which may have been associated with the Norman settlement and monastic site at St. Mullins, Co. Carlow given its proximity and a roadway today linking the townland to the site.

Numerous monastic and urban sites in the surrounding region such as the aforementioned Duiske Abbey and St. Mullins would have been serving a local population. The extent to which these communities settled the upland portion of the Blackstairs is difficult to assess however and it may have been that the population was low enough not to have warranted the settlement of the less fertile, wetter and more exposed uplands. Conversely frequent plagues may have resulted in people taking refuge in the more isolated uplands away from urban centres. This suggestion is based on documentary sources from Duiske Abbey which inform us that the area was affected by the Black Death in 1348 (Kelly 2004, 2). The proximity of communities surrounding the Blackstairs to the major trading ports along the River Barrow would have allowed the disease to spread rapidly. The effects of the pandemic on the population however are impossible to tell today although records from the various monastic groups around the country can give us some idea (Kelly 2001, 12). Charters from Duiske Abbey record that the monks there began caring for the sick before succumbing themselves in 1348. The surrounding population was devastated as was the population of the Abbey and it struggled in existence before the Dissolution of the monasteries in 1536. A visitor to the Abbey in 1349 wrote; "it is filled with woeful looking men some covered in sores, others spitting up blood. Few recover that have their infection" (Joyce 2009, 16). Dendrochronological and pollen analysis across Ireland suggests that there was a considerable regeneration in oak forests across Ireland at this time as a result of the dramatic fall in population and the consequential reduction in agricultural land being exploited (Kelly 2004, 41). This might explain why letters and documents relating to the campaign of Richard II six decades later in 1394 refer to the area around the Blackstairs as being wooded (Saul 1999, 279; Senior 1984, 143; Steel 1941, 208), something which is in stark contrast to the agricultural land today. Placename evidence also supports this in the names of some of the

Blackstairs townlands (e.g. Craan/Craan – wooded area; Crannagh/Crannach- abounding in trees; Dranagh/Dranach- abounding in blackthorns; Gowlin/Doire-an-Ghabhlain- fork of the oak; Raheenkyle/Raithín Coille- the fort of the woods). Until targeted environmental analysis is done in the Blackstairs we cannot know if these indicate earlier forests or a result of the Black Death and its knock-on effects in later decades.

The substantial remains of five moated sites along the fringes of the Blackstairs uplands (see Fig. 5.18) indicate the presence of medieval communities despite the lack of other archaeological evidence. These features which date to the thirteenth and fourteenth centuries were generally the fortified settlements of Anglo-Norman lords although they may have been built by large tenant farmers, monastic sites (Barry 1977; Barry 1988) or by a number of Gaelic Lords (O'Conor 2000, 100). O'Keeffe (2015, 59) has also argued that they were built by English settlers farming previously uncultivated land during the reign of Edward I (1272-1307) which offers another explanation for the absence of other medieval settlement in the Blackstairs uplands to those presented above. Three of the Blackstairs examples have been identified on the slopes of Brandon Hill, two on its southern foothills just below the upland fringe in the townlands of Ballygub New (MS03) and Brandonhill (Ida) (MS01) and the third upland example on its eastern slopes in the townland of Ballyogan (MS01). Both examples on the Wexford side of the range in the townlands of Knockatober (MS04) and Kyle (MS05) are also located just below the upland fringe. The siting of the Kilkenny examples could suggest that they were linked to the aforementioned major Anglo-Norman settlement at Graiguenamanagh, Co. Kilkenny on the course of the River Barrow to the east.

Preservation and the visibility of each of these sites vary considerably. The upland Ballyogan example (MS02) has been surrounded by extremely dense mature forestry plantation some of which, despite the respect the planters afforded the centre of the site, has begun to encroach through overhanging branches, seeds germinating and root damage. Brandonhill (MS01) lies on what is now wild vegetation but which was once part of a land reclamation extension while Ballygub New (MS03) is situated within a field system which is currently managed under pasture. Streams or rivers run close to all sites. While the internal space of the two unforested examples (MS01 & MS03) are relatively flat (probably from later plough levelling), the internal surface of

MS02 is extremely undulating. Stone is visible through the dense grass and bracken vegetation and while patterns or structures are difficult to discern at present, the outline of up to seven buildings were formerly identified (Gibbons 1990, 29). In the case of the Wexford examples, no trace of the sites exists today but they are recorded on the first edition OS maps. The presence of these moated sites indicates that the Normans were using parts of the uplands by at least the thirteenth/fourteenth century and most likely for agricultural purposes, evidence for which is found elsewhere in the Blackstairs.

Agriculture

In the absence of records it is difficult to assess the full extent of land ownership, agricultural practices and field enclosure during this period in Ireland in comparison to Britain where a good record still exists for many manors (Hatcher 2009, xii). Parts of the uplands and the surrounding foothills certainly were being used during the late-medieval period as evidenced by the Annals of Duiske Abbey. Agriculture, especially sheep and crops, were central to the monastic life of the Cistercians order (Barry 1988, 103; Monk 1985/86, 34). After its foundation in 1204 the Abbey was granted 23,000 acres of land in the surrounding area (Fig. 5.19) and it has been estimated that 16,000 acres of this included the poorer quality lands of the Blackstairs, Brandonhill and Coppanagh ranges. This was not farmed solely by the monks as lands were leased especially from 1290 onwards which helped to fund large-scale building projects in the abbey (Carville 1979, 49) thus hinting at unidentified settlements or the construction of the aforementioned moated sites. Despite the importance of agriculture to the latter, the soils surrounding the Blackstairs examples vary in their suitability for this activity (Fig. 5.20). The two Wexford sites (MS04 & MS05) are surrounded by relatively fertile acidic brown podzols however the upland Brandonhill examples are located on or close to peats or lithosols which are generally of poor fertility especially in the case of Ballyogan (MS01).

Further evidence for agricultural activity in the range comes from the townland of Grange/Monksgrange, Co. Wexford to the southeast of Blackstairs Mountain where the monks in Duiske Abbey had one of their many outlying grange farms (GRA01) recorded as such for the first time by the present survey. Here, three carucates of land was gifted to the monastery in 1226 (Butler & Bernard 1918 35, 39;

Carville 1979, 41). Three townlands today refer to the presence of the grange farm one of which includes an upland portion (see Fig. 5.19). No physical evidence for any of the associated farm buildings has yet been identified although it has been suggested that the present Monksgrange House (family home of the Anglo-Norman historian G. H. Orpen) may have been built on the medieval farmyard (Carville 1979, 42). The only surviving archaeological evidence is a fishpond (FP01) which is silted up today outside the upland zone. A former owner, T. Orpen had heard the feature referred to as "The Baize Pond". A baize was a coarse brown woollen cloth used to make the clothes of the lay-brothers rather than the white worn by the monks and Carville noted that this name suggests that the pond was used for the washing of these habits (1979, 44) and consequently indicates the group working the surrounding lands. As this grange sits below the Cooliagh Gap, it is likely that the mountain pass was a communication route between it and the abbey. Brenda Lynch in her description of the medieval Cistercian landscapes of Ireland (2010) refers to the Scullogue Gap to the north as being important to the monks of Duiske. It is possible that the Cooliagh Gap was just as important if not more at this time adding further weight to the suggestion highlighted above that the use of the pass for movement has its origins long before the post-medieval roadways.

Placename evidence also suggests a booley site on the northeast fringes of the Blackstairs during the post-medieval period, first recorded as part of the present survey. The townland of Boolynavoughran (first used in 1593- see logainm.ie) and the nearby townland of Booleycreen (no upland portion) suggest that seasonal cattle herders were using at least this part of the uplands and foothills. These placenames also suggest that the area was wooded; Booleynavoughran (Buaile na bhForcrann) - "Booley site under the trees"; Booleycreen (Bualie na Críon(ach)) - "Booley site of the withered timber/decayed wood" indicating the scrub/edge of a larger wood or forest (Terry O'Hagan, pers. comm.). This adds further support to the accounts from Richard II's campaign describing the landscape as wooded. The area today is almost entirely drained and enclosed for agriculture and modern housing and there is no evidence identified as yet for these booley huts. There is an area of deciduous forestry in the townland at present although it is a twentieth century feature as the spot is depicted as a patchwork of field systems on the first edition OS map but it is marked as rough land on the 25" series. There is no local memory of any booley tradition in

the region today as is the case for the rest of the Blackstairs. These townlands may hint at a much more widespread practice across the uplands and foothills during the period.

Early Post-Medieval Period

Archaeological traces of human activity in the post-medieval period (seventeenth - late eighteenth centuries) remain as elusive as the medieval period (Fig. 5.21) although this is the first time direct references to the uplands are found in documentary records giving a better understanding of land use. These documents suggest that the upland area was largely left to rough grazing and turf cutting while the lower slopes were enclosed and farmed. Some of the townlands in the foothills also consisted of undrained bogs and forests, a stark contrast to today. Population growth would have moved the limits of these as more land and fuel was required.

Folklore tells us that the uplands were a place of retreat also for marginalised members of society, the most famous being Charles O'Dempsey and Captain James Freney. O'Dempsey was a raparee from Lea Castle; County Laois who stole horses after his family were dispossessed following the Williamite Settlement. This earned him the name "Cahir na gCapall". He is said to have taken refuge at a set of tors north of the Lughnasa gathering point at the Cooliagh Gap named "Caher Roe's Den" after him. He was eventually caught and brought to Portlaoise where he was hanged in 1735 and buried in Ballyadden Graveyard, Co. Laois (Cosgrave 1839). James Freney was a descendant of the Freney family of Ballyreddy Castle, Co. Kilkenny who were dispossessed by Cromwell leading his father to settle in Thomastown. Freney himself turned highwayman in the 1740's after he had to shut his public house owing to the fees charged by the town corporation. He joined the notorious Kellymount gang of County Kilkenny and was declared an outlaw in 1748. His exploits took him to raiding stage-coaches in the foothills and lowlands surrounding Brandon Hill and the southern end of the Blackstairs Mountains. He is said to have hid and buried treasure in the uplands before his capture along with the rest of the Kellymount gang in 1749 (Holden 2009). These were not the only people using the region however and evidence hints at multiple land uses just as in any other period.

Population

The Down Survey (1656-58) and the accompanying census of 1659-60 indicates a sparsely populated landscape in the Blackstairs with only 145 people in the Carlow townlands (10 Irish (all in Coonogue) & 135 English), 152 in Wexford (6 Irish in Ballybaun & all others English) and 59 in Kilkenny (all English) giving a total recorded population for the region of 356 individuals (Fig. 5.22). It is unclear whether English refers to new settlers or those who speak the language. While this census records a nationwide population of 500,000 over 15 years of age (O'Laughlin 1994, 1), the particularly low population in the Blackstairs townlands may be a continued result of the Black Death depopulation as well as the Cromwellian Wars which saw between 20 to 40 percent of the Irish population killed by war, famine or transplantation (Bartlett 2010, 127; Cunningham 2011, 40). Similarly the records for certain townlands may not have survived and so our data is skewed. For example the 1641 Depositions record at least one family in the townland of Ballycrinnigan but no individuals are recorded here in 1659. Similarly there is no population recorded in the townland of Ballyogan where the seventeenth-century house, "Galmoy Castle" is recorded which either suggests the house post-dates 1659 or else the population record has not survived.

Tradition in the Blackstairs today holds that many of the families originated in the lowlands of County Wexford and were displaced around 1700AD by the Williamite Settlement (Pat Murphy; Séamus Murphy; Andrew Jordan, pers. comm.). One of the least discussed events in Irish history, this widespread land confiscation was a result of the Battle of the Boyne and the fleeing of the last of the Catholic nobility to France which led to a ruined economy, the uprooting of many population groups and the growth in banditry (Holmes and Schezi 2014, 226; Simms 1956, 163) of which the above mentioned O'Dempsey and Freney were a part. These displaced population groups are said to have settled along the foothills and uplands of the Blackstairs Mountains on land which had previously been unclaimed and unsettled. Certainly by the 1840's the population had exploded from the small figures recorded by the 1659 Census to 7,705 in the Blackstairs' Carlow townlands, 2,936 people in Wexford and 1,903 people in Kilkenny. Similarly the 1839 maps show a largely enclosed landscape except for parts of the higher slopes while the Down Survey maps suggest that much of this landscape was bogland or forested and the uplands are

marked as “unprofitable”. Records in the National Folklore Collection in UCD have references to the Irish language being spoken in the region including on the Wexford side of the range (MS 591, 64; MS 1344, 62-82) which is in contrast to Irish being almost unrecorded in the region in the 1600’s. This tradition would also account for much of the field enclosure on what is now commonage in the period following the Down Survey. A further support is that there are strong connections between Blackstairs families on both the Carlow and Wexford side of the range and families in other parts of county Wexford. Throughout the nineteenth and twentieth centuries men and women from the Blackstairs would take wives and husbands in Wexford from areas where they had a family connection and vice versa (Andrew Jordan; Séamus Murphy, pers. comm.).

Settlement

Little archaeological evidence for post-medieval settlement has been identified to date in the Blackstairs region. This is unsurprising as the uplands are marked as “unprofitable land” on the Down Survey Maps from the late 1650’s and some of the surrounding foothills, where the data is available, are forested or bogland (Fig. 5.23). While a tower house (Ballynalour (CAS02)) and large houses (e.g. Ballindoney, Co. Wexford (CAS01), Rathnageeragh, Co. Carlow (CAS03) & Ballyogan (HOU01)) in the foothills indicate a human presence, no confirmed settlement sites have been found in the uplands as of yet.

Depositions following the 1641 rebellion also provide a small window into settlement in the foothills. Three individuals and their losses are recorded in the Blackstairs region at this time, John Prance of Poulmounty & Ballycrinnigan, Daniel Cavenagh of Clonmullen (near Bunclody) and Elizabeth Griffith of Killedmond. The 1659 Census however is the largest proof we have of people occupying the foothills and possibly the upland slopes at this time. Seasonal settlement in the uplands may be indicated by agricultural remains.

Agriculture

Down Survey maps are not the only documentary evidence for agricultural activity in the Blackstairs in the post-medieval period. As well as recording settlement, the 1641 Depositions provide a snapshot of the agricultural practices in the region at the time. John Prance, along with being attacked and members of his family

killed, lost horses, cattle, pigs, hay and "garden fruits" to the rebels (TCD MS 812, fols 142r-142v). Similarly, Elizabeth Griffith reported that her sick husband Thomas Griffith was robbed of cattle, a mare and hay (TCD MS 812, fols 143r-143v). There is no mention in either of these accounts of sheep which were so vital to the medieval and present day local economy (a similar case occurs on the 1901 census for the region – see Chapter 6). The record of Daniel Cavenagh is made in response to charges brought against him and so no reference is made to his property (TCD MS 809, fols 071r-072v) although his habitation in the area around Clonmullen would suggest that there was an accompanying farm. It is possible that the farming practices especially by those with cattle and hay on the land included upland grazing. The uplands were certainly being used a century later for sheep grazing. One of the most accepted "last wolf in Ireland" killings occurred as late as 1786 near the village of Myshall after it had been hunted down from the slopes of Mount Leinster. This event is attributed to Mr John Watson, a master of hounds at Ballydarton House near the village of Fenagh. His daughter, Miss Emily Watson recorded in her diary how this wolf had been terrorising sheep and lambs in the mountains before the decision was made to exterminate it (Hickey 2011, 78; Moffat 1938, 75; Praegar 1950, 180).

Evidence for seasonal occupation and associated agricultural activity alluded to above is indicated by a cluster of huts (H01, H02; H03, H13) recorded on the northern slopes of Dranagh Mountain (Ballycrinnigan townland) in 2011. These are substantial structures with diameters over 6m and walls surviving to 1.5m in height. All are circular except for one rectangular example. They may be booley huts although there is no tradition of booleying in this region despite placename evidence from the northern fringes of the range suggesting it was practiced (see above). A second upland cluster of three huts (H38, H39 & H40) also in the townland of Ballycrinnigan to the west of Bran Scultair discovered by hillwalkers and first recorded as part of this survey may date to the same period as the previous hut sites. Interestingly these clusters are located in the townland of Ballycrinnigan where the 1641 Depositions record the presence of John Prance farming cattle and making hay. Booleying is not the sole interpretation of these sites as it has previously been suggested that the 2011 recorded examples may be the remains of shepherd's huts (Ó Murchú 2012, 52). If the last wolf in Ireland was hunted from Mt. Leinster in 1785 it means there was a community of these animals in the region until the 1780's. Once

these were wiped out, sheep had no major natural predators on the mountains (apart from birds of prey), limiting the need for continuous tending and with it hut building. Alternatively they are the remains of a booley tradition which has long since been lost. A recent investigation in the Galtee Mountains suggests that many booley huts there are seventeenth – eighteenth century in date (Costello 2015) and the Ballycrinnigan examples bear a striking resemblance to these.

Parts of the Blackstairs uplands may have been used for sport or recreational hunting throughout this period also. This is suggested by the townland names of "Deerpark Old" and "Deerpark New" at the northern fringes of the range (DP02) as well as "Deerpark" on the northern slopes of Brandon Hill (DP01). The former may have been attached to the castle site in Carrickduff (CW021-002) in the lowlands to the east. While the windows of this castle are Georgian in style, parts of the structure may have seventeenth century or medieval origins. The use of the name "Deerpark" on Brandon Hill does not appear in any records until the Down Survey Map of 1654 when parts of the former large townland of "Graige" (now Graiguenamanagh) are made into the townlands of Deerpark and Ballynakill.

1798 Period

Rebellion in 1798 had a major impact on the region with its prominence in local tradition as well as the number of commemorative monuments to events in the various villages a testament to this. For the upland region there are two features attributed to events at the time, a campsite and routeway. Military camps are generally associated with the permanent or short term lodgement of troops either on campaign or occupation. In contrast, the military camp in the Blackstairs uplands (MC01) consists merely of a simple sub-triangular field enclosure in which a group of rebels accompanied by the famous Fr. John Murphy of Boolavogue rested on the night of the 22nd June 1798 before continuing their campaign the following day into Goresbridge, Co. Kilkenny. Earlier that day they had moved through the Scullogue Gap along the northern road which passes through the area (the southern route being built in 1847 as part of a Famine Relief Scheme, see Chapter 6) and attacked the garrison villages and barracks at Rathanna and Killedmond, having accessed them through the bogs to the east of the villages (where the Blackstairs Mountains lie). That night locals travelled from the surrounding area to see and support the rebels. The roadway on which they advanced was later used in a fighting retreat back to Wexford after the rebels defeat at

Kilcumney (Byrne 1863, 208; NFC 973, 333-337; MacSuibhne 1974; McHugh 1998; Pakenham 1969). There is no visible surface trace of this nights events only a local legend and letters from the period, however, there may be sub-surface archaeological traces of their activity which might be revealed through excavation, geophysics or ploughing in the form of areas of burning or lost items.

This field is suggestive of how the Blackstairs sheltered rebels and soldiers from other periods and campaigns throughout Irish history. Indeed a number of houses are said to have hosted rebels during the 1798 period in the surrounding area. The medieval period also saw movement of forces through the area during various campaigns such as that of Richard II in 1395AD (Saul 1999, 280) and uprising of the O'Nolan's of Carlow in 1302AD (Otway-Ruthven 1980, 218). Some of these armies may have rested temporarily in the foothills or retreated into the mountains following attacks or skirmishes. Similarly, members of the Carlow and Wexford Brigades of the IRA would retreat through the Blackstairs following ambushes, raids or attacks during the War of Independence and Civil War (1919-1923) (see Bureau of Military History Archives).

Nineteenth Century

The nineteenth century is when we get the most detailed picture of the Blackstairs based on maps, documentary evidence, surviving settlements and land enclosure as well as local folklore and the National folklore collection in UCD. Despite the availability of these resources, they have remained unresearched as part of an analysis of the Blackstairs uplands until now. More interestingly, the same issues which limit our understanding of earlier periods such as the visibility of sites, the absence of scientific dating and preservation, are also found in the nineteenth century. However in this case, surviving folklore, local tradition and the greater availability of detailed contemporary documentary and cartographic records supplement our understanding. These complement the available archaeological evidence in some cases while being contradictory in others. Together they present a more complex use of the upland landscape than modern perceptions of the period account for and what is presented in the documentary evidence or the archaeological record alone. Given the implications of this for our understanding of earlier periods, the nineteenth century forms the focus of a more detailed discussion in *Chapter 6*.

Twentieth Century

Upland agriculture continued into the twentieth century although mainly as rough grazing, the limits of maintained field systems, most of which were laid in the previous century, creeping downslope. Settlement also continued in the uplands although most of these went out of use over the years as younger generations left the area or built new houses further downslope. The biggest use for the uplands in the twentieth century Blackstairs, however, was resource procurement and commercial exploitation (Fig. 5.24).

Turf Cutting

Extensive peat growth across the Blackstairs until recent decades meant that a ready supply of cheap fuel was formerly available to the communities who lived in the uplands and foothills as well as the wider region. Turf cutting was carried out on an individual, communal and industrial scale at different times throughout the recent history of the landscape however the tradition has died out owing in part to its designation as a Special Area of Conservation and the increasing availability of alternative sources of fuel. While earlier removal certainly occurred it is the twentieth century activity which has the most visible traces in the Blackstairs uplands today. Numerous structures and roads were also built at this time to facilitate extraction which adds to the cultural heritage of the landscape. None of the features associated with this activity and discussed here were recorded prior to the current project.

While the pockets of isolated turf cutting where individual houses were sourcing their fuel are hard to identify, those areas where turf cutting was carried out at an industrial or communal scale more recently have left their mark on the landscape. There are three areas where large-scale twentieth century turf cutting is still visible in the Blackstairs, all located on the northern spine, on or near the summit of the following mountains; Cloroge Beg (TC01), Blackrock Mountain (TC02) and Stoolyen (TC03). These are easily spotted by the network of steep banks left behind by the cuttings. Erosion has removed more peat than was present when extraction stopped and this cycle will continue until all the peat has vanished in many places just as has occurred at earlier sites. For example, references are made to turf-cutting on the bog of Cummer in nineteenth-century accounts almost all of which has been removed today (Kennedy 1856, 2) (for further discussion see Chapter 6). Formation of some of the widespread peat hags across the higher slopes of the Blackstairs were likely

initiated by earlier peat removal for fuel. Similarly, the extensive fires which have swept the landscape since at least the nineteenth century have stripped much of the peat which once covered the range (Conry 2006, 41). Numerous stories and tales abound of turf cutting being carried out at a particular site where only thin covers of peat exists today. Similarly local knowledge also attests to stony areas such as on the northern slopes of Blackstairs Mountain having once being covered by a deep layer of peat which was removed in a burning incident (Conry 2006, 48). As previously discussed, such activity and its knock on effects may have revealed and exposed a number of archaeological sites and artefacts of which we have no knowledge today with wider implications for our understanding of the prehistoric and medieval use of the uplands.

So important was turf to local communities that access roads were constructed from the lowlands to these sites. In some cases the roads lead straight to the site while others are joined together in a vast network across the landscape. Some of these had nineteenth-century origins as evidenced by the early OS maps however new roads were also constructed in the early twentieth century (e.g. see R02 and R04). These were likely built through a communal effort to facilitate the access of carts and sleds which were pulled by horses (NFC 1344, 137; NFC 1669, 8). Many of these roads were paved and cut into the mountain with channels dug in places to allow water to drain off. Some such as R03 have since been almost entirely reclaimed by landslides or have become overgrown with only a faint outline left. Others such as R14 were cut so deep and lined so well that they are still clearly visible and easy to follow apart from the vegetation which has grown over them. The use of these roadways by turf cutters is well attested to locally, the most famous being a sharp turn in the roadway on the south side of Stoolyen, known locally as "The Wicked Corner". It is said that many a cart overturned at this spot when the horse came downhill too quickly (Conry 2006, 51).

The outbreak of the Second World War led to a widespread shortage of fuel in Ireland among other imported commodities. In reaction the Government declared the "Emergency" and the country became increasingly reliant on its own resources, one of which was peat. The summit of Blackrock Mountain known locally as the "Moneer" or "Moanyer" (TC02) was identified as an important fuel source and so a roadway (R12) was built up to the summit of this site in order to facilitate the industrialisation

of peat extraction (Frizelle 1941, 21). Running for a distance of 3.5miles, it was constructed in 1941 and allowed for mechanised vehicles to reach the top. Up to 160 people were involved in peat extraction and a shelter (ST01) was constructed (Feehan & O'Donovan 1996, 13). The presence of newly recorded less substantial and smaller hut sites (H21-H25) on this ridgeline attest to earlier and possibly nineteenth-century phases of turf-cutting activity. Peat extraction continued after the war by contractors hired by Wexford County Council (Feehan & O'Donovan 1996, 13).

Forestry

Forestry activity began in the later twentieth century as the State began to purchase large tracts of marginal land for the planting of non-native conifers for industrial purposes. This saw the loss of large swaths of commonage across the Blackstairs including Bantry Commons, a townland of huge importance to sheep farmers in the nineteenth century (see *Chapter 6*). Beginning in the 1970's, pockets of land have been acquired and sold ever since and the amount of forestry has been increasing. This destructive nature of this activity has masked or removed numerous archaeological features from the landscape as suggested by the newly updated distribution map resulting from this project (see Chapter 7).

Infrastructure

Despite the importance of the various routeways through the Blackstairs in the past, the rise of the motor industry has meant that the range has become a barrier to communication rather than a facilitator. It is now cheaper, faster and more cost-effective to bypass the range rather than take one of the many routes through it. This has meant that only three modern roadways cut through the mountains now at the Corribut Gap, the Scullogue Gap and the Nine Stones. Apart from this the only other developments are a communications mast built close to the summit of Mount Leinster in the 1970's, a weather station on the ridge above Ballycrinnigan and Bantry Commons and a wind farm on Kilbrannish Hill. Wind farm development remains a threat to the area and the Blackstairs have been identified as a target site for wind farm development in the most recent Carlow County Development Plan 2015-2021 (see Chapter 7).

Agriculture

Since the nineteenth century, agriculture has been largely confined to rough grazing. Cereal and potato cultivation, once widely practiced as indicated by the traces of cultivation ridges found across the landscape and alluded to in the documentary evidence (see *Chapter 6*) is now almost absent apart from a few isolated farms in the foothills. Sheep and cattle are the predominant livestock. As population decrease continues in the area and the average age increases, horses are beginning to replace the traditional farming practices due to their lower maintenance and their larger livestock unit ratios (Helena Fitzgerald, pers. comm.).

Gatherings

Gatherings and festivals formed an important part of the early-twentieth century social calendar and two upland sites (FES01 & FES02) were used as part of this tradition. Families and communities from both sides of the range (some as far away as County Kilkenny) would meet at the Cooliagh Gap on the last Sunday in July known as “Mountain Sunday” or "The Big Day". Although not in the uplands, there were other gatherings at various dates throughout the year in the foothills and wider region including; St. Mullins 25th of July (“Sum-a-lins Sunday”); Coonogue Woods 29th June (“Fraughan Sunday”); Kiltennel 2nd Sunday in June; Clonygoose 3rd Sunday in June; Killoughternane unknown October date; St. Patrick’s Well, Templeludigan 17th March; St. Anne’s Well, Killanne (26th July). Bonfires were lit on every crossroads on the night of the 29th of June each year also which would bring the locals together (NFC MS890, 413-431). Most of the gatherings, practices and customs associated with these sites and events which stemmed from the earlier periods had stopped by the mid-twentieth century. Given their stronger association and larger use in the nineteenth century, the upland gatherings are further explored in Chapter 6.

Summary

Analysis of the Blackstairs archaeological remains in the context of their surrounding landscape, demonstrates the interchangeable, multi-faceted cultural and social nature and use of these uplands since prehistory right up to the present day. This is something which has been poorly understood until now, both a result of previous research, which has been limited to basic recording and one small-scale research project, and the product of those investigations which were poorly reflective of the surviving remains across the entire upland area. Systematic fieldwalking and

open-source imagery survey has changed our understanding of this landscape, the interpretation of which has been supplemented by contemporary accounts and records as well as evidence from research in other Irish upland landscapes. Most of the latter however has focused on targeted periods or sites types with less investigation on patterns of continuity and change across time. Consequently, the increase in recorded sites and the resultant expansion in knowledge found in the Blackstairs uplands is likely reflective of other Irish uplands where research has been limited thus far. Despite a poor previous understanding of the past, the Blackstairs uplands, as previously discussed (see Chapter 3), has been designated as a Special Area of Conservation (SAC) in which the archaeological remains are included for protection. Effective and appropriate management of this SAC however cannot be carried out without having a good understanding of what survives in this landscape and the processes which have gone into shaping it. This survey demonstrates that the Blackstairs are not wild natural landscapes but shaped by the effects of thousands of years of human activity just like other upland areas. Intensive survey and similar approaches to those taken here are urgently required in other Irish uplands in the future (see Chapter 7).

Investigating the Blackstairs uplands as a whole, rather than focusing on smaller study areas, highlighted that the Dranagh Mountain 2011 survey was not an isolated incident but one that could be replicated across the entire mountain range. The density of sites on Dranagh however is still far higher than the rest of the mountain range. This could be down to two factors; (a) its southerly sheltered position and terraced topography lead to a more intensive and prolonged use or (b) vegetation and peat (which were stripped on Dranagh but not as intensively elsewhere during the present survey) no matter how thin can mask low lying and subtle features. This emphasises that burning incidents will need to be monitored into the future (further discussed in *Chapter 7*) as it appears to be one of the few means (albeit unsystematic and potentially damaging) of recording prehistoric and medieval features in non-intensively grazed upland areas, in the absence of excavation and other means of survey such as geophysics.

While there are a multitude of sites such as enclosures which cannot be dated (Fig. 5.25) there is still a huge amount we can now tell about the Blackstairs uplands which were in use since at least the Neolithic period as evidenced by rock art, a portal

tomb, summit cairns, cursus sites and pre-bog walls and hut sites. The level of activity appears to reduce across prehistory (represented by standing stones, a stone rows and hillforts) although this may be down to the monumentality of the features and the effects of vegetation and peat cover skewing our visibility of the remains. Larger sites generally associated with certain periods such as summit cairns or field walls may have continued in use in later millennia, evidence for which cannot be identified without excavation. Similarly, pre-bog walls and hut sites may date to the Bronze Age rather than the Neolithic. Activity certainly continued into the Iron Age as shown by the deer trap from Blackstairs Mountain and possibly by the Lughnasa festivals on Brandon Hill and at the Cooliagh Gap. At least some parts of the uplands were in use throughout the medieval period as farmland however, much of it was still left to nature or used only for seasonal grazing and occupation as the Down Survey maps and 1659 Census suggest. The Williamite Settlement in County Wexford appears to have had a dramatic effect on the Blackstairs Mountains and probably accounts for much of the land enclosure we see today and the population explosion in the eighteenth and nineteenth centuries. The effects of the Great Famine on the descendants of these groups in the nineteenth century were dramatic with a major population decrease in the Blackstairs townlands as highlighted by the 1841 and 1851 census. An analysis of the historic OS maps shows a dramatically different landscape as a result, with far fewer houses and larger field enclosures by the beginning of the twentieth century from what was recorded on the first edition maps. Despite this major drop and landscape change, there is little discussion on the Famine in this part of Ireland which is traditionally held to have escaped its effects. Similarly, archaeological remains from this period have been entirely unrepresented in the uplands until now. More crucially however, the preservation and visibility today of pre and post-Famine sites and features recorded on contemporary documents, has profound implications for our understanding of earlier periods which are largely based here on the archaeological record alone. These issues are addressed in the following chapter.

Chapter 6 – Repopulating a hidden landscape - The Blackstairs Mountains in the Nineteenth Century

> "In place of the sterile, dreary and stern aspect that pervades this mountain range on the Carlow side, we have here the better soil, the sunny and cultivated slopes, the cottages scattered along and far up the mountain sides, or sheltered on the banks or the dells by which the sides of the mountains are broken" (Fraser 1844, 186)

Introduction

In the previous two chapters we have seen how targeted and complementary remote sensing techniques and fieldwalking surveys can alter our distribution maps of archaeological sites in upland landscapes (Chapter 4) and consequently our understanding of the landscape (Chapter 5). Desk-based remote sensing techniques offer rapid means of reconnaissance and recording which were unimagined until a few decades ago. In some cases these are the only means of recording archaeological features in certain areas owing to dense vegetation. In others, classic ground surveys remain the sole method of feature identification until resolution improves or image acquisition dates are more beneficial to the archaeologist. Basic but systematic investigations, combined with historic documents and cartography, local folklore and placename evidence allow us to construct an overall narrative of the landscape identifying patterns of use and desertion over long time periods on which further research can be built. As previously highlighted, the density of sites on Dranagh Mountain was never matched during the present survey. While this may be either a consequence of peat burning and the resultant exposure of buried remains or a reflection of the more favourable and sheltered atmospheric conditions in this part of the range leading to more intensive use over time, another factor may also be at play; fortuitous survival. Investigation of the nineteenth-century landscape is quite revealing in this regard. Not only does it inform on a hitherto uninvestigated and unrecorded period in the Blackstairs uplands but also highlights implications for our understanding of earlier periods which have been targeted by previous projects in the Irish uplands elsewhere.

The nineteenth century offers an excellent case study for a number of reasons. Firstly, cartographic and documentary evidence from the period (Table 6) depict and describe the landscape and its activities in greater detail than in the centuries before. Secondly it is almost within living memory as the children and grandchildren of those who lived and died at least in its latter half still live in the landscape today preserving

accounts and information in local folklore. Added to this is the National Folklore Archive which houses oral and written accounts collected in the twentieth century from the Blackstairs region and includes information on the landscape recorded directly from those who lived through the period. Many of these records can be contradictory to what survives in the landscape today or complement knowledge without the need for excavation. Folklore also adds a personal and human dimension to the past as well the preservation of a way of life in the oral tradition of the region, something which is generally inaccessible even in excavations.

Selecting this period also has profound implications for our understanding of the region at present. The nineteenth century was one of major social change which manifested itself dramatically in the landscape. Rising population figures saw a push into the uplands, visible both on maps and in the ruins of settlements and field systems. Continuous depopulation since the middle of the century has brought a reversal in this trend leading to the abandonment of a multitude of these features and their reclamation by montane vegetation. Finally, it addresses modern issues and definitions most significantly the cut-off point of 1700 by the NMS for the protection of sites and features as well as issues raised in Chapter 2 in our definitions of upland.

Overview of the Century

Nineteenth-century Ireland was one of dramatic and unprecedented social, economic and landscape change which included a restructuring of field enclosures, a shift in landholding, population decline and economic change. Since the seventeenth century, more and more areas of once communal mountain pasture were enclosed as part of the rundale system (Aalen et al. 1997, 82) contributing to the population boom of the eighteenth and nineteenth centuries which expanded five times faster in the uplands than the lowlands between 1770 and 1841 (Aalen et al. 1997, 84; Ryder & Orser 2006, 25). The Napoleonic Wars of the early nineteenth century and the resultant economic growth meant that there was generally a better standard of living for all. With the end of the wars, cultivation and industrial production lessened while food prices began to rise (Aalen et al. 1997, 88; Daly 1994, 11; Geary 1995, 78). The continually rising population (albeit at a slower rate than at the turn of the century) began to rely on less land and fewer sources of food, the potato supporting the majority of the rural poor (Aalen et al. 1997, 87; Daly 1994, 8). Uplands provided ample space for small farms to those who had the means to clear it and make a living.

Labourers on the big estates were also provided with lands on marginal and poor upland soils (Daly 1994, 18; Whelan 1995, 27). Sub-division of small farms meant the population remained locally rather than emigrating. Fuelled by the potato crops resilience to poorer soils and the widespread availability of turf fuel, upland expansion and settlement was ideal for poorer members of society as it provided land which was unappealing to more progressive farmers. Landlords also benefited from this situation as marginal and poor land provided rent and labour (Aalen et al. 1997, 84). Famine in the middle of the century brought an abrupt change in society and the landscape with it, as a general retreat from the uplands began across the country in its closing decades. The above is based on a generalised national narrative so where and how did the Blackstairs region, and specifically its uplands, fit into this story? And how is this manifested in the archaeology revealed as part of this study.

Documentary Sources

Archaeological investigations of the nineteenth-century upland landscape have the added benefits of cartographic and documentary sources, a number of which were used as part of this investigation (see Table 6). These combine with the archaeological record to reconstruct the landscape in the absence of scientific methods. Despite their value in assessing land use, ownership and division as well as population statistics, they also come with a number of limitations and drawbacks.

Census data was collected throughout the nineteenth century; however, the survival and value of the information they contain varies considerably. The first detailed surviving census for the Blackstairs was collected on the night of the 6th June 1841 (Crawford 2003, 19) followed by another on the 30th March 1851 (Crawford 2003, 22). Despite being hailed as "a milestone in census taking" (Crawford 2003, 16), only fragmentary remains of the 1841 census remain, as is the case for 1851 (Crawford 2003, 85). Crucially these record the number of houses and their occupants in the middle of the century; only a few years after the first ordnance survey, on either end of the Famine decade and immediately prior to Griffith's Valuation survey. The latter was a systematic survey of boundaries and divisions led by Richard Griffith and recorded details such as land value, buildings, ownership and tenancy in each townland across the country. Maps based on the first edition Ordnance Survey complemented this record (Duffy 2007, 49). Combined, these sources enable us to examine population and settlement change across a decade – fortuitously, the most

dramatic of the century. Despite their systematic nature, they may not be entirely reliable. Records and surveys of this nature were carried out by government officials of the gentry class whose writings often refer to the lower classes with disdain. Research in Roscommon (North-West Ireland) noted an entire village absent on the 1841 and 1851 censuses because of its small size and the belief that it was unimportant for inclusion on government documents (Hull 2006, 43). Figures and returns for the following four censuses (1861, 1871, 1881, and 1891) no longer survive meaning the next reliable source of census information comes from the 1901 census at the turn of the century. While still unreliable in places (e.g. ages), it records the occupations of residents and the number of associated buildings and their use with each house at the time. From this, the farming methods being employed can be deduced. Details on the houses themselves were also recorded such as building materials and the number of rooms. However, because of the difficulties in matching census data to a particular house in the landscape, differentiating and identifying data for those houses in the upland portion of a townland to those in the lowlands is problematic. For this reason the upland only townlands (Slievegar, Slievebawn, Bantry Commons (Killann), Bantry Commons (Barrack Village), Blackstairs Commons, Brandonhill (Gowran) and Brandonhill Ida) form a special case study as examples when referring to the census data unless otherwise stated. As the remains of all but one of these houses no longer exist, examples of themes under discussion such as architectural styles will be drawn from surviving examples still present in the landscape elsewhere.

While census and valuation records provide information on the population, cartographic sources provide an impression of the landscape as it was laid out at a particular moment in time. Field system extents and layout and the position of houses, woodlands and routeways can all be compared to later sources and the present day landscape. For the nineteenth-century Blackstairs we have the first edition OS maps, sketch maps from Griffith's Land Valuation as well as 25" mapping from the first decade of the twentieth century. These however are not entirely reliable as structures which appear to pre-date the Famine and the later nineteenth century are not depicted on any of the cartographic sources. In some cases their ruins are mapped on the 25" series suggesting a number of possibilities; (A) they were entirely ruined by the time of the earliest maps and were deemed not appropriate for mapping, (B) they fall into a

brief window between the mid-century and later century sources or (C) they stood at the time of mapping but were deliberately excluded. The latter is not entirely unlikely as similar to the exclusion of a village from census records, excavations at an unmapped, mud-built cabin at Carrowcashel, Co. Roscommon (North-West Ireland) revealed an artefact range dating 1795-1865 (Orser 2010, 84). Coupled with this are the notes of one surveyor for the first edition mapping of Roscommon:

> "I think it is important that nothing be put on the map which is liable to rapid change, and consequently I would make a selection of the houses. I would not put a house on under a certain class" (Weld 1832, 607-8).

This has major implications for our understanding of the Blackstairs landscape as will be demonstrated below.

Folklore was collected from the region in the mid-twentieth century, some by professional travelling collectors such as J. G. Delaney and others by residents of the region. Housed in the National Folklore Archive in UCD, the detailed accounts refer to life in Ireland in the nineteenth – early-twentieth century. Crucially many of the informants were themselves born in the middle of the century, the sons and daughters of those who lived through the Famine period and saw some of the major changes to the landscape and the end of many traditions and activities which had died out by the time of collection. Despite issues with memory, it is nonetheless a unique resource providing a glimpse of daily life from the perspective of the lower classes. A catalogue of the folklore relating to the Blackstairs region can be seen in Appendix 3. Folklore and descriptive accounts of the landscape were also collected in the middle of the century by gentry travellers and writers. These included Patrick Kennedy who published two books; *Legends of Mount Leinster* (1855) & *Evenings in the Duffry* (1875) under the pen name "Harry Whitney". While most of their content refers to myths and legends, a snapshot of daily life, households and the landscape in the middle of the century is also provided. Placename folklore, was also collected in the 1990's and early 2000's by Michael Conry as part of research on Carlow's granite geology (2006) much of which was included on a recent hillwalkers map of the mountain range by Barry Dalby of EastWest Mapping. Together, these census records, cartographic sources and descriptive accounts build a detailed picture of the Blackstairs region in the nineteenth century which will be drawn apart below.

The Landscape

Arriving in the Blackstairs region in the early nineteenth century, one would have been presented with a landscape very different to what we have today. Visually the colours which first draw our eyes would contrast to the current view. Patchy grey lines indicative of relict field systems on the slopes above 200-300m (Fig. 6.1) would have enclosed the greener colours of grazing pastures. Depending on the season, parts of the enclosed land would have changed from brown to green with the cycle of the potato or cereal crops. Similar cycles occur today but in different shades and patterns owing to a different vegetation cover made up of heather, gorse and ferns. Above the limits of enclosure grazing would have been heavier than it is today. Some parts of the landscape were even described as being "white with sheep" (Michael Byrne, Dranagh, *pers. comm.*). Consequently, the density of heather growth would have likely been lower and the patchwork of wild grasses much more widespread. Sudden changes occurred then just as they do now caused by large fire events which stripped back the vegetation and peat, exposing the bedrock. Carrigvahanagh ("The White Mountain") (Fig. 6.2) gained its name from the white granite bedrock exposed after a large fire in the mid-nineteenth century (Conry 2006, 41) while an area of exposed granite bedrock known as "The Flags", on the Blackstairs ridgeline, were revealed by a peat stripping fire also (Conry 2006, 47). Similarly, the tors referred to as the "Burnt Knobs" may refer to such an event. Much of the extensive areas of bogs and woodlands mapped by the Down Survey in the seventeenth century were removed by this time as depicted on the OS maps although knowledge of these features was noted in folklore collected in the early-twentieth century from both sides of the range. While some of the bogs still survived at the time of recording, the woodlands had been cleared (NFC MS573, 21; NFC MS890, 537) most likely for farmland (Aalen et al. 1997, 123; Mitchell 1976, 202). One of the last natural oak woods in the Blackstairs, Coonogue Wood, was cleared and exported to Britain during WW1 (Conry 2011, 164). Before this however it was a major part of the landscape, used for annual gatherings on the 29th of June (NFC MS890, 420) (see below).

Amongst the wide areas of bogland, open commonage and farmland was a far more extensive pattern of settlement than exists today (Fig. 6.3). These ranged from one off houses inhabited by labourers and small farmers, to large farmsteads with multiple outhouses – "mountain men" as they are referred to in one folklore account

(NFC MS 1669, 8). Widespread in the early part of the nineteenth century as suggested by the first edition OS maps, a decline in population initiated by the Great Famine brought about the abandonment and removal of many of these settlements. Thirty-one however have been recorded and survive in ruins, testament to a process of population expansion and contraction throughout the century. Before exploring these archaeological remains further, documentary records are drawn upon here as a context.

Population and Social Structure

Landscape change was inherently linked with population. Following the famine of the 1720's, the population began to rise rapidly across the country. Estimations suggest that by the end of the eighteenth century, it was growing by 15% per decade, a rate which would allow it to double in 50 years. Population estimations for 1788 were set at 3,750,000. Census figures from 1821 returned an estimate of 6,802,000 and the first accurate census in 1841 put the national population at 8,175,000 (Daly 1994, 2; Ó Tuathaigh 1990, 137) suggesting that it stood at 8,500,000 by 1845 (Aalen 1978, 155). When the Famine struck, population decline began rapidly brought about by a million deaths and two million emigrants in the ensuing decade (Poirtéir 1995, 9). Another 4,000,000 emigrated between 1856 and 1914 making the later nineteenth century a time of population decline, in stark contrast to the previous century (Clear 2007, 57). Over-emphasis on the Famine as the sole cause of population decline however, has been warned against. Rather, reduction would have occurred anyway as growth was slowing by this time, the Famine initiating the process quicker and more abruptly (Aalen 1978, 159; Daly 1994, 117; Kennedy 1973, 207).

Class Structure

Society in the nineteenth century was divided by class groups; labourers, small farmers/smallholders, large farmers, land agents and landlords, the models of which have varied between authors (see Table 7). Here, Lee's model has been taken for its simplicity as it is beyond the current scope to estimate farm sizes for all house sites within the study area. As will be further discussed below, most of the surviving upland houses in the Blackstairs from the period were occupied by small farmers and the cottier classes. None of these families owned the land they occupied rather it was held by Protestant landlords (Daly 1994, 13). Many landlords, especially absentees,

preferred to lease the whole of their lands in a region to one large tenant referred to as a "middleman" (Roebuck 1981, 89), a class of gentry in themselves. Middlemen then sub-let farms to large farmers and smallholders both as a management technique and to reap the rewards of rising land prices at the beginning of the century. While most (but not all) of the main Blackstairs ridgeline tenants in the mid-nineteenth century leased from middlemen or held farmed land freely, on Brandonhill the land was leased directly from the landlords (Griffith's Valuation 1850).

Cottiers (Fig. 6.4) were a form of labourer hired by large farmers and landlords. Instead of payment they were provided with a plot (generally poor or marginal land) on which to build a cabin and grow potatoes or keep an animal (Murray 1907, 356; Dooley 2000, 6), relying on the sale of surplus food or spinning and weaving for an income (Daly 1994, 21). Manure was also provided, all in exchange for labour for up to two-thirds of the year. Such an arrangement favoured the tillage farmer as it provided a cheap workforce and allowed for easy expansion of the cultivated area by simply increasing the number of cottiers. With houses built on common land, their living conditions were notoriously poor and by the time of the Famine at least half the population in areas devoted to tillage were made up of these labourers (Aalen et al. 1997, 74). Many of the more isolated dwelling sites in the Blackstairs uplands were likely occupied by these families.

Above the cottier class were small farmers who rented areas of land typically five-fifteen acres in size (Dooley 2000, 6; Lee 2008, 1). With better living conditions than the labouring class, small farmers could live in larger houses although in some cases their cabins were barely distinguishable from those of the labouring class. Indeed the census of 1841 makes them difficult to distinguish from the labouring classes below them (Trant 2004, 96; Winstanbly 2012, 12). Many of the settlement sites within field systems on the slopes of the Blackstairs were likely occupied by these families who farmed the surrounding fields. Income was sustained either through domestic industry such as spinning, weaving or flax production or by the farmer working as a labourer himself on large farms and estates (Daly 1994, 17). In other cases, small farmers sub-let plots of land to other farmers, the rent from which they used to pay the rents for the whole of their lands, exploiting the benefits of rising land prices and their own fixed leases (Daly 1994, 16). Nationally, it was this class that was most heavily affected by population changes, in the rise by sub-division and

lowering mortality rates and marriage age leading to larger families, and in the decline by poverty (Aalen 1978, 158). Certainly the dramatic drop in population between the 1841 and 1851 census and the drop in houses depicted on the Ordnance Survey maps across the range indicate the presence of these groups. Most small farmers had no written agreements with their landlords meaning their tenancies were insecure and eviction was a constant threat. Others were squatters, the true number of which are unknown and likely grew in the first half of the century (Winstanbly 2012, 11). This insecurity is best exemplified in the Blackstairs in the infamous Coonogue eviction (1839) reported upon extensively in newspapers from the period when 40 families were evicted in one day (Ellis 1995, 14).

While many may have occupied the uplands, identifying the labouring class is difficult. Labourers, who could be further divided into bound labourers and out-labourers, were at the bottom of the social ladder and relied on larger farmers and landlords for employment. Bound labourers worked for a small wage but were not given anywhere to live, or land on which to grow food forcing them to rent properties, thus, their living conditions relied heavily on market prices. Some of the aforementioned houses within field systems may have been rented by these families. Widespread availability of wasteland in Ireland during the period meant that anyone who did or could not receive a sub-divided plot could instead clear an area of land for free or a very low price (Daly 1994, 18) ample space for which was provided in the uplands. Some of the houses identified as cottiers by the current project may have been used instead by this class group. Out-labourers, often referred to in the period as "the destitute classes" (Orser 2013, 215) or "spailpín's", had the worst living conditions having to continually move from place to place in search of short-term employment and very low wages (Daly 1994, 20; Dooley 2000, 6). While folklore indicates the presence of such individuals (NFC MS1344, 372), identifying them in the archaeological record is difficult.

While large farmers and landlords owned portions of the uplands, evidence for their occupation of this area in the Blackstairs has not been identified however, some did live in the foothills. Many large farmers acted as landlords themselves, sub-letting plots of land to smaller farmers or providing land to labourers and cottiers (Orser 2013, 215). Thus the presence of labourers, cottiers and small farmers in the Blackstairs uplands would have been as a result of these individuals. Large farmers,

the Deacons of Gurrawn (NFC MS1344, 154), the Robins and Downes of Adamstown, Robinsons of Clonroche and Greenes of Coolaght, Co. Wexford were noted in folklore from Tomanine in the Blackstairs foothills as taking in the sons of local small holders for work. Consequently, this indicates the presence of labourers and cottiers in the Blackstairs region who were most likely on the poorest land in the uplands. Instead of wages, the boys were provided with food and tobacco. Labour included ditch digging, fence building, feeding cattle, cleaning barns and threshing (NFC MS1344, 135) indicating the greater means and improvement techniques of larger farmers in the surrounding lowlands as well as their farming practices which affected the uplands (e.g. cattle may indicate booleying or rough grazing; ditch digging indicates drainage and land improvement).

The Impact of the Famine – Population and Settlement

As previously stated, the impact of the Great Famine on the population and its decline throughout the later nineteenth century (Table 8) is often over-emphasised for a process that was all but inevitable. Its dramatic effect on the population and the landscape however cannot be underestimated. Striking in 1845, the Famine lasted for the following decade varying in intensity from place to place with the worst years being 1846-8 when starvation was rife and seeds from the previous year's crops had either been eaten or destroyed (Crawford 1995, 61; Daly 1994, 55). Estimates suggest that 41-45% of the crop failed across County Wexford while 46-50% failed in County Kilkenny. No figures survive for County Carlow (Daly 1994, 54) although it was likely in a similar range to its neighbours. The majority of its victims were not claimed by hunger but by diseases such as cholera which came with the squalid conditions, the first of the major epidemics striking the country in March 1847 and reaching a peak in 1849 (Kelly 2013, 218; Kennedy et al. 1999, 105). Houses and cabins across the Irish countryside were abandoned or evicted, the former occupants making their way to urban centres, workhouses or foreign shores.

While its devastating impact on the West of Ireland is widely renowned, the south-east is often considered to have escaped much of its effects because of better quality of land, lower population and access to more urban centres and food (Póirtéir 1995, 51). True, the west suffered worst with higher death rates and levels of starvation; however, the east did suffer immensely (for a detailed statistical discussion see Kennedy et al. 1999) with poorer regions such as the uplands likely taking more

of the burden. Analysis of the records in the National Folklore Collection also highlights that this perception is one which took root in the mid-late twentieth century. One informant from the 1930's describes old people in the region in their youth commenting during bad weather; "T'would put you in mind of Black '47" based on the belief that heavy rainfall contributed to the blight (NFC 591, 8). Another describes a loss of 80% of the population in the townland of Corrageen (NFC 1344, 147). While analysis of the census records actually shows a rise in population in this townland (one of only nine where this occurred – see Appendix 4) it does reflect the devastating impact it had on the population in the wider region and especially on popular memory demonstrated further in the number of accounts on the Famine in general in the collection (see Appendix 3). In light of these perceptions, it is worth addressing the topic here as they impact on our understanding of the Blackstairs uplands.

Census figures from the Blackstairs region for 1841 and 1851 (see Appendix 4) highlight widespread population decreases of over 50% in some townlands but averaging at 30% overall, resulting from evictions, voluntary abandonment and deaths (Orser 2006, 181). There are occasional growths such as Slievebaun, Brandonhill (Ida) and Coonogue however the general trend is one of decrease. As most of the Blackstairs townlands include a lowland portion, and villages in some cases (Myshall & Kiltealy), it must be borne in mind that the statistics here reflect the overall trend for those townlands and not just the uplands.

Upland population change specifically is harder to determine but by combining the first edition OS maps and census information we can get some impression of this. What they indicate is that abandonment of the poorest land did not occur immediately after the Famine but people continued to settle and even take up new holdings in the uplands into the latter half of the century. For example, the townland of Clorogue Beg, Wexford, which includes both an upland and lowland portion, contained 54 structures (some of which include sheds, outhouses and landed estate buildings) in 29 settlement units on the 6" map (Fig. 6.5). Census returns for 1841 two years later record 20 houses (one uninhabited) while a decade later this figure dropped to 15 with an additional 2 uninhabited. Griffith's valuation (1853) lists 13 occupied and 4 vacant houses indicating continued abandonment in this short time. By the end of the century, the 1901 census records 10 occupied houses in the

townland and one additional uninhabited dwelling. Similarly, a population of 107 was recorded in 1841 falling to 69 a decade later with 65 individuals recorded at the turn of the century. The disproportionate drop in population compared to houses is explained by relatively large, young families and domestic servants living in the households in 1901. Together these demonstrate a continual process of population decline and house abandonment in the townland throughout the century, most heavily influenced by the Famine but one which appears to have already been in motion. Close examination of the sources indicates that most (but not all) of this initial abandonment occurred in the foothills and lowlands rather than the uplands. Five upland farm sites in the valley between Clorogue Beg and Mount Leinster (Fig. 6.6) were all abandoned between the two OSI maps and Griffith's Land Valuation indicates that four of these were in the latter part of the century and not an immediate consequence of the Famine. The land in this upland valley was held as one large plot by William J. Wallace from Matthew Foote at the time of survey. Houses and offices were then sublet to four individuals and another lay vacant. Only one survives as a ruin in the landscape today sub-let by John Dunne on Griffith's Valuation (Fig. 6.7), the others having been removed without any surface trace. Interestingly however these are referred to as "Hughes's Walls" in present day folklore. Henry Hughes was listed as one of the other three sub-tenants on Griffiths valuation, suggesting one of three scenarios; (1) intermarriage after Griffith's survey, (2) abandonment by one family and occupancy by the next generation of another family or (3) the wrong name being attributed to the site today. Hughes and Dwyer names do not appear on the 1901 or later censuses indicating that the house was abandoned at some point in the mid-late nineteenth century. The family names of other sub-tenants in this valley on Griffith's valuation, Hayes and Beahan/Behon, appear on the 1901 and 1911 census despite the houses having been removed by this time as evident from the 25" map suggesting movement by later generations to better land downslope (although movement of other families of the same name into the townland cannot be discounted).

Townlands which do not include a lowland portion (Bantry Commons Killann & Barrack Village, Brandon Hill Gowran & Ida, Slievegar, Slievebaun) present an interesting picture; in some cases there is an increase in the number of houses or population between 1841 and 1851 while in others the Famine appears to have had a major impact on population decline (Table 9). Slievegar is most interesting in the

former as 7 structures were mapped in 1839 (Fig. 6.8) while only 4 are listed on the 1841 census (with no other structures noted) but this then increases to 5 on the 1851 census. Griffith's lists five structures, two of which were vacant demonstrating two important points; abandonment of upland houses was already in motion before the Famine and movement into the uplands continued in its aftermath, the extra house perhaps occupied by a family evicted elsewhere. Census figures for 1901 list three houses and no others indicating that the two unoccupied houses were either levelled in the meantime or deliberately unrecorded. Two of the names associated with houses that appear on Griffith's valuation still appear on the 1901 census; Cox and Whelan. The third house, occupied by Ryan's in 1901 suggests marriage or the changing of tenants as Prendergasts occupied the third house in 1853. Unsettled plots of land were leased in common in this townland. Ruins of houses exist today (Fig. 6.9) which are unmapped on both the first edition map (Fig. 6.10) and Griffith's valuation. The land on which they stand is recorded on the latter as "mountain land" owned by Colclough. This suggests that either the houses predate the first edition OS mapping, were deliberately unmapped or had a very short phase of use in the latter part of the nineteenth century as they are mapped as ruins on the 25" edition.

Bantry Commons (Barrack Village) townland in contrast is one of continuous abandonment both prior to and (most dramatically) in the wake of the Famine. 84 structures mapped on the 1839 map in 52 settlement units (Fig. 6.11) however only 48 are recorded in 1841 and 34 in 1851. Population figures also drop considerably, from 257 to 155 individuals. Griffith's valuation records 31 occupied and 6 unoccupied houses, all of which are held freely with all of the vacant households attributed to a freeholder. By the turn of the century the population had plummeted to 81 and the number of houses with it to 10 occupied and 1 unoccupied. Conditions for those who remained however appear to have improved as the century carried on. "Offices" (i.e. sheds) are listed for 9 of the 10 occupied households in 1901, all but one owning at least three. In contrast, out of 31 occupied houses on Griffith's, 9 had one additional outhouse and 5 with more than one. The use for these outhouses (see *Agriculture* below) also suggests an improved quality of life by the turn of the century.

As only one house is recorded in the townland of Slievebaun in all sources, the addition of 1 individual in the Famine decade either suggests the birth of a child or the hosting of an evicted neighbour (see below). There was certainly a change in hands in

the latter half of the century as Timothy Toomey was recorded as the tenant on Griffith's Valuation while John Cullen and his daughter Mary were the 1901 occupants. The two Brandonhill townlands also record interesting figures. Brandonhill (Gowran) shows 6 settlements on the first edition OS map (Fig. 6.12). By the time of the 1841 census, only one house was recorded with a population of 7. The Famine decade appears to have wiped out the population in this townland as by 1851, no houses or individuals were recorded. Griffith's valuation supports the idea of total settlement abandonment during the Famine as the land was by then divided into 6 plots, all leased out by the landlord, Viscount Clifden. Five of these plots were leased in common ranging between 2 and 14 tenants. In contrast, 10 structures were mapped in the neighbouring townland of Brandonhill (Ida) in 1839; however, none were recorded on the census of 1841. By 1851, 1 house and 11 individuals were recorded. Interestingly, this is in stark contrast to the Griffith's Land Valuation two years later where Brandonhill (Ida) was largely held as grazing mountain land by two landlords, Viscount Mountgarrett and William F. Tighe. Land was leased in 12 plots, 7 of which included houses. Mountain pasture made up the rest, leased in common between 45 individuals as well as William Tighe himself. By the turn of the century, only 3 houses were recorded; one occupied by a farming family of four, (Cullens), one by a pair of farming sisters (White & Phelan), and the final one by a single individual (Smith), a caretaker and game keeper. The former three names appear on Griffith's valuation, two of which, Doyle and Phelan, held houses as well as land. A decade later the townland would be entirely unoccupied like its northern neighbour. While Brandonhill (Gowran) demonstrates population decline prior to the Famine, Brandonhill (Ida) presents a more complex case as either houses or individuals were deliberately unrecorded on the 1851 census or multiple phases of house abandonment and construction occurred in the short time period between records.

Across the country, cottiers and smallholders were almost wiped out by the 1880's while landless labourers had almost vanished also (Connolly 1995, 49). Complicating population estimates however was the enumeration of the children of farmers as labourers. Survivors of the Famine who managed to hold on to their lands saw improvements in their holdings with social change in the later nineteenth century brought on by the Land League and Home Rule movements. Thus, the large farmer population group began to increase in the later part of the century as conditions

improved for the poorer classes (Lee 2008, 2) (see Table 8). With lowering populations, more land would have become available in the lowlands thus reducing the upland push bringing with it an abandonment of upland dwelling and the reduction of land use to rough grazing. Analysis of the Blackstairs, however, shows that this was not always the case and that upland settlement not only continued in places after the Famine but increased in places also. Those who remained in the region may have been able to expand and improve their holdings thus explaining some movement into the uplands. Folklore also indicates that those who emigrated in the latter half of the century often sold their holdings to neighbouring families or to those returning from America (NFC MS 1408, 256-265) which may explain changes to names in the above records. It is against this process of population movement that the surviving Blackstairs features from the century can be interpreted.

Settlement

Upland houses in the nineteenth century were built in the vernacular tradition, the subject of which has seen much investigation. One of the earliest was by the renowned Swedish ethnographer, Ake Campbell who began the classification of houses in the early-twentieth century (1935; 1937). Under the direction of Kevin Danaher, the Irish Folklore Commission began a questionnaire survey scheme from the 1930's, on various aspects of Irish life and tradition, a scheme which is still ongoing to this day. Examples of those relating to the house include; "Roofs and Thatching" (1945); "The Home" (1959) and "Fuel and Light" (1967). Many other surveys on various customs also detail uses for the house (e.g. "Observance of the Feast of St. Martin (1939) and Christmas Customs (1944)). Responses to various questions were housed in the archive in UCD which have gone on to form the basis of many publications since (see journals: *Béaloideas*; *Folk-Liv*; *Ulster Folklife* as examples). Danaher himself published extensively throughout the twentieth century on various aspects of the vernacular tradition producing many distribution maps still referred to today (e.g. 1945(a); 1945(b); 1946; 1956; 1969; 1972; 1985; 1992). Other influential authors and researchers include E. Estyn Evans (1940; 1955; 1957), Alan Gailey (1985) and F. H. A. Aalen (1978; 1997). Before looking in detail at some of the Blackstairs houses, it is worth assessing general trends across Ireland observed by the above authors in the first instance followed by classification.

Blackstairs Houses in Context: Irish Vernacular Architecture

Housing in the nineteenth century was reflective of class and social order. Large estates and houses were built by landlords while one roomed cabins and small houses were built by the poorest members of society. It is the latter which characterise the Blackstairs settlements. Use of local resources, together with the absence of will to make architectural statements meant that the majority of these buildings blended into the surrounding landscape just as any natural feature. Similar cases across the country prompted Campbell to comment;

> "Built of stone, clay, sods, grass and straw brought from the vicinity, the house harmonises with the landscape to which it belongs. Wherever the old building traditions are maintained its features are of a fine simplicity" (1937, 223).

Such resources included stone for walls, clay for floors, straw, reeds and grass for roofs (Aalen et al. 1997, 82).

As previously highlighted, certain commonalities existed between the houses of the labouring and small farmer classes making them difficult to distinguish in some cases. Such trends are common across the Irish countryside. Firstly, they were rectangular in plan with extensions generally done in length rather than width (Danaher 1972, 78). Secondly, rooms normally took up the full width of the building. Where multiple rooms existed, these usually opened into each other with no separating hallway. Wooden or wattle partitions may have been used in some cases to sub-divide rooms (Danaher 1972, 79). Large pieces of furniture such as dressers or settlebeds sub-divided rooms also however, the only record of such features in folklore from the Blackstairs states they were not used for this purpose (NFC MS1663, 48). This account relates to the informants' regions (Graiguenamanagh and Knockymulgurry) and so their use as dividers may have occurred elsewhere. Thirdly, walls, whatever the material, were thick and solidly built. Windows and one door were found in side walls and never in the gable ends. Only where lofts existed in some houses would a small opening be found in the upper reaches of the buildings gable end. Fourthly, the roof was steeply pitched and composed of thin wooden beams, held up using the side walls and not supported by central pillars or posts as in the continental or earlier Irish aisled houses. Styles varied from gable-ended buildings to hipped roofs. Organic thatch formed the primary roofing material laid on a sod bed in some cases and only in limited circumstances was slate used (Danaher 1972, 84).

Building Materials

Local building materials and their availability were the primary factors in house construction, which were also limited by cost. The abundance of granite in the Blackstairs region made this one of the primary resources for building. Poorer upland farmers used a drystone technique with little dressing of the stones. Contrasting with this were the houses of larger farmers and landlords in the surrounding lowlands, built from worked and dressed granite and set with mortar. Such a feature is common across the country (Danaher 1972, 83). Cottiers and the poorest of labourers and farmers would have built houses with sod walls (Byrne et al. 2007, 21; Danaher 1978, 9) two examples of which were identified in the Blackstairs uplands as part of this project. Temporary structures such as fowl sheds or workmen's shelters could also be built of sod (Danaher 1972, 83). Stone built outhouses have been identified by the present survey in a number of places such as Crannagh, Knockroe and Slievegar however sod-built examples have not. Such poorly built and organic structures inevitably decayed over time (Danaher 1978, 25) leaving behind little trace of their former existence. Folklore from the Murphy brothers of Knockymulgurry (aged 90) testifies to this where the Price family lived on the approach to the Cooliagh Gap in their grandfather's time (mid-nineteenth century). No visible trace exists today of the house which once stood on this site although a standing stone (SS04) and a well nearby are named after the family (James & Michael Murphy, pers. comm.; Conry 2006, 44). Where the ruins of houses do exist, commonality in construction technique and style over several decades make it is almost impossible to date them (Danaher 1978, 8). Two features in particular are important in classifying houses both sod and stone built; their fireplaces and entrances.

Fireplaces

Despite their geographical, social and dimensional differences and developments, all small houses across the country had one thing in common; the kitchen and more specifically the hearth formed the prime component. A classification based on the placement of the latter was first devised by Ake Campbell dividing vernacular houses into either; (A.) central chimney houses or (B.) gable chimney houses (1935, 74) (Fig. 6.13). Simply put, the chimney was either located in the houses central axis or against one of the gables and never in a side wall. In the majority of cases in the Blackstairs uplands, a fireplace is difficult to identify and may

only be revealed through excavation or geophysical survey. However, an example of a gable ended chimney is evident at VER10 in the townland of Clorogue More.

Life in the house centred on this feature, a characteristic found all over Europe and defined as "Ernhaus" by Josef Schepers (Kennedy 1987, 645). Here, food was cooked, the family could relax, guests were entertained and each member of the household had their own place (Danaher 1972, 78). The importance of the hearth in the Blackstairs specifically at this time is also reflected in the nineteenth-century writings of Patrick Kennedy, for example; "all who had no duty to do, crowded again round the ample hearth, and conversation was renewed" (1855, 9); "I must only get up and make a cake, and bake it on the hearth-stone" (1855, 56); "one of her sons should be found the next morning, nodding by the cold hearth" (1855, 63); "Mick held council with the parents round the hearth" (1855, 67); "sitting at the hospitable hearth of Dandie Dinmont" (1855, 236). Travelling story tellers or seanchaí's were noted as visiting the homes of Blackstairs inhabitants at night by one NFC informant with the fireside being highlighted as the location for this activity (NFC MS1239, 59).

Entrances

An alternative classification was proposed by Alan Gailey and focused on the entrance with all houses falling into either (i.) direct-entry or (ii.) hearth-lobby entry (1985) (Fig. 6.14). Direct-entry houses refer to those cases where the door opens directly into the kitchen of the house. These can sometimes be identified from the outside if the chimney is at some distance from the door. Hearth-lobby classified houses where the door opened into a small porch or jamb wall which shielded a centrally placed hearth from view. A window was usually placed in these jambs so that the occupiers could see who was entering the house (Byrne et al. 2007, 11). A questionnaire produced by the Irish Folklore Commission in the 1940's sought to identify the distribution of house types across the country for which 400 responses were received (Byrne et al. 2007, 12). Hearth-lobby houses were found to be the most common in the east of the country with direct-entry, a mainly western phenomenon, noted as unusual in the east. The Blackstairs upland houses identified in the present survey stand in stark contrast to this with the direct-entry houses being exclusively used in all but one example, VER06 in Knockroe.

Building Types in the Blackstairs

Structures in the Blackstairs are scattered across the entire mountain range and can be broadly summarised as follows (see Fig. 6.15 for locations of examples discussed below):

- Cabins
- Small Farmer's houses
- Outhouses
- Landed Estate Buildings
- Military Barracks

Cabins

Rarest of all house types in the Blackstairs, and in Ireland as a whole (Aalen 1978, 182) the current record for their existence is likely a poor reflection of their former abundance. Built from the same organic materials as their surroundings, these structures would have decayed to nothing following the end of their use life. Many may have been built in hollows and the slopes of the mountain above the limits of field enclosure, the natural undulations of the surrounding topography and vegetation growth masking their identification. Evictions or abandonment of some led to their materials being incorporated into nearby walls or other structures and the ground being ploughed over and smoothened (Orser 2006, 187-8). Many of the single structures scattered across the field systems of the lower slopes on the first edition OS maps (Fig. 6.16) may depict such features, their traces long since removed.

Examples of two construction materials were identified for the first time during survey in the Blackstairs uplands; sod (2) and stone (5) (Fig. 6.17). All of these surviving examples are outside the limits of enclosure on what is recorded as either mountain or common land on Griffith's valuation. None are mapped on this or the first edition OS maps and only one at Slievegar is mapped as a ruin on the 25" edition. Their occupation dates are also unknown in the area today suggesting one of two possibilities; either the houses predate the maps or they were deliberately unmapped. Names are attached to some of these houses; the Rathnageeragh two (VER25 & VER26) are associated with the family name "Hegarty" (Seán Canavan, pers. comm.) and the Slievegar example (VER01) is known as "Jack Ryan's Walls" (Barry Dalby, pers. comm.), none of which appear on the 1901 census or in the area today.

Consisting of a single room which made up the kitchen, sleeping and living area, these houses sheltered the poorest members of society; cottiers and labourers. As only the footings remain for most of these sites, it is impossible to determine the roofing style employed however examples elsewhere were built with scrap wood or rough branches and thatch with no sod insulator (Danaher 1972, 91). The even wall height surrounding the stone-built Slievegar example suggests a hipped roof may have been used rather than a gable ended building. Entrances are only visible in two examples; one at Rathnageeragh, defined by two stones on either side, facing north and downslope and another in Slievegar facing north also (Fig. 6.18). In both cases it is a single entrance in the long axis of the building. All appear to have been direct entry structures with no current evidence for windows or hearths. A shed or outhouse appears to have been built on one side of the stone-built structures in Raheendarragh (VER08) and Slievegar (VER01) (Fig. 6.19). As the occupants were likely labourers or cottiers these may have been used to store tools rather than to house animals. Fire in April 2015 revealed a further two outhouses which were previously masked by vegetation (Fig. 6.20).

With the exception of Raheendarragh, traces of ridge and furrow indicating crop or potato cultivation were identified near all the cabins, at Rathnageeragh within an enclosed space but on the open mountain at Slievegar (Fig. 6.21). At Clorogue Beg (VER17), a north-south aligned house was sandwiched between two small field or garden enclosures on its east and west sides. Traces of ridge and furrow are visible in one of these suggesting that this may have been used to grow potatoes and vegetables while the other was used to keep an animal, paying the rent and manuring the crop in the process. Three newly identified cairns in the cultivated enclosure also indicate clearance. A single garden enclosure accompanies one of the Rathnageeragh houses and the stone Slievegar house. At Rathnageeragh it is bounded by an earthen bank raised from a surrounding ditch. Grass in the centre of this enclosure indicates a higher level of fertility than the surrounding land perhaps from the penning of a pig or the manuring of vegetables. Earth rather than stone also encloses the garden at Jack Ryan's in Slievegar and ridge and furrow appears on the open mountain surrounding the site.

Despite their former presence being noted in historical literature, a detailed architectural survey in County Wicklow failed to identify any sod built examples

(Byrne et al. 2007, 21) making their survival in the Blackstairs a rare example for future investigation. As the occupiers of such houses were among the worst affected by the Famine, Danaher estimated that about 75% of these structures went out of use between the years 1846 and 1851. Further to this, legislation in the late nineteenth and early twentieth centuries required landlords to provide accommodation for labourers which brought about the almost total extinction of such houses (1972, 91). As well as sod as a building material, one-roomed cabins in general appear to have gone out of use before the end of the century. Certainly by the time of the 1901 census, no such houses are mentioned in the Blackstairs upland townlands. Poverty did not vanish with these houses as in some cases two roomed structures were being occupied by families of four or five supporting the commentary above that the houses of small farmers were sometimes indistinguishable from the one roomed labourers cabins. One two-roomed cabin was recorded on the 1901 census in Bantry Commons (Barrack Village) occupied by five siblings of the Fenlon family all of whom were listed as labourers and servants indicating that landless labourers and cottiers continued to occupy these uplands into the twentieth century. Given their easy removal, the apparent possible exclusion of some from the sources of the period and that the traces of such structures cannot be found in Coonogue or Knockroe where they are documented, it is likely that their former abundance may never be fully identified in the uplands.

Small-Farmer's Houses

Much more substantial than cabins, houses were made up of multiple rooms or major sub-divisions within the building but still made from the same materials, sod and stone. Keeping with the trend across the country, most rooms were added onto the length of the house rather than the width. Upward extension also occurred although these appear to have been added in the latter half of the nineteenth or early-twentieth century. Upland examples of these were identified at Knockroe (VER06) and Coonogue (VER20). According to the 1901 census, houses were built from both sod and stone in the Blackstairs townlands although the latter was by far the favoured choice. Difficulties in matching these records to houses in the landscape today bring complications in assessing how many of these were in the upland portion of townlands compared to lowlands. Certainly none of the houses recorded on the census

in the upland townlands were built from sod or mud and no such houses have been identified in the landscape today.

Entry style is difficult to determine in many cases because of preservation. Hearth-lobby entrances are certainly found in the uplands such as on the two-storey example on Knockroe (VER06) above (Fig. 6.22) Direct-entry is suggested in others due to the placement of the hearth in the gable such as on Clorogue More (VER16) (Fig. 6.23). Roofing style, where there is enough of the surviving walls to determine, all appear to be gable-ended with no examples of hipped roofs identified (Fig. 6.24). The 1901 census indicates that by the turn of the century both slate and thatch were being employed almost in equal measure (Chart 13). Data collected in the 1911 census suggests that slate was gradually replacing thatch roofing and folklore from the 1930's also supports this when it noted that all houses were thatched with wheaten straw in the previous century (NFC MS172, 316).

Room numbers are difficult to assess from the early sources. Maps simply record a structure whether it is single or two-storey or two-roomed or five-roomed. Bigger structures are clearly distinguishable from smaller ones however attached outhouses may have been present rather than a larger living space. Even present examples in the landscape are difficult to assess as internal divisions may have been organic leaving little visible trace without excavation. Many of those which still survive appear to have been occupied into the twentieth century and so modifications may have been made to the nineteenth-century structure. The 1901 census however gives us some indication of room sizes at least at the turn of the century (Chart 14). Most houses had three divisions shared between 1-9 people highlighting that house size has no correlation with family size. A single house in Bantry Commons (Barrack Village) had eight rooms with an equal number of outhouses used for a variety of purposes (see below) shared by a family of five. Interestingly one of the occupants was a retired gold miner. In contrast two, two-roomed cabins in the same townland were occupied by families of an equal size one of which was the aforementioned Fenlon's (labourers) and another by the Keelys. Despite their employment being listed as farmers, Keelys only had one outhouse; a stable, possibly indicating that they too were labourers. While family size had no link with house size, income on the other hand appears to have had a direct link as would be expected.

All surviving examples in the landscape today are accompanied by at least one outhouse. Holdings labelled "house" or "house and land" on Griffith's Valuation indicate that this was not always the case. Alternatively some of these may refer instead to the sod and stone one or two roomed cabins of the labouring classes above. Improving conditions throughout the later nineteenth century may have led to the modification or replacement of earlier cabins, thus; some surviving house ruins may have been placed over former cabins. Certainly on the 1901 census, no upland townland house was without an outhouse apart from the aforementioned cabin in Bantry Commons (Barrack Village).

Outhouses

Farmhouses with outhouses or "offices" as they are referred to on Griffith's survey and early censuses are the most frequent settlement type at the end of the century. Few however, are recorded in the Blackstairs townlands on the mid-century censuses. Numerous clusters of two or more structures exist across the uplands on the first edition OS maps which do not match the number of structures listed on the 1841 census. Instead of reflecting abandonment alone, absence may indicate the deliberate choice of the census surveyors not to include certain outhouses as "offices". Sod or wooden sheds for fowl keeping or storing food or tools may have been excluded for example. By the turn of the century almost every farm was recorded with at least one outhouse. Consequently this either demonstrates a wider presence of outhouses in the middle of the century than the censuses suggest or reflects the improving conditions of farmers in the latter half of the century. Examples of both attached and detached outhouses were identified as part of the present survey in the Blackstairs uplands all of which are built of stone. One of the best examples of attached outhouses is "O'Keeffe's walls" (VER13) above the village of Rathanna (Fig. 6.25). Lying northeast-southwest, two outhouses are attached on both gable ends within a surrounding enclosure. Another example now lies in forestry in Clorogue More (VER16) (Fig. 6.26). Similarly Hickey's walls in the townland of Clorogue Beg (VER11) refers to a substantial farmstead with two parallel lines of structures organised around a central square with an attached garden plot surrounded by the remains of a relict field system (Fig. 6.27). Examples of detached outhouses can be found on Knockroe (VER06) and Cloroge Beg (VER18).

Landlord Estate Buildings

Houses and estates of the landed gentry are not often associated with upland landscapes. Despite being an issue in many parts of Ireland, there were no absentee landlords in this area. Some of the Blackstairs landlords lived at a distance from the uplands itself (e.g. Kavanagh's of Borris House and Tighe's of Inistioge). Others however lived in the shadow of the Blackstairs and its foothills such as the James's of Ballycrystal, Orpen's of Grange House and Newton's of Mount Leinster Lodge. None of these houses however (Springmount House, Willmount House, Grange Demense, Ballybawn House, Askinvillar House) are above the 200m OD line.

One upland feature associated with the gentry, however, is a structure known locally as "The Lodge" (ST02) which sits in the valley between Clorogue More and Clorogue Beg. Lying in ruins today, its former importance is evident in its size and the formal access path leading up from the Kiltealy-Bunclody road. While most of the above houses are single storey, the remains of this structure suggest two floors and it has an almost castellated appearance. No references to this site were identified in the NFC however; a nineteenth century account suggests that it is likely the remains of a hunting lodge. By the time of her death in 1861 at the age of 39, Eliza Gilbert, better known by her stage name, "Lola Montez" (Fig. 6.28) had led an exciting and controversial life. Actress, singer, dancer, courtesan, Countess of Landsfeld and mistress to King Ludwig I of Bavaria her career took her to the courts of Europe as well as Australia and America. Before much of this however she was married to Lt. Thomas James of Ballycrystal. Following the wedding in 1837, she travelled to the James' family home in the foothills of Mount Leinster. Daily life in Ballycrystal was not to her liking as she later described it as monotonous in her autobiography; "hunting followed by eating, followed by more hunting, followed by tea" (Seymour 1996, 17). Hunting lodges were a feature of many estates and considering this feature is on the former estate of the James family and is labelled as a "lodge", it is likely that it was used as a hunting lodge.

References to hunting are also found in records from Brandon Hill. Figures from the 1901 census record a gamekeeper and caretaker in the townland of Brandonhill (Ida) however no physical remains for this feature were identified as part of this survey. As it was placed on the mountain lands of the Tighe estate, it is possible that this occupant managed the landlord's hunting grounds part of whose

employment terms required an occupation of the lands. The hut site recorded on the summit of Knockroe Mountain (H26) was also suggested by one hillwalker as a grouse hunting lodge (Michael Monahon, pers. comm.) although the butts which generally went with this activity, examples of which are found in the North York Moors (Whiteman & Talbot 1991, 12) cannot be identified. While it is not recorded on the OS maps, it does appear on the Griffith's Valuation sketch map giving it a possible early-mid nineteenth-century date.

A final upland estate feature is a structure in Raheenkyle (ST03) which is known locally as "The Scabby House". Large arched windows and two storeys indicate its former status however it is the white quartz facade which is most dramatic. Interestingly however, this is not visible from the Tomduff-Nine Stones roadway which the house abuts. The house is not recorded on the first edition OS map but it is on Griffith's Valuation. A path leading from the site to Mount Leinster Lodge, (Tudor revival late eighteenth-century landed estate building initially built by the Newton family and now Kavanagh's) is also recorded by the latter (Fig. 6.29) of which there is no trace today however this does indicate that it was an estate feature, perhaps a reading room or retreat. Visible from the main access path into Mount Leinster Lodge, the white façade must have made a dramatic impact in stark contrast to the green and brown fields and mountain on which it was built.

Military Barracks

Military activity in the Blackstairs has previously been discussed in Chapter 5. Law and order were tested on numerous occasions in the nineteenth century also, with the most dramatic being an incident now known as "The Bantry Commons Case". As the name would suggest, the townland of Bantry Commons forming much of the eastern flank of the Blackstairs ridgeline uplands was traditionally grazed in common by surrounding farmers. Down Survey maps (1685) also refer to this area as "Common" (see Chapter 5). Much of the land on the west side of the ridgeline was owned by Thomas Kavanagh (1767-1837) of Borris House. Seeking to expand his landholdings, Kavanagh claimed control of the unenclosed area of land in Bantry Commons (NFC MS1344, 112; NFC MS1344, 178) and removed grazing and turbary rights (NFC MS890, 543). A letter to him relating to the case dated 23rd February 1835 described the presence of houses and enclosures across the townland (Kavanagh 2001, 66). Settlers from England were invited with the prospects of cheap rent to

improve the land by building fences, houses and access roads (NFC MS890, 542; NFC MS1344, 112). New family names included Coutler, Smelcher and Hill (NFC MS1344, 179). It is also possible that some of these settlers' were those who were removed from better land elsewhere in the estate and allocated leases for the poorer mountain land as occurred on the Ballysaggartmore Estate, Co. Waterford (Whelan & O'Keeffe 2014, 708). Local opposition began to turn violent as houses were damaged, field walls knocked and new settlers attacked (NFC MS1344, 112) a feature found on numerous estates across the country (Clark & Donnelly 2003, 25; Whelan & O'Keeffe 2014, 701).

In an attempt to counter such activity, Kavanagh constructed a series of barracks in the area and paid a sergeant and twelve policemen to occupy them. Most of these structures were wooden however some were constructed of stone (NFC MS1344, 113). As local farmers released their sheep on to the land, the constabulary would round them up and impound them, in some cases taking them as far as New Ross. In response, the police became a target with the pens being attacked by night in order to release the sheep (Michael Byrne, pers. comm.). Such acts peaked in one instance when farmers attacked an RIC barracks by rolling large boulders which were positioned 50-60feet above, down onto the wooden structure below (NFC MS1344, 113; NFC MS1344, 178). The occupants escaped without harm; however, the barracks was levelled. Eventually the case was brought to court by Thomas Kavanagh, where it was heard at the Quarter Sessions in Wexford (Kavanagh 2001, 66; NFC MS1344, 113). Folklore states that the locals were represented by Daniel O'Connell (NFC MS890, 543; NFC MS1344, 113; NFC MS1344, 179; Michael Byrne, pers. comm.; Barry Dalby, pers. comm.). Judge and jury sided with the locals against Kavanagh when evidence was provided by a Protestant landowner named Fox who stated that his family had grazed the land in common with other farmers in the area (NFC MS1344, 179). Kavanagh was ordered to remove the field enclosures and level the houses and barracks within two days (Kavanagh 2001, 67; NFC MS890, 543; NFC MS1344, 113). The barracks are also associated with the Tithe War (1831-1837) in one instance (NFC MS890, 543). It was noted that the remains of the new settler's houses and cultivation drills were still visible on the mountain in the 1950's (NFC MS1344, 112). State forestry planted in the 1960's, now impedes on any survey of such features and has likely damaged many beyond recognition.

Locations for the barracks constructed of wood and levelled by boulders are unknown today and are yet to be identified. This has broader implications for other structures built of similar materials and their identification. Two stone barracks are known however, one in the townland of Ballyglisheen and the other in the townland of Ballybeg Big, both on the Carlow side of the range. These are referred to locally as "Tower Houses" (NFC MS890, 543; Michael Byrne, pers. comm.; Barry Dalby, pers. comm.) as they conform to the style of police barracks of the early nineteenth century; a central structure with a round tower on one corner of the building either two or three storeys high (Dúchas 2002, 12). Formerly constructed of stone, both lie in ruins today. The Ballybeg Big site (located in the foothills) is depicted as a ruin in the 25" series OS maps (1906) along with two other associated structures within a defined space just below the limits of field enclosure however none of these are marked on the first edition 1839 maps, instead the area is some distance beyond the limits of field enclosure. The building lies in a north-south alignment with the tower on the southwest corner. Similarly the upland Ballyglisheen (ST05) example also lies in a north-south alignment with a southwestern tower. This tower, however, is clearly marked on the first edition OS maps as a one roomed structure with a tower. Despite the court order given to Kavanagh to level any structures, the 1906 maps, while showing the building as a ruin, also have an addition built on to the eastern side of the structure, visible today as two rooms, signifying occupation at least into the late nineteenth century (Fig. 6.30). Local tradition today accounts for this discrepancy stating that the stonemason employed to build the structure disagreed with Kavanagh over payment and occupied the house himself. His descendants, the Cantillon's, were still living in the house up until the early twentieth century when Mr. Cantillon was killed by a stallion kick. The cairn known as "The Height of Stones" (C65) was built as a memorial (Michael Murphy, pers. comm.; Conry 2006, 45). Interestingly, the absence of the Ballybeg Big site on the first edition maps suggests the deliberate exclusion of ruined sites as previously discussed.

Folklore from both archival and current sources and the unification of both was also useful in the interpretation of other structures which appear to be linked with the event. "Rose's Walls" (ST04) refers to ruined, multi-roomed, rectangular structure located at the Cooliagh Gap (Fig. 6.31). Aligned east-west along the pathway known as the "Tower Road" it is surrounded by a stone enclosure. Adjacent to the western

side of this enclosure is a deep pit surrounded by a stone wall with a west facing and ramped entrance (Fig. 6.32). Local knowledge today is limited to the fact that a policeman with the family name Rowe or Rose once lived in the building (Barry Dalby pers. comm). The building is not marked on the first edition maps although the ruin is on the second edition maps along with the enclosure. Archival folklore records from the 1940's sheds light on this building as it is noted that; "a barracks was built on the site known as Cahir's [Roe's] Den and it was demolished too" (NFC MS890, 543). While not exactly at Cahir Roe's Den, it is likely that this is the structure that is referred to by Thomas Ryan, the informant as; (A.) no structures exist at Cahir Roe's Den itself and the area is unsuited for construction, (B.) the Cooliagh Gap is heavily associated with Cahir Roe's Den (see festivals below) and (C.) Cahir Roe's Den is the first summit immediately to the north of the Cooliagh Gap. Further to this, Mrs. Elizabeth Byrne of Grange, Co. Wexford (born 1867) recounted in 1954 how her father went to the Cooliagh Gap with a priest on the evening the houses and barracks were being demolished. With every crash the priest proclaimed; "Ain't it grand to see them coming down" (NFC MS1344, 179) suggesting that there was a barracks or structure in the immediate vicinity. Coupling the modern reference to a policeman living in this structure with the archival evidence that a barracks stood at the site, it is suggested here that the Cooliagh Gap structure was most likely one of Kavanagh's barracks. The large pit located next to the structure may have been dug and used as a holding pen for impounded sheep.

Clachans

As well as scattered farmhouses, another settlement pattern grew out of the shortage of agricultural land in nineteenth-century Ireland; the clachan. Composed of a nucleated cluster of houses, land surrounding the settlement was organised on a communal basis often due to the considerable ties of kinship between houses. Occasionally, gardens plots were kept beside each individual house for the growing of vegetables. Surrounding the settlement was the "infield", a large open field organised into strips for the growing of potatoes, oats and occasionally other crops. Around this and generally separated by a wall was the "outfield", poorer land used for rough grazing. Strips in the infield were rotated between houses on a cyclical basis either annually or bi-annually thus ensuring fairness in the distribution of better soils. Such a system meant there was little desire to improve land as the benefits of ones labour

could be claimed by another the following year. Patches of scrub or bog were cleared and improved in the outfield on occasion for the growing of potatoes (Aalen et al. 1997, 80) especially as the population grew.

Mapped by Desmond McCourt (1971) based on OS maps, clachan numbers dropped dramatically in the latter part of the nineteenth century. Surviving longest on more marginal land (into the twentieth century in some cases), the Irish uplands, including the Blackstairs Mountains, held on to the last pockets of this post-medieval settlement pattern. Most of these however were in the foothills surrounding the range and outside the upland area under discussion here. One such example was located in the townland of Dranagh. Here an unorganised group of houses were built along a roadway and around a central green area known locally as "The Street" (Fig. 6.33) (Peter Kealy; Helena Fitzgerald, pers. comm.). Fields surrounding the houses were cultivated while the upland to the east of the cluster was grazed in common. Most of the houses, occupied by some of the last native Irish speakers in County Carlow were removed in the twentieth century except for one left to ruin (Peter Kealy, pers. comm.). A second example was hinted at by an NFC informant in the Carrigeen area where 13 houses stood in a cluster known as "The Street" also. Abandoned during the Famine, the ruins of 8 were still visible in the late nineteenth century (NFC MS1344, 148) although there is no visible archaeological trace today. Another informant noted a further example in the townland of Gurraun Lower to the east of Rathnure village, Wexford. Described as a cluster of 7 houses (which cannot be identified on the OS maps), each owned an acre of ground which was farmed intensively with wheat, potatoes and vegetables (NFC MS1796, 395). Grazing may have been carried out on the Blackstairs uplands to the west.

Remains of a single clachan in the upland zone (VER05) are located on the southern slopes of Knockroe Mountain (Fig. 6.34). Here a cluster of four houses lie in an area densely overgrown with scrub and bordered by planted conifer forestry in which more house remains may exist. None of these houses are marked on the early OS maps although they are known locally today as "Hickey's Walls" (Martin Shannon, pers. comm.). Each house falls under the stone built one roomed cabin classification with high gables indicating a gable-ended roof style. Despite there being no current evidence for hearths in the gable, the structures appear to have been direct-entry. Accessed from the mountain road leading to Ballycrystal and Stoolyen, a small

grotto has been constructed over a nearby mountain stream from which water could be accessed (Fig. 6.35). Scrub and forestry surrounding the cluster makes it difficult to identify the limits of cultivation and the infield although the outfield was likely located on the open mountain to the north of the site in the Slievegar or Knockroe townlands.

This clachan and the above isolated houses would have relied on the surrounding land to support themselves and their families. Evidence for their agricultural practices are still visible in the landscape today next to these sites. Other instances of agricultural remains are found more sporadically also indicating the presence of a nearby settlement site which has since been removed.

Agriculture

Archaeological traces for agricultural activity are most obvious in the field enclosures which penetrate the upland zone. While some are still in use today, others have returned to scrub vegetation. Our understanding of their former use can come from the topographical traces left by cultivation ridges or in the future from more detailed environmental analysis. Folklore also contributes to our understanding of the work and activities carried out in these fields as it does for the surrounding foothills.

Labourers tasks included hay making, ploughing, harvesting (NFC MS1344, 127-132), cleaning out and bedding animal sheds and thinning and weeding vegetables such as turnips and potatoes (NFC MS1344, 127-132). Both bound labourers and cottiers are referred to. Pay rates for the former were referred to in one account (NFC MS1344, 127-132) while the latter were provided with house, fuel, tobacco and animal feed or bedding. Larger farmers would often hire the son of a cottier for the summer and provide him with food thus reducing his parent's burden. On some farms he would also be provided with a quarter or half acre of land, potato seed and manure. These he could sell for his own or his families gain often receiving a penny or ha'penny per stone (NFC MS1344, 136). Livestock and cultivation are both represented in the landscape all of which first required the clearance and improvement of land to make it suitable for agriculture.

Improvement

Uplands were generally considered unproductive by the gentry landowners and travellers as previously discussed. Direct attempts were made by some landlords

to make the land more productive (Whelan & O'Keeffe 2014, 703) such as was the case in Bantry Commons and thus increase profits. In other cases, squatting and upland expansion by small farmers and cottiers themselves contributed to land improvement. Physical evidence for this activity by both groups is most dramatically represented in the myriad of field systems stretching into the uplands. Fieldwalking however reveals more subtle traces in the form of drainage ditches and clearance cairns. Examples of ditches are visible on Crannagh ridge just outside the current field system line most likely with the aim of extending the limits further upslope (Fig. 6.36). Similar drains are visible across the field systems in Knockroe (Fig. 6.37). Stones removed during clearance after ploughing or ditch digging would have been predominantly incorporated into walls and structures. The thickness of the Blackstairs field walls today and the abundance of stone on the unenclosed mountain compared to the field systems, many of which do not include cairns, supports this argument. Cairns are visible occasionally; however, in field systems which appear to be nineteenth century in date such as Slievegar, Clorogue Beg and Crannagh (Fig. 6.38). After clearance, drainage and enclosure the land could be put to use for agriculture however land beyond the field systems was also put to use.

Livestock

Most of the Irish pastoral system in the nineteenth century was dominated by cattle; however sheep were locally or periodically important (Aalen et al. 1997, 72). Beef production and dairying required larger amounts of pasture land forcing small farmers and cottiers to the poorer upland slopes which were less suitable for cattle (Aalen et al. 1997, 73). Carlow and Wexford in particular were renowned for the suitability of their lowlands for cattle grazing and dairying (Ó Gráda 1993, 89). Loudon's *Encyclopaedia of Agriculture* noted how most of the farms in County Carlow were managed for dairy production (1825, 137); however, agricultural statistics for 1854 indicate that tillage had replaced dairying as the dominant land use type in the county bringing it more in line with the situation in Wexford at both times (Aalen et al. 1997, 70). Dairying in the Blackstairs region was most intense in the Barony of St. Mullins area indicated by a higher ratio of milch cows to cattle than found on the eastern and northern sides of the range (Aalen et al. 1997, 72). Loudon noted that the practice of letting cows to dairymen was found in County Carlow (1825, 1156) whereby one large tenant farmer would lease 20-40 cows to a dairyman

in exchange for a butter rent. The latter would sell calves, keep the buttermilk and be provided with a cabin and potato ground. In some cases dairy houses were also provided for milking and storing the produce and utensils. Herd sizes were limited to forty- the maximum number that could be hand milked by a single family (Aalen 1997, 71). Many of the cottiers and isolated houses on the slopes of the Blackstairs such as VER01 on Knockroe may be associated with this activity. Certainly a "cattle shed" is mapped in the uplands of Raheenkyle townland on the OS first edition map. Dairymen are noted as being absent in Kilkenny (Loudon 1825, 1155) which may explain the lower density of such houses on Brandon Hill. Cottiers were recorded by Loudon in County Wexford, however their occupations were not although it was noted that their quality of life, conditions and wealth were far superior to those of their status in the rest of the country (Loudon 1825, 1155). Survey and an analysis of the folklore archives in UCD and census information contributed to the successful identification of some of this activity in the Blackstairs uplands.

Field systems despite indicating land management are unreliable as indicators for the types of farming employed except where ridge and furrow are clearly evident. Instead folklore and historical records must be referred to in the absence of excavation and palaeoenvironmental data. Census figures from the turn of the century refer to the types of activities being practiced as *Form B2* recorded statistics on the numbers and types of buildings associated with each farm. As previously stated, all but one house, occupied by a labouring family, in the upland townlands had at least one outhouse on the 1901 census (Chart 15 & Table 10). Stables were clearly the most popular outhouse type with all but seven of the upland townland households having at least one (two on the Furlong farm in Bantry Commons (Barrack Village)). Horses would have been an important livestock unit to both the farmer and the labourer, pulling ploughs, carts and various other types of farm machinery. For labourers in particular, work may have been easier to secure if they had their own horse with the added benefit of being used to the animal's characteristics. Likewise, journeys to and from the markets such as Borris and New Ross would have been far easier. Folklore accounts for the presence of horses in the landscape too (NFC MS1344, 164) with one account referring to their use by large farmers to turn butter churns (NFC MS1063, 27) clear evidence for the presence of cattle rearing in the landscape. As well as hay, grass and oats where they could be obtained, horses were noted as being fed with

ground up furze (NFC MS1344, 182-3) which grows across many parts of the uplands. Without this resource, survey alone would not identify furze harvesting as a use for the uplands despite its former importance. Consequently, it raises issues as to what other plant species were gathered both in this and earlier periods, the evidence for which cannot be identified through field survey alone (see "Natural Resources" below).

Cattle husbandry towards the end of the century is clearly evident in the census figures. Cow houses were present at 19 upland farm sites, clearly distinguished from milking houses on the census. Presence of the latter on five farms along with cow houses indicates that cattle were not just grazed on the uplands for beef. Cow houses also suggest the over-wintering of animals in and around the farmyard. Some may have doubled as dairies on farms where a purpose built outhouse was not present. Calf houses on eight farms also indicate the rearing of animals and a dairy industry. Despite the difficulties in identifying its physical traces, placename evidence also demonstrates that dairying and beef farming was carried out in the uplands. One placename indicative of dairying activity is found on the southern slopes of Knockroe Mtn - "Airghe" (milking place) (Conry 2006, 44) and may refer to a booley site. Interestingly, this is at the northern limits of the St. Mullins Barony where a large dairy industry was noted above. In the absence of archaeological evidence, folklore also suggests dairying was carried out in the region. Kerry cows were the predominant breed in use (NFC MS1344, 70), bought and sold at markets such as Borris and New Ross (NFC MS1344, 139). Disease resistance, tolerance for poor weather conditions and high-milk yield made it the favoured breed across Ireland (Aalen et al. 1997, 71). Dairy farming in county Carlow was principally intended for butter production and it was noted by Loudon that the best butter in Ireland was made here. Quality was so high that it was divided into three parts for the international market, brought to the River Barrow and exported from New Ross and Waterford. Portugal received the poorest butter, Spain the second and London the best where it was highly esteemed and often labelled and sold as Cambridge butter (Loudon 1825, 1156). Butter was churned by most farmers using hand churns (NFC MS1063, 27) and accounts of May Day superstitions from Kilbrannish and Rathnure are also indicative of dairying activity (NFC MS1063, 7-8; NFC MS1097, 243-244; NFC MS1344, 178-179; NFC MS1344, 262-263; NFC MS1796, 470-476).

Alongside the larger livestock, poultry also made up an important component of many upland farms. Fowl houses were recorded on 16 of the 27 upland townland houses on the 1901 census. Where fowl were kept, chicken was the dominant species. Reared and tended to by the woman of the house, any monies raised from the sale of eggs or meat was either kept as her own income or used to cloth the children or fund their education (NFC MS1063, 10; NFC MS1829, 36). Other households kept it simply as general income (NFC MS1829, 54). Fowl were sold at the market in New Ross with people travelling from all across Carlow, Wexford and Kilkenny (NFC MS577, 373). Archaeological evidence for fowl keeping in the Blackstairs uplands was identified during field survey on some surviving farm sites. Small grottoes (Fig. 6.39) were constructed in the walls of houses and outhouses in which poultry could nest and lay eggs. Their proximity to the house made it easier for the family to observe the bird and take eggs when they were laid. One example on Clorogue More has a triangular shaped hole made in the farmyard wall of the house, lintelled on all three sides by slabs. A second example in the townland of Crannagh has two square holes built into the gable walls of an outhouse facing the house. Such features may have existed on other house sites and cabins although the current states of preservation of surviving structures have rendered them invisible. Burning at Knockroe in April 2015 revealed a small shed with a very low entrance next to a house, most likely the remains of a hen house.

After stables, pig houses were the second most common outhouse type on the 1901 census being built on 20 of the 27 houses (two at a Slievegar house). Pigs were kept by some farmers, usually as a source of income rather than for personal consumption (NFC MS1829, 54). Such was the importance of pigs to the family income that they were often kept inside the house with the family, much to the horror of upper class travellers and writers. As the century progressed, pigs were generally moved to purpose built sheds (Hull 2006, 150). A labouring family in Bantry Commons (Killann) had no other animals apart from pigs on the 1901 census highlighting their importance to these households in the Blackstairs also. Pig markets were held in Killanne village every fortnight in the late nineteenth century (NFC MS573, 29). Possible archaeological evidence for pigs in the landscape today was identified during survey in the small garden plots attached to the cottiers houses in

Knockroe (VER01) and Rathnageeragh (VER30) which may have been used to keep them, the greener vegetation cover a result of the soils higher fertility as a result.

Despite their importance today, sheep were not mentioned on the 1901 census. The abundance of barns and sheds on most farms or buildings listed as "Other" may have been used for over-wintering of sheep. Alternatively they may have been kept out on the mountain or in field systems for the entirety of their lives. Sheepfolds identified during the present survey on Brandonhill (SF03), Knockymulgurry (SF05) and Coonogue (SF06) (Fig. 6.40) testify to the presence of sheep in the landscape in the nineteenth century. Numerous sheep passes were also identified in field walls scattered across the landscape where they are referred to as "geata" (pronounced ge-a-ter) (Patrick Byrne, pers. comm.) and examples include Knockroe (SP01), Crannagh (SP02; SP03; SP04) and Ballycrinnigan (SP04; SP05) (Fig. 6.41). The sheer abundance of field walls means that the true number of these features is likely far higher and warrants further survey in the future. Sheep are alluded to in the folklore of the region also. Sheep shearing carried out through the co-operation of two or three neighbours was mentioned by one informant to the NFC (NFC MS1829, 54), the Bantry Commons case clearly refers to the presence of sheep in the early half of the century while Michael Byrne of Dranagh as previously mentioned, testified to the mountain being white with sheep in his youth.

Goats are another livestock unit which do not feature in the folklore of the region or the 1901 census although an area on the southern slopes of Knockroe is known as "The Goat House" (Barry Dalby, pers. comm.). Feral goats roam the open-mountain and forestry of Dranagh Mountain today. Culling operations were conducted by Coillte in the late- twentieth century which met with much local opposition as they were considered part of the mountain (Michael Byrne, pers. comm.). The origins of this herd are unknown but may represent the former farming of goats in the nineteenth-century landscape. Apart from a single placename and a feral herd, the keeping of goats in the Blackstairs would have gone unnoticed during survey, highlighting the importance of local tradition and communities in the recording process.

Cultivation

At the dawn of the century, even the poorest members of society were cultivating cereals as well as vegetables and legumes such as turnips, peas and beans for their own personal consumption. Tillage where it was practiced was mainly on a mixed farming basis. The eighteenth century and early nineteenth century saw an explosion in the demand for flour caused by global expansion and military campaigns bringing with it a rise in cultivated land, the establishment of more and more mills and a demand for agricultural labourers (Aalen et al. 1997, 74). The proximity of New Ross and the River Barrow ports to the Blackstairs and the number of mills in the foothills on the first edition maps compared to the Down Survey is testament to this growth and how the region played its part. Occupants of many of the upland houses would likely have worked as labourers on the lowland farms and estates. Economic decline from the 1820's saw the rise in reliance on the potato crop to the point that one chronicler in Kilkenny commented that it was rare to see peas and beans other than on lands farmed by the gentry (Ó Gráda 1993, 10). By the end of the century, mixed cultivation had returned as evidenced by direct references in the folklore to the practice itself or its by-products in the household. Cultivation also brought a rise in craft workers especially blacksmiths (Aalen et al. 1997, 76) another group widely attested to in the folklore from the foothills (NFC MS885, 4-8; NFC MS885, 109-112; NFC MS885, 114-129). Wexford received the title "the model county" in this period due to its commitment to tillage improvement (Aalen 1997, 76). Even in folklore, the foothills surrounding the Blackstairs were noted for their cultivation rich soils (NFC MS573, 29). It was not just the lowlands that were cultivated as is the case today, uplands soils were also broken by ploughs and spades either for personal consumption or sale. Cereals, potatoes and vegetables were all grown in the uplands throughout the nineteenth century represented both in the analysis of the folklore from the region and identified for the first time in the archaeological record as part of this survey.

Relict remains of cultivation are plainly visible in many of the now abandoned upland field systems today either as topographical features (e.g. Knockroe Mtn and Tomduff Hill) (Fig. 6.42) or as differential growth in the heather vegetation (e.g. Rathnageeragh). The remains of an iron plough (Fig. 6.43) in the uplands of Coonogue townland beside a farmhouse (VER20) also indicate the presence of cultivation. This and the more common wooden plough would have been pulled by

cattle or ponies (NFC MS1344, 70). Without folklore or excavation in the future, evidence for the latter would have gone unidentified during this survey. Folklore also refers to the cultivation of a variety of crops such as cereals (NFC MS1344, 70; 127-132; NFC MS1829, 36; 54; NFC MS1540, 126-127), flax (NFC MS577, 369; NFC MS750, 100; NFC MS1344, 191), and beet (NFC MS1344, 182; NFC MS1829, 36; 54) at least in the foothills surrounding the range. Without environmental data or excavation, evidence for these crops could not be identified in the uplands from survey alone.

While the above crops may have been grown in a select few upland fields, potatoes or vegetables were likely the main crop grown owing to the size of the drills identified during the present survey (see “Cultivation Ridges” Volume 3). Known as lazy beds, this ancient land use system was found to be particularly suited to potato cultivation. Ploughing was done on larger farms which could afford both the equipment and the animal stock to pull them. Poorer farms used the more laborious spade (also known locally as a "fac" (Seamus Murphy, pers. comm.)). Digging was done to form the ridges, the high labour-input costs of which were easily absorbed by the large population base. Ridges then had to be maintained throughout the growing season. Thus the potatoes resilience and the adaptability and effectiveness of the lazy bed system allowed for marginal land to be used productively (Aalen et al. 1997, 88). Potatoes were sown in February giving the crop plenty of time to grow before the first harvest in Late July or August (NFC MS172, 293; NFC MS591, 22). Seeds were procured by removing the buds or eyes from the previous year's crop, a role generally done by the women of the household (NFC MS1829, 36, NFC MS1344, 131). Across the country the lumper potato was the dominant species sown providing a high yield crop requiring little manuring and tolerant of poorer soils (Aalen 1997, 85) but sacrificing on taste (Ó Gráda 1994, 88; Williams 2008, 98).The Blackstairs region was no exception and here, according to the analysed folklore records, the lumper was most commonly used also (NFC MS1344, 146); however, when possible, the Champion variety was favoured especially for its taste followed by Scotchdown and Pink Eyes (NFC MS591, 22). When it came to harvesting, poorer families pulled the stalk from the ground to remove the crop. Better off farmers with larger amounts of land to harvest used a single plough to bring the potatoes to the surface where they could be “spurdled”. This involved picking the potatoes up with a spurdle, a three

pronged fork with each prong 1" thick, and shaking the clay off on one side of the worker and placing the potatoes on the opposite side. Another worker, sometimes the farmer's wife would follow behind collecting the potatoes into a basket known as a "praiskeen" from where it was emptied into a waiting cart (NFC MS1344, 191-2).

Vegetables such as turnips were grown in the uplands also as indicated by folklore. Restricted mainly to garden plots rather than as field crops, these were especially important in the early summer months after the previous year's potato harvest had been consumed and before the coming harvest (Aalen et al. 1997, 87). References are also made to turnips in accounts about the Famine in the region (NFC MS591, 8; 90; NFC MS1136, 295; NFC MS1159, 222; NFC MS1796, 478). The aforementioned NFC account referring to "mountain men" states that they were often seen carrying vegetables in kishes or baskets on their backs (MS 1669, 8) indicating the presence of these crops in the upland landscape.

Natural Resources

Domestic crops were not the only type of plant exploited in the uplands at this time as previously indicated by the cutting of gorse for horsefeed. Bilberries were an important source of income to many families in the late-nineteenth and early-twentieth century where they are known locally as "fraughan's" (pronounced; frock-in's). An exhaustive study of bilberry picking across Ireland was carried out by Michael Conry (2011) in which the Blackstairs formed one case study. Numerous accounts in the NFC also refer to the practice (MS 890, 413-431; NFC MS1565, 81-82). Some of the most frequented sites were Coonogue Wood, Brandon Hill, the area south of Blackstairs Mountain, Clorogue and Blackrock Mountain (Fig. 6.44). People of all ages crossed the mountain range to their favoured picking sites collecting the berries in tins, cans and buckets. Graiguenamanagh became an important hub for the practice, exporting berries along the River Barrow to the fruit markets of London, Manchester and Wales (Conry 2011, 95). Much of Conry's research is based on interviews with locals and highlights use of the landscape which would otherwise go unnoticed in the archaeological record. Similarly, the use of dandelion leaves and gorse branch bark in place of tobacco as recorded in folklore (see below) also indicates the exploitation of natural upland resources.

Turf-Cutting

As discussed in the last chapter, turf was an important source of fuel in the nineteenth-century Blackstairs household ample supplies of which was found in the uplands. Also discussed was the fact that much of the peat deposits exploited during this period have been removed either by erosion or burning meaning only the twentieth century sites survive today. Folklore in the NFC also alludes to the activity in the "Modes of Transport" questionnaire (1959). One account relating to the Knockymulgurry region states that sleds were pulled by donkeys or jennets for carrying turf as well as single axle wooden carts (NFC MS1669, 8). Interestingly, there are no areas with evidence for turf-cutting in this region today, much of the peat having been removed. Nineteenth-century turf-cutting sites were identified during survey however on Cloroge Beg Mountain (TC01), Craan ridge (TC02) and Stoolyen Mountain (TC03). Written accounts also refer to the activity in sites where physical evidence could not be identified during survey such as Patrick Kennedy's account in *Legends of Mount Leinster*:

> "on the black bog of Cummor [south east of Mount Leinster]… we meet rough-coated horses, drawing old fashioned country cars, on which tall turf-kishes are tottering; and women, girls and boys, carrying breadbaskets or pails and jugs filled with milk, to relish the mid-day meal of the turf cutters. Here the men, stripped to the shirt, fling up from the pit the square cut turf; and the attendant wife or children bear them carefully in their hands, to the high healthy bank and arrange them in rows, to be dried by the sun and wind. The smoke rises here and there from fires lighted to cook eggs or herrings; and by and by, we will see the labourers with their little families enjoying their well-earned, palatable dinner, using the towel or apron in which the cakes were brought out, as a table cloth" (Kennedy 1855, 2).

Turf-cutting is also represented in the landscape by numerous access routes leading from the lowlands to the bogs (Fig. 6.45). All of these were newly recorded as part of the present survey and examples include a road from the Scullogue Gap to Stoolyen (R04/R14) or from the Kiltealy-Bunclody road to Clorogue Bog (R02) (Fig. 6.46). Timber was also used as a resource as we have seen, however, much of the woodlands noted in earlier records (see Chapter 5) appear to have been levelled by the time of the first OS maps in the late 1830's except for the aforementioned Coonogue Wood removed during WWI (Conry 2011, 164).

Quarrying

Stone was the most common source of building material in the range used in both houses and enclosures. Most of this however appears to have been exploited on an individual or communal basis rather than by skilled tradesmen. Plug and feather split stones were identified on Dranagh Mountain (Fig. 6.47) during field survey showing that stonemasons were active in the area and further evidence may be identified elsewhere in the future. As well as the retired gold miner in Bantry Commons (Barrack Village) mentioned above, a stonemason was also recorded on the 1901 census in Bantry Commons (Killann). References to quarrying or stone-cutting activity are absent from the folklore records of the region.

Road Building

Upland trackways have been discussed previously, which facilitated access between either side of the mountain range or to areas of settlement or turf cutting. One newly recorded trackway (R07) however was built in the nineteenth century most likely during the Famine in the townland of Ballyglisheen. To deal with the widespread hunger the British Parliament established Public Works schemes across the country employing men, women and children, roadway construction being one of the main tasks. Numerous such schemes, named and described in the NFC accounts, were conducted in the lowlands surrounding the range such as at Clonroche (NFC MS1344, 133), Tomenine (NFC MS1344, 151; NFC MS1136, 296), Castleboro (NFC MS1796, 478) and Ballindaggin (NFC MS1344, 154) at which some of the upland poor may have been employed. As well as the Ballyglisheen scheme, a second example in the immediate foothills saw the construction of a roadway between the uplands through the Scullogue Gap joining Kiltealy and Ballymurphy (Fig. 6.48). This is still referred to as "The New Line Road" (Martin Shannon, pers. comm.) and today forms the R702. It is notably absent on the first edition OS maps while it is clearly marked on later editions having been built in 1847 (NFC 973, 335).

The upland Ballyglisheen scheme saw the construction of a roadway linking the lowlands to the mountain pass at the Cooliagh Gap (Fig. 6.49). No folklore exists for the building of this routeway although it is known locally as "The Wexford Road" (R07). It is linked to what are referred to as the "Tower" and "Gowlin" roads (R06) and has the exact same start and end point as the Tower Road creating a triangular area between which field walls were constructed (FS25). The Tower Road is marked

on the first edition OS maps and is a well-built routeway with evidence of paving in places (Fig. 6.50). The Wexford Road is marked on the second edition ordnance survey (1894) but is not on the first edition. It is of poor quality compared to the earlier routeway and large banks and pits along its course suggest that it may not have been completed (Fig. 6.51). This is a prime example of what were described during the period as a "road to nowhere" as it runs parallel to a pre-existing road shaving only minutes off the journey time.

Gatherings and Festivals

Numerous gatherings and festivals took place in the Blackstairs in the twentieth century as discussed in Chapter 5, many of which had earlier origins. One upland example took place at the Cooliagh Gap known locally as "The Meeting Point" on the last Sunday in July (FES01) and an analysis of archived folklore in the NFC describes the nineteenth-century practices (NFC890, 413-431; NFC890, 495-510; NFC890, 511-517; NFC890, 537-543; NFC890, 577-579; NFC1344, 141-145; NFC1344, 180-182; NFC 1565, 81-82). Families and communities from both sides of the range (some as far away as County Kilkenny) took part in the gathering which was popularly known as "Mountain Sunday" or "The Big Day". Horses and carts would be left in farmyards in the foothills before the attendants would climb up to the saddle. Singing and dancing were the main attractions while children would begin the fraughaun picking which would go on throughout the autumn. Food was provided by vendors who set up stalls along the route which may explain the widenings (RW01 & RW02) in the walls of the roadways R05 & R06 recorded during field survey. Match making occurred at the site also between communities from either side of the mountain range which in some cases led to brawls according to some accounts. People would climb up to the site of Caher Roe's Den where according to folklore; gold was buried by the Celtic God Cathair Mór although this was often altered to being the treasure of the famous highwayman Caher Roe after whom the tors at this summit were named (see Chapter 5). As evening fell, those gathered would continue to the houses on the Carlow side of the range where dances and festivities continued before the Wexford communities returned home in the early hours of the morning. Further traditions are discussed by Máire MacNeill in her exhaustive survey of the Lughnasa Festival sites of Ireland (1962, 225-227). One of the many landlords of the area, Major Arthur MacMurrough Kavanagh (1831-89) of Borris House planted a

grove of Scot's Pine trees leading up to the site (Conry 2006, 43) of which only a line of trees survives today.

As well as gatherings, local and individual bonfires were a popular practice at certain times of the year in the twentieth century as discussed in Chapter 5. Folklore from the NFC also accounts for these in the nineteenth century with St. John's Eve in June marked by a series of bonfires both in the uplands and the lowlands. So numerous were these fires that the evening was referred to as "Bonfire Night". Almost every townland appeared to have a gathering site, usually at crossroads or communal or important structures such as lime kilns. Once the fire was lit, dancing, music and singing began. Burnt timbers or ashes were taken home and scattered or placed in fields for protection. Fires were also lit beside the houses on the Blackstairs uplands where they could be seen from great distances leading to rivalries and competitions annually to build the biggest fire. The tradition of lighting fires by upland farmers continued much longer than the communal lowland gatherings (NFC MS890, 413-431; NFC MS959, 143-149; NFC MS959, 157; NFC MS1063, 5; NFC1855, 128). Without these accounts, survey alone would not have identified these gathering or burning activities with broader implications for similar gatherings from the time for which there is no record or in earlier periods also. Similarly, excavation of an upland house site could reveal burning in the farmyard which might go unexplained without these records.

Artefactual Evidence

Only one nineteenth-century artefact was identified in the Blackstairs over the course of the survey, a clay pipe stem discovered in the middle of a turf cutters road on Knockroe Mountain (Fig. 6.52). Engraved on one end of the stem was "INGO" with at least four more illegible letters possibly indicating a manufacturer.

Smoking was an important part of social life in the nineteenth century as evidenced by the huge increase in clay pipes at the time (Rynne 2006, 180). Old women were specially noted as clay pipe smokers in folklore from the Rossard region of the Blackstairs (NFC MS1063, 21). When tobacco could not be obtained or afforded people turned to local resources many of which were available in the uplands. Fir bush stumps where the bark was dry and withered was one resource. Dandelion leaves were also dried and smoked where they grew on pastures. Beet pulp

from the lowlands was kept for smoking by labourers although it was noted that it produced a horrible smell. Tea after it had been brewed was also kept (NFC MS1344, 182-3). Alone, this pipe stem suggests that tobacco was smoked in the region indicating that the Blackstairs was tied into a global trading network. Folklore not only confirms the widespread nature of the activity but also provides us with a more detailed impression of the tradition and how communities made use of the resources from the local landscape. Coupled with the accounts for bilberry picking and gorse horsefeed, or for objects such as wooden ploughs, without local testimony both archived and present in the landscape today our understanding of the period would be far poorer. Consequently, this has implications for understanding the medieval and prehistoric use of the landscape also.

Understanding Earlier Periods from Nineteenth-Century Evidence

Investigation of the archaeological evidence from the nineteenth century combined with the documentary evidence available raises a number of issues for our understanding of earlier periods. While some of the evidence is complementary (e.g. folklore accounts of fowl keeping, fowl houses recorded on census documents, archaeological evidence for hen keeping in nesting boxes) in other cases it is contradictory or evidence has not yet come to light. For example a large number of settlement sites are recorded on the OS first edition maps for which there is no trace on the surface today. Sub-surface traces may exist however these cannot be accessed without excavation. Without this cartographic record the existence of many would be unknown and our understanding of the distribution of settlement in the nineteenth century in the uplands much poorer. Similarly the Coonogue eviction refers to the eviction of 40 houses for which there is no trace today. This, however, is not surprising as generally all traces of houses were removed from the landscape. Large stones were removed and the land smoothened for pasturage (Orser 2006, 187-8). Ploughing in later years if it was carried out would have masked these remains further. The aforementioned deliberate non-recording of houses by the first OSI mappers may also hint at the presence of houses long removed for which there is no record or presence in the landscape today.

If more substantial and larger features such as houses can be removed from the landscape without trace, what does this mean for smaller structures such as hut sites from earlier periods? Similarly features from this period are as vulnerable to the

effects of vegetation and peat formation as medieval and prehistoric sites. For example, outhouse structures in the Slievegar townland associated with the settlement site VER01 first recorded as part of this survey in 2013 only came to light following a burning incident in 2015.

Folklore also informs on many aspects of the home and landscape in the nineteenth century which can offer interpretations without the need for excavation. The lack of such accounts from earlier periods means our understanding is much poorer. For example records in the NFC describe the types of fuel used such as wood (NFC MS1344, 128; NFC MS1824, 65; 67; 70; 71), turf and dried animal manure (NFC MS1824, 65; 67; 70; 71) and the methods of burning it, namely lamps (NFC MS1824, 70; 71), candles (NFC MS1063, 30; NFC MS1344, 189-190; NFC MS1824, 65; 67) and hearths (NFC MS1344, 128; NFC MS1824, 65), which lit the Blackstairs upland homes after dark. Similarly details including the layout of houses, the number of rooms and the types of furniture are described in both folklore (NFC MS591, 17; NFC MS1344, 138; NFC MS1663, 48) and census records. The latter can in some cases be difficult to ascertain where organic sub-divisions were used or only the outer walls of a house survives.

Documentary records and folklore accounts also highlight another major issue with the archaeological record; preservation. Even with excavation, many important features and objects in a nineteenth-century upland home would be long since destroyed and thus unidentifiable mainly because of their organic nature. These include common features such as Saint Bridget's crosses (NFC MS907, 162-165; NFC MS907, 166-181; NFC MS 1063, 5-7) and clothing (NFC MS750, 98-114; NFC MS 750, 162-188) as well as unusual ones such as the storing of hair (NFC MS1063, 9) or small hens eggs (known as "Fortnales") in the walls of homes for luck (NFC MS1063, 31). Similarly the species of animals that were kept are well documented and described which is often difficult to ascertain from field systems alone in the absence of features such as sheep passes and fowl nesting boxes. The use of the uplands by members of society but for which there is no archaeological record as of yet are also described. These include wandering labourers (NFC MS1344, 372), travelling pedlars (NFC MS750, 98-114; NFC MS 750, 162-188) and the drilling sites of secret military societies such as "The Whiteboys" who were closely linked to the Fenian movement (NFC MS591, 14). The absence of the Mesolithic period in the

Blackstairs and Irish uplands was discussed in Chapter 5 and the low-intensity nature of activity at this time attributed as the cause rather than a lack of use. If evidence for low-intensity use of the uplands by groups we know were using the landscape in the nineteenth century (a little over a century ago) can go unnoticed, this has major implications for the absence of activity not only in the Mesolithic but in all periods of the archaeological record.

Summary

Archaeological features from the nineteenth century are as vulnerable as features from earlier periods yet these same sites remain unrecorded. Without a rapid assessment of the survival of such sites and their preservation at least by record, many will be lost in the future to the effects of erosion, vegetation growth as well as forestry plantations and in some cases agricultural land clearance and improvement. None of the features discussed above were recorded prior to this survey, the archived folklore records were unanalysed for an understanding of the landscape and a collective understanding of the nineteenth-century Blackstairs uplands did not exist.

Detailed accounts of daily life and farm work in folklore highlight the value of this resource when reconstructing the nineteenth century. Many of the objects mentioned and providing a fuller and more colourful image of the past are organic and would leave no or very little archaeological trace; mountain passes filled with wooden carts on market day, small eggs placed in thatch, wooden spoons and bowls as well as clothing would have all gone unnoticed. Even where material culture could be identified either in part or whole, their use may not be entirely obvious such as slates used for writing; tins and buckets used to support the fraughan industry; or clothing demonstrating a close bond between households. These also call into question our understandings of earlier periods for which such accounts and descriptions do not exist. Where materials may survive such as beads, combs or isolated patches of burning in farmyards, a greater understanding of the uses of these objects can be built up, the best example being the various materials that were smoked in clay pipes.

The National Folklore Collection is an invaluable resource which should be assessed by all those considering research of the post-medieval period as well as modern traditions and folklore. Differences in attitude and memory evident from accounts collected in the 1930’s-70’s compared to today suggest that this resource is

not timeless and is in danger of being lost rapidly. Memory is organic and fluid and recorded by the victors or survivors just like history. Today, the area is popularly regarded as having missed the worst effects of the Famine. Less than a hundred years ago, such an attitude was not present in the same area as archived folklore demonstrates. The NFC provides us with a reach into the nineteenth century through reports directly from those who experienced it. Even these have their limitations however and just as living memory today only reaches as far as the early twentieth century, these resources only document the latter half of the century with descriptions of the earlier half more unreliable.

Built heritage and topographical traces for this century are rich in upland landscapes however they are also vanishing rapidly either through neglect and overgrowth, erosion or improvements and clearance. Analysing cartographic sources indicates that this has been the case since the period itself and so is not a recent phenomenon. Every one of these sites post-dates 1700 and thus falls outside the protection of the National Monuments Service. Despite being one of the closest periods to us chronologically, it is one of the poorest understood archaeologically. Arguably, we know more about the Neolithic from an archaeological point of view than the nineteenth century (Orser 2006, xii) and certainly more targeted excavations have been carried out on the former across the country, the latter often being removed quickly in order to reach earlier periods within tight project time-frames. With most of our limited current archaeological understandings coming from lowland excavations we arguably know even less about the uplands during the period. Not every house or trace of cultivation can be protected and to do so would be counter-productive especially when trying to engage with local farmers and communities positively. What is needed however is a rapid survey of these landscapes to at least identify and record as much as possible before it is lost further. Sod-built cabins for example leave little trace but two survive in the Blackstairs where they are not documented in contemporary writings. In contrast, none have been identified in Wicklow where their documentation does exist. Without the surviving examples our knowledge of this building material in the Blackstairs uplands would be completely misinformed.

Just as in the broad brush method there is a value in targeting a specific period. Once we start piecing the period together, analysing the available sources and tying it into broader themes and discussions we can see the landscape slotting into the

generalities of the broader regional and national narrative while in other cases questioning myths and assumed beliefs. The next chapter looks at where we go from here.

Chapter 7- Where to Next? The Future of the Blackstairs Mountains & Upland Archaeology

"Threats to upland archaeology are constantly changing. Hence it is not practical to suggest controls for what might in some cases be short-lived (although by no means trivial) problems. The key is for archaeologists to anticipate and avert future threats by being involved formally in any discussion of proposals that might otherwise inadvertently endanger archaeological heritage" (Darvill 1986, 87)

Introduction

Research targeting the Irish uplands has been limited until relatively recently. The current investigation of the Blackstairs Mountains has not only demonstrated that these understudied landscapes are worthy of further research, but that this is of major concern. These ever changing landscapes are under threat both from humans and nature. Hundreds more archaeological features likely remain unidentified beneath the peat in the Blackstairs alone not to talk of the rest of the Irish uplands. The fortuitous discovery of rock art in field wall tumbles (Chart 16) or hut sites after burning incidents is testament to this. Threats will continue into the future such as under and over grazing, forestry plantation and peat erosion. Measures can be put in place however to limit their effects on the surviving archaeological remains. Opportunities for preserving and monitoring the known record as well as the potential for new discoveries are offered through engagement with local communities in this landscape as well as other interested administrative and commercial bodies. Even features that have been identified and discussed throughout the body of this text have a more detailed story to tell that can only be done through more intensive investigation. In short, the current project should be viewed as a stepping stone towards further research in the Blackstairs and Irish uplands. This chapter reviews what has been identified to date and identifies a number of current and potential future threats to both the known and unknown archaeological remains. Opportunities arising from both local engagement and the comparison of results in the present survey to those of the 2011 project are also explored along with their implications for the future management and protection of the now updated archaeological record for the Blackstairs uplands. Recommendations for future research are also made, not only in this study area but applicable in most if not all other under-investigated upland areas in Ireland.

Blackstairs Upland Archaeology in Review

This project is the first and only review and investigation of the archaeological record for the entire Blackstairs Mountains since the Archaeological Survey of Ireland in the 1980's. It follows on from a similarly intensive survey on Dranagh Mountain in 2011 however this differed in scale and methodological approaches. The latter identified an additional 70 sites to the ASI record through intensive fieldwalking following a burning incident. In contrast, the current project identified 187 previously unrecorded features in the uplands and a further 13 in the foothills using open-source imagery and fieldwalking primarily while also using folklore and documentary evidence as well as exploiting the windows of visibility offered by small-scale burning incidents. Local engagement with hillwalkers and landowners also facilitated the recovery of a number of features but more crucially aided in the interpretative process on individual sites and areas within the landscape which cannot be elucidated from topographical survey alone. The exploration of other remote sensing techniques such as multispectral satellite imagery and airborne laser scanning in the Dublin Mountains, while highlighting numerous limitations with their use in upland landscapes, also demonstrated their value as potential albeit not entirely reliable reconnaissance tools. Much of their value instead lies in monitoring changes in vegetation cover, surveying areas now densely vegetated but which was low at the time of data capture or identifying subtle traces of features in targeted sites not visible by other means. Investigation of the nineteenth-century landscape was most revealing, not only documenting this period for the first time in the archaeological record of the Blackstairs uplands but also highlighting limitations in our understanding of earlier periods based on the upstanding archaeological record and field survey alone.

Together these indicate that intensive survey should be made a priority in the Irish uplands especially with the improving availability of open-source satellite imagery which makes such a task less laborious and costly. Upland agricultural practices which are generally low-intensive have allowed for the preservation of archaeological remains in these landscapes at a level generally unseen in the lowlands. The updated record for the Blackstairs uplands implies that our understanding of these same features is extremely limited across the country owing not just to a lack of intensive research but also factors such as dense vegetation and peat cover which masks these well preserved sites. Monitoring burning events is also imperative as

these can offer brief windows of visibility for identifying features which were previously overgrown. Where possible, other means of recording should also be applied such as field survey and remote sensing to gain the fullest understanding and a context for further investigation. Without understanding what survives in these landscapes, sound management decisions cannot be made by landowners and administrative bodies. Upland archaeological remains across Ireland therefore are under threat from numerous factors in spite of the huge potential for research. Current threats are reviewed below in the context of these new discoveries in the Blackstairs uplands.

Current Threats to the Archaeological Record

The Irish uplands, while managed by local individuals, communities, commercial companies and farmers for the most part, are also maintained by county councils. Many mountain ranges fall under the remit of multiple county councils as a result of their past and present use as local, regional, administrative and county boundaries. Effective and uniform management across these landscapes on issues such as grazing, forestry, wind farming and recreation requires intercommunication between neighbouring departments. Decisions made regarding each of these can have an impact on the preservation of both above and below ground remains and thus their management is intrinsically linked to the archaeological record. The Blackstairs uplands which are divided by three counties, Carlow, Wexford and Kilkenny, offer an interesting case study in the problems which can arise when a collective strategy is limited and where numerous administrations work at different paces.

In many cases it is a lack of communication and a common strategy which presents the biggest threat to the Blackstairs archaeological remains as well as those in other Irish uplands. While all County Development Plans for the Blackstairs region discuss similar topics, none make reference to the strategy of their neighbours on the same issues. For example, the mountain ranges two main spines are proposed as SAC's by both Carlow and Wexford County Councils; however, neither makes reference to the strategies in the neighbouring county. Instead they refer to the collective national strategy on such issues. Similarly, all three County Councils list the Blackstairs uplands as a specific Landscape Character in their assessments and note the particularly sensitive nature of the region. While this works for some issues such as natural heritage protection it collapses and is contradictory on others such as

wind energy strategies. Recognising the sensitivity of the uplands physically and visually, both Wexford and Kilkenny County Councils have stated that no further wind farms will be developed in the Blackstairs region despite the high winds needed being present. Instead lowland areas where there is less of a visual impact on the landscape especially surrounding these iconic backdrops will be pursued (Kilkenny County Council 2014(b), J8; Wexford County Council 2012(b), 24; 34; 77). Carlow County Council in contrast has left huge swathes of the Blackstairs "open to consideration" in its wind farming strategy (Carlow County Council 2015(b), 41). As well as a visual impact, development of wind farms could also have a detrimental effect on the archaeological heritage, damaging unknown sites and draining bogs which may preserve organic remains. Such a strategy also stands in stark contrast to the policy of protecting this SAC. Contradicting this however is a statement in the corresponding landscape character assessment document which highlights the low capacity of the region to absorb wind turbines (Carlow County Council 2015(c), 35) which would bring it more in line with the neighbouring counties. Such conflicting statements and strategies could lead to confusion and even exploitation in future with potentially damaging effects for the archaeological record.

Wind farm development is not the only potential threat to the landscape and consequently its heritage. Management of the natural and commercial vegetation also has its influences on the visibility and survival of archaeological remains. Owing to the varying sensitivity of the landscape, each county council has divided their administrative landscapes into a series of zones. Appropriately, the Blackstairs uplands were highlighted by each as most sensitive because of the fragile natural habitats they support and the unique and iconic views both from and of their slopes. As a consequence, both Wexford and Kilkenny County Councils, while encouraging the development of forestry, highlight that it must be in harmony with a variety of other factors including conservation areas, under which the Blackstairs fall (Kilkenny County Council 2014(a), 76; Wexford County Council 2013(a), 135). This demonstrates progress from earlier policies of planting large swathes of the upland area in previous decades (e.g. Brandon Hill, Kilkenny and Bantry Commons, Wexford). In complete contrast and despite the sensitivity of both the landscape and the views, commercial forestry is raised by Carlow County Council as a beauty and recreational resource for the Blackstairs region. The immediacy of this ongoing threat

is demonstrated in the recent advertisement by the forestry body Coillte Teoranta to commence afforestation of new areas in the Blackstairs townlands of Coonogue and Dranagh (Carlow Nationalist 27 October 2015, 27). These plantations, while relatively pleasant in their mature stage, are an eye-sore on the views when harvested or young. More importantly here, the processes which go into their planting are extremely destructive to the landscape and its archaeological remains (Darvill 1896, 50). Certainly large amounts of nineteenth-century houses and field systems have been overlain as evidenced by historic cartography and the damaged examples of the latter still visible in many places (Fig. 7.1). In areas where forestry was planted before systematic survey was carried out, many features from earlier periods may have been removed. Even where a buffer was formed around a feature, seeds and roots can still cause damage such as at the moated site (MS02) in Ballygub New (Fig. 7.2). Large gaps in the archaeological record for the Blackstairs following this survey mainly occur over areas of forestry (Fig. 7.3) and this does not appear to be coincidental. The handful of sites recorded on Dranagh Mountain prior to the 2011 survey caused the forest manager to leave the now open mountain unplanted (Declan Doyle, pers. comm.). Had this area been ploughed and covered, it is likely that all of the newly identified sites would have been destroyed without record. The significance of the results of that survey was included in comments by The Heritage Council to the National Forestry Draft Plan 2014-2020 (The Heritage Council 2014, 2).

As well as the management of other factors having an impact on the preservation of archaeological remains, the absence of other targeted heritage policies can have an equally damaging effect. While the recreational and natural heritage of the region is highlighted by all County Councils, the archaeological heritage is not. National Monuments are listed for the region as part of the SAC however their implications for understanding this landscape are not discussed in any meaningful way and are not highlighted as issues for future development such as wind farms or afforestation. Successive centuries of human occupation, much of it unrecognised until now, have dramatically altered this landscape as we have seen, creating the natural heritage that is being protected. The significance of the Blackstairs archaeological record was highlighted in comments to the draft Carlow County Development Plan (2014/15) however these do not appear to have been regarded in the final publication. Monitoring of these sites and advertised development will

continue into the future. One of the reasons for the limited consideration of archaeological heritage in both Carlow and Wexford Development Plans is the absence of a Heritage Officer for these counties. Their appointment should be made a priority in the near future as not only does it impact on the uplands but the wider county as a whole. In spite of these threats and issues, there are still numerous opportunities for further research in this landscape.

Opportunities for Future Research using the Current Approaches

Further research and the dissemination of knowledge in the Blackstairs region will rely on a variety of sources. Methods used as part of the current project can be continued such as the monitoring of newly available remote sensing data, whatever the format, as it becomes available, for previously unidentified features. Despite the many difficulties in the Dublin Mountains, lidar and satellite imagery should they become available for the Blackstairs, should be assessed. Resolution and time of acquisition may be more favourable and some of its benefits have already been highlighted such as the identification of the passage in the Two Rock Mountain cairn. Continuous monitoring is also required into the future in order to confirm those sites listed as "undetermined" because of access issues and as new sites may be revealed. Similarly, survey should follow in the wake of burning events when and where they do occur. Further desk-based analysis is also required for more recent centuries especially landlord records which may hint at the presence of the elusive cottiers and squatters as well as dates for some of the house sites and onset of enclosure. Two-way dialogue should be continued with local communities both for the gathering of information which can help to identify and interpret archaeological remains, but equally to highlight the presence, importance and protection of these same features. Hillwalkers who frequent the region also fall into the latter category. Burning of the upland vegetation also offers periodic windows of visibility and recent changes in legislation for this provides ground for a unification of the previous approaches.

Vegetation Burning

Dense vegetation often presents a significant barrier to the recording of archaeological remains in upland landscapes. Episodic burning is one of the few methods available which allows us to see what lies beneath the canopy. This is a long-established practice in the Blackstairs uplands as evidenced by folklore from the early part of the twentieth century. Aging farming communities (see below) coupled with

legal restrictions and political decisions on the times of year when the practice could occur in recent decades has led to the dense accumulation of heath and scrub vegetation in many areas. Since 2000, the legal period for burning in Ireland has been restricted to the months between September and February which is generally a time of adverse weather conditions and higher precipitation (Nugent 2012, 4). This is in stark contrast to Britain and Northern Ireland where burning is permitted until mid-April each year (Tubridy 2013, 40). Consequently, when fires have been lit close to these densely overgrown areas, either intentionally or accidentally, the huge fuel supply encourages wildfires. These damage the atmosphere, present a threat to property, forestry and life, impact on the surrounding ecosystem and not only strip the vegetation but also the underlying peat cover. Such intensive fires are also potentially damaging to wooden or organic objects which may be preserved in the peat. Lifting of restrictions as part of controlled management of the landscape has long been called for both by agricultural communities as well as the State Forestry Service amongst other groups (Ciaran Nugent (Forest Service), pers. comm.; Irish Uplands Forum 2015, 14).

Burning when it is carried out in controlled circumstances and at more favourable times of the year, is beneficial to a wide variety of upland interest groups. For farmers it allows better management of the grazing land especially where sheep numbers may be low. Young heather shoots are more palatable to sheep than the denser vegetation which takes hold after a number of years (Tubridy 2013, 19). Agricultural activity is intrinsically linked to the local and wider ecosystem, thus best practices in the former can be equally beneficial to biodiversity and habitat management. As upland sheep farming is in decline, biodiversity is shrinking as heather and gorse spread rapidly. Burning can help to protect endangered habitats when it is done in a controlled manner (Tubridy 2013, 8). Young heather is also an important food source for a variety of wild species such as red grouse while denser heather offers nesting sites (Nugent 2012, 26; Tubridy 2013, 19). Burning legislation and its management and control is also of interest to the archaeological community as access and the visibility of archaeological remains are closely linked to its use as previously discussed (Fig. 7.4). The density of sites recorded on Dranagh Mountain in 2011 has been unmatched anywhere else in the range. While this may be an archaeological reality, no burning incidents of the same intensity have occurred

elsewhere in the time since. In cases where limited burning did occur, previously undetected features were brought to light such as on Knockroe Mountain in 2015.

Until recently, burning incidents have been largely unpredictable and unsystematic. The practice often takes place outside the legal window making constructive dialogue with farmers difficult. Opportunities for archaeological survey in reaction to these events are largely opportunistic and serendipitous which is far from ideal. New government pilot legislation at the end of 2015 has extended the period in which controlled burning can take place into March which will enable farmers and foresters, to make better use of the more favourable weather conditions than the previous cut-off date of February each year[6]. Now that barriers on controlled burning have been lifted, archaeologists should begin to capitalise on this by building networks with local farmers. Firstly, if an upcoming controlled burn is reported, preparations can be made in advance to record any newly identified features rather than reacting after events. Similarly, fire brigades could report areas of burning to archaeologists in cases of accidental or malicious fires. Secondly, plans can be put in place to protect fragile known remains. Thirdly, the effects of burning on archaeological remains both prior to and following a burning incident can be researched through replicated sites. Most significantly the decrease in wildfire events which will come from this will reduce the burning of deep peats many of which likely preserve organic archaeological remains as suggested by the wooden deer trap on Blackstairs Mountain. This new development has the potential to promote a huge amount of inter-disciplinary research with the added benefit of increased openness from communities who are at the heart of these landscapes. People living in and moving through this landscape are the key to its understanding, preservation and monitoring into the future. Similarly, hillwalkers who frequent the area offer the potential for continuous monitoring both of the known record and the recovery of any newly exposed features. The contributions of each of these are explored next.

Farming Groups

Local communities are central to both the short and long term management of the uplands which has a knock on effect on the preservation of archaeological

[6] http://www.ahg.gov.ie/minister-humphreys-to-allow-flexibility-for-hedge-cutting-and-burning-on-pilot-basis/

remains. Farmers can monitor the known record while also reporting newly exposed sites and features during their ordinary use of the landscape. However, challenges are presented by the average age profile of this particular group in the Blackstairs (Fig. 7.5) which has seen a continual rise over the last three decades and poor transference of family farms to the next generation as demonstrated by recent research (Blackstairs Farming Group, forthcoming; Colin Gallagher, pers. comm.) This is a problem for many upland regions and rural Ireland in general because of poor services and the difficulties of generating incomes (Census Statistics Office 2012, 14; Harding 2014, 18). The biggest contribution offered by local farmers is their testimony, traditions, knowledge and respect for the known archaeological remains under their care. It is the sustainable management of the uplands and farming methods of lesser intensity to those in the lowlands which have preserved archaeological features often unwittingly and fortuitously as knowledge of their existence is often unknown. The purchase of land by larger farmers or the return of younger generations in the future from towns and cities that have lost their connection with the region potentially endangers the record. By building awareness of the presence of archaeological features, these issues can be avoided. Promoting awareness amongst current farmers also helps to preserve and monitor the landscape something which is applicable to all the Irish uplands. The recent establishment of a collaborative farming group in the Blackstairs region offers a unique opportunity to further the aims and results of the present thesis.

The Blackstairs Farming Group was set up in order to bring about a collective locally-led means of sustainably managing these fragile uplands in a way that was beneficial both to the landscape and the farmer. €70 million has been allocated in the Rural Development Programme for locally-led agri-environmental projects to date (Allen et al. 2014, 56). As well as being included within this, the Blackstairs Farming Group have so far received €30,000 grant funding from The Heritage Council, the European Forum on Nature Conservation and Pastoralism (EFNCP), Carlow County Council and Wexford County Council. Phase 1 is currently being undertaken by gathering baseline information on current farming practices and the condition of the mountain range which includes detailed habitat mapping; a report on which is due in early 2016 (Blackstairs Farming Group, forthcoming). The outcomes of this investigation will be of huge interest to the future archaeological management of this landscape and the results of the archaeological survey carried out as part of this thesis

have been incorporated into the analysis. Steps have also been taken by the author to raise awareness of the known and updated archaeological record amongst the farming group through the wide network that has been created and this will continue into the future.

Hillwalkers

As well as those living in the landscape, the Blackstairs uplands are also frequented by hillwalkers who pass through the area periodically. As well as individual hikers, four hillwalking clubs one of which bears its name also make use of this landscape for recreational purposes; Tullow Mountaineering Club, Tyndall Mountain Club, Wexford Hillwalking and Mountaineering Club and The Blackstairs Ramblers. Sudden changes to the landscape and areas of peat erosion with the potential for revealing archaeological remains can be continually monitored by these groups. New features can be reported to the relevant authorities and actions taken as appropriate, be they simple recording or rescue excavation. Members of these groups were contacted at the projects outset and communication has been ongoing throughout. Sites have been reported by this group as well as the provision of interpretative information which has been accumulated both from their own experiences and investigations as well as that which has been gathered through their contact with local farmers many of whom have passed on since. Awareness of the archaeological heritage near frequently used walking routes was also promoted which is further explored below.

The potential of this group for identifying previously unknown features has already been highlighted in the discovery of a hut cluster (H38-H40) in Ballycrinnigan (Fig. 7.6) and a deer trap on the summit of Blackstairs Mountain. This reporting however relied on direct contact by telephone or email and later reporting. This can be unreliable as some sites may have been forgotten or identified by hillwalkers who were not in contact with the author. With the increasing availability of GPS systems and smart phones, mobile phone apps can be developed in which new discoveries can be recorded in the field allowing for easier identification by researchers and archaeologists and reducing issues of memory and positions in the landscape.

Citizen Science and the Wider Community

Communities and individuals who have little or no direct links to the Blackstairs could also be involved in the research process into the future. Citizen science, the harnessing of amateur and public research, voluntary time and knowledge to aid research (Dickinson & Bonney 2012, 1) has seen a growing level of interest across a variety of disciplines (e.g. Dickinson & Bonney 2012; Landgraf 2013; Crall et al. 2011) including archaeology. Scotland has an extensive track record in using volunteers and members of the general public in the recording and interpretative process which has included upland and highland landscapes. Launched in 2006, Scotland's Rural Past Project saw volunteers trained in survey and recording techniques and helped to raise the importance of archaeology locally and nationally over a period of five years (www.rcahms.gov.uk). Other ongoing projects include the Glenshee archaeological project run by the Perth and Kinsoss Archaeological Trust, Northlight Heritage and the Cairngorms National Park Authority. Again locals and volunteers work with archaeologists to better understand the prehistoric and medieval past of the upland tracts of the Glenshee River (www.glensheearchaology.co.uk). One of the most ambitious citizen science projects developed thus far is the Atlas of Hillforts in Britain and Ireland conducted by the University of Oxford. Launched in 2012, it aims to create a database of hillforts across these two countries on which future research can be developed. Crucially the survey relies on local communities taking an interest in and recording hillforts in their regions in a systematic manner and submitting this information to the project co-ordinators (Ian Brown, pers. comm; www.arch.ox.ac.uk/hillforts-atlas-survey.html). Similar projects could be developed for the Blackstairs and other Irish uplands.

Many of the models developed by other disciplines are also worthy of note as they could be modified to research the archaeological and cultural heritage of these landscapes. Place and field name mapping has seen a sudden rise in interest across the country with the best and most effective examples being the *Meath Field Names* and *Louth Field Names* projects. The Blackstairs too has seen the collection of hundreds of placenames by Barry and Clive Dalby of *EastWest Mapping* who have carried out similar surveys in the Wicklow Mountains and Nephin Beg Mountain, Co. Mayo. These have been published through detailed hillwalkers maps and are an invaluable source for any researcher of upland landscapes. An ongoing project is the Duffry

Mapping Project launched in June 2015 of which the author is a part, focusing in particular on the Wexford townlands of Camtiege, Ballindaggin and Kiltealy, the latter which includes a portion of the Blackstairs uplands. Names of individual fields are being collected and mapped by the residents of this area along with any related folklore which will supplement any future archaeological research in the landscape. This survey could also be extended to incorporate the communities in all of the Blackstairs townlands.

Automatic feature detection in remote sensing data has seen growing, albeit slow, interest in recent years in the archaeological profession as previously highlighted in Chapter 4. This approach was not carried out as part of the present project however there is scope to do so in the future. One of the limitations of these resources is that no one visualisation reveals every feature. Working through each visualisation and their often wide ranging parameters would be extremely time-consuming for the researcher alone if these sources were to be used as part of reconnaissance surveys. Combining the outputs of these visualisations with a citizen science programme however could help to counter this issue. The ongoing Sunspotters Project conducted in Trinity College Dublin (www.sunspotter.org) offers a valuable model in this regard. Here, members of the public log in to an online system of images to distinguish sunspots from false readings in automatically detected algorithms. Researchers use this information to calculate the complexity of sunspot groupings and their effects on solar eruptions (Neal Ó Riain, pers. comm.). A similar project could be developed for the uplands whereby automatically detected images from multispectral satellite imagery or airborne laser scanning data would be assessed by communal groups. These could work in tandem with Bing and Google Imagery for the same area allowing natural or false features to be discounted. Similarly, positional information could be provided which could be downloadable to GPS systems allowing potential sites to be visited by hillwalkers or farmers as they pass through the landscape and reported back to a principal researcher.

Schoolchildren could also be involved in the recording process for the uplands which would not only be of benefit to our understanding of the landscape but would also encourage an awareness and appreciation for the wider archaeological and cultural heritage in Ireland. Folklore was gathered in the 1930's by schoolchildren from their parents, grandparents and neighbours and written in copy books which

were later housed in the National Folklore Archive in UCD. This far-sighted, ambitious, invaluable and influential project could be repeated again as many local traditions and knowledge of their former existence are being lost rapidly. Technological advances since the early-twentieth century mean that digital recording methods could also be used and encouraged. A pilot school tour of an area in the Blackstairs was provided to fourth and fifth class pupils of Bunclody National School, Wexford in early 2015 which included the use of replica artefacts and site visitations. The success of this day means this avenue should be pursued into the future.

All of the above suggestions involve the further development of approaches taken as part of the current project. While some of these such as continued networking with local communities can be carried out at no cost, others require financial investment, opportunities for which are competitive and relatively limited at present. Many techniques and approaches used as part of other upland projects elsewhere in Ireland such as palaeoenvironmental research or excavation were not used as part of this project for this same reason. However, the potential contributions of such methodologies in the Blackstairs uplands, should funding become available in the future, is worthy of exploration.

New Research and Dissemination Techniques in the Blackstairs Uplands

A landscape based approach has been taken as part of this thesis. Specific features within the Blackstairs landscape are also in need of further and more intensive investigation as evidenced by a multitude of research questions generated by the results of landscape survey. Detailed approaches in other upland landscapes elsewhere in Ireland (see Chapter 1) have addressed these same questions relative to them, three of the most crucial being dating, previously unidentified sub-surface remains and the historic vegetation cover. These can range from non-invasive methods such as geophysics to invasive ones like excavation and radiocarbon dating. We now have the scope and baseline knowledge in the Blackstairs for a more informed research strategy into the future on specific time periods or site classifications. Similarly, the dissemination of knowledge has generally relied on direct contact with various interest groups throughout this project. The potential tourism value of the upland archaeological remains is also worthy of discussion.

Excavation

Dating has been an issue for many parts of this project as it was in the previous survey on Dranagh Mountain. One of the biggest reasons for this is the dearth of either development or research-led excavations in the uplands. While sites can be classified and interpreted many cannot be fitted as of yet into a chronological narrative. Hut sites and cairns for example may date to almost any period except where factors like their position (both in the landscape or peat) or relationship to other features such as field walls hint at potential but broad dates. Excavation would not only help to counter this issue but would also provide us with a better understanding of the use of these features and the surrounding landscape. For example, were the hut clusters in the townlands of Dranagh and Ballycrinnigan used for booleying and if so in what time period? Excavated upland hut sites elsewhere in Ireland have been dated to the Neolithic at Piperstown, Dublin (Rice 2006), Bronze Age on Achill Island (McDonald 2006), Iron Age in the Beara Peninsula (O'Brien 2009), medieval period on Brandon Hill, Kerry (Coyne 2006(a)) and post-medieval period in the Galtees (Costello 2015) indicating that they could be from any period. Similarly what function did the isolated hut sites such as those on the northern slope of Blackstairs Mountain or the Knockroe summit serve? It must be borne in mind, however, that excavation may not answer this question as demonstrated by the lack of any finds or charcoal from hut sites investigated using this technique on the Paps of Anu, Co. Kerry (Coyne 2006(a), 44) and in the Wicklow Mountains (O'Sullivan et al. 2008, 93).

Specific and morphologically identifiable sites and features whose interpretations have been based on the results of excavated examples in the Irish uplands elsewhere are also in need of confirmation. The parallels already highlighted between the cairns in CF01 and CF02 on Dranagh Mountain in the Blackstairs and those on Piperstown Hill in the Dublin Mountains require further research. This would help to establish whether the former contain Bronze Age burials as was uncovered during the excavation of the latter (Rice 2006, 47-8). Similarly, the large summit cairns which have been suggested as dating to the Neolithic on Brandon Hill, Blackrock Mountain, Slievebawn and Mount Leinster could have numerous research questions answered through targeted excavation. Passage tombs may be revealed as occurs at Seefin Mountain, Co. Wicklow while in other cases Late Neolithic or Bronze Age cists and later burials may be uncovered such as at Poulawack, Co. Clare

(Jones 2007, 122-3) and Tibradden, Co. Dublin (Farrington 1933, 252). Dating may also be undetermined in the absence of any finds however in these cases excavation would not be entirely fruitless as it would help to determine the sub-surface structural style of the cairn. Such an investigation revealed a complex construction of dry-stone walling rather than the seemingly haphazard dump of material owing to later activity on the Western Pap summit cairn in Co. Kerry (Coyne 2006(a), 43). A programme of rescue excavation on the upland moated site in Ballygub New, Co. Kilkenny (MS02) would help to determine the extent of the damage caused by the surrounding and encroaching forestry plantation as well as being a potentially significant contributor to knowledge on such sites.

Investigation of the nineteenth-century case study presented a number of complementary and contradictory traits between the historical documentary record for the period and the upstanding archaeological remains on the ground. Excavation would be of immense value in addressing a number of the issues highlighted. For example houses in the landscape today which appear to date to the nineteenth century are absent from contemporary maps. Evidence elsewhere such as sheepfolds recorded on earlier maps and not on later editions and vice versa suggests that features were being deliberately unrecorded. Buried objects and charcoal from the hearths which were central to the use life of these houses would help to answer these questions as it did for similar research in lowland landscapes in Roscommon. Research here in the townland of Ballykilcline also suggested that evicted houses could be distinguished from voluntarily abandoned ones through the material culture and the site stratigraphy. Such an investigation would help in the social understanding of many of the upland houses in the Blackstairs also. Related to this through the aspect of material culture, records from the National Folklore Collection give detailed accounts of the types of objects and tools found in and around the household during the nineteenth century. Excavation results and the items retrieved would offer an interesting point of comparison to these for what survives and its implications for our understanding of these sites if such accounts did not exist. It also addresses issues such as how we might interpret more unusual objects such as isolated pieces of slate which were often used at this time as writing tablets as previously mentioned.

In short the list is almost endless for the range of questions excavation could begin to answer and it would help to fill in major gaps in the record most notably dating issues. The latter would largely rely on a programme of radiocarbon dating from multiple sites in order to develop a more scientifically based chronology for the landscape.

Geophysics

Lidar and satellite imagery as we have seen, have the potential in some cases for identifying or enhancing our knowledge of features on a landscape level. Geophysical techniques provide a means of assessing particular features or targeted areas at a more detailed level. Such approaches were not carried out as part of the present project; however, this is a methodology which should be tested into the future both for reconnaissance and more intensive investigations (Barton & Fenwick 2005, 4; Bonsall et al. 2014, 11; Campana 2008, 5; Jones 2008, 13). As an example, areas where houses are mapped on the first edition OS map but for which there is no topographical trace either through fieldwalking or airborne remote sensing could be targeted to identify any sub-surface traces. Equally, sites which have are visible above-ground could also be investigated for further sub-surface traces of sheds and outhouses recorded on the 1901 census but which cannot be identified through fieldwalking today. In the case of prehistoric and medieval sites, traces of enclosures or ditches could be picked up around some of the passage tombs or the remains of structures inside the ringforts or Knockscur hillfort. Numerous techniques should be used where possible as one piece of equipment may not detect what another one does (Brady et al. 2013, 138; Bonsall et al. 2014, 61; Gaffney 2008, 329; Jones 2008, 13). Earth resistance, magnetometry and ground penetrating radar (GPR) could be done systematically over the sites in an attempt to pick up any traces of buried stone footings, ditches or areas of burning or waste disposal. In wetter and waterlogged areas, however, GPR is likely the only technique to produce any successful results (see Jones 2008, 16-17 for discussion). Similarly, historic vegetation burning activity may impede on the visibility of archaeological remains in magnetic-based survey methods (Ernenwein 2008, 115). Technological advances in geophysics techniques have been developed which allow for largescale reconnaissance by attaching instruments to vehicles (Bonsall et al. 2014, 69; Jones 2008, 39; Tsokas et al. 2008,

84). Owing to the fragility of the landscape and its protection as an SAC, however, such techniques are not advisable.

Past Vegetation Cover

Vegetation cover has long been an issue in the Blackstairs uplands which has a major impact on the visibility of archaeological remains as previously demonstrated. The historic nature of this cover however and its influence on the sites during their use is poorly understood yet important. Topographical traces of cultivation ridges in the uplands and the folklore accounts of vegetables being grown indicate that the current range of species was not the same throughout the past. Similarly, the sequence of peat onset across the uplands on which the present cover thrives is poorly understood owing to a lack of palaeoenvironmental research and targeted radiocarbon dating of non-archaeological samples. The dating of a deer trap on Blackstairs Mountain to 336–42 BC indicates that peat was already present by this stage but gives no indication of its date of initiation. Consequently, this affects our understanding and sequencing of those pre-bog features scattered across the range which have been exposed by fire and erosion.

Palaeoenvironmental research would not only help to identify the origins of the present land cover but would also help in the research of species and varieties for which there is no evidence today. Numerous upland ranges have been targeted across Ireland as part of this research by a variety of disciplines including the Wicklow Mountains (Glanville 1999; Mitchell & Conboy 1993; Leira et al. 2007; Thorp & Glanville 2002), the MacGillicuddy Reeks (Anderson et al. 2004), the Galtee Mountains (Donna Hawthorne, pers. comm.; Leira et al. forthcoming) and the uplands of Antrim and Donegal (Hanna 1993) all of which have produced varying dates and land use histories. In terms of upland archaeological research specifically, one of the most detailed investigations was carried out in the upland Barrees Valley on the Beara Peninsula, Co. Cork (Overland & O'Connell 2009). Here, palaeoecological samples were taken during archaeological excavations of pre-bog structures and the results combined with those from a lake cores and peat monoliths taken nearby. These indicated agricultural activity from the late Neolithic onwards in a landscape which appeared to be largely wooded until the fourteenth-eighteenth century when the largely cleared landscape that is present today was created (Overland & O'Connell 2009, 321). Similar samples could be taken during the proposed excavations above in

the Blackstairs Mountains. However, it was also pointed out that the results from Barrees are largely site specific and do not represent the vegetation history for the entire upland area. Consequently, multiple systematic projects would need to be carried out across the landscape.

Understanding of the distant past and long-term landscape cover is not the only benefit to be gained from such investigations. Documentary and oral accounts on the nineteenth century describe the cultivation of the upland area for potatoes and turnips. Research to identify the distribution and frequency of these and other crops could be carried out especially in those areas where houses are recorded but no nearby evidence for cultivation ridges. Similarly, the intensity of rough grazing during this time could also be investigated through the density of heather in the pollen record (Stevenson & Thompson 1993, 70). However, pollen analysis on which such an investigation would rely is not entirely reliable as it is difficult to identify its source and origin (Mary Tubridy, pers. comm.; Overland & O'Connell 2009, 319). The historic grazing regime of the Blackstairs uplands could also be investigated in a similar manner to research carried out on field wall systems in the Burren uplands, Co. Clare. Here, peat and soil samples and cores were examined for the evidence of spores found in herbivore dung fungi which indicates the presence and diet of grazing animals such as sheep and cattle (Feeser & O'Connell 2009). This approach would be extremely interesting in the vicinity of the hut sites suggested as being for booleying on Dranagh Mountain and Brandon Hill. Similarly, the presence of these spores on cultivation ridges could indicate fertilisation of the soil by nineteenth-century cottiers.

Palaeoenvironmental research across the landscape is imperative to improve our understanding of its historic use. One of the current tasks of the aforementioned Blackstairs Farming Group is the production of a detailed biodiversity map of the Blackstairs to help with future vegetation management and farming practices. This could be expanded to include peat coring to analyse and plot past vegetation cover also; proposals for which have been provisionally made between the author and the habitat mappers through the collaborative network formed by the group. Areas of suitable and deep peat deposits are being identified by the habitat mappers during fieldwork which will be of interest in the future for this purpose. Some deep pockets of peat remain such as the north eastern slopes of Dranagh Mountain, Knockroe, Mount Leinster and Craan which could be exploited. Preliminary findings however

have suggested only limited potential for palynological research. Periodic burning of the peat in the Blackstairs has stripped much of it away over the last few centuries. This has resulted in a deeply disturbed stratigraphy. Interesting soil profiles in areas of eroding peat have been identified however which suggest periodic and broken phases of agricultural activity which saw the importation of soil and fertiliser to the region before the peat took hold again (Mary Tubridy, pers. comm.). Investigating these phases and sequences will be of considerable research interest into the future both to understand the present day and past natural and cultural landscape.

Developing Tourism

Hillwalkers and recreational use of the Blackstairs alluded to above also highlights the potential for tourism development which is acknowledged as being of economic value in the current County Development Plans of all three Blackstairs County Councils (Carlow County Council 2015(a), 33; 184; Kilkenny County Council 2014(a), 79; 92; 110; Wexford County Council 2013(a), 96-7; 321-4). Recreational and natural heritage features are highlighted as being of interest (Carlow County Council 2015(a), 178-9; Kilkenny County Council 2014(a), 72; Wexford County Council 2013(a), 300) however no specific proposals have been made. Neither are they mentioned as heritage attractions despite the landscapes being highlighted as natural and recreational attractions. Heritage and archaeology elsewhere in the county is discussed as an opportunity for developing tourism by Carlow County Council however this is not transferred to the Blackstairs. This can only reach its full potential through collaboration. Carlow County Council launched the Mount Leinster Heritage Drive in 2008 which brings the participant on a self-guided car tour through the various towns and villages at the foot of the Blackstairs as well as taking one route through the uplands. Despite its value, it is limited to the north and western side of the range, excluding the Wexford side and Brandon Hill. Widening this scenic route would not only benefit the local economy of the surrounding villages but would also provide the tourist and local with a fuller experience of this diverse landscape which can only be fully appreciated from different viewpoints.

In terms of drawing people into the uplands rather than viewing them from a distance, again few strong proposals are forthcoming and no collaborative strategy is in place. Future county development plans should consider the Blackstairs archaeological remains and their potential for drawing hillwalkers and providing a

better and more informed experience of the landscape for the visitor and local alike. Awareness of these features could be raised on popular hillwalking routes through the range. The aforementioned Blackstairs Map by EastWest Mapping included most of the previously recorded archaeological remains and will include some of the findings from the present survey in future editions (Barry Dalby, pers. comm.). Self-guided walks and publications could also be developed for the range such as are widely available in Britain (examples include; Dartmoor in England (Earle 2014), the Southern Uplands Way in Scotland (Dumgal 2003) and large swathes of the Welsh uplands (cadw.gov.wales/daysout/HeritageWalks)) but to a lesser extent in Ireland (e.g. the Burren Co. Clare (Carthy 2011; Kirby 2009)). Information signs could accompany some sites to improve the experience however these could equally draw a number of issues. Some may upset the visual harmony of the site and in some cases they may be targeted by vandalism. Alternatively, printed guides and books available online or in local villages could be developed as well as mobile phone apps based on GPS and QR codes could also offer a solution to these issues. Another proposal offered in the recent Dublin Mountains access report was that of a hiker's passport based on the Camino de Santiago pilgrim's passport. This would encourage the visitation of multiple sites in the upland area rather than the better known and more frequently visited examples solely (Ní Lionáin & Davis 2014, 60). Interest in the archaeological heritage of the Blackstairs Mountains amongst the hillwalking community was demonstrated on numerous occasions over the course of the current project. Walking tours as part of Carlow's Annual Walking Festival have featured a heritage tour for the last four years part-led by the author. These have been booked to capacity every time (c.25 walkers) with repeat and new attendees each time. Members of various hillwalking clubs were also accompanied on numerous occasions where the awareness of the archaeological remains was again promoted.

Such endeavours are not without their problems however. Erosion at sites highlighted in guides on Dartmoor in England was highlighted as far back as the 1980's (Darvill 1986, 71). This has continued ever since and numerous upland sites and features have been seen significant damage from footfall erosion (Browne & Hughes 2003, 113; Leighton 1998, 56). In an Irish context, the popularity of Croagh Patrick in County Mayo has also led to significant erosion of the archaeological remains on the summit (Jones 2013, 3). Similar occurrences are found in sites

discussed as part of the present project such as Two Rock summit cairn in the Dublin Mountains and Slievebawn cairn in the Blackstairs. The true extent of this damage across the Irish uplands is something which appears to be poorly understood and quantified at present and is in need of further attention. With careful and systematic monitoring, sound decision making based on the current state of preservation and careful conservational repairs, an enjoyable and valuable resource could be developed for visitors to the Blackstairs uplands into the future.

Other Irish Uplands

All of the above avenues of research are broadly applicable to the Irish uplands as a whole. Similar surveys to the one undertaken here are now imperative in these areas. Many, as previously discussed in Chapter 1, have been the focus of detailed surveys and investigations for specific time periods. While these offer invaluable contributions to knowledge, there is a pressing need for more broad brush reconnaissance approaches as demonstrated in the Blackstairs. Some have been carried out progressively over the years and continue to produce new sites and results such as the Wicklow Mountains (e.g. Corlett 1999; 2003; 2009; 2011; Darby 2007; Warren et al. 2013). While such an approach is often the only means available because of shortages in funding opportunities, a targeted, rapid, intensive, landscape-based project such as was carried out here is preferable to gain an overall understanding and context for the uplands on which individual or site based recording can continue into the future.

As was highlighted at the outset, the Irish uplands can often be identified in the NMS distribution maps of recorded sites due to the large gaps caused by the lower density of monuments. This is no longer the case for the Blackstairs although it remains the same for many others. The Slieve Bloom Mountains in Counties Laois and Offaly are another upland area which jump out as a largely blank area in the national archaeological distribution map. Just as in the Blackstairs prior to the present survey, some recorded features suggest the region is worthy of further investigation (Fig. 7.7). Limitations to the latter however are presented by wide tracts of forestry across much of these uplands which may have removed many sites. Surveys should be carried out rapidly in light of this in non-forested areas before there is further loss or damage. Slieve Callan and the surrounding mountains in Co. Clare is another such example (Fig. 7.8). Only five sites have been recorded in the upland region most of

which has been covered with dense forestry. While sites in these areas have likely been damaged beyond recognition, many more may still lie unrecorded on the open slopes. Numerous townlands in the region refer to transhumance (Boolynamiscaun, Boolinrudda, Boolyduff) and the recorded features (megalithic tombs, cairn, standing stone, ogham stone and a ringfort) indicate prehistoric activity suggesting a much more heavily used landscape in the past than is reflected in the SMR.

The Ox Mountains in Co. Sligo are an interesting case. Despite the wealth of recorded prehistoric sites in the wider north-western upland region, few are recorded in these uplands apart from the iconic, outlying Knocknarea Mountain (Fig. 7.9). While limited in number, like the Blackstairs these recorded sites suggest an unrecognised archaeological landscape. A series of cairns have been identified along the main mountain range although these may date to any period along with a passage tomb (SL019-258) and standing stone (SL024-005). Medieval activity is highlighted by the presence of ringforts and two crannogs (SL025-007; SL018-078). Booley huts, which could date to any period, have also been identified. Apart from these and a few others, huge swathes of this peat-covered, lightly forested mountain range have no recorded archaeology. The discovery of partial skeletal remains of two individuals (SL024-001) during turf-cutting in 1969 suggests that the peat may overlie as yet undiscovered sites. Supporting this are the large number of features identified on the nearby Dartry Mountain range although huge swathes of this landscape also appear devoid of features again likely a result of current visibility and research strategies. The Cooley Mountains are another example of poorly populated landscape in terms of recorded sites again with the added benefit of being largely unforested.

Most of the above examples are relatively small ranges. Much more ambitious would be a survey of the Wicklow Mountains, Ireland's largest area of upland or the numerous and densely packed ranges in Co. Kerry. Huge numbers of sites have been identified in the former but these for the most part have been limited to mountain summits or river valleys which are still cultivated and settled today. More sporadic are the slopes especially towards the centre of the range. The isolation of many parts of the Wicklow uplands may suggest that large parts were less densely populated and utilised than the above examples however they should not be ruled out entirely. Hillwalkers in 2013 identified a booley hut on the slopes of Keadeen Mountain an otherwise apparently bleak and isolated spot (Lawless 2013, 18). Again this highlights

the importance of this group to the identification of sites and features into the future. Absence in the archaeological record does not mean absence in the landscape and an awareness of this is particularly important in the understanding of the nineteenth-century use of the upland landscape.

Post-Medieval Archaeology in Ireland

Many features of the Irish landscape fall outside the remit of National Monument protection owing to their eighteenth and nineteenth-century dates. These centuries however were the most heavily populated time periods in Irish history and thus produced a higher density of sites for such a short timeframe. Current site distribution maps for the uplands, despite their apparent incompleteness as demonstrated in the Blackstairs surveys, at least indicate a human presence in the earlier periods but none for more recent centuries and the shaping of the landscape we see today. This poor understanding provided the rationale for giving special attention to this period in Chapter 6. Once detailed investigation took place in the Blackstairs, it became apparent that the nineteenth century is one of the most visible periods in the relatively undisturbed upland landscape (by twentieth century agricultural standards) where prehistoric features dominated the record previously. Added to this, are a variety of documentary, cartographic and folkloric records which reveal elements of the hidden past which are not available for earlier periods. Before this survey, Orser's assertion (2006, xii) that we knew more about the Neolithic than the post-medieval period archaeologically was certainly true in this landscape something which has now been dramatically altered.

Perhaps it is time that this cut-off date of 1700 is brought forward so that we can better understand the narrative of a given landscape. Only by understanding land use history can we make effective decisions on its future management. We cannot protect every example of vernacular architecture and field wall in the uplands and such a strategy would be counterproductive especially when trying to work with farmers wishing to manage the lands sustainably as well as being a financial impossibility. At least by recording and surveying these buildings and other farm features such as sheepfolds or fowl nesting holes we can preserve many by record and exceptional examples can be protected. Historic England's NMP bring the date up to the mid- twentieth century, why not Ireland.

Summary

Ireland's economic crash allowed the archaeological profession to slow down, lament what could have been and take stock of what had already been accomplished. Publications and reports were produced outlining methods and strategies for a more targeted future for the profession and our understanding of the past (Ciuchini 2010; UCD & The Heritage Council 2006). Much of this was focused on the development-led sector which has little interest or direct effects on the uplands. As the country moves towards a more sustainable future, the uplands may come under increased pressures and stress especially in areas where they have been limited until now. Wind farms strategies as we have seen are not uniform and some County Council's continue to support or consider the uplands as potential or ideal locations. Forestry too is a resource which will continue to exploit large unenclosed areas and the farms of dwindling communities for which there are no heirs or those seeking a rapid income for other projects. Strategies and attitudes towards agricultural practices are also changing. Recent decades has seen the widespread abandonment of the uplands allowing heather to become dense and unsuitable for grazing. When burning has occurred, an activity carried out for centuries, these fires have been intense and dangerous, sometimes out of control owing to the large fuel supply. The removal of peat cover, while exposing buried stone remains is also potentially damaging to unknown organic remains. These threats will continue long into the future whether steps are taken to mitigate or limit their effects or not. Rapid surveys need to be carried out in order to get a greater understanding of current conditions and inform future developments. Archaeologists should not work in isolation, but collaborate with local communities, commercial companies, county councils and any other interested parties. Only then can suitable and effective decisions be made which work for the greater good of these landscapes and their cultural heritage.

What is the archaeological potential of an understudied upland landscape in Ireland?

This question has been at the root of the project throughout. An initial assessment of the SMR for the Irish uplands would suggest that these were as under-utilised in the past as they are today and as such are of little archaeological interest today. This project has demonstrated that this was not the case in the Blackstairs and as such may reflect the Irish uplands as a whole. Previous projects have mainly

focused on particular periods. Intensive reconnaissance survey with no temporal limitations gives us a fuller (though still by no means complete) understanding of the archaeological landscape. This was certainly not done in the Blackstairs before, nor was it done for an entire mountain range elsewhere in Ireland. Remote sensing offers the potential for assessing the landscape and identifying both individual features and areas of potential on a scale unimagined even a decade ago. While no one perfect resource was found, these can only continue to improve in the future and archaeologists should remain abreast of developments. Fires and peat erosion while potentially destructive also offer huge potential and can dramatically alter our understanding of these landscapes. Identifying prehistoric or medieval remains other than large monumental sites has relied almost exclusively on this method in the Blackstairs. Similarly, the limited artefactual evidence in the Blackstairs was only brought to light by peat erosion. These factors also inform and influence visibility of the more recent past which is almost entirely absent from the Irish archaeological record for the uplands. Results here demonstrate that it is the post-medieval period that is the most heavily represented in these landscapes. A major survey of the post-1700 landscape is thus needed for large parts of the Irish uplands. This period had one of the biggest influences on the present day landscape in terms of enclosure and land use yet it is the least understood. Once baseline information has been established as was done in the production of this thesis, it offers the potential for a more informed programme of intensive research which can be set within a wider context.

No longer should the uplands be considered the marginal landscapes they are today but part of and set within the context of a regional, national and even international network throughout the past. Land was certainly poorer but it offered its own resources and opportunities. Just as today, conflicting attitudes to these landscapes were spread across all walks of society. Uplands were places of resource and recreation; retreats for those who wanted to be hidden and beacons for those who wanted to be seen; places where the gods of some resided alongside the demons of others; the desperate last hope of one social group and the financial opportunity for another; permanent homes near those just staying a short while; symbols of resistance and places to be conquered; thrilling and terrifying; calming and distressing; intrinsically linked with human culture, identity and nature – all of which is manifested in their understudied archaeological record.

“We are now in the mountains and they are in us, kindling enthusiasm, making every nerve quiver, filling every pore and cell of us.”

― John Muir, My First Summer in the Sierra (1911)

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