“FOLLOW THE GROOVE, MAN.”

An Exploration of Wayfaring in the Landscape of Neolithic Langdale

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MA (Hons)

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During the Neolithic period, the Langdale Pikes were the stage for the most prolific axe production in the British Isles, with its artefacts being distributed to all corners of the island through vast exchange networks. Their prevalence and popularity have led many archaeologists to ponder the significance of the mountainous location to Neolithic people. Like many axe production sites, Langdale has long been perceived as a liminal and even dangerous place, with the popularity of the axes attributed to their value as created by risk. In this study, we shall demonstrate that not only is this a misrepresentation of the role of mountains, but that it must be inherently false. This study will demonstrate that these were dynamic landscapes by using a combined theoretical approach to movement through least cost analysis and phenomenological fieldwork. By using both an objective and subjective approach to this landscape, the study created a path network, as defined by the various agents entangled within the landscape which were consolidated and built upon by a series of experiential walks. A methodological feedback loop was developed which overcame the limits of either approach whilst presenting the results in a credible, creative and hopefully collaborative, way through interactive story maps. Beyond the methodological developments, the results of the path network and subsequent fieldwork demonstrate a seasonal movement into this landscape wherein a variety of activities could have taken place and thus attested to the fact that this landscape could not have been liminal during the Neolithic. Successful navigation and discovery of the working sites required the traveller to be equipped with an expansive and detailed knowledge of the landscape accessed through such mnemonic movements.

Figure 1: (Covering Image) Steve Calvert examining a possible fragment of tuff as part of a scree slope on the southern face of the Langdale Pikes during our second day of fieldwork. Image courtesy of author.

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Dedicated to the memory of my fell walking companion and trail blazing friend, Norman.

28th November 2007 – 3rd January 2020

CHAPTER ONE

Life Between Earth and Sky

Since I was a young girl, I have lived within sight of the Langdales. My many anecdotes are the result of years of wandering their paths with my family, following the grooves of the landscape to discover their secrets. For almost all my life, their misty waters and precipitous crags have held a special place in my memories. Such a lasting impression is not, however, unique. Situated in the most north-westerly English county, Cumbria (Figure 2), the Langdale Pikes have long been a fascination for writers, poets and artists. They are not the largest fells in the region, the highest peak of the range, Pavey Ark, stands at 697m above sea level. Nor do they cover vast swathes of land, as they are contained within a compact area under 9km². Nevertheless, there remains an undeniable pull to this region for the last six millennia. This pull cannot wholly be explained through its unique volcanic geology of Lingmell Tuff, used to create the polished stone axes of the Neolithic, though this is often assumed to be the 'purpose' for Neolithic people's journeys to these mountains.

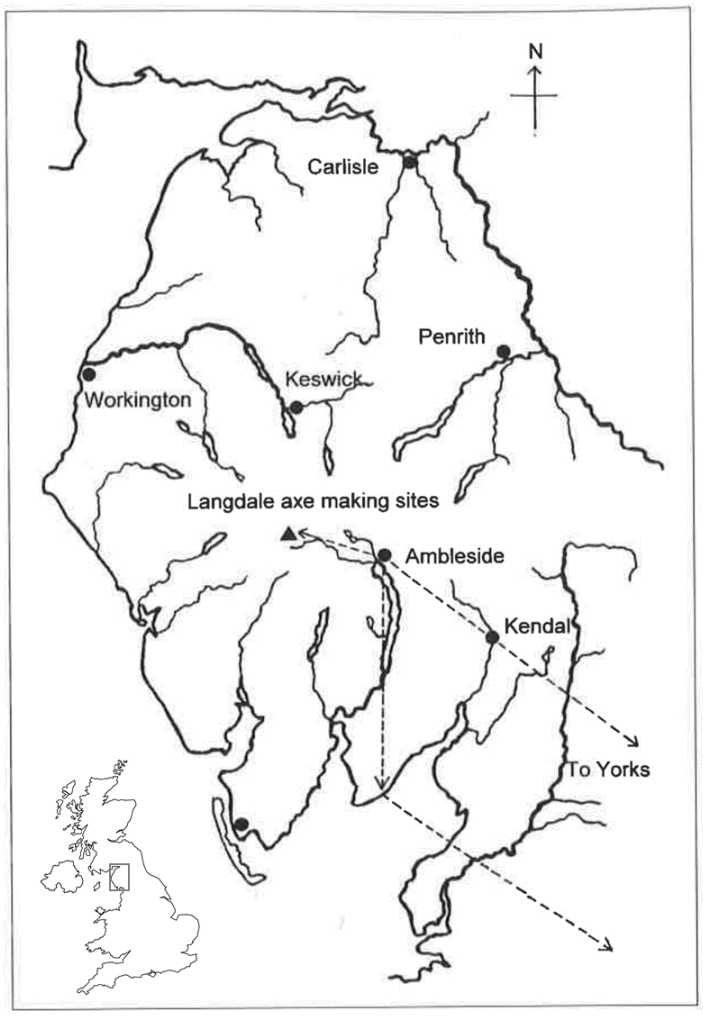

Figure 2: Location of the Langdale working sites on a national and regional scale with markers for the southern movement corridors to Yorkshire and beyond. Image courtesy of Blamires. 2005:6.

The polished stone axes produced from Lingmell Tuff on the high peaks of Langdale were versatile objects. They could be hafted, and reshafted, reshaped and resharpened, all to provide a plethora of uses for the tool user. Mark Edmonds described their place as 'an extension of the hand' (2004:42); a fitting description as they would have served a purpose in almost every aspect of the user's life. However, their value was not limited to their functionality. The presence of axe deposits at monumental sites, such as the stone circle Long Meg and Her Daughters in the Eden valley, represents that they played a more spiritually significant role in wider Neolithic society and culture. In some cases, axes were clearly produced specifically for spiritual purposes as some examples are so thin or highly

polished that they would have shattered upon impact if used functionally (Edmonds, 1995:53). Such artefacts were carefully deposited and, unlike many other lithic artefacts, thus purposefully ending their life cycles in places of spiritual or ceremonial significance such as pits, enclosures, cairns and settings of stone circles. Such deposition separates polished stone axes from other lithic production as the artefacts kept their value even after purposeful removal from society inferring that such deposits were almost sacrificial in nature. Such coveted possessions led to the rise of the axe 'factories' of Britain, most notably Mounts Bay, Cornwall, Graid Llwyd, North Wales, Tievebullaigh, Ulster, and Great Langdale, Cumbria (Bradley & Edmonds, 1993:39).

Due to the significance of polished stone axes to wider Neolithic society, axes produced at these axe 'factories' began to spread far across the British Isles, often into areas where other high-quality raw material was already in use (*ibid.* 40). The vast distribution of these axes across the British Isles not only demonstrates a certain popularity of the polished stone axes, but also the enigmatic 'industry' which organised the 'large scale' production and distribution of these axes as well. However, an isolated focus on the working sites and the axes they produced have formed some questionable assumptions, particularly surrounding the role and character of Neolithic Langdale. By isolating the material at either end of the journey, the artefacts and the processes which led to their creation have been separated from their source, the landscape. Therefore, in order to understand the complexities of the prevalence of the Group VI axes, we must understand the landscape and the role it played during the Neolithic. In this thesis, we will focus on the Great Langdale axe production and quarrying sites, the activities that occurred there during the Neolithic and, more specifically, the movement of people within this landscape. In this sense, this thesis separates itself from many other studies of Neolithic axes and their sources by focussing less on the artefacts or sites themselves and assessing the overall character of the place in from which they came. As the character of a place is the construct of the society or cultures who experience it, this thesis especially focusses upon the physical experience of this mountainous landscape, the influence this may have held over the activities which occurred there and the overall role the landscape played in the production of Langdale axes.

NEOLITHIC CUMBRIA

Previously known as a 'secondary Neolithic region' (Evans, 2008:3) due to an interpretative bias towards the north east and south of England, Neolithic Cumbria provides a unique example of a region with direct links to both the Irish seaboard, the Pennines and north-east England as well as south west Scotland. Before exploring the landscape of Neolithic Langdale, it is worth exploring Neolithic Cumbria as a whole to understand the culture and society responsible for the complex stone working sites. As previously mentioned, Cumbria is geographically unique. Its borders of the Irish Sea to the west and the Pennines to the east as well as its central mountainous region surrounded by coastal plains and the Vale of Eden provided a distinct microcosm which was both enclosed and open to neighbouring regions (Watson & Bradley, 2009:65). Before reviewing the occupational record for

both the upland and lowland regions, it must be noted that Cumbria has often fallen foul to the common archaeological debate: *Is it evidence of absence or absence of evidence?* As settlement of the lowland regions of Cumbria intensified from the Industrial era onwards, finds from these areas which demonstrated occupation evidence naturally increased. Industrial regions such as the Furness peninsula are home to some of the largest assemblages, though the recording of such finds often lack any form of detailed contextualisation (Evans, 2008:120). Considering this and the lack of modern occupation or development in the upland regions, the patterns and character of Neolithic Cumbrian occupation should be understood with reservation.

The majority for evidence for Neolithic occupation in both the highland and lowland regions of Cumbria is gleaned from environmental data and lithic scatters. Typically, the Neolithic period is defined by sedentism and the establishment of farms as influenced by the study of European LBK settlements, as well as British discoveries of the Orcadian stone houses and Irish field systems (see Cooney, 1997 & 2000). The assumption that these styles of occupation directly translated to mainland Britain has caused a problematic lack of evidence for Neolithic occupation in regions like Cumbria. However, sedentism in such regions was not necessarily adopted as part of the Neolithic package. A lack of sedentism does not necessarily infer that this was a hunter-gatherer society as the occupation evidence shows a pattern of various activity zones linked by a mobile economy (Evans, 2008:35). On the south western coast of Cumbria, the lithic scatters which demonstrate these areas of prolonged, repeated activity date back to the Mesolithic with few features which demonstrate the Mesolithic – Neolithic transition in Cumbria. Sites such as Eskmeals and Ehenside Tarn show ephemeral evidence for temporary structures indicating long term, recurring occupation but no formal sedentary settlement (Bradley & Edmonds, 1993:136). Ehenside Tarn was only defined as Neolithic due to the artefact assemblage, most notably the working of Langdale Tuff at the site (Darbishire, 1873).

As the occupational evidence in these coastal regions is largely based upon lithic scatters as defined as activity zones, it is worth noting the character of these lithic sites. Of the 8000 lithics recorded from the western coastal plain of Cumbria by Cherry & Cherry (1996 & 2002), none were found in a quantifiable majority to define any of the 158 coastal sites as Neolithic (Cherry & Cherry, 1996:61). However, the lithic scatters believed to represent activity zones showed a predominance of domestic lithic production. As often the local materials such as flint were of poorer quality than those found elsewhere in the British Isles, the tools produced was relatively restricted. Most assemblages indicate use and rejuvenation of many cores, retouched flakes and scrapers which often showed signs of multiuse (Evans, 2008:33). With the predominance of such domestic lithic production in the lowland region as well as ambiguous evidence of woodland management from the pollen record, it is clear that the lowland riverine and coastal region around the periphery of Cumbria were the principal regions for occupation (*ibid.* 37). Here, occupation took a nomadic form with seasonal movements between each of the reused activity sites across the coastal and riverine landscapes. Each site is located near raw materials and fresh water and suggests that this was an established form of

Figure 3: View from the reconstructed Greycroft circle to the highlands of Cumbria highlighting the importance of the location of monuments in transitional zones between highland and lowland. Image courtesy of Chris Collyer, 2019.

settlement, even without permanent dwellings (*ibid.*). An example of this established lifestyle can be drawn from Ehenside Tarn where a large number of artefacts were discovered after the draining of a small tarn in 1869 (Hodgkinson *et al*., 2000:71). This included flint and stone artefacts (including a shafted Langdale tuff polished axe), a proliferation of pottery and a number of wooden artefacts such as two fish spears, two wooden paddles and three wooden clubs (*ibid.*). A re-excavation of this site in 1957 further revealed the presence of an artificial platform indicating a purposeful settlement style without the need for sedentism (*ibid*.).

Beyond the evidence for an established occupation of Cumbria, Neolithic society here also proves to be more than mere subsistence. The evidence of a significant number of Neolithic monuments indicates a rich and successful culture which prospered both in the lowlands and the highlands of Cumbria. In the region of Ehenside Tarn and Eskmeals alone, there is a high concentration of both upstanding and lost stone circles including Kirksanton, Lacra, Gretigate, Greycroft and Swinside. These monumental sites lie in a region between the lowlands and the highlands, between sea and sky. A similar distribution can be seen at the opposite edge of Cumbria where the occupational zones in the Vale of Eden are separated from the internal mountains of Cumbria by a series of monumental sites such as Long Meg and Her Daughters, Mayburgh henge and King Arthurs Round Table. Furthermore, at sites such as Greycroft (Fletcher, 1957 in *ibid.*), the presence of Langdale tuff polished axe fragments reveal a symbolic relationship between these monuments and the mountains they frame (see Figure 3). In this sense, the Cumbrian landscape is not only divided by its natural geography, but this division has also been monumentalised in the formal land use, with monuments providing the gateways between upland and lowland, land and sky. Of course, this is not to ignore the evidence of possible occupation in the highland areas. Although, again, no formal settlements have been discovered in the highlands of Cumbria, there is environmental evidence from Blea Tarn, 2.8km from the Langdale working sites, which suggests minor clearance activities occurred in this area before the Elm decline (Pennington, 1970 & 1975 in Bradley & Edmonds, 1993:138). Intriguingly, the clearance activities, defined by the presence of charcoal, appear to be centralised

around the mountains of Langdale and Scafell (Higham, 1986:35), possibly indicating a level of small scale subsistence occurring here during the Neolithic which could be linked to the axe production itself.

NEOLITHIC LANGDALE

Neolithic Langdale is composed of a complex of stone quarrying and working sites which follow the geological band of Lingmell Tuff, which curves across the mountain face of the central fells for 19km between a height of 500 and 900m above sea level (Bradley & Edmonds, 1993:69). Not all this band is exploited during the Neolithic period, with working sites only occurring across the southern face of Langdale and in small surface exposures on Scafell and Glaramara. The petrological sourcing of this geological band is known as Group VI, though this identification is also now debatably shared with glacial erratics in other areas of the country (William-Thorpes *et al*., 1999). Since the petrological identification in 1941 (Keiller *et al*., 1941), Langdale has consistently remained a site of national importance due to the unequalled scale of axe production and distribution during the Neolithic (see Figure 4). Much of the early research was conducted by Clare Fell (1948, 1950, 1953, 1954, 1957, 1964, 1971, 1972, 1974 & 1980), who provided unparalleled contributions to the

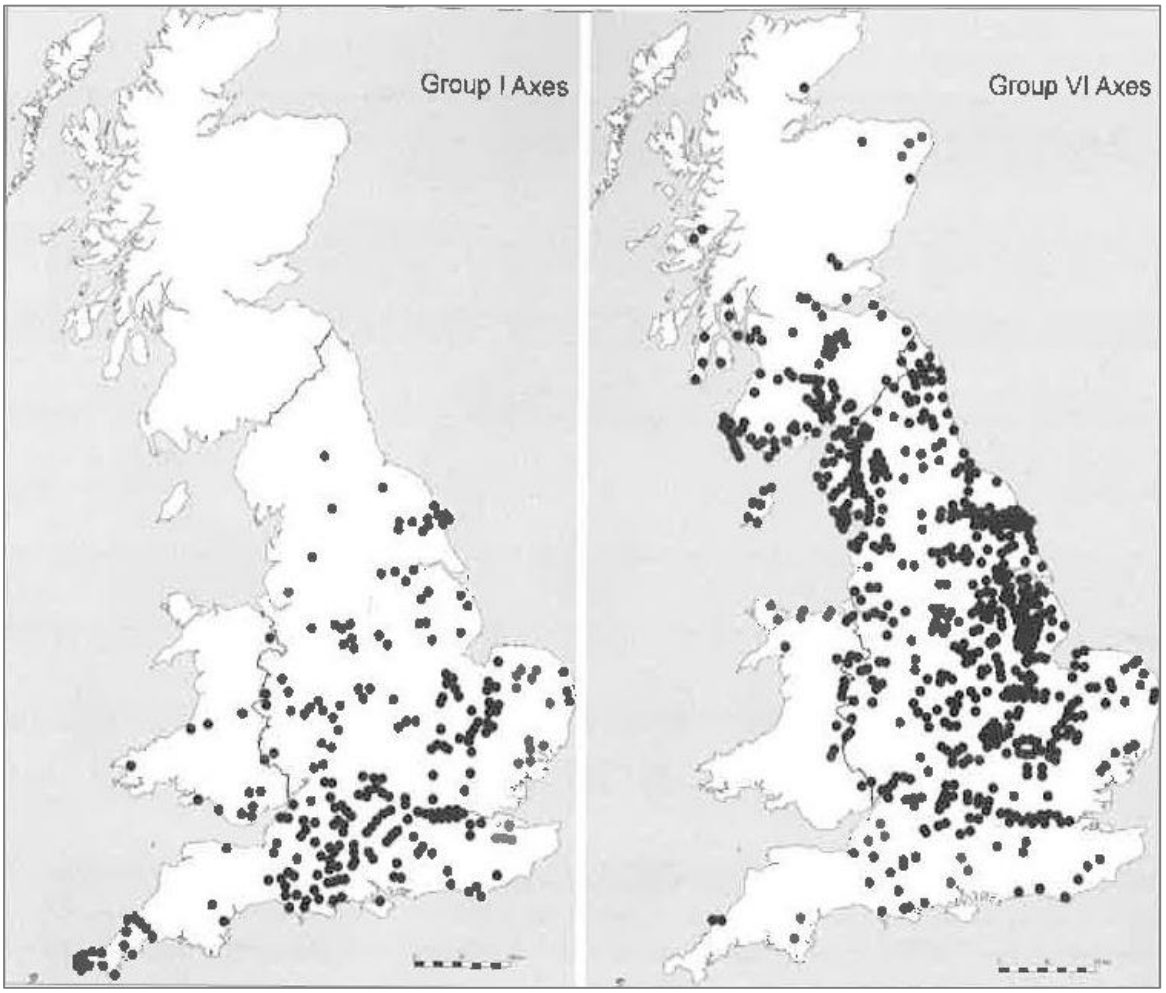

Figure 4: Distribution of Group I axes (Penzance, Cornwall) compared to the distribution of Group VI axes (Langdale, Cumbria). Image courtesy of Clough & Cummins, 1988.

understandings of the prehistory of Cumbria and worked tirelessly to raise the recognition of prehistoric Cumbria on a national level. Further survey of the entirety of the production sites was conducted in detail by Claris and Quartermaine (1989) which identified many of the quarry sites as impressive field monuments and far more complex than the original identification of the scree slope of Pike O' Stickle (Bradley, 2000:85). The identification of sites across Langdale, Scafell and Glaramara and the prolific distribution of axes across the British Isles has caused a fixation on an economically driven mode of production and exchange thus creating the term 'Langdale axe factories'.

Such terms as 'factory' and 'production', laden with industrial ideologies based upon large-scale production and widespread distribution, created a focus on the exchange networks and how such large-scale industries could exist during the Neolithic (Bradley & Edmonds 1993; Clough & Cummins, 1980; Cummins, 1979; Fell 1948, 1954, 1964; Plint 1962, 1978). The major interpretative issues with most of these studies is their inductive leap from what is occurring locally within Langdale, to national distributions and their respective movement networks. Cumbria, as a region, is ideal for making such inductive leaps as its geographical position is conducive to the idea of national exchange centred on Cumbria (Evans, 2008:10). Located between highland and lowland zones, as well as being surrounded by the Irish Sea, allows for maritime movement through the Irish Sea zone and terrestrial movement via the river valleys and across the Pennines to Yorkshire and beyond.

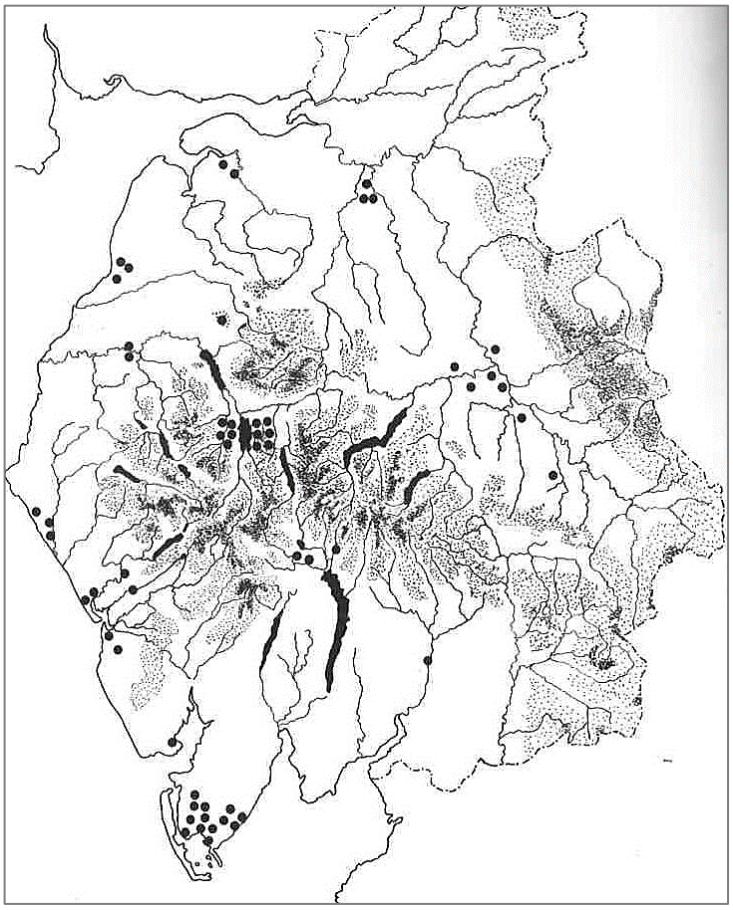

Figure 5: Distribution of Group VI axes along the river valleys and coastal plains radiating from their source in the central fells. Image courtesy of Edmonds, 2004.

On a local level, Cumbria's own topography is also conducive for mapping such movement as the river valleys radiate outwards from the central volcanic fells thus facilitating terrestrial and riverine travel out of the region (*ibid.*). Movement through these valleys is not only demonstrated by the natural topography, but also by the distribution of Langdale axes along these valleys to the coastal plains of Morecambe Bay and the Solway Firth, as shown in Figure 5 (*ibid.*). A further pattern from this distribution is the material development from roughout to finished polished axe, a development which occurred during the journey from source to

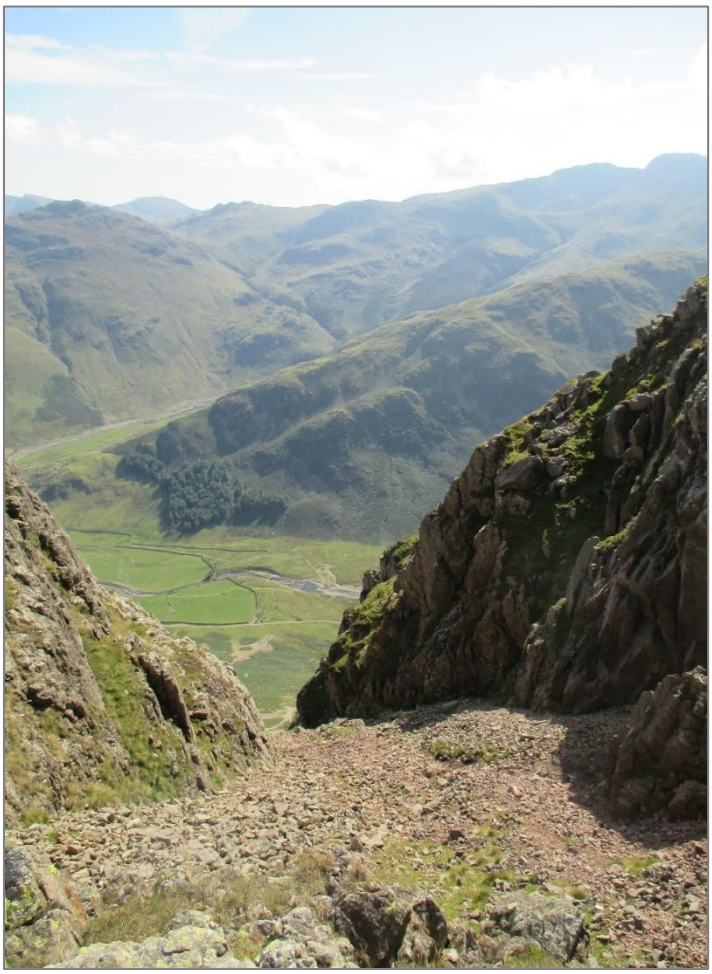

Figure 6: The southern scree slope to the east of Pike O' Stickle, commonly seen as the heart of the Langdale 'axe factories'.. Image courtesy of author.

destination (Edmonds, 2004:153). Grinding stones found alongside both roughouts and polished axes are only found at lowland locations such as the coastal site Ehenside Tarn (Darbishire, 1873). In such contexts, the evidence of modification, reworking and resharpening indicate not only the continued value of Langdale tuff over progressive generations, but also its mundane use in domestic settings as well as in wider, value-laden exchange (Evans, 2008:30). Like so many artefacts from the Neolithic period, there is an indistinct line between the ritual and the mundane with these polished stone axes, living in a grey area, the ritualised everyday.

BETWEEN EARTH AND SKY

It is worth briefly exploring why these sites became such prolific production centres, especially in light of equally usable material found in far more accessible locations. As previously mentioned in this chapter, there is little evidence of permanent occupation in the highlands of Cumbria as Neolithic occupation seems to amalgamate in the lowland zones around the coast and riverine valleys. Therefore, there is a social and cultural separation inspired by the natural topography itself, between domestic and spiritual, land and sky, parted by the construction of monumental gateways which guard the division between each landscape. Both the occupation record being constricted to the lowlands as well as the construction of monuments in key transitional zones within the landscape indicate that the mountains were not merely natural features in Neolithic cosmology. If the majority of the Neolithic population lived on the lowland plains of Cumbria, the mountains represented the limen of their visible world. The idea of limanility refers to the intermediate between two forms, on the edge but within neither. The mountains of Cumbria, looming on the horizon and shrouded by cloud, represent this liminal zone. A place between land and sky.

It is this idea of liminality, a place between, which may have provided meaning for the axe production sites. Studies into the tensile strength and quality of the rock quarried at Langdale (Bradley *et al*.,

1992:229) show that the extraction sites were not chosen for their rock quality as often similar or better quality raw material could be found at more accessible sites on the mountain. A further survey of the parent tuff exposure demonstrated that quarry sites were located on the steepest gradients and furthest from the valley floor (Watson, 1995 in Bradley, 2000:87). Clearly, the character of place has an overwhelming influence over the production of axes during the Neolithic. The Langdale Pikes dominate the skyline of many southern Cumbrian skylines with the bulbous pinnacle of Pike O' Stickle providing a unique focal point of the landscape. Such unique character to these mountains meant that the artefacts produced here were not only mundane tools or items of ritual purpose but 'pieces of place' (Bradley, 2000:88). The meaning behind these places remains allusive to modern archaeologists as our modern understandings of the world do not allow us to view such places in the same way. However, by understanding the principle that the place of extraction is important as some liminal space between earth and sky we can begin to understand how such places became prolific centres of production and why such materials were distributed so far.

NEOLITHIC LANGDALE IN REVIEW

Due to the focus on the exchange of axes for many years, the significance of the place itself has become overlooked. Some recent studies have returned to the landscape to understand the source of Group VI's influence. The most notable recent study was Mark Edmonds creative exploration of the Langdales, tracing the way in which the landscape moulds human activities conducted there as well as the landscapes agency in the creation of value (Edmonds, 2004). This is a significant departure in both form and content to his previous joint work with Richard Bradley and their landmark excavations of the Langdale working sites (Bradley & Edmonds, 1993).

Bradley and Edmonds excavations had a sharp focus which aimed to explore the variations of technological practice in the character and spatial context of the working sites (*ibid.* 106). The excavations themselves discovered an interesting polarisation in stone working methods between informal working, creating crude and asymmetrical roughouts covered with irregular terminations, and formal working, which resulted in precise forms that could have easily been polished (*ibid.* 129). Furthermore, a divergence in the organisation of work was also unearthed. In some cases, every stage of working, from quarry to roughout, occurred at the same location. In other cases, each stage took place at a different location (*ibid.*). Clearly, there was a great deal of variation which occurred both spatially and chronologically, as each site has varying, but overlapping, radiocarbon dates between c.3800 and 3300BCE (*ibid.* 130). Beyond these specific technological conclusions, it is their overarching interpretations of the landscape which lead to the question posed by this study.

Due to the development of spatial organisation at the Langdale working sites, two leading interpretations were established. Firstly, the development indicates the sharpening of focus on travel to the mountains for the express purpose of producing axes (*ibid.* 142). This interpretation is no longer seen as entirely credible as it assumes an industrious nature to these mountains, a product of

post-Industrial Era thinking focussed on efficiency and production. The efficacy of such perspective is dissolved when considering the location of many of the working sites. The choice to work stone from remote precipices, high in the mountains, immediately calls into question the efficiency of the working sites, as stone with the same mechanical properties could be gained from far more accessible locations further down the mountainside (Bradley, 2000:86). The second interpretation argues that the sites were specifically placed in remote, liminal and often dangerous locations to control access to the raw material (*ibid.*). From the evidence of hammerstones found at each of the working sites, there is further indication that each site may have been controlled by a particular group. The hammerstones all originate from the lowlands of Cumbria but, depending on their composition (granite or tuff), are each sourced from different areas of lowland, such as Morecambe Bay or the Solway Plain (*ibid.*). In either case, there remains a focus on the location of the working sites regarding the control of access, though disregarding the nuances of who or how this area could have been controlled.

Since Bradley and Edmonds publication in 1993, archaeological interpretations in general have moved towards more subjective perspectives. In Mark Edmonds 2004 book, *The Langdales*, the author focussed upon a more story driven approach, tracing the role of the mountains in human life from the Neolithic to present. The book provides a poetic narrative of the Langdales and explores the ways in which the landscape and the agents within it have shaped life and culture for nearly six thousand years. The intriguing account discusses the landscape not only as an archaeological wonder, but also as art, poetry and industry, never forgetting the entangled web of players on such a stage throughout time. Although the creative style of the book shall not be replicated in this thesis, its acknowledgement of archaeology as existing in both the past and present and being at the mercy of its setting and viewer are themes I should like to hold onto throughout my explorations.

Beyond Mark Edmonds work specifically on the Langdales acknowledging such subjectivity in archaeological interpretation, other archaeologists have used this perspective to reassess other aspects of the Neolithic axe production and trade systems in Britain. The rise of materiality in archaeological theory has led to further study on the locations of these quarry sites with many archaeologists arguing that the dangerous and liminal locations were a source of value for the artefacts created there (e.g. Cooney 2015, 2016; Cooney *et al*., 2012, 2013; Nyland, 2015; Topping, 2010; Whittle, 1995). By applying entanglement (e.g. Hodder, 2012) and object biography (e.g. Joy, 2009), axe production theories began to play heavily into the social and cultural understandings of the Neolithic. For example, for the island quarry sites of Rathlin, Lambay and Shetland, the organisation of axe production is argued to parallel the organisation of the landscape as created through the agricultural shift (Cooney, 2016:8). Furthermore, there have been arguments that an item's value in the Neolithic is formed by the difficult journey required to obtain it, as well as its source. Such processes and movements have been widely explored across many different past cultures (e.g. Garrow, 2007; Hind, 2004; Ingold, 2004; Kador, 2007) and by using these perspectives

of movement, this study aims to challenge common assumptions of mountain quarries being dangerous and liminal places in Neolithic culture and society.

A STUDY IN LANGDALE

In this study, I focussed on two major research questions. Firstly, what was the role of the mountains of Langdale in the lives of the Neolithic societies who may have encountered them? Secondly, how does their role influence our traditional understanding of the landscape of the Langdales? By applying the perspective of human movement to this study, I intend to explore the role of the mountainscape of Langdale by demonstrating the dynamism of such landscapes in the past. In order to do this, this study will also develop a more appropriate methodology for studying movement in regions where archaeological evidence in minimal. Such methodology endeavours to be both credible and creative and such requires both an objective and subjective approach; namely, least cost analysis and phenomenological fieldwork. By using one primarily objective approach, least cost analysis, and one primarily subjective approach, phenomenology, the anticipated results of this study will provide a technical evidentiary base to experiential results. Through this approach, I hope to model a number of representational routes through the landscape which can be phenomenologically tested in order to establish the role of the landscape in human activities. The results of such analysis will hopefully prove that these were not challenging landscapes during the Neolithic but held a rather different and significant role in Neolithic society.

In the following thesis, I will investigate the role of the mountainscapes of Langdale by using the combined application of least cost analysis and phenomenological fieldwork in a methodological feedback loop which will delve deeper into the agency of the mountains in human movement. This investigation is presented over the course of the following six chapters. We begin by reviewing my theoretical approaches of least cost analysis in chapter two, followed by phenomenology in chapter three. These chapters will evaluate the use of these theories in relation to human movement in archaeology and present more proficient methods of applying these theories to create more representational reflections of past human movements. Through this analysis, in chapter four I shall present my methodology for analysing human movement in Langdale using both least cost analysis and phenomenological fieldwork in order to create more accurate representation of the human and personal perceptions of human wayfaring.

Using this methodology, I will explore the results of its application in chapter five where I will present and evaluate the efficacy of the results of my path model and the subsequent fieldwork. These will be discussed in more detail in chapter six where I return to my research question and aims in order to assess whether my study has demonstrated the role of the mountainscapes in Langdale during the Neolithic. I will explore the role they played as well as how this influences our understanding of the role of the Langdale working sites themselves. Finally, I will conclude this study by discussing the implications of this investigation for future studies in both past human movements and Neolithic

Langdale. Firstly, in the following chapter, I shall examine the use of least cost analysis in the study of past human movements in order to present a more representational method for modelling the past pathways around Langdale.

CHAPTER TWO

Movement Modelling in Review

The use of Geographic Information Systems (GIS) in archaeological inquiry has an ever-expanding repertoire of literature based upon its variety of applications and relative ease of use. The archaeological analysis of movement, through GIS approaches such as cost surface and network analysis, has had a similarly extending history, especially in prehistoric contexts where the lack of alternative evidence leads to a reliance on computational approaches. There is no doubt that GIS is an extremely successful and useful tool to reconstruct past mobilities in a variety of contexts (see e.g. Fábrega-Álvarez, 2006; Gaffney & Stančič, 1996; Howey, 2011; Kvamme, 1999; Llobera, 2000; Murrieta-Flores, 2010). This chapter will focus primarily on Least Cost Analysis (LCA) as, although other forms of movement modelling are used, it is the most routinely practiced in archaeology and provides the largest pool of studies to review. The intention of this chapter is to explore its uses and misuses and to assess the, often overlooked, underlying theoretical and methodological issues surrounding its routine practice in archaeological movement modelling. Such routine has caused a plethora of issues which this chapter will explore and offer developments in order to propose a more appropriate methodology for modelling human movement in regions of minimal archaeological evidence.

DEVELOPMENTS AND DIFFICULTIES OF LEAST COST ANALYSIS

Archaeologists have used GIS as a tool to routinely conduct geospatial analysis of socioecological landscapes of the past for the last thirty years. The study of movement has provided the subject for such a boom in GIS application. Archaeologist have long examined the products of human movement through both artefacts and people and have since concluded that there is an intrinsic value to movement in past societies (Howey, 2011:2523). With the rise of GIS applications to archaeology, LCA rose as the primary method for modelling past movements and has since become routine. However, such routine often leads practitioners to fall into the computational trap, creating landscapes which are oversimplified, static and monochrome (Howey & Brower Burg, 2017:4). They allow the technology to determine the hypotheses and subsequently fail to recreate the multidimensional and variegated landscapes of the past, producing results which more adequately reflect a computers perspective than a humans. As powerful as LCA can be, its application ‘brings with it silences’ (Harris, 2000:118). These silences are the problems, regions and topics where the data is not available or require heavily interpretative approaches which many practitioners would prefer to avoid. In archaeology, these silences encompass movement in prehistoric landscapes, especially those applied in this study which possess little to no tangible evidence of human

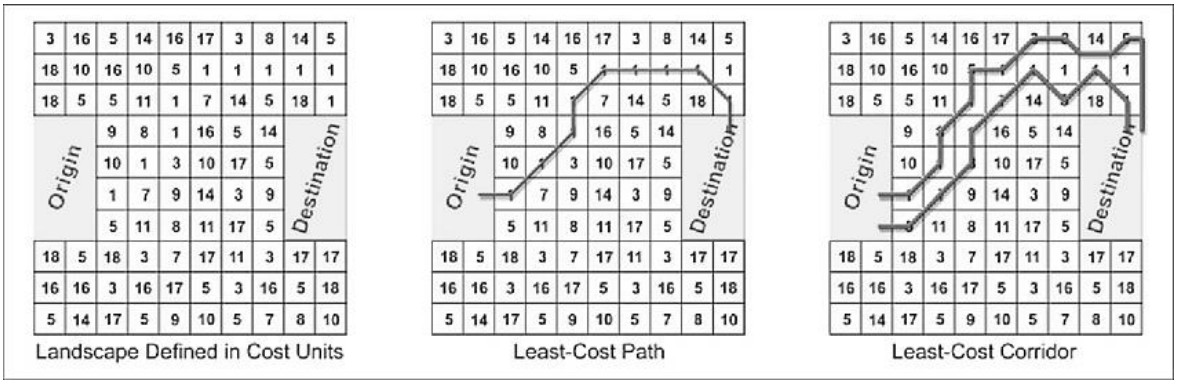

Figure 7: A simplified diagram of least cost path analysis with inclusion of least cost corridors, an analysis which will not be conducted in this study. Image courtesy of Rudnick et al., 2012:7.

movement. By analysing the rises and fall of LCA, we can assess the developments towards more multifaceted and dynamic models of past landscapes in order to develop a more appropriate methodology for modelling movement in this study.

For the reasons outlined above, this study focusses on LCA, a GIS tool which plots a route of least cost, between a chosen source and destination, across a cost surface as defined by the GIS practitioner (see Figure 7). LCA stemmed from an application of fluid dynamics, used in the hydrological mapping of watercourses, to pedestrian movement (Llobera, 2000:69). The issue with applying such quantitative methods to the dynamics of human movement is the failure of such hydrological models to link spatial structures to human behaviour (Batty, 1998:19-20). Therefore, the problem lies in how one may express the nonnumerical actors of human movement and wayfaring. LCA is based upon Zipf's Principle of Least Effort (1949:7) which assumes that, on a common level, humans will economise all facets of their behaviour, including movement. Commonly, this assumption is used to the detriment of the nuances of past people's decision-making regarding their movement. This leads to many models merely utilising slope and terrain models in order to find the most economically viable path, a noticeably modern perspective. However, the complete understanding of this principle is that all varieties of human movement have some form of cost as defined by the culture, society and time period to which they are situated. Humans will attempt to limit these costs when travelling thus, by using all their available knowledge of the landscape and their method of movement, they will establish the most appropriate path (Surface-Evans & White, 2012:2). Immediately, this assumption raises problems for many aspects of human movement in the past, especially regarding societies to which we have very little understanding surrounding the nuances of social norms. Such lack of humanity within these models underlies the three major problems for the application of LCA.

ASSUMPTIONS OF LEAST COST ANALYSIS

Firstly, LCA assumes that the traveller has a detailed knowledge of the entirety of the landscape they are attempting to navigate and have the 'data' to make an informed choice about the most effective route to take (Branting, 2012:213). Secondly, LCA also assumes that the traveller would choose the most cost-effective route through the landscape rather than taking another road based upon other,

more dynamic, social, spiritual or economic factors (*ibid*. 214). Humans, even with detailed knowledge of the landscapes they are moving through, tend to make decisions regarding their travel which are not logical or efficient (*ibid*.). Instead, they move subjectively and base their decisions upon a variety of influences such as social interaction, resource acquirement or activity zones. Therefore, cost must be defined more accurately in LCA models.

A cost surface is a computer-generated raster surface, in which each cell upon the surface is assigned a cost based upon the definition of cost within the study (Bell & Lock, 2000:86). From this cost surface, a path can be generated in which the mover will attempt to move across the surface from any given origin to the destination whilst 'paying' the lowest cost possible. Cost should refer to satisfying the needs and requirements of an individuals or groups journey. The results of such costs should include the flexibility and variety of such needs and thus should present a satisficing variety of alternative paths which both allow for freedom of choice to the mover whilst fulfilling the requirements of travel (*ibid*. 215). However, based upon the classic approach of Gaffney and Stančič's Hvar study (1996), cost surfaces tend to be based upon slope models, though recent studies by Wheatley and Gillings (2000) have incorporated visibility into these models. To base a methodology entirely upon slope or slope and viewsheds gives primacy to features of movement which may not have held such significance in the culture or period in question whilst further introducing notions of environmental determinism in human movement. Furthermore, such features are often biased towards the 21st century western views of landscape and often produce results which would more accurately represent modern movement across such landscapes. This is not to dismiss the use of slope models or the role of visibility in past movements, but such features should be used as a base to model further complexities of past movements to create a cost surface that is not only comprised of objective data but subjective dynamics. Such fundamental failings are summarised by the final problem with LCA: LCA creates idealised pathways through the landscape and, when the opportunity is available to compare with surviving pathways, they often do not match with real routeways used in the past (Branting, 2012:212).

Due to these and other failings, LCA has typically not lent its tools to the modelling of cultural landscapes which have little or no human alterations. Such landscapes in the early prehistoric periods were constructed through mythological and historical narratives and through ties of kinship between people and place rather than any form of landscape alteration. Therefore, such landscapes are often assumed to have unquantifiable data and so are unusable in LCA applications (Boaz & Uleberg, 2000:101). This is not the case. The unquantifiable data defined by Boaz & Uleberg in the Mesolithic cultural landscapes of southern Norway are merely nuances in the macrotopography (i.e. the relative location of the site within the landscape) and microtopography (i.e. the characteristics of individual locations) as interpreted and defined through the cultural lens (*ibid*.112). Although this study involves the use of definable site locations, the methodology proposed offers an intriguing use of the landscape in a dynamic and subjectively defined way by looking beyond the physical datasets to include sites which may have had mythological or historical narratives transposed onto them (*ibid*.

104). Such studies highlight an important transgression of previous technological developments in archaeology, namely the technological determinism inherent in archaeological studies (Huggett, 2000:9).

Too often in archaeology, the adoption of new technologies and ideas are conducted too quickly for the theoretical underpinnings to be established. The tools available often define the questions asked. Computers are inherently value-laden and favour especially quantitative values (*ibid*. 11). This leads archaeologists to favour the quantitative values available which ultimately leads to the repetitious confirmation of obvious relationships (Gaffney *et al*., 1995:212). Therefore, it is the important task of archaeologists to distance themselves from the tools and establish an epistemological basis to the social processes which underpin spatial distributions and patterns (Murrieta-Flores, 2010:250). It is imperative to move beyond the technological methodology and outline the theoretical underpinnings of LCA to provide stable reasoning for conducting such analysis. This study analyses the movement of Neolithic people in a seemingly uninhabited landscape but in an area of intensive quarrying and lithic production. Therefore, the type of movement is only evidenced by the material found at either end of the journey (Garrow, 2007:45). Unlike other movement studies based upon the remains of ancient tracks, this study immediately becomes more difficult as it requires the understanding of the nature of Neolithic settlement and mobility. Whittle (1997) argued that Neolithic movement works on two levels from 'circulating' to 'radiating'. 'Circulating' refers to a continuous movement of society involving the nomadic movement between various short-stay camps around a landscape. 'Radiating' refers to the movement of people based around a central, more permanent settlement. Both types of movement, however, exist on a spectrum and Neolithic societies, and individuals within them, probably exercised degrees of each type. Such understanding probably applied to the movements around Neolithic Langdale as well.

DEVELOPMENT OF SUBJECTIVE MODELLING

Beyond such permanent and continual movements around settled landscapes, there are other forms that we shall explore here. Ethnographic examples from non-western societies show that movement is a fundamental part of social identity (Cummings, 2007:55). Journeying, whether for economic, social or spiritual purposes, is an embedded practice in the cosmological understandings of the world and thus makes every journey value-laden (*ibid*.). This is an exceedingly important factor considering the journeys of the Langdale axes as so often such trade and exchange networks are considered economic. Such analogies infer that even economic movements were not mundane and instead may hold a plethora of symbolic and ritual connotations (*ibid*.). An appropriate example of the intangibility of many facets of past movement can be found in the analysis of hunter gatherer movements. Hunter-gatherers were notable in their nomadic and transitory nature which left minimal trace on the archaeological record (Harris, 2000:117). Although they did not build physically tangible landscapes, hunter gatherers did construct and live within cultural landscapes created from social

memory, mythology and history of their environments (Boaz & Uleberg, 2000:101). The problem remains as to how to portray such intangible landscapes within GIS models. Many archaeologists agree that such analysis needs to be more dynamic and 'human', though there are a variety of methods for doing this, such as developments into virtual reality, simulation engines or autonomous agents (see Bell & Lock, 2000., Boaz & Uleberg, 2000., Harris, 2000., Llobera, 2000). Although these developments provide new exciting avenues for research, they all seek ways of credibly representing the complexities of decision-making regarding human movement (Harris, 2000:123). LCA can still provide the tools for expressing these complexities.

As we mentioned previously in this chapter, one of the major problems with many applications of LCA traces back to its adoption in archaeology before a sound theoretical backing was established. If we return to the theory, we can use the tool more effectively. Here, the theory required encapsulates the methods and psychology of human movement during the Neolithic. Human movement is the physical act of spatial decision-making. Therefore, it is inextricably linked to the space in which it occurs. Through the entanglement of person and place, human identity has become indivisible from the environment it inhabits as well as the knowledge of such environment (*ibid.* 122). Acknowledging this, traditional mapping of slope or terrain is inherently limited in its representation of the world and how humans move within it. Instead, LCA needs to find a way of accessing the 'mental map' (*ibid.*) and the complex layers of emotions, senses, values, customs and traditions. In some ways, we should be attempting to build maps much like we do throughout our lives. Our knowledge and understanding of the world around us developed through both direct, indirect and imagined experience of physical landmarks in the world. This process is best demonstrated in the surviving oral traditions of the Tłı̨chǫ people, a Dene First Nations people of the North-Western Territories of Canada, who use the stories of their predecessors in the form of mental mapping to travel their land (Legat, 2008:44). In this example, to be lost is not a geographical problem but instead it is a loss of identity and relationships as '[…] they had no stories to guide them' (*ibid.*). For a true understanding of human wayfaring on foot around a landscape, we must also understand the person themselves. Therefore, in order to design more representational maps of such landscape, we must reflect such knowledge and experience. Although this is achievable through the application of LCA, it cannot be achieved by LCA alone. Thus, we require a secondary experiential approach in order to provide the subjective data with which to model the possible pathways around the landscape of the Langdales.

CHAPTER THREE

Phenomenology in Review

Experiential archaeology has long been a dividing method of archaeological research, as defined by its origins in the rejection of 'objective' Processualist methods. In this chapter, we focus on the most popular of these methods, phenomenology, as like LCA, it contains swathes of potential which could be utilised upon a thorough examination of its misuses in the past. The development and popularisation of phenomenology originated in criticisms of Processualism, which asserted that the sterile and Cartesian methods of processual study said nothing of past cultures due to their inability to go beyond positivist and empiricist knowledge. Since the late 1970's, critiques of Processualism have focussed on: Processualists views on the character of archaeology as a science and the aims of their objective explanations; the socio-political characteristics of archaeological research; the contemporary location for the cultural production of knowledge (Johnson, 2012:270). The resultant reactionary discourse generated from such critiques created a polarisation in archaeological theory characterised as being science versus story, objectivity versus subjectivity.

Post-Processualism sought to repopulate the past through the recognition of 'humanness'. To do so, it was deemed necessary to go beyond the evidence creating a highly interpretative methodology. The term methodology is used here loosely as many who undertook such approaches were defined more clearly through their rejection of Processualism rather than a new coherent theoretical standpoint. In the words of Barbara Bender (1998:40), this methodology often amounted to 'the imaginative leap' required to understand the relationships which were conceptualised during past people's experiences with landscapes. Since its unforgiving critique during the early 2000's, however, the approach has seen a renewed interest with a motivation towards creating holistic methodologies which create credible and testable results that advance archaeological understanding beyond the individual. In this chapter, I will focus on the developments and dismantling of the approach adopted by Christopher Tilley, and other post-processual landscape archaeologists, referred to as phenomenology in order to present new founded methods of conducting meaningful and credible phenomenological research of past landscapes.

ORIGINS OF PHENOMENOLOGY

Phenomenology was primarily designed around two major rejections towards Processualism. Firstly, phenomenological approaches reject the notion that the mechanism of past societies can be reduced to scientific processes, which operate regardless of spatial or temporal parameters. The 'irrational abstracted idealism of geometrical universal space' (Tilley, 1994:11) argued for predictable historical developments leading to reductionist determinate explanations. Instead, post-Processual approaches

to historical processes emphasised the role of human agency within specific contexts as the driving force in the creation of history (and prehistory). The second rejection is of scientific rationality, a primary motivation of Processual methodologies. As post-Processualists accepted the role of human agency in the creation of historical narratives, it followed that contemporary narratives created by archaeologists were also implicated by subjectivity (Barrett & Ko, 2009:277). Therefore, the objective methodologies that sought to analyse said historical narratives also sought to perpetuate the archaeological status quo creating cyclical studies into the past. As an alternative, post-Processualists argued that it is not enough to confine archaeology to the past (Shanks & Pearson, 2001:156). They created a past defined by 'a richly textured carnal phenomenological "thick" description' through the 'tropic or metaphoric nature of language' (Tilley, 2004:28).

Beyond the direct reactions to the preceding theoretical approach, it is worth noting the three core background influences which led to post-processual landscape phenomenology to become so popular during the 1990s and early 2000's. The first was explored in its infancy above with the acknowledgement and appreciation of the subjectivity in both the creation and study of landscapes. Influenced by developments in human geography during the 1970s and 1980s, this approach affirmed that landscapes could never be viewed entirely objectively as they are always contemporarily viewed and framed as the subject of study (Johnson, 2012:271). The second influence regards the accessibility of the archaeological data within a British context. For many post-processual landscape archaeologists, the subject of their studies was often within reachable distance and encouraged frequent direct experience of landscapes. Drawing on seventeenth century concepts of landscape as a framed perception of a given space (e.g. Wordsworth's Lake District), post-Processualists utilised this cultural and geographical context generating an escalated development of phenomenological approaches in British landscape archaeology (Fleming, 2006:269). The third influence surrounded the political conflicts in archaeological ownership as personified by events around Stonehenge in the 1980's. When New Age travellers were barred from the site by English Heritage leading to the infamous Battle of the Beanfield, new light was shone on the various stakeholders whom stressed different and competing perspective on the World Heritage Site. Therefore, post-Processualists acting in such political climates (e.g. Bender, 1993, 1998 & 2001) were under pressure to explore the subjective views of a multiplicity of people in order to understand what gives sites such important meanings to people both in the past and present (Johnson, 2012). Thus, the context of the late 1980's and 1990's was the perfect powder keg for the theoretical spark of phenomenology to ignite.

APPLICATIONS OF PHENOMENOLOGY

Post-Processualists had academic, cultural and political contexts and critical justification to develop an alternative theory, which reacted against the negative aspects of that which came before. Having accepted total subjectivity in the creation of knowledge, post-Processualists followed a humanistic approach, which went beyond traditional modes of fieldwork to incorporate multi-sensory

experiences which expressed a subjective and multi-vocal view of the past (Fleming, 2006:268). Phenomenology formed the theoretical backing, providing descriptions of the character of human experience through directed interventions with their surroundings (Brück, 2005:46). Some phenomenologists went further to assert that personal bodily perceptions provide the only means of learning about the past through the explicit exploration of Heidegger's *dwelling-in-the-world* (Heidegger, 1962). It is worth defining Heideggerian phenomenology, a philosophical approach that underpins many, if not most, archaeological phenomenological studies. Phenomenology is a branch of philosophy concerned with understanding epistemological and ontological questions of the dialectical mediation in subject – object engagement (Van Dyke, 2013:5910). Edmund Husserl was one of the first modern day phenomenologists who defined the study, though his transcendent approach led most archaeologists to adopt the phenomenology defined by Heidegger and Merleau-Ponty. Heidegger argued that knowledge was generated through bodily experience and material engagement with the world around us (Brophy & Watson, 2019:1). Unlike Husserl's approach, Heidegger believed that said experiences can only be understood through the context in which they are revealed (*ibid*.). Heideggerian phenomenology was utilised by many archaeologists as a hermeneutical approach to creating descriptive accounts of the past as revealed by the direct bodily experience of the phenomenologist.

Some of the first archaeologists to apply the Heideggerian *dwelling-in-the-world* were Tim Ingold (1993), who argued for *taskscapes*, a social collection of temporally and spatially related tasks within a seamless world and time, and Julian Thomas (1996), who applied Heideggerian concepts to critique Cartesian dichotomies of archaeological methods which objectified the past. Besides these theoretical applications, the most notable contribution to this discourse was set forth by Christopher Tilley in his seminal book '*A Phenomenology of Landscape'* (1994). Tilley's provocative application of Heidegger's phenomenology centred around the dichotomy between space and place. In his book, Tilley argues that 'space is a far more abstract construct than place' (Tilley, 1994:15). Place can only gain meaning through the conscious experience of it. Through this experience, space is created from multi-dimensional meanings constructed through 'movement, memory, encounter and association' (*ibid*.). Therefore, to understand a place, past or present, we must understand the processes which created the space. Tilley's acknowledgement of the dialogic relationship between subject and object stressed the agency and materiality of landscapes and provided a refreshing perspective of how to approach them. Although theoretically sound, it was through Tilley's 'methodology' that his application of phenomenology became severely contentious.

As knowledge is created through direct bodily experience, it must be concluded that the processes that create meaning can also only be understood through direct bodily experience. For Tilley, the 'body is the primary research tool' (Tilley, 2008:271). Therefore, any methodology for archaeological study must involve the experience of the subject. Although useful as a fieldwork practice, Tilley created a problematic methodology for archaeological research in that he didn't have one. Tilley claimed 'there can be no rulebook method to undertaking 'good' phenomenological

research' (*ibid*., 274). Instead, he provided a number of 'basic stages' (*ibid*.) that one can employ when attempting phenomenological research of landscapes. These stages involve: developing a feeling towards the landscape; experiencing landscapes in various types of weather; exploring natural places; and writing narratives of landscape experiences beyond normal written recording conventions (*ibid*.). After achieving such a high familiarity with the landscapes, Tilley then recommended that the observer imaginatively interprets their findings into a prehistoric lifeworld (*ibid*.). Such a highly interpretative approach has since been taken up by a number of phenomenological practitioners. For example, another seminal application of this theory was conducted by Vicki Cummings on the Neolithic landscapes of Wales (Cummings *et al*., 2002; Cummings and Whittle, 2004).

Zealously continuing the work of Tilley, Cummings applied an explicitly phenomenological methodology to her study, arguing the occularcentricism in the creation of space in the Neolithic (Cummings *et al*., 2002). Unlike Tilley's approach, however, Cummings assured that her results could contribute to archaeological knowledge by making them testable and thus more reliable. Her approach involved Tilley's 'thick' narratives (Tilley, 2004:28) supplemented by photographs, but also employed systematic recording of the 360° panoramic drawings from each monument as well as GIS analysis of their viewsheds (Van Dyke, 2013:5912). The static form of such monuments as merely viewing platforms disregards the materiality and use as active sites. Ultimately, her approach did not provide comparable results as the viewsheds inevitably remain the same regardless of the observer. Cummings inevitably bolstered decontextualized interpretations that, although unfounded in evidence, validated her phenomenological approach creating a self-serving argument for the applications of phenomenology and the discovery of landscape meanings. Such fieldwork methodologies inevitably led to criticism as, although interesting personal exercises, they rarely provide sufficiently evidenced interpretations of the past. Instead, they recreate the prejudices of the observer creating only generalised sweeping statements about past lifeways. Therefore, it is important to explore the criticisms raised surrounding phenomenological fieldwork in the past and determine a more credible and stable methodological framework for the future.

CRITIQUES AND DEVELOPMENT OF PHENOMENOLOGY

There are a plethora of criticisms surrounding the phenomenology as popularised by Tilley and Cummings in the 1990's and early 2000's, too many to explore in detail here. Instead of a general overview of such reactions (see Fleming, 2006; Johnson, 2012; Barrett & Ko, 2009), it is worth exploring the criticism which can be resolved in order to create a credible methodology for further research. In such case, the primary critique regards the faulty and incomplete methods and analyses created by the use of bodily experience as the sole archaeological method. The faulty methodologies to which phenomenologists adhere to rely upon the authors own subjective bodily experience of a site or landscape. Through this, the researcher claims to gain insight to the intentions and ideologies of past people's actions towards their environments. Therefore, phenomenology assumes the

universality of the human body and thus human experience; a feature which bonds all humans together regardless of space or time (Bruck, 1998:27). This goes against phenomenologist's arguments that humans do not act objectively but rather subjectively, thus each experiencing the same thing differently. In fact, the nature of Heidegger's 'being' can vary greatly across time and space, contexts of class and gender, or even the natural variability of the human body (Hamilton & Whitehouse, 2006:34). This leads to a problematic methodology, the results of which can only take us as far as the most basic generalisations of past lives.

So, the question remains, how can one record and analyse a landscape in such a way to capture subjectivity whilst also allowing the process to be replicable by another subjective individual? Furthermore, how can this become a legitimate epistemological methodology through the replication of similar results by different subjects? This has been the overarching critique from many of phenomenology's oppositions such as Fleming (1999; 2005; 2006) and Hamilton and Whitehouse (2006). Hamilton and Whitehouse particularly concern themselves with creating an epistemological methodology through the acknowledgement that, like many established archaeological approaches, phenomenology is part of a holistic understanding of the past which can be formed through a variety of theoretical and practical approaches (Hamilton & Whitehouse, 2006:32). Used in such a way, phenomenology could enrich archaeology through broadening the questions asked and attempting to understand behavioural parameters of the past (Brück, 2005:64). Although phenomenological work may not prove new 'truths' in archaeology, it is an extremely useful tool for the exploration of new questions and therefore provides a new challenge to the established assumptions of archaeological discourse.

Before proposing such new challenges, it is important to explore the contextuality of the walker themselves further. We have highlighted throughout this chapter the role of subjectivity in phenomenology, but this is often focussed on analysing the context of the landscape, not the person. If we are to use this approach, it is imperative to explore the participants context as they are the true centre of study. Bintliff (2009:29) explores Tilley's personal context as a white male who exists within the modern era, far departed from the world of his Neolithic counterparts. According to Bintliff (*ibid*., 30), the most significant influence on Tilley's experience was the enclosure of the English landscape and the development of the countryside from a worked land for the subsistence of the mass peasant population to the 'enormous themepark' (*ibid*., 31) created through the development of large estates as a landscape for pleasure. Such 'themepark' landscapes still exist today as the working populations of small-scale farmers diminish in regions such as the Yorkshire Dales and Cumbria, with many turning to the rural tourism economy (as shown by the employment statistics for the Lake District with 15000 people working in the tourism sector and only 2500 in agriculture (Office for National Statistics and DEFRA Agricultural Survey, c.2013)). With such rise of middle-class urbanites descending on the British countryside, the romantic view of a simpler bygone age where people and nature lived in a harmonious balance has begun to dominate the perspectives of such landscapes (Bintliff, 2009:30). Subsequently, when revaluating the work of Tilley, we begin to

see these notions of a middle-class, London-dwelling, theoretical archaeologist visiting the countryside for a walk around the remains of prehistoric monuments whilst recording his personal emotions and observations of such a landscape (*ibid.*). Although the best-case scenario would be to avoid these subconscious perspectives altogether, this is of course a ludicrous notion. Instead, moves must be made within phenomenology to acknowledge the role of subconscious beliefs and ideologies regarding landscape and society. From there, any work produced through such an approach can be evaluated with the understanding of such bias.

In many ways, by acknowledging the critiques of phenomenology as products of the modern era, we should look to such modern era for theoretically invigorating inspiration. Psychogeography is one such theoretical approach and developed in the popular consciousness by Guy Debord and the Situationist in 1950's Paris (Coverley, 2010:12). Although developed as an urban affair, psychogeography offers the ability to recognise the context of a study whilst also offering a re-imaging of the world surrounding us. Psychogeography offers the participant 'a setting of ourselves at the mercy of spaces, a changing of spaces as we move through them' (Smith, 2016 cited by Overall, 2016:3). Through this, we can recognise the modern contexts of our study whilst interpreting the traces of landscape and the role it plays within human lifeways. Chtcheglov (1953 cited by Overall, 2016:4), a precursor to Debord and the Situationists, saw the urban world as filled with landmarks which were both the creators and transmitters of ghosts and legends. Here, psychogeography allows a more direct relationship to the role of social memory which, although more tangible in a modern urban environment, could be used within an archaeological enquiry. Through a closer inspection of the landscape itself as it appears today, we could begin to understand the palimpsest of human activities which occurred over thousands of years. Furthermore, the results of such analysis need to be presented in such a way as to represent the dynamic nature of these landscapes and the role of humans within them. From these theoretical considerations, I will now propose a method for approaching the landscape of Neolithic Langdale using a more creative and credible phenomenological approach.

CHAPTER FOUR

Methodology: A Feedback Loop

In this chapter, I will use the assessment of each theoretical approach to present a more appropriate method for modelling movement in the landscape of Neolithic Langdale, where there is little archaeological data. In this method, I intend to use both LCA and phenomenology to provide a more balanced approach between subjective and objective data in order to more accurately represent the human element of wayfaring. Furthermore, I will provide a method which can more accurately demonstrate the dynamism of such landscapes as non-static agents. To achieve this, I have developed a methodological feedback loop in which the objective LCA component feeds into the phenomenological fieldwork which then feeds back into the LCA model. In a sense, my methodology mimics the hermeneutic circle. The hermeneutic circle encapsulates the act of interpretation or understanding (Hodder *et al.,* 1995:238). Understanding of the world always maintains a historical context, in that the understanding is achieved through knowledge which has been credited through experience. Understanding is never given but rather always a part of a pre-understanding which is inherently formed by experience. Experience and understanding form an infinite loop of reflection upon meaning (Kirk, 1993:197). This study encapsulates this loop as an applicable methodology which can be used to explore the meaning behind movement. In some ways, this loop could continue in perpetuity, though the scope of this study immediately limits the cycle to the available timescale. In the following sections, I will outline each stage of this feedback loop and how it will be applied to this study in order to demonstrate the role of the Langdales during the Neolithic.

CONCEPTUAL MODEL

Conceptual modelling is a process first developed by software engineers during the 1980's and 1990's which provided a method of representing and, subsequently, understanding powerful computers by creating faithful representations of a programmable system as a guide for software engineers (Gonzalez-Perez, 2017). Conceptual models are formed of concepts and the relationships between them which represent a chosen space and time. In archaeology, these are not commonly used though there are noteworthy exceptions in digital heritage. One of the most notable uses of conceptual modelling in archaeology is the implication of the CIDOC Conceptual Reference Model, which 'provides definitions and a formal structure for describing the implicit and explicit concepts and relationships used in cultural heritage documentation' (International Council of Museums, ca.2006). This conceptual model is an international framework to map all types of cultural heritage information using a common form of semantics which can be understood and shared between all sectors of cultural heritage practitioners such as museums, archivists and librarians (*ibid.*). Their use of conceptual models for presenting, organising and sharing such expansive knowledge bases present

a computational development of philosophical ontologies. Ontologies, in this sense, refers to a model which defines the entities and their relations within a defined topic area thus defining the rules and interfaces of such a topic (Neches *et al*., 1991:40). By following this approach, the first analysis of the movements around the Langdales is a free flowing representation of all the possible players in the landscape, both spatially and temporally, as well as how such entities interacted with each other within the landscape. By exploring this theoretically, the model provides a framework for all possible human and natural intentions within the landscape thus providing a basis for further analysis within the LCA model.

The conceptual model is the basis for the entirety of this study and thus the way it is modelled is important to provide a strong foundation. The conceptual model will be designed as an entity-relationship diagram: entities being a person, place, thing or event present in the real world, and relationships being associations between such phenomena (Gordillo & Laurini, 2002:4). This will be complemented with a definitions table in order to explicitly clarify the intended meaning of the model (see Figure 8 for example). Much like phenomenology, there are no explicit methodologies for creating a conceptual model within digital humanities and, where methodologies are offered within

Term	Synonym	Description	Business rule	Related to
Trip	Travel product	Type of travel desired	Instances are cruise, flight, train trip, bus tour	Tour
Tour		Travel to and from destination, sight-seeing of points of interest		Traveler, itinerary
Prospect		Person interested in trip	A prospect becomes a customer	Customer
Customer		Person interested in trip	Customer who books trip is a traveler	Passenger, tour
Traveler	Passenger	Person who purchases trip	Down payment required before itinerary created	Itinerary, club, destination, customer
Agency		Booking organization		Traveler, tour
Party		People customer travels with		Traveler
Itinerary	Schedule	Schedule of events	Departure occurs before arrival	Traveler, tour, party
Ticket		Issued after payment	Traveler must have ticket before departure	Passenger, trip, tour

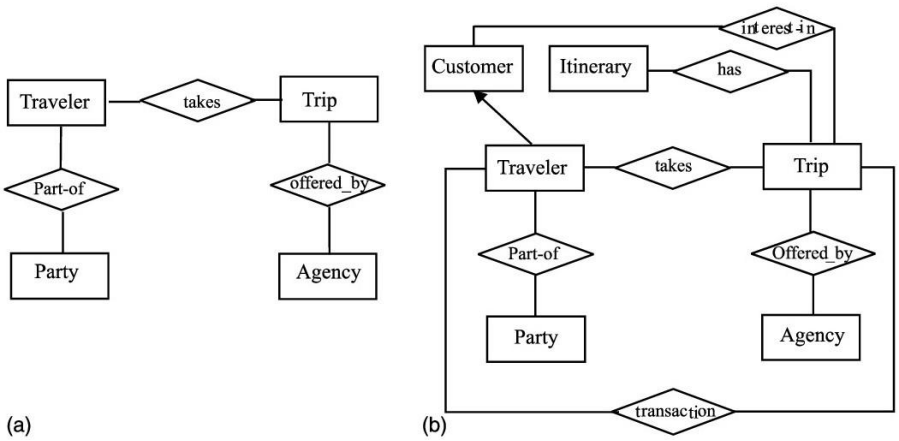

Figure 8: An entity-relationship model for a travel domain with corresponding definitions table. A similar style of model is the intention for this study. Image courtesy of Sugumaran & Storey, 2002: 256.

IT-based studies, they are centred on a programmable system. Although conceptual models do not necessarily *need* an explicit methodology, they should adhere to some basic criteria in order to create a solid and substantial model foundation in this study. Firstly, the model should be clear when defining the intended meaning of the terms used within it (Gruber, 1995: 909). This criterion was defined for the design of computational ontologies however, it is beneficial when referring to a subjective topic such as movement as it explicitly defines the terms as they are meant to be understood. Secondly, once a term is defined, the entities and relationships should be coherent within the model (*ibid*.). All terms defined within the model should be consistent with all other definitions as inconsistencies will cause misunderstanding within the model itself. Of course, some of the definitions will be self-evident, such as roughout, but where more subjective terms occur, care must be taken to ensure clarity and consistency. Finally, the conceptual model should be extendable (*ibid.*). Although the model created in this study will be limited to its parameters, the model should be able to be extended as new information and data, regarding both the entities and relationships and their definitions, arises. Other than these criteria, I offer no further methodology to this stage. The conceptual model is meant as an exploratory tool and should not be too restricted. Therefore, once all features have been explored and modelled, the type of movement occurring within this landscape will be understood and thus the appropriate LCA model can be created.

ANALYTICAL MODEL

The features explored in the conceptual model provide the basis for the analytical model which will be created using the LCA tool in ArcGIS. From the conceptual model, the appropriate features are chosen based upon their ability and appropriateness to be modelled within ArcGIS. As the conceptual model was a deep exploration of all facets of the landscape, some features are not physically located in the landscape and so do not lend themselves to mapping in the first instance. Some of these less tangible features can only be mapped after they are recorded from the fieldwork, thus highlighting the cyclical nature of this methodology. Therefore, the first LCA model will most likely only contain a sparse number of features that are easily mapped and within the study area. Beyond the features marked out by the conceptual model, there are also base features of the landscape which can either facilitate or restrict movement. Most notably, slope is a base factor to human movement in such environments, though the perception of slope is subjective depending on the type of movement. Nonetheless, slope is a very basic facilitator of human movement and requires acknowledgement within this study. All the features which fulfil this criteria, in that they are mappable in this first instance, will subsequently be modelled into ArcGIS in order to create a cost surface.

The selected features of the landscape which facilitate movement are the foundation of our LCA conducted within ArcGIS. Traditional LCA models work on the principle of moving the traveller from A to B across a landscape, or surface, along a path which accumulates the lowest cost possible (Surface-Evans & White, 2012:2). The surface on which such paths are modelled is formed of cells,

all of which are assigned a value, or cost, and when combined generate the cost surface. Therefore, when a traveller moves across each cell, their route is based upon the direction of least cost (see Figure 6, pg.8). Otherwise referred to as a multi – criteria cost surface (Howey, 2007:1831), the type of cost surface used in this analysis uses a variety of different features, as selected from the conceptual model, in order to create a single cost surface formed of the combination of multiple cost surfaces. Each feature selected from the conceptual model will form a singular surface and be ascribed a value to both its positive cells (those which contain the feature itself) and its negative cells (those which do not contain the features). The surface of each singular surface is then ascribed a weight which dictates its influence over the multi-criteria cost surface as a whole. All the singular surfaces are then combined to model the multi-criteria cost surface.

Through the amalgamation of each individual cost surface into the multi-criteria cost surface, the travel cost across the landscape can be measured. The higher the cost, the harder to move across the cell. Again, as this study is not attempting to find industriously straight paths, it makes more sense to model a path network, rather than a simple line from A to B. Such wandering forms of movement are more likely to represent a wider variety of types of movement, from paths which aim for the working sites directly up the mountainside to paths which meander through many of the diverse features in the landscape. Therefore, not only will the multi-criteria cost surface identify the complexities of human movement, but the destinations will also recognise this complexity as well. Through the inclusion of the tangible features identified in the conceptual model as multiple destinations within the landscape, the LCA algorithm will model more than a singular path through the landscape. Instead, it will model a network of paths from our start points of Elterwater, in the south, and Stonethwaite, in the north. Therefore, our results from our LCA model will be a network of pathways across the landscape which can subsequently be tested through the phenomenological fieldwork.

Before exploring our phenomenological fieldwork, it is worth noting the influences the fieldwork will have over our model as part of this cyclical methodology. Again, unlike common cost surfaces, the costs within this surface are not strictly tangible and mappable features as intangible features, often play a stronger role in human wayfaring. Therefore, this study will involve mapping features which become apparent or tangible from the phenomenological fieldwork conducted according to the LCA model. This reiterates the cyclical nature of this methodology as the mappable elements will increase as more fieldwork is conducted. Of course, whatever subjective or intangible features are identified within our phenomenological fieldwork still need to have some form of geographical bearing in order to be mapped within the model. Although not all features can be translated to a geographical location in this study, such as dynamic features like weather, some features can be represented through tangible attributes. For example, stories and memory can be a defining aspect of human movement and these could be represented through the paths we take in our fieldwork. Our fieldwork hopes to reveal further tangible attributes to intangible concepts.

PHENOMENOLOGICAL FIELDWORK

Phenomenological methodologies are far harder to pin down than those of their GIS counterparts. Phenomenology itself is subjective and so standard forms of archaeological recording are unviable as they seek to record the objective 'truth'. However, as we have explored in chapter three, phenomenological fieldwork without a proper methodology can often sway into the realms of one person's ramblings. The main issue to be overcome here is the misconception of universal experience. As Brück (2005:54) states phenomenological fieldwork is based upon the assumption that 'the human body and the physical landscape act as constants that impose the same limitations on physical movement today as they did in the past'. As previously explored, this is a major problem with fieldwork methodologies enacted by Tilley who assumed his own experience would also account for that of a wholly different person during a wholly different time. Furthermore, even 'unspoiled wilderness' landscapes, such as the mountainous zones like the Langdales, have changed since the Neolithic period further drawing into the question of universal experience. Therefore, universal experience in phenomenological fieldwork is a mythical concept. In my methodology, this subjectivity of experience is to be highlighted and expressed in such a way as to contextualise the results thus making them more credible as a testable.

My methodology for my phenomenological fieldwork takes inspiration from Hamilton and Whitehouse's (2006) strategy for the Tavoliere – Gargano Project which explored the familiar and everyday experiences in domestic contexts of Neolithic ditched enclosure sites. Their methodology focussed on basic phenomena relating to the daily experience of communication through visual and audial signalling (*ibid.* 46). Thus, their phenomenological approach focussed on the success or failures of specific types of visual and audial signals communicated around the remains of the enclosure sites and their landscapes as conducted and recorded by a diverse group of participants. Their use of 'soft' (Chapman, 2001:6) phenomenological approaches, such as 360° panorama drawings, allowed the accurate recording of multiple experiences which were comparable over both a large number of sites and a number of diverse participants (Hamilton & Whitehouse, 2006:43).

Beyond these traditional phenomenological methods, Hamilton and Whitehouse also created a method for recording audio and visual signalling communication between peoples over a variety of distances (*ibid*. 46). Here, the recording methods provide a parallel to the value system used to create the least cost surface for path modelling. By attributing a value to the audial and visual phenomena, based upon the increasing possibility of communication, they were able to record all possibilities of communication using a diverse range of participants in a testable way (*ibid*. 48). This method of value attribution to various subjective phenomena is how we intend to allow for the phenomenological record to be further questioned within ArcGIS. This process of result return emphasises the holistic approach which should be adopted when using concepts such as phenomenology. The value attribution of this methodology as well as creating a record which can be built upon and compared by a diverse group of people.is an inspiration for my own method

Our phenomenological fieldwork involves a series of walks informed by the results of the LCA model. The route modelled will be experienced to investigate the practicalities of such routeways as well as the type of experience each route facilitates in relationship to the landscape. The landscape will be accessed from either Elterwater in the south, following the natural flow of the Great Langdale Beck from Windermere and the southern coast of Cumbria, and Stonethwaite in the north, following the Langstrath valley from Borrowdale and the Pennines. At the start of each walk, the access point will be noted alongside the conditions of the walk such as weather, equipment and the practicalities of conducting the fieldwork such as timeframe and accommodation. As the walk is being conducted in 2019, all these conditions will affect the way in which the landscape is encountered and provide context for the recorded results. This context will also be supplemented by a contextual record of each participant regarding their fitness, their knowledge of the Langdales, their archaeological knowledge and their relationship with this study as these will influence the participants experience of the landscape and fieldwork further. Although this data is not necessarily a 'result', it is important to acknowledge to demonstrate the lack of universality in the experience and deny the objective truth of the results themselves. Beyond the contextualisation of the exploration, the fieldwork walks will be recorded using a multimedia approach as defined in Figure 9.

MEDIA FORMAT	APPLICATION
Sound Recording	Using a Dictaphone, the overall narrative of the walk will be recorded. As recordings are made, a note will be made of their location so they can be plotted later. These recordings will include discussions about wayfaring, obstructions (both physical and mental), physical exertion, resources encountered, sensory experience, modern intrusions etc. as well as memories and anecdotes instigated by the landscape. Furthermore, these recordings will document any unique sounds created by the landscape.
Photographs	Photographs will visually document the journey statically to record scenes of note such as visual relationships between features of the landscape or unique colours and forms encountered on the journey. Photographs will also be used to capture social interactions with the landscape by the participants.
Video	Using a static camera controlled and positioned by the participant, video will provide an active medium to capture parts of the journey which require a dynamic response. This will include how humans and animals navigate certain terrain, movements within the landscape itself, sounds in their contexts, social interactions such as memory responses and general video records of our movements.
Map	A physical copy of the LCA model will accompany the fieldwork as well as OS Explorer map (combined from OL4, OL5, OL6 and OL7 as the study area lies on the intersection for all the maps of the Lake District). Copies of the GIS routeways will be used for annotation of the route physically taken.

Figure 9: Outline for all multimedia proposed in this study as well as how it will be applied. Image courtesy of author.

Beyond these guidelines of following the modelled routes and recording as mentioned, the fieldwork has no further formal structure as the walks will inevitably be dictated by the landscape as we find it, which cannot be accounted for at this stage. The fieldwork will be conducted and, where possible, recorded by two participants, myself and my father, Steve Calvert. The importance of more than one participant is once again to demonstrate the lack of universality in experience and it is hoped that the dialogue between our experiences will provide some intriguing results. The participants will follow the route recorded as closely as possible, within reason, and record their experiences as noted above. The recording parameters are extensive but not all data recorded will be used. The purpose of this method is to attempt to recreate a representative route of the journey as experienced using the multimedia record so as to compare this experience to others. To create this, the fieldwork will be completed multiple times and the results will be used to further inform the LCA model. The revised routeways will then be tested again in subsequent fieldwork. This is not attempting to seek a perfect route, but rather explore all dynamics of wayfaring in such landscapes and demonstrate the role of the landscape on the experience of the wayfarer, both mentally and physically. Each walk conducted will produce more 'data' on the landscape thus deepening the already deep map.

DEEP MAP PRESENTATION

As part of my methodology, I will present the results in a dynamic, subjective and collaborative way to reflect the essential qualities of using experiential approaches. My methodology here draws inspiration from psychogeography, with focus on the concept of deep mapping. For the purpose of this study, a deep map is a multi-layered, multimedia and often digital, cartographic representation of both geographical and social space which integrates ideas of imagined or created space in a collaborative and open-ended workspace (Earley-Spadoni, 2017:96). Deep maps work well with phenomenological and psychogeographical studies because they are further defined by the performative and engaged nature manifested in their creation (Roberts, 2016:2). In this sense, deep mapping lends itself to this study as it is defined by the *doings* of people and allows for subjective and multivocal approaches to landscape. Although there are no direct parallels in this approach presented in other studies, deep mapping is often used in digital archaeology and heritage. Deep mapping has been used as a form of digital storytelling in the Cultural Landscapes of the Irish Coast Research Project (Kujit *et al.*, 2015) which present the archaeological exploration of the cultural heritage of Inishbofin and Inishark, Co. Galway, through the mix of traditional monograph and short film which are accessible through mobile scannable images within the book (Earley-Spadoni, 2017:98). This sense of 'diving' into the book through multi-media digital storytelling allows the project to present the complexity of such an environment in a way which more accurately and effectively conveys the narrative of this dynamic landscape (*ibid.*). Therefore, this model of presentation is the most appropriate for the purpose of my study and its presentation.

By creating the deep map, the fieldwork conducted around this landscape becomes a form of story board in which the spatial dynamics of human-thing-landscape relationships can be explored. Through the experiential and objective data collected, a richly complex, diverse and sometimes contradicting representation of space can be created (Bodenhamer, 2015:23). Deep mapping provides a medium to present diverse forms of data, from spatial to spoken word, allowing us to create a rich tapestry of the landscape which, most importantly, is malleable (Perrin, 2016:9). Its malleability allows for repeated experience by a range of participants thus building an open-ended multimodal workspace which can be openly critiqued, reformed and added to as well as a complimentary presentation of the traditionally static data formed from GIS analysis. Therefore, utilising deep mapping in both its presentational and performative characteristics alongside phenomenology, the final presentation of this fieldwork is hoped to be a rich representation of the Langdale landscape, and the interrelationships acted out within it.

Once the fieldwork is completed, the deep map will be created with ESRI's Story Maps, an open source software which allows for the amalgamation of the quantitative geographical mapping with the narrative multimedia content (ESRI, 2019). The intention of using this software is to create a dynamic and interactive map which presents an engaging tour of the landscape of the Langdale landscape as well as the experience of the fieldwork itself. Therefore, the various forms of recording outlined in Figure 8 will be used to create my deep map. The base of the map will be a simple top-down cartographic or geographical representation of the landscape onto which points may be plotted. Each point will mark out the journey through a series of videos, photographs, audio recordings and maps. Due to their online format, in order to access these results, an internet connection will be required to follow the links provided to the Story Maps in the appendices of this thesis. Please ensure you have access to a computer with a working internet connection before continuing here. Although not a collaborative study, the accessibility of these deep maps online means that they can be both shared and developed by any person who may take an interest. Such collaboration is not an aim of this study but my focus on expressing the dynamism and multivocality of such landscapes means that this form of presentation is perfect for further study in the future. The exact form of this presentation is defined by the results of the phenomenological fieldwork and thus little more than a simple framework for this presentation can be proposed here. Therefore, with this methodology, I can finally conduct our analysis of the Langdales in order to discover the role of this mountainscape within the Neolithic. In the following chapter, I will follow this methodology in order to fulfil this aim as well as test the appropriateness and efficacy of this method.

CHAPTER FIVE

Results: An Everchanging Landscape

CONCEPTUAL MODEL

To create the conceptual model, all facets of the landscape and the players within it had to be considered. Not only did this provide a substantial base for my LCA model, but also provided an opportunity to thoroughly analyse the landscape and explore the broad range of actions taken by and in the landscape. Like with all research, it was important to investigate as widely as possible at first before narrowing my field as I sought to answer our research aims. As outlined in the methodology, the conceptual model is open to further additions as the research continues. Therefore, what is presented in this instance is the first iteration of the conceptual model. Before exploring the results of this investigation, it is worth outlining the process used to create it. As explained in the methodology (see chapter four), there is no explicit framework for creating a conceptual model in the humanities. In this study, the entities and definitions table was compiled first before the conceptual model. By creating a table of the entities and their definitions as defined by this study, I was able to simply list all the actors in the landscape thus making the subsequent model creation easier.

The first step in the creation of the conceptual model focussed on the physical features within the landscape. Consulting an Ordnance Survey (OS) map, I identified all the named features of the landscape as these places are recognisable as distinct entities and thus provide a basis for modern wayfaring. However, after exploring the OS maps, there were several recognisable features of the landscape which were not defined. Therefore, further landscape features, such as the glacial erratics like Copt Howe (see Figure 10), were added to the list as features which were not named in any known source which litter the landscape. Here, it is worth noting that I am referring to the natural glacial erratics of Copt Howe and the rock art. Although, in the following analytical model, I will

Figure 10: The large glacial erratics of Copt Howe framing the Langdale Pikes in the far distance. Image courtesy of Watson, 2016.

not be referencing the rock art as recent excavations (Bradley *et al.*, 2019:1) revealed that the rock art was created just after the closure of the axe working sites (the axe working sites were in use between 3800BCE and 3300BCE whereas the rock art was made in 3300BCE and 2900BCE (*ibid.*)). As they have not been included on recent maps or walking guides, they have probably not been used for wayfaring for a long time, probably due to the developments in infrastructure in recent decades which have made many natural features redundant in wayfaring, particularly in the southern region of our study area. As I collated all the natural features, it became abundantly clear that the man-made aspects of the landscape were equally as important entities in the landscape today. The focus on this as an archaeological study could often disguise the importance of the modern landscape. However, this has an enduring presence on any actor in the landscape. Therefore, the farmland, buildings and walled enclosures all have a heavy influence on the movement of any person or thing through this landscape. Thus, all these features also had to be included in the table of entities.

After the physical entities had been explored, it was important to process the less tangible actors in the landscape. Firstly, the archaeological sites. These are not entirely tangible in the modern landscape as many are ephemeral traces on tuff outcrops. However, much of this is not visible to the untrained eye and so they are not seen as a defining feature for wayfaring. Similarly, the tuff outcrops which were not all utilised during the Neolithic, must be noted where their presence is known as they represent a significant goal for the consequent fieldwork. The presence of the tuff also serves as a reminder of the other resources of these mountains. As I am attempting to challenge the view of this mountainscape being a liminal and dangerous place, it is important to consider all possible resources in this landscape. Entities such as medicinal herbs and edible plants as well as possible fauna are included to demonstrate how active these mountains could have been. Such entities would have been significant actors within the landscape itself, with fauna especially defining the vegetation levels on the mountain side and valley floor. Considering the historical fauna of the region reminds us of the current fauna, most notably, the Herdwick (see Figure 11). These sheep are farmed across the Lake District fells and maintain a low level of vegetation on the fells and fields all year round thus drastically affecting the contemporary appearance of these fells.

Finally, there were several entities which did not take any physical form within the landscape. The weather in this region is one such ephemeral entity. Although it holds no figure, it does hold a power over this landscape and all the actors within it. As this region sits within fourteen miles of the Irish Sea and in a mountainous region, the weather can change very quickly. Winds can bring rain or shine within minutes and dramatically change the perception of the environment. Furthermore, the elevation of the mountain range (with Pike O' Stickle at the highest point of 709m) consequently lends itself to cloud cover, significantly reducing visibility. In parallel with weather as an entity, visibility and sound have also been included. Both of these entities are significantly affected by weather, but they remain separated from it as they are also equally influenced by the landscape. Beyond these immaterial concepts, there are more anthropogenic concepts at play in this landscape which have significant power over the management of the physical landscape. The Lake District

Figure 11: The native Herdwick sheep play a hugely significant role in this landscape as they graze all over the fells, maintaining the vegetation at a low level. Image courtesy of author.

National Park Authority, Cumbria County Council, National Trust and Fix the Fells all have stakes in the landscape and thus manage how the valleys and mountains are preserved and presented. Over the years, these organisations have controlled the physicality of the landscape and their influence should not be underestimated.

After a thorough list of all the entities were compiled into the definitions table (see Appendix 1), the conceptual model was designed (as shown in Figure 12). The model included 63 entities, classified as either natural features, anthropogenic features, natural events, anthropogenic concepts or miscellaneous concepts. Overall, the model is almost equally balanced between anthropogenic and natural entities (31 natural entities to 28 anthropogenic entities). Due to the restraints of creating a coherent model, not all the relationships are shown in the model itself, though the full relationship tree for each entity is described in the definitions table. Within this landscape, there is a balance of power between humans and nature. However, humans hold a power to control this balance in the modern era. Again, it is worth reiterating that this model ultimately represents the landscape as it is presented today. Although it attempts to imagine aspects of the past landscape which may have been important during the Neolithic such as the flora and fauna, these are mere inferences made from the present landscape. This does not reduce the validity of this model as this study was never proposed to be conducted in a Neolithic landscape nor did it intend to invent an imagined Neolithic landscape. Instead, the purpose of this model is to outline the contemporary landscape in such a way as to discover the type of movement that occurs and could have occurred in this landscape as well as the features which facilitate or restrict that movement. By firstly analysing the type of movement occurring, then the features which influence this movement can be identified for further use within LCA model.

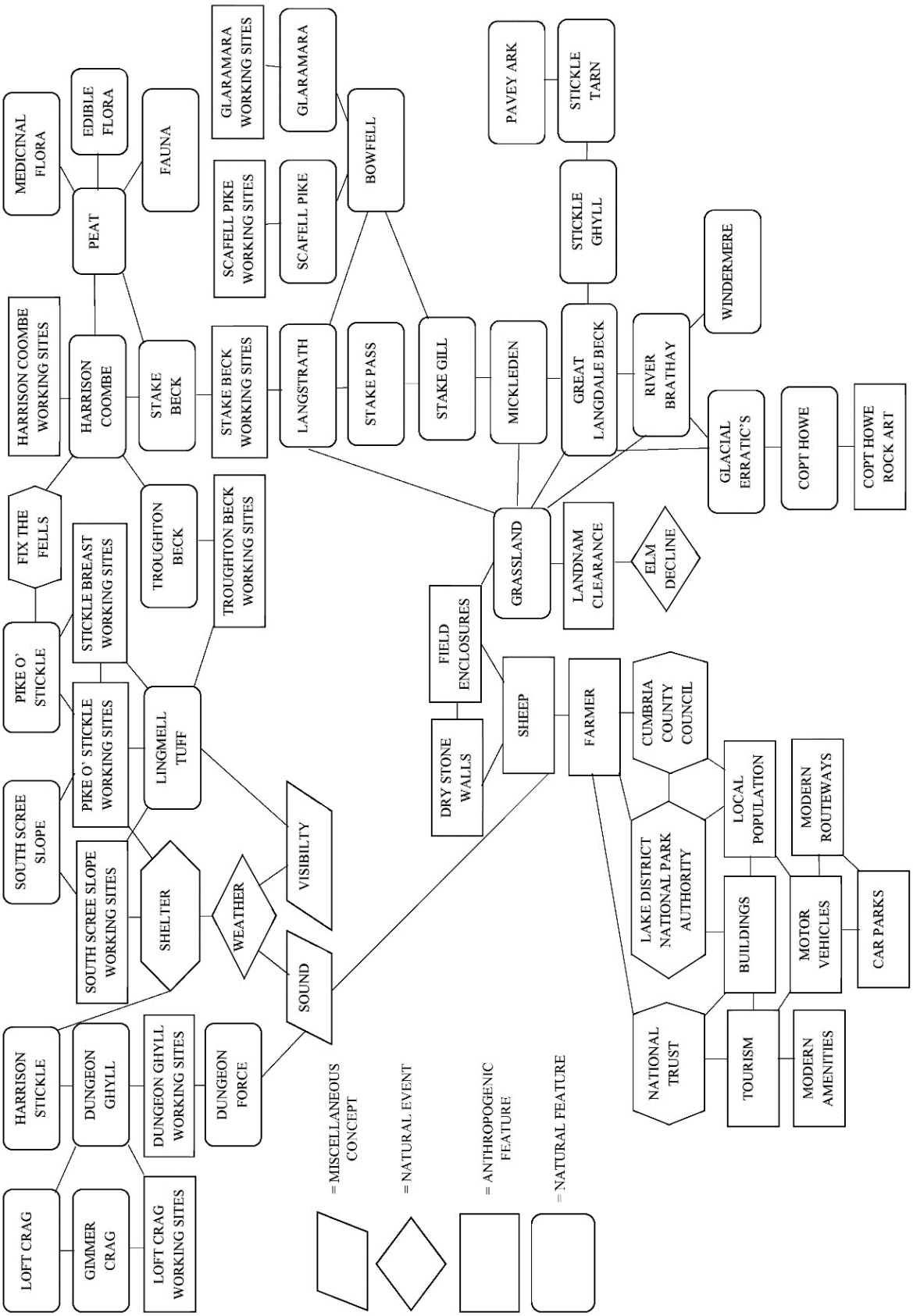

Figure 12: The final conceptual model organised by type of feature and showing the representational relationships of entities. For full list of entities with their definitions and relationships, see Appendix 1. Image courtesy of author.

There are two clear types of movement occurring in the landscape of the Langdales. On one hand, the modern landscape has been managed and adapted in such a way as to facilitate easy movement

for hill walkers looking to climb the various peaks of the Langdale range. The conceptual model demonstrates this by the heavy presence of the various governing bodies of this landscape, most notably the National Trust, Lake District National Park Authority and Fix the Fells. Essentially, these organisations control the access to the contemporary landscape and, in this sense, could provide a modern parallel for the existence of such control in the past. Fix the Fells has a particular impact on the physical results of movement in this region as they work to repair the various footpaths which are damaged through both heavy footfall and natural erosion. In the 2019 period, they undertook a project on Stake Pass, repairing the footpath using local Herdwick wool to enable more drainage and reduce erosion (Clarke, 2017). The erosion is testament to the rise of tourism since Thomas Gray's famous Lake District tour in 1769, which fuelled the tourism boom of the 1800's (Solnit, 2002:96). The plethora of pathways is a reminder of the many uses and abuses of the landscape since then. The variety of path styles, from drovers tracks in the valley basins to the sheep trails of the fell tops, reminds us of the diversity of traveller. For many centuries, the paths have been forged by both the farming communities, with an ephemeral path beside Troughton Beck being a faint reminder of droving traditions in the fells, and tourists alike. However, the movement here is inherently different to its Neolithic counterparts due to the scale of movement. The footfall in this region since the turn of the 19th century has increased exponentially. Such footfall not only causes erosion of footpaths but also creates new unofficial paths which leave their enduring scars on the landscape for centuries. The Neolithic traveller left no such scars on the landscape which survive to the present day.

In contrast, the Neolithic forms of movement, as represented through the conceptual model, seem far more seasonal, probably incorporating some form of temporary settlement in the area. Firstly, it is worth noting the difference between sites we can validate in the landscape, such as the working sites, and those which are only inferred by the landscape, such as the medicinal flora. Although this difference will prove significant when the GIS model is created, for now it represents how much the landscape has changed. The diversity in flora and fauna has significantly decreased since the Neolithic though there remains the trace of this diversity from the fish in Stickle Tarn to the bilberries and juniper that coat the mountainside. However, their presence, alongside the landnam clearance which occurred during this period, indicate a far more active landscape than merely a place of rocky pilgrimage. Of course, this is not a new discovery. Bradley and Edmonds already identified the mineral soils beneath the blanket peat which would have been adequate grazing for livestock (1993:140). Furthermore, during the Mesolithic and Neolithic, the elm decline and subsequent clearance episodes, as identified in pollen analysis, could have been managed in a cyclical pattern of regeneration through burning, cultivation and grazing (Skinner, 2000). This type of land management does not require idle hands but would require seasonal work to ensure the success of the grazing in the following year. Therefore, through the inclusion of these inferred features, the type of movement has changed from an A to B goal-orientated method of movement to a more seasonal movement within this landscape where the groups may have remained in the area for a season and conducted a variety of activities in the landscape.

LEAST COST NETWORK: THE FIRST PATH

From the results of the conceptual model, the type of movement occurring in this region during the Neolithic was seasonal, in which a group or groups moved into the landscape and from there moved, on a daily or weekly basis, up into the fells for a variety of activities. To analyse the routes that may have been taken by these people, a multi-criteria cost surface was created using the features identified in the conceptual model which are most important for wayfaring, and those which can be programmed into the model. Of course, this means that before any fieldwork is conducted, the choice of features is limited to what has a known location. Therefore, the initial analytical model does not hold as many features as have been identified in the conceptual model. However, enough features with known locations exist as to programme them into my multi-criteria cost surface to create an initial representational routeway through the landscape. Our routeway will be modelled using the location of the waterways, modern routeways and glacial erratics as well as the working sites and the main area of natural resources, Harrison Coombe. The features also will be weighted alongside the slope of the region as this plays one of the most significant roles in facilitating movement throughout

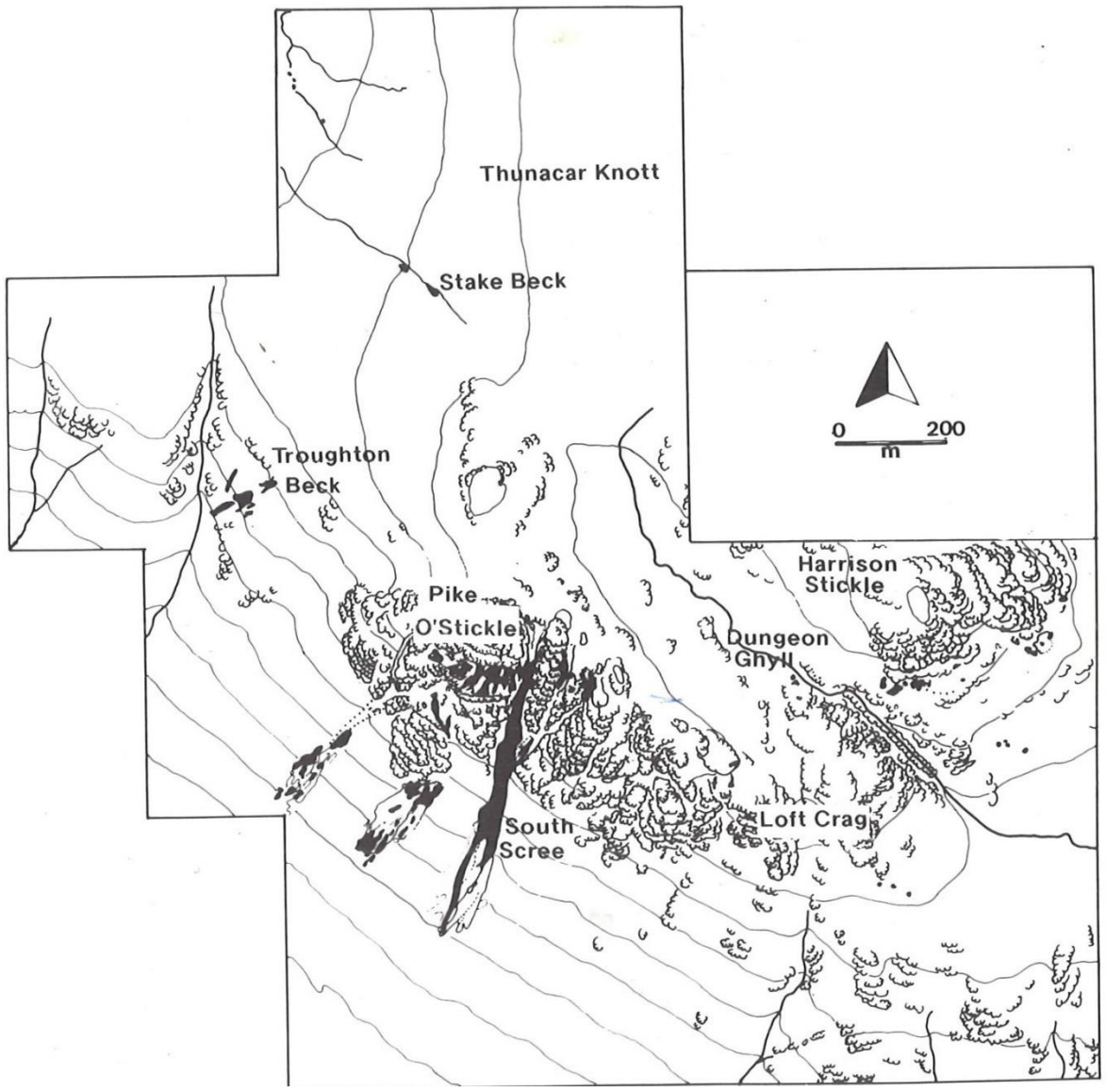

Figure 13: Map of the known working sites and the significant areas of debitage, marked in black, after Claris and Quartermaine, 1989. Image courtesy of Bradley & Edmonds, 1993:73.

criteria cost surface and thus create the network of pathways through the landscape. Firstly, I had to weight and value each feature in order to create a representational cost surface.

To create a multi-criteria cost surface, each feature must be assigned both a weight and a value. The weight of each feature refers to the influence it weighs over the cost surface. Each feature is assigned a weight as a percentage of the cost surface as a whole. The greater the weight, the more influence it holds over the chosen pathway. The value of the feature refers to the cost in which it would take to travel across each cell of the surface. The value is split in to positive and negative values. Positive values refer to the cost of each cell which passes through a feature. Negative values refer to the cells which do not pass through a feature. All the values are based upon a scale of 1 to 10 with 1 being the easiest to traverse and 10 being the hardest. All features were assigned values manually except from slope which was gradated from 1 to 10 already. When assigning the weights and values to each feature, there were several issues which had to be resolved regarding the processing of the data. It was initially hoped to assign weights and values to every feature identified in the conceptual model. However, as each feature requires an individual raster layer to be processed, the size of the model became too large to process. Therefore, the features were merged into overarching groups in order to process the data successfully. Furthermore, a further problem was encountered when too many different values were combined. When the full range of values, 1 to 10, was used, the outcome was a cost surface which had very little variety from one cell to the next, further demonstrating the inability of such systems to truly accurately model all the complexities of human life. To tackle this without assigning the same value to all features, the features were ranked from most important to least and thus scored accordingly. This method worked far more successfully and allowed for a more representational cost surface. Therefore, the final weights table was finalised as shown in Figure 14.

Feature	Weight	Positive Value	Negative Value
Waterways	15%	3	9
Slope	25%	Gradated	
Glacial Erratics	15%	3	6
Harrison Coombe	10%	1	7
Working Sites	25%	1	9
Modern Routeways	10%	4	5

Figure 14: The weight table for the first multi-criteria cost surface. The values are based on a 1 to 10 scale in which 1 is the easiest and most desirable to traverse and 10 is the hardest and least desirable. Image courtesy of author.

To weight and value each feature representationally, it was important to consider each category of features by their importance to wayfaring and their importance in the landscape. These two factors complimented the weights and values system as value could be attributed to the feature based upon its importance to wayfaring individually, and weight could be attributed to the feature based upon its influence over the landscape collectively. Therefore, as the fells could be regarded as resources zones during the summer months, the most important feature for wayfaring would be the working sites (see Figure 13) and the resource rich area of Harrison Coombe. As these locations were the goals of each

journey up the mountain, they hold the least value, and thus the highest desirability, to pass through. Therefore, these features were assigned the lowest cost of 1 with their surroundings being valued at 9 for the working sites (in order to further emphasise the importance of these features) and 7 for Harrison Coombe (as this feature was less decisively located in the landscape). Beyond the goal of the journeys, the waterways and glacial erratics of this landscape were deemed significant as, even with tree cover, they may have provided clear guides to the mountain summit. However, without further observation of their role within the landscape today, they could not be given a lower value than 3. On the other hand, the negative value of waterways was attributed to 9, due to the importance of waterways in modern mountaineering and, in this landscape, the terrain is often very rough outwith the river valleys. Finally, although not Neolithic, the modern routeways were included as an important feature of wayfaring as they have been consolidated by travellers' footsteps for centuries. As the creation of these pathways is not clear, to discount them as purely modern designs would be foolish. Instead, I attributed them a value of 4 in order to account for the possibility of an ancient origin.

Beyond the values of each feature, the weights also needed to be ascribed according to their influence over the landscape. Again, the weights were attributed based upon their ranking in comparison with the other features in regards to wayfaring. As the working sites were the goal, they were immediately ascribed as one of the most important features in the landscape. In parallel, slope was also ascribed as the most important as it encompassed the entire landscape and is often the most significant factor of mountain wayfaring today; the steepest path is not always desirable. There may be many reasons why a traveller may choose the steepest path, whether that be for efficiency or challenge, this study is attempting to show more types of experience. Therefore, slope must play a part in my cost surface, but it must play a balanced role in order to allow an alternative path. Although these features were determined to have the greatest influence over the landscape, their weight was set to 25% each. Although this percentage seems limited, when measured against all the features, it is a fair percentage and does not overpower the other features in the cost surface.

The second most important features within the landscape were determined to be the waterways and the glacial erratics. Similarly to their value, these features are distinctive enough in the landscape whether there was woodland coverage or not, as many of the erratics, such as Blea Rock and Copt Howe, are so large that they would dominate the valley even in tree cover. Likewise, the waterways carved their paths in this landscape for many years and it is reasonable to assume that their presence in the landscape has had a significant influence for millennia. Finally, Harrison Coombe and the modern routeways were attributed a weight of 20% for two different reasons. Firstly, Harrison Coombe was given this small weight as the area lies at the summit of the landscape. Therefore, its influence within the landscape is small as its influence is held only in its immediate vicinity. Furthermore, unlike the working sites, we are not certain of its role in the Neolithic as it is merely assumed that this is where many natural resources were collected the natural resources available today. Due to the doubts in its precise location and form, it would be undue to award it any larger

weight at this stage in the study. Secondly, the modern routeways were only awarded a low weight as they exist as recent manifestations of the role of the mountains as leisure pursuits and thus the modern routeways facilitate this goal. Their inclusion, however, is due to their unknown origins and thus they should not immediately assumed to be modern. With the weights and values assigned and the multi-criteria cost surface created, the pathways could be finally be modelled.

As mentioned in the methodology, the path was modelled from the starting points of Elterwater, to the south, and Stonethwaite, to the north. These are the most logical access points to the landscape, based upon the distribution of axes in Cumbria, though it is accepted that there are other routes, from Bowfell or Thirlmere, which could have also provided access. Due to the time restraints and limited processing power of the computer in use, these were the only access points used. The start points also had to be limited due to the number of end points used. As previously discussed, the type of movement occurring is less linear and more undetermined, like that of a wanderer. Therefore, to define one goal would be counterintuitive. Instead, the resources identified in the conceptual model

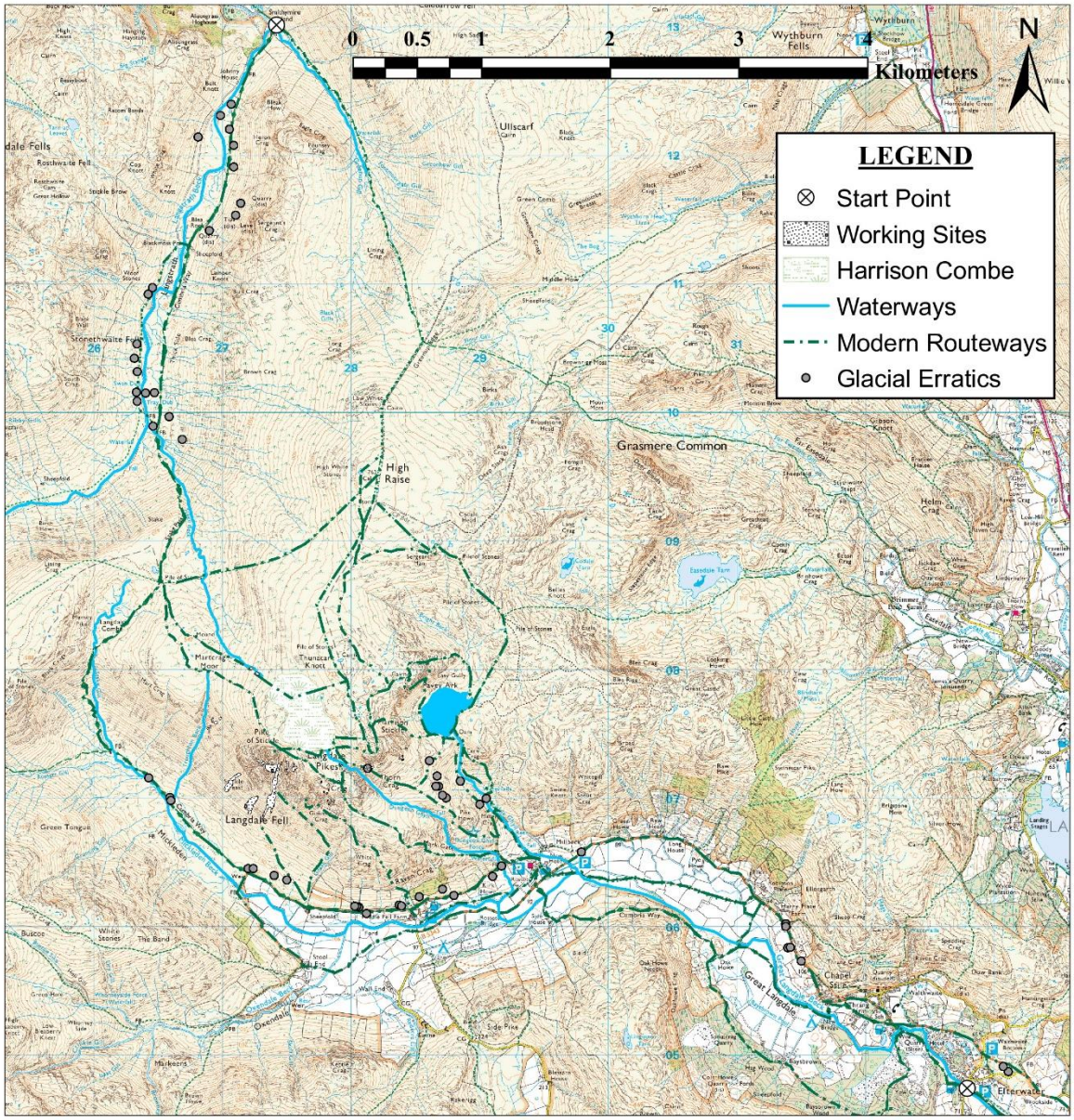

Figure 15: The features modelled from the conceptual model for use in the multi-criteria cost surface. Image courtesy of author.

were used as the journeys goal. This included the working sites and natural resources of peat, flora and fauna. Most of the working sites have definitive locations, however, the natural resources are slightly harder to determine. In order to provide a symbol of these resources, Harrison Coombe was chosen as a representative area in which they can be found. Again, this does limit other areas which do have or could have had such resources, but it does provide an initial area to aim for in our journey. Furthermore, Harrison Coombe was chosen specifically due to its proximity to all the working sites as well as its altitude being the summit for all resources sought.

From the results of the multi-criteria cost surface, the network of paths created did not appear as predicted (see Figure 16). It was hoped that the path network would use some of the features such as the glacial erratics or waterways to navigate through the valleys and up the mountain. However, the pixelated path produced was far more direct in its approach to the working sites. For example, as the slope was heavily weighted, any paths directly up crag faces and on steep terrain were expected to be avoided as these would have been too great a cost. Contrarily, as seen from the straight path from

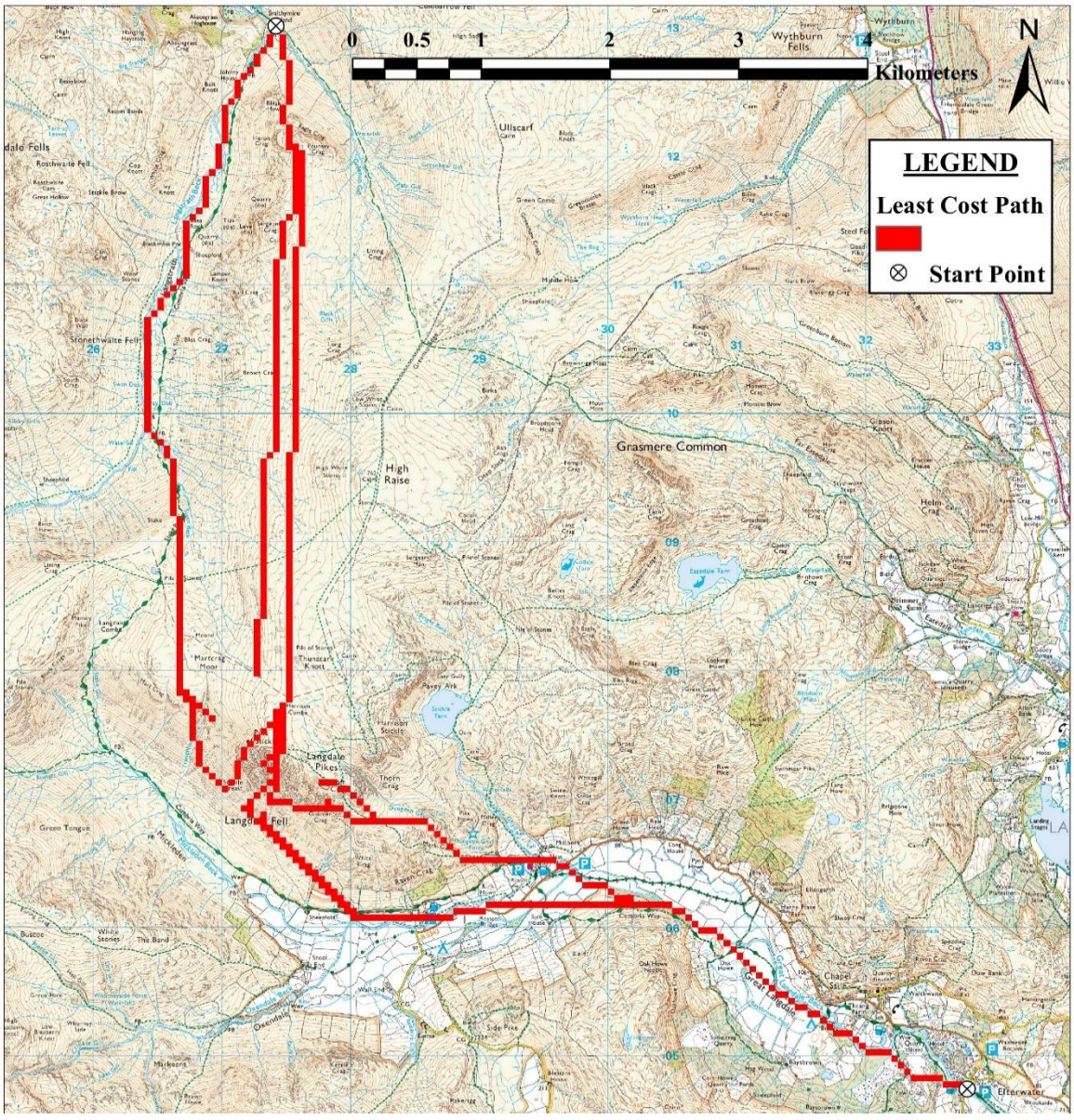

Figure 16: The first path model as created from our multi-criteria cost surface. The path network begins at Elterwater in the south and Stonethwaite in the north. Image courtesy of author.

Stonethwaite, the path often climbs these steep slopes in order to achieve the most direct route. Furthermore, the size of the paths depicts the computational approach the GIS provides. The size of the pixels covers around a 10m² area which, in the mountains, can be the difference from the top of a cliff and the bottom. Sadly, this problem cannot be rectified without better topographical survey data for this region. However, this issue reaffirms the limits of computational approaches as the data used in GIS may never be good enough to represent the dynamism and complexity of the world. Therefore, due to both the size and placement of the paths, the fieldwork is clearly necessary to both experience the paths as well as create more subjective data with which to further define routes through this landscape. This is what was intended for the first round of fieldwork.

THE FIRST PATH: FIELDWORK FROM STONETHWAITE AND ELTERWATER

Before beginning the fieldwork, the pathways processed by the GIS (see Figure 16) had to be somewhat adapted in order to create a route which could be physically tested in the field. An adaptation of the route was necessary for several reasons. Firstly, the size of the pixelated path was a problem as it encompassed a wide area in the real-world; thus, it was important to transcribe a more specific version of the path which could be tested in the field. Secondly, the path network was created with two starting locations. Understandably, both start points cannot be tested on the same day as to walk such a great distance in the time as well as to record the fieldwork thoroughly whilst doing so would be a near impossible feat. This is especially the case when our accommodation for the fieldwork was 50 miles from the Langdales and took nearly two hours to reach. Therefore, all fieldwork had to be completed each day within 6 to 8 hours. Finally, the programmed route has many separations and diversions and, again due to the practical restraints of conducting the fieldwork, it was not feasible, nor necessary, to walk them all. Therefore, a more practical route which could be completed within the day needed to be produced from these tangled paths. To rectify these issues, two routes were adapted, one from Stonethwaite (see Figure 17) and one from Elterwater (see Figure 18). Each route was planned as a looped path allowing us to test two different pathways from each start point, one there and one back. Although some of the paths modelled were not used, my planned routes were a sufficient representation of the LCA model, and they adhered to the practicalities of conducting this fieldwork.

Beyond planning the route, it was also imperative to undertake the pre-fieldwork recording, namely the participant context record to be completed by the participants which included myself and my father, Steve Calvert. The ‘Participant Context Sheet’ (see Appendix 2 for completed records) provided information regarding each participant’s relationship to the project, their knowledge of the landscape as well as their general fitness levels. Although only three questions were asked, the questions uncovered the most important bias’ of each participant and thus provided a base for the evaluation of the results of the fieldwork. For example, if a participant lacked any hill walking or mountaineering skills or experience, they may perceive some aspects of the walk as too dangerous

Figure 17: The proposed routes for the first round of fieldwork from Stonethwaite for day one. The forecast weather is also recorded. Image courtesy of author.

and this should be noted for evaluation later. Therefore, these context sheets were vital to fill in before the fieldwork so that these biases could be recorded, and the participants could be made aware of them. The main conclusion from these context sheets was that each participant had a vested interest

Figure 18: The proposed route for the first round of fieldwork from Elterwater for day two. The forecast weather is also recorded. Image courtesy of author.

in the success of the project as well as a personal knowledge of the landscape. Although a vested interest is common factor for all participants in archaeological research, the importance of noting it allows us to scrutinise the fieldwork and assess whether it directly influenced the results, as is the

Figure 19: The straight path from Stonethwaite expected us to traverse Eagle Crag, a large, perilous crag face. Image courtesy of author.

same for our personal knowledge. As I am using the contested theoretical approach of phenomenology, acknowledging the biases and influences on our experience are important as without accepting our aims, one could assume that our experience was universal (see Brück, 1998). In fact, the reason I may discover certain viewsheds or discover tuff in unlikely places is precisely because I am seeking it. By acknowledging our bias, I can hope to avoid such assumptions and thus provide a more credible experience.

Upon completing all appropriate preparations, my first round of fieldwork could commence. For this initial exploration, I organised two days to investigate the routes modelled from both Stonethwaite and Elterwater. The following walks were recorded thoroughly using a multimedia approach outlined in chapter four to provide a richer and multifaceted response to the experience of each route. Following this, it would be illogical to present the findings in a lengthy written narrative. Instead, the descriptive account of this first round of fieldwork is presented through a series of Story Maps for, firstly, Stonethwaite in Appendix 3 and, secondly, Elterwater in Appendix 4. As these interactive tours provide the descriptive narrative to the fieldwork, the remainder of this section will evaluate the first round of fieldwork and consider our results regarding the cyclical methodology and the reprogramming of the LCA model. Therefore, the Story Maps in Appendix 3 and 4 must be explored first on your browser before continuing reading. Each Story Map details the experience of the walk in a step by step narrative through a multimedia, interactive map allowing a more sensory understanding of how the journey was undertaken and the experience it caused.

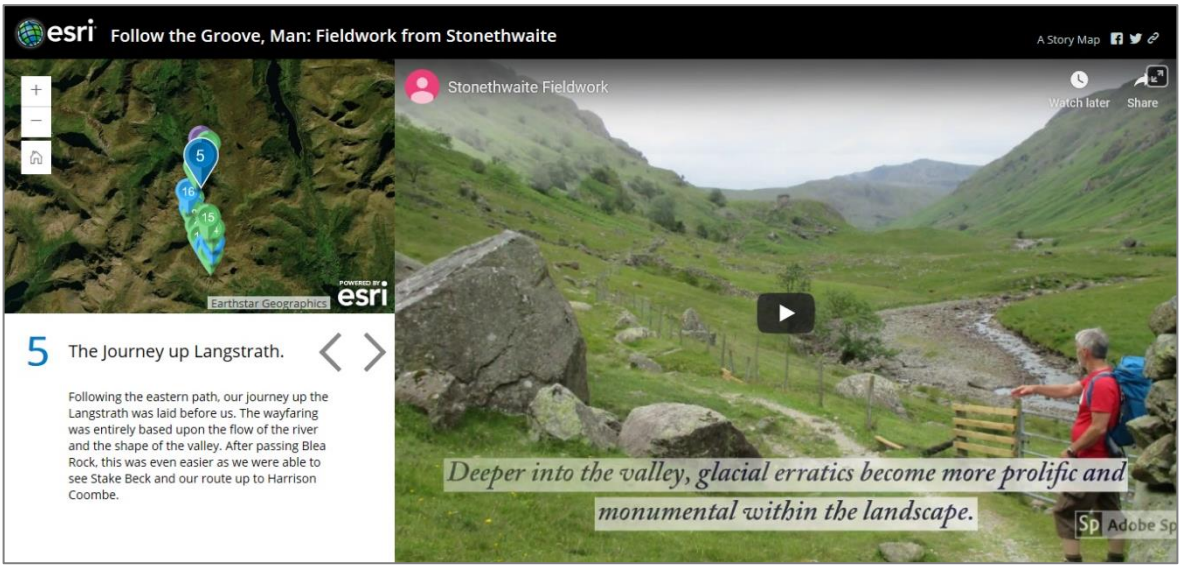

Figure 20: A screen capture of one of the stages of the Story Map from Stonethwaite in Appendix 3. Both Appendix 3 and 4 should be explored before the reader continues with the analysis of the fieldwork. Image courtesy of author.

Naturally, when walking the routeways from my LCA model in the real world, it was not possible to follow the exact path, nor was it logical to. We attempted to follow the LCA paths as closely as possible (see Figures 21 and 22). However, their role in how we dictated our movements was secondary to the landscape itself. Our focus on the landscape and how it naturally facilitated movement ultimately decided the exact route taken. Furthermore, this optimistic aim was also thwarted by English trespassing laws (see Section 68 of Criminal Justice and Public Order Act, 1994). Though we may have wanted to wander across the landscape freely, we were limited in our movements, especially in the valley basins, as the landscape is divided by farmland. Nevertheless, the fieldwork was successful as it provided two major conclusions with which to continue the research. Firstly, the fieldwork did provide an evaluation for the modelled routeways through ground truthing test the paths. This was especially important regarding the paths which seemed achievable on paper, but we did not successfully follow in the field. For example, the straight path from Stonethwaite was not possible as it required us to traverse a steep incline and a series of crag faces before reaching the summit (see Figure 19). Not only was this difficult but it was also unnecessary as two river valleys detoured around the precipice and led on smoother routes to the summit. Therefore, this fieldwork was successful even if only to challenge the results of my LCA model. However, this was not the only aim of the fieldwork.

The second major result focussed on the experience of wayfaring the landscape. Upon arriving in the landscape, a decision which was made, rather spontaneously, to conduct the fieldwork with little aid from modern navigational tools, such as a compass or map, in order to heighten the experience of being in the landscape and force us to focus on handrails (linear or otherwise defined features in the landscape used to guide mountaineers towards their target). It should be noted that this was only successful due to our detailed knowledge of the landscape we were in. As we were testing a planned route, we were required to understand exactly where this plan wanted us to go and use this alongside our knowledge of the landscape to navigate the landscape as ‘naturally’ as possible. Unhindered by

Figure 21: The final route for the first round of fieldwork from Stonethwaite for day one. The final time and direction are also recorded. Image courtesy of author.

navigational distractions, this method allowed us to focus on the attributes of the landscape identified as significant wayfaring features thus evaluating the decisions made by my conceptual model and my multi-criteria cost surface. As I shall discuss the implications of the fieldwork both from an

Figure 22: The final route for the first round of fieldwork from Elterwater for day two. The final time and direction are also recorded. Image courtesy of author.

archaeological and theoretical perspective in the following discussion chapter, the results here will further outline the consequences the fieldwork had within the methodology and the continuation of research.

Figure 23: Looming over the valley below, Blea Rock is a glacial erratic which commands a dominating position in the valley. Image courtesy of author.

From our 'blind navigation' method, we were able to determine the features in the landscape, as they exist today, which are the most significant for wayfaring. Firstly, from both approaches, the significance of waterways was distinctly apparent. Both the Great Langdale Beck and the Langstrath are dominant features within their respective valleys and provide a clear handrail to navigate the valley floor. However, due to farming land management, the character of the Great Langdale Beck has changed especially as its path is channelled through the landscape to drain the surrounding farmland. On the other hand, the Langstrath appears to flow freely, as evidenced by its large width, shallow depth and surrounding wetland. The implications of this on Neolithic wayfaring will be discussed in the following chapter, but for now this feature plays a more significant role in the multi-criteria cost surface. Additionally, this significance applies to the waterways flowing down the mountainside, with Stake Beck, Stickle Ghyll and Dungeon Ghyll providing important handrails both in the ascent and descent. Therefore, moving forward with the second LCA model, the waterways will have a greater influence over the multi-criteria cost surface.

Contrarily, the glacial erratics, which were expected to have a significant influence on wayfaring, provided little guidance in the landscape. However, Blea Rock and Copt Howe stood out as significant way markers along the valley bottom as well as indicators of change in the landscape. Blea Rock marked a notable change from a narrow river valley surrounded by glacial erratics to a wide U-shaped valley, which provided expansive views of the head of Langstrath and Bowfell

beyond. Once again, the fieldwork has indicated, through experience, the shortcomings in my original multi-criteria cost surface which need rectified in the next model. Finally, another major shift in my original perception of this landscape is the ever-present role of slope. Even though both participants are relatively fit and more than able to complete the fieldwork, on both days the slope of the routeways was a major factor in navigational decision making. In fact, many of the changes to the proposed routeways were due to steep inclines or crag faces which would have been very difficult to traverse and, often, illogical. Thus, it will be important in the next model to define the steepest slopes as inaccessible. Apart from these changes, there were few other discoveries which effected our methodological feedback loop. The working sites remained the most important goal due to their known locations and this importance was fed by the chance discoveries of tuff guiding us, like breadcrumbs up the mountainside. Therefore, using the information gathered, I could move on to the second phase of analysis.

LEAST COST NETWORK: THE SECOND PATH

From the results of the fieldwork, there are some obvious changes to be made to the multi-criteria cost surface. These changes involve manipulating the slope, so the highest vales are off limits for the path network and adapting the weights and values for more accurate representations of what was experienced in the field. By doing this, I hoped to refine the path network and remove the peripheral paths which plagued the previous model. Additionally, by altering the model based upon our subjective fieldwork observations, I hoped to create a more representational network with less computational straight lines across the landscape. Before outlining the changes made to the model, it is worth exploring some of the results of the fieldwork in relation to the reprogramming of the LCA model. One of the major features of my Elterwater fieldwork was the farmland which restricted our movement in the valley basin (a useful demonstration of the limits of experiential archaeology in contemporary landscapes). As this was a major influence over our movements in the field, it will not be included in the cost surface as this would remove the entire Langdale valley from our model. As the paths taken around the farmland allow us to observe the path along the valley floor, there was no purpose in removing such a large portion of the study area and thus this feature was not inputted into the model. Vegetation was another significant influence over our fieldwork as it restricted our movement, especially the wetland grasses of Harrison Coombe and Langstrath. Although these features also played a significant role in the fieldwork, they were not inputted into the following model as the data collected would have simply placed a bias on those areas of the landscape. In order to create a fair cost surface regarding vegetation, the model would require vegetation data for the entire landscape and such data is not available, neither for the contemporary landscape nor the Neolithic. Beyond these limits, a number of changes were made to create a more refined and representational multi-criteria cost surface for this landscape.

My first change involved revisiting the slope model which provided the base for my multi-criteria cost surface. Possibly due to the small geographic area of the region in question, the slope model did not seem to emphasise the inclines of the mountainside. Rather than manually restrict the path network by modelling impassable zones throughout the landscape, I chose to remodel the slope from the elevation data and this time apply a multiplier. By doubling the height, I doubled the slope which provided an emphasised slope model on which to base the multi-criteria cost surface. Although this manipulation created an unrealistic model of this landscape, the only true change to the LCA model was the input of a more accurate representation of the slope as it pertains to human movement in the real world. Alongside this rectified input, the multi-criteria cost surface had another addition. The paths as walked during the fieldwork were modelled and inputted to the cost surface. Although they were both adapted and shortened due to the practical restraints of the fieldwork, these paths demonstrated the real-world manifestations of the previous model and provided a verified path network around this landscape. In order to avoid their presence creating a bias within the multi-criteria cost surface, it was important to carefully consider the weights and values of the new model.

Feature	Weight	Positive Value	Negative Value
Waterways	30%	1	10
Slope	30%	Gradated	
Glacial Erratics	10%	3	7
Working Sites	10%	2	8
Modern Routeways	10%	3	7
Fieldwork Paths	5%	2	8

Figure 24: The weight table for the second multi-criteria cost surface. The values are based on a 1 to 10 scale in which 1 is the easiest and most desirable to traverse and 10 is the hardest and least desirable. Image courtesy of author.

In the new weight table (see Figure 24), every feature has been altered in correspondence with the fieldwork results. Before considering these changes individually, it is worth noting that the positive and negative values are more 'extreme' than in the previous table. After experimenting with the least cost programme in ArcGIS, I realised that the programme responded better to polarised values on the 1 to 10 scale. Interestingly from these tests, attributing all negative values to 10 does not negatively impact the results and thus 10 has been used as a negative value in these tables. In this table, the positive and negative values were based on a mirrored approach where the positive value was manually assigned by choice, but the negative value was assigned as the mirror opposite of this value (i.e. 1 mirrors 10, 9 mirrors 2 etc.). As a result of our fieldwork, the waterways were the most significant handrails to guide ourselves around the landscape. Therefore, these were attributed the lowest value as they were the most significant features for wayfaring.

Following the most important feature, the working sites remained important features of wayfaring as they were the goal, though the rise of the value of waterways meant their value was demoted to 2. The fieldwork paths were also awarded this value as they were the manifestations of wayfaring and in this landscape. The inclusion of these previously trod paths is a nod to the role memory has in

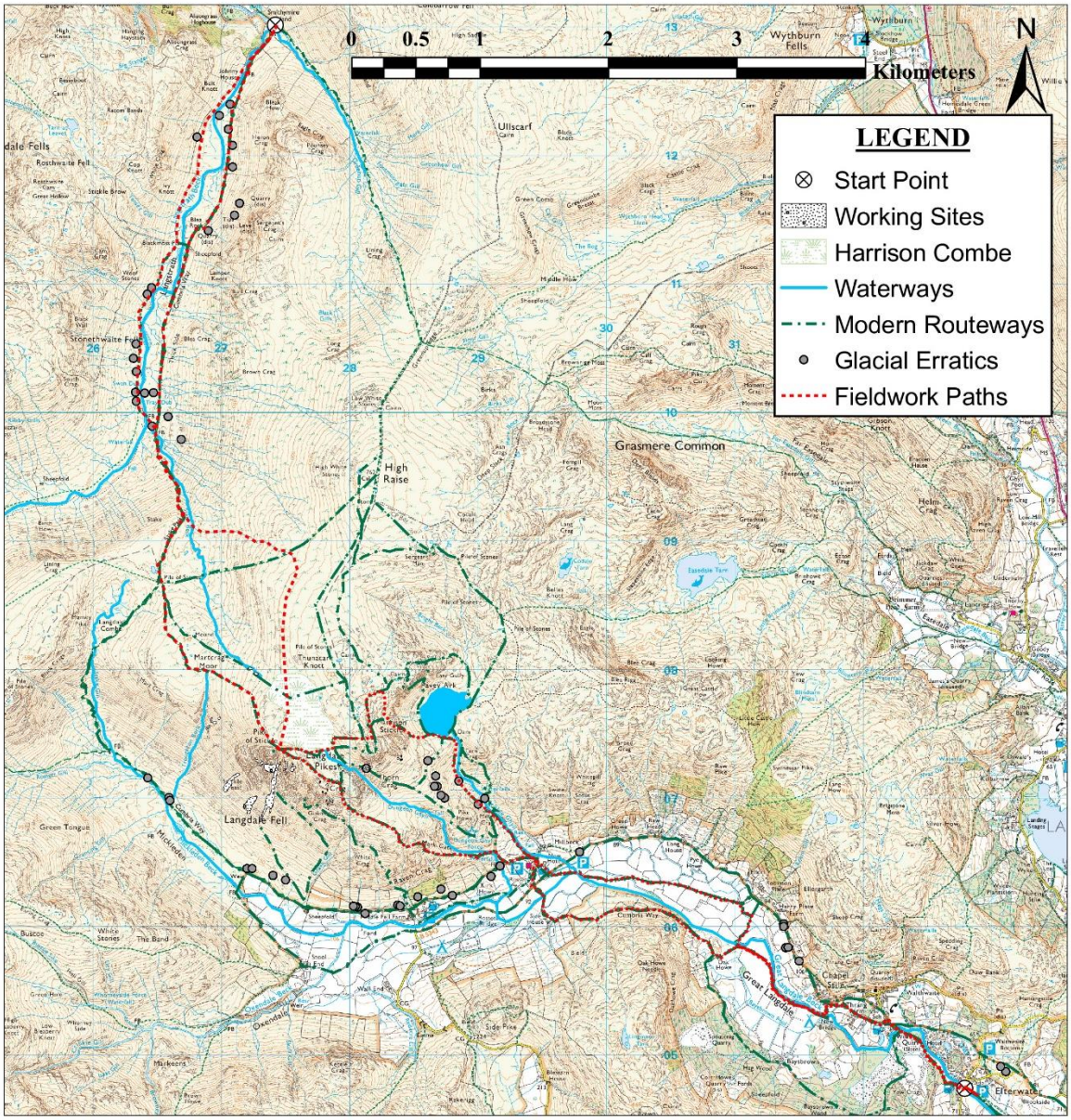

Figure 25: The features modelled from the conceptual model with additions made from the first fieldwork tests for use in the multi-criteria cost surface. Image courtesy of author.

wayfaring and how generations of travellers often follow the same routes through landscapes (see Figure 25). As memory is often regarded as a similarly important feature of prehistoric wayfaring, it seemed logical to value the inclusion of past paths. Finally, the modern routeways and glacial erratics were assigned the highest value of 3. Although their role in wayfaring was diminished by the influence of other factors during our fieldwork, these features continued to hold some value in my model. The modern routeways especially held value in the Langdale valley basin where the trespassing laws forced our movement along predetermined routes. Similarly, glacial erratics provided some guidance as route markers when navigating along the base of the mountain. However, their diminished role within the mountain range as well as the lowering value of other features meant they hold the highest value in this model.

Of course, the values of the features are not the only defining characteristics of my multi-criteria cost surface. The weights play an equally important function as they define the influence that each value

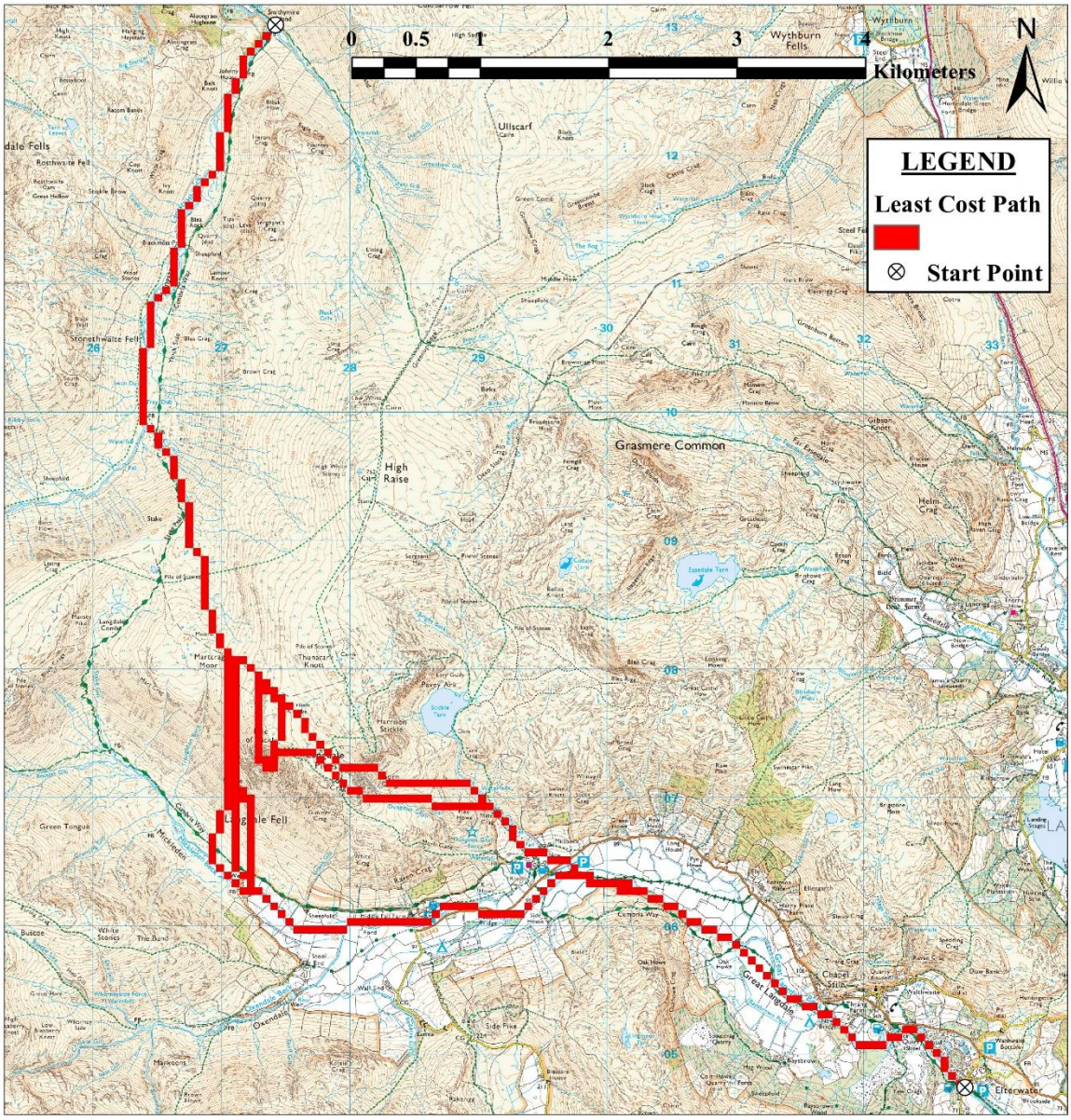

Figure 26: The second path model as created from our revised multi-criteria cost surface. The path network begins at Elterwater in the south and Stonethwaite in the north. Image courtesy of author.

has. Again, as the most defining features for wayfaring in this landscape were the slope and waterways, these were awarded the highest weight, 30% each. From the fieldwork, it is clear that these two features play the greatest role in facilitating and restricting movement through the landscape and so, until more data is gathered, they hold the greatest influence over my cost surface. Beyond these facilitators, the remaining features did not hold any great influence over the landscape. Although the working sites are significant goals on my journey, their ephemeral trace on the landscape holds no great influence as often one can only see the sites when they have arrived. Their discrete nature is a factor to be discussed in the following chapter, but for this analysis, their weight was limited to 10%. Similarly, the modern routeways and glacial erratics were also attributed 10% as they certainly hold some sway over the landscape, but this influence is inconsistent, with greater influence in the valleys and little on the mountain. Due to this inconsistency, both their weights were limited to 10%. Finally, the fieldwork paths were accredited 5%. Although their value in wayfaring

is significant due to the mnemonic role, they have no physical existence. Therefore, they cannot hold a great influence within the landscape. Thus, they were only attributed 5% until more data is gathered.

From the revised weight table, the path network created was successfully refined as hoped as shown in Figure 26. Many of the periphery paths no longer existed and the paths now followed routes which were far more achievable as they did not involve steep cliffs and crags. From these results, there is a clear change caused by the newly inputted data as well as the re-evaluation of weights and values. Firstly, the valley paths have been thoroughly refined and, with the revised data, have created a two dominant paths into the fells. Although their refinement was a successful result of the fieldwork observations, it remains interesting that the analysis continuously chose the flatter Langstrath valley with the steep incline over Stake Beck rather than the gentler slopes up Greenup Gill, another river valley which loops round to Harrison Coombe from the north. Furthermore, the southern approach roughly follows the Great Langdale Beck to the base of Stickle Ghyll. From our fieldwork observations, this may have been the most facilitating choice as the valley floor could have been boggy and so following the river not only would have provided a suitable handrail through the landscape, but also may have facilitated easier travel via the firmer river basin. The second significant change to the model were the ascents and descents from the mountain, most notably from the Langdale valley. The model defined two routes, one of which involved following the handrails of Dungeon Ghyll and Stickle Ghyll and the other which took a direct route up the western side of Pike O' Stickle. The paths which follow Dungeon Ghyll and Stickle Ghyll are noteworthy as they are seemingly undemanding whilst they also pass through the working sites alongside Dungeon Ghyll. On the other hand, the direct path up Pike O' Stickle is far more challenging. Not only does it traverse the steepest slopes on the range, but its straight path north shows a clear problem in the data. As the other paths weave around the landscape features, there is clearly not enough data in this area to adequately model a path which follows more 'natural' lines through the landscape. Therefore, from this model, this is one of the areas which I will focus on my second phase of fieldwork.

THE SECOND PATH: FIELDWORK FROM LANGDALE

With the refined path model, the aims of this fieldwork were similarly refined. Unlike the previous fieldwork, we would not walk into the fells from Elterwater or Stonethwaite. Instead, I chose to focus our efforts on the paths modelled from the Langdale valley to the resource zones on the summit. This decision was made as the refined paths along the valleys of Langstrath and Great Langdale Beck were very similar to the paths we had already walked in the previous fieldwork session. Therefore, due to the time restraints, I decided more information could be gained from walking the network of paths within the Langdale Pikes themselves. Furthermore, this decision allowed more time to explore the exact locations of the working sites themselves, an opportunity we had not had on previous walks. Therefore, the aim of this fieldwork was to walk the modelled paths on the southern face of the Langdale Pikes, especially those not previously explored, and use them specifically to explore the

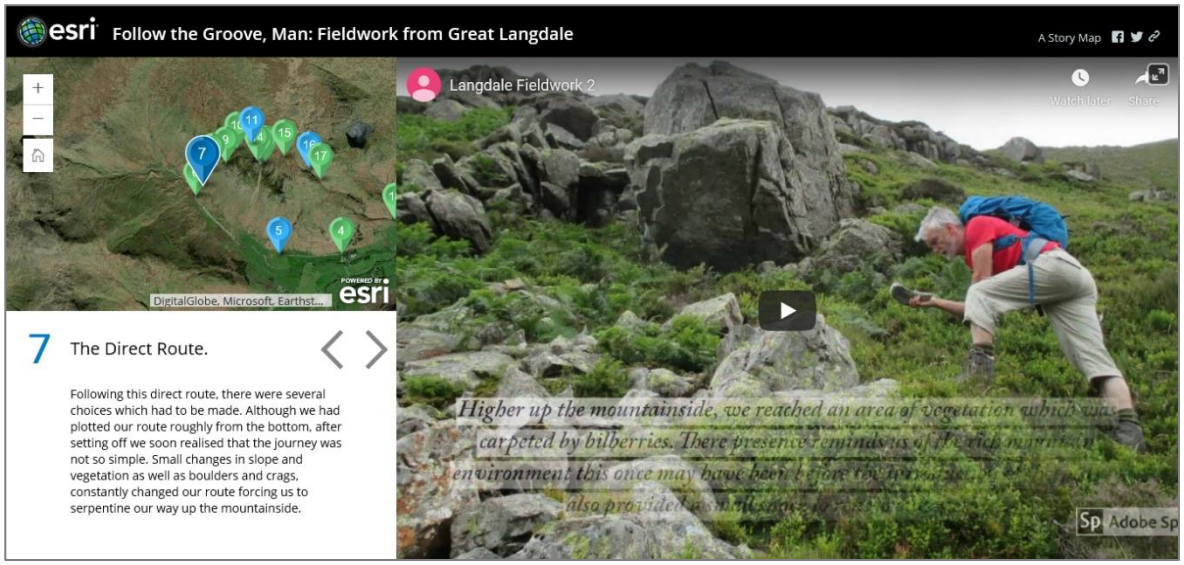

Figure 27: A screen capture of the Story Map available in Appendix 5 which should be fully explored via the readers browser before reading any further into the chapter. Image courtesy of author.

working sites in some of the most challenging locations in this landscape (see Figures 30 and 31). Before reading any further this section, please fully explore the Story Map available via your browser in Appendix 5 which fully details in an interactive multimedia account the experience of this journey.

Overall, the path followed was the truest to the model of all the fieldwork conducted in the project. Although, again, we could not follow the artificially straight lines in the field, we were able to follow the direct path up the mountain with reasonable ease and subsequently follow the path down via Dungeon Ghyll. This journey provided an interesting insight into the landscape as whole as well as the different mindsets in human wayfaring. There were three key areas of results which I will explore individually. Firstly, the decision was made to make the ascent via the direct route to the west of Pike O' Stickle. Ascending via this route was deemed the safest method of testing this path, as it had not been tested before and the steep slopes could have held hidden dangers which could be more concealed when descending. Although the modelled route travelled across Stickle Breast first, we chose instead to remain on the valley floor until we could view the entire mountainside in order to safely plan our route to the summit (see Figure 29). We were able to do this upon reaching Troughton Beck, a stream which drains Martcrag Moor and where some of the axe working sites are also located. The route taken directly up the mountainside was a close representation of the model as it was the shortest route to the summit. However, it was also the slowest in terms of speed with the ascent of 600m taking one hour and thus a speed of only 10m per minute. Such slow speeds were due to both the ever-steepening slope of the mountainside as well as the vegetation and rock fall which had to be navigated around. On the other hand, the slow speed allowed us to notice several intriguing features such as the bilberry bushes, which covered the higher slopes, and number of pieces of tuff which had washed down the hillside from Pike O' Stickle. This data would be useful to plot into my model to provide some diversity to this area and possibly model a more representational direct route. Overall,

this path, though slow and tiring, was entirely doable and, due to the direct nature of the path and its proximity to Pike O' Stickle at all times, is one of the easiest to navigate using the landscape features.

The second key result of this phase of fieldwork was exploring the working sites of Pike O' Stickle. These sites are located on the southern face of the bulb of Pike O' Stickle on a series of narrows ledges, one above the other, thus forming the stepped outline of the top buttress, as seen in Figure 28 (Bradley & Edmonds, 1993:75). Due to this stepped form, scrambling across to the working sites could have been easy. However, upon scouting a route and traversing the crag face with relative ease, the high winds caused evermore danger as we moved on to the exposed southern face. Furthermore, these winds caused vasospasm, the contraction of blood vessels causing a temporary loss of blood supply, in my hand which severely hindered its movement. This affected my ability to scramble safely as well as record our fieldwork effectively. Sadly, due to this and our solid commitment to my risk assessment, we chose to turn around having not quite reached the working sites themselves. Nevertheless, our brief time on the crag face had revealed an important feature. Although when perceived from the valley floor, the top buttress of Pike O' Stickle seems a dangerous precipice, its stepped nature with grassy rests makes for a relatively easy scramble. Therefore, even the working sites in the most 'dangerous' locations could be reached easily, assuring suitable weather conditions and the traveller's knowledge and experience of such places. From this, the perceptions of this landscape as dangerous and liminal were probably based upon the observations of someone who was both less knowledgeable of the landscape personally and mountaineering more generally.

Figure 28: From this angle at the base of Troughton Beck, we could observe the mountainside ahead and plan a route according the landscape features presented to us. Image courtesy of author.

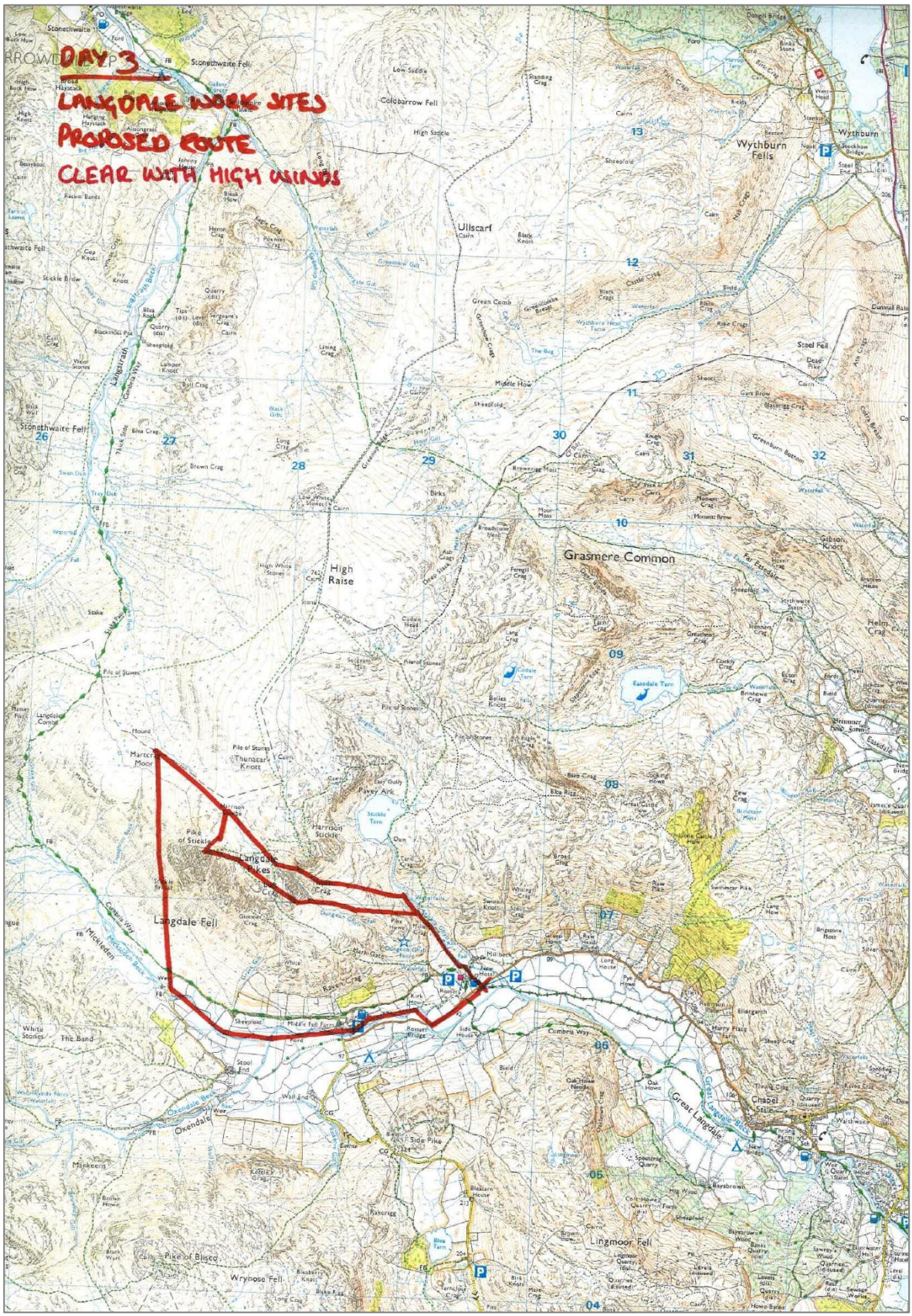

Figure 29: The proposed route for the second round of fieldwork from beginning from the base of Stickle Ghyll. The weather is also recorded. Image courtesy of author.

Finally, following the eastern shore of Dungeon Ghyll provided an effective handrail down the mountainside. Furthermore, we were able to discover a few sites where quarrying of tuff may have occurred. Such a discovery along the route of Dungeon Ghyll reaffirms the use of these natural

Figure 30: The final route for the second round of fieldwork beginning at the base of Stickle Ghyll. The final time and direction are also recorded. Image courtesy of author.

handrails in the landscape. On the other hand, the discovery also reminded us of the beauty of this landscape and the importance of such natural wonder to these working sites. The Pike O' Stickle working sites are in an epic location, with panoramic views of southern Cumbria as far as Morecambe

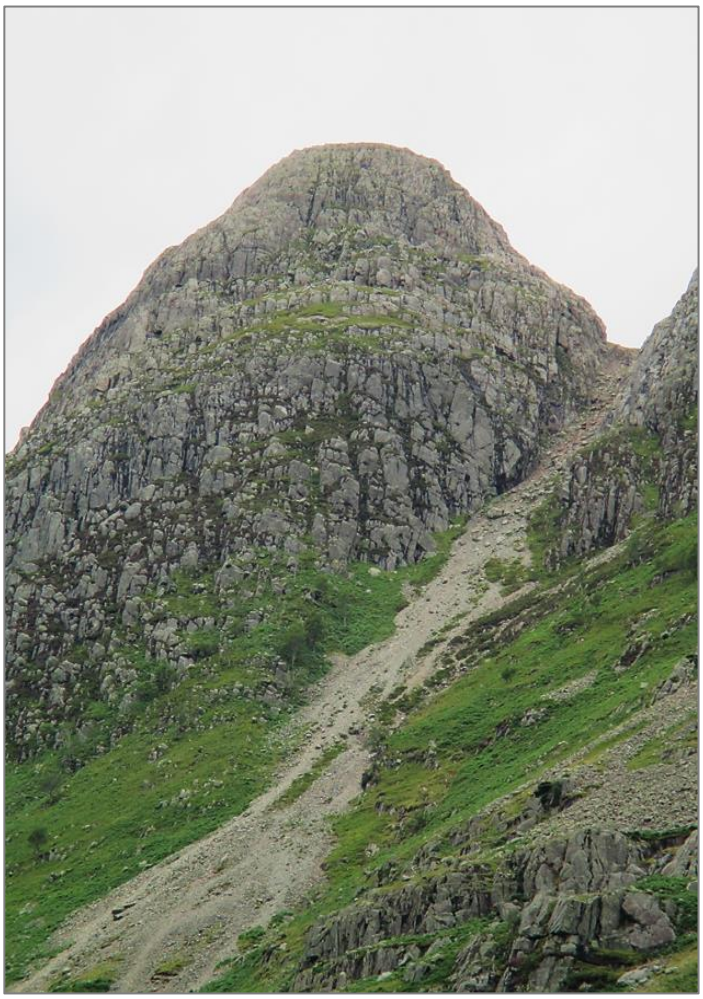

Figure 31: From the valley floor, we could see the bulb of Pike O' Stickle and the locations of the working sites on this steep, stepped southern face. Image courtesy of author.

Bay. Similarly, the Dungeon Ghyll sites inhabit a framed scene, between Loft Crag and Harrison Stickle, with the famous Dungeon Force falls crashing immediately below and the bulb of Pike O' Stickle commanding the horizon in the far distance (see Figure 32). It is these features that also create value in the landscape with the working sites possibly chosen for these aesthetic reasons above all else. However, such subjective value is another feature of the landscape which is difficult to input into my model. Like weather, there is no singular location to which any value could be applied and so, in order to allow this subjective data to provide a valuable contribution to LCA models, more complex and variable programmes must be designed.

Although there were several interesting results from this fieldwork, due to the limitations of time on the study, the methodological feedback loop was paused here. The nature of our methodology meant that the cycle of phenomenological fieldwork and LCA modelling could continue perpetually. In some ways, this would make any cessation of the cycle seem too soon. As an indication of this, I will quickly explore the results which could have influenced the next model before moving onto my discussion of the implication of my results theoretically and archaeologically. Firstly, from the discovery of bilberries and other rich natural resources on the mountainside beside Troughton Beck, I would have modelled some of this vegetation to recreate the diversity in this area and hopefully refine this path. Another feature which could have been modelled in this area was the old droving path on the western side of Troughton Beck. This path is no longer featured on maps but was a popular route up the mountain in years past, as shown by its scarred remains on the mountainside. In turn, this may have led to further fieldwork on such direct routes up the mountain on the southern face of the Langdale Pikes. Although such further exploration would have provided us with an ever-richer model of the landscape, the results I have discovered in my methodological feedback loop have raised some intriguing ideas surrounding the theoretical framework of this study, characteristics

Figure 32: At the Dungeon Ghyll working sites, the valley gorge frames the dramatic scenery including Dungeon Force in the gorge below and Pike O' Stickle on the horizon. Image courtesy of author.

of Neolithic wayfaring and notions of Neolithic Langdale itself. I will explore these ideas in the following chapter.

CHAPTER SIX

Discussion: The Narrative of Navigation

The results of the LCA model and phenomenological fieldwork raise several intriguing discussion points regarding both the theoretical and methodological approach and the role of this mountainscape during the Neolithic. Before exploring these in detail, it is worth revisiting the aims of this study. These aims were twofold: firstly, to challenge common assumptions of these mountain quarries being dangerous and liminal places in Neolithic culture and society and thus re-evaluate the role of such mountainscapes during the Neolithic. Secondly, to develop a more appropriate methodology for studying movement in regions where archaeological evidence in minimal. In this chapter, I shall explore the successes of my chosen method and how the use of both LCA and phenomenology provided a balance of objective and subjective data to produce a more creative, credible and collaborative result. I will also explore the importance of the results in demonstrating the dynamism of this active landscape and the role such activity and experience played in Neolithic society and culture. Much like this study, the discussion presented here is also cyclical as the results demonstrated the fluidity of time in this landscape with the present performed in the past and the past performed in the present. Before exploring this omnipresent cycle, I will first explore the results of our methodological developments.

OBJECTIVE VS. SUBJECTIVE

To develop more appropriate methods for modelling past movement in a region of little or no archaeological data, I utilised both LCA and phenomenological methods. Both have been used previously in the study of movement (as explored in chapters two and three) and have their benefits (as explored in chapters three and four). On the other hand, both have their limits. Namely, limits to their objectivity, in regard to phenomenology, or their subjectivity, in regard to LCA. Logically, to resolve these issues, I applied both LCA and phenomenology together to develop these separate approaches into a single holistic method. My methodological feedback loop allowed the objectivity of a data-driven model to provide the basis for my phenomenological fieldwork which subsequently fed subjective data back into the model. By applying this feedback loop, I resolved some of the limits of each theoretical approach. Firstly, the 'objective' LCA model provided a comparable and credible basis for phenomenological fieldwork which could be repeated by multiple participants thus making the approach more of an objective exercise. Secondly, the subjective data created from the experiences of the phenomenological fieldwork provided data for the LCA model thus reducing the sterility and increasing the humanity in each model. Furthermore, not only did the fieldwork create dynamic data which represented the landscape as a living world, filled with agency and activity, but

it also created data for a landscape which seemed devoid of it. Of course, the limits of the data must be acknowledged. This active landscape was experienced in 2019, through the eyes of two 21st century people with all the relevant modern inhibitions. Therefore, how can my experience possibly relate to that of my Neolithic counterparts? It is true that the landscape we walked is the result of millennia of land management, from farming and deforestation to the creation of a leisure landscape. Thus, our fieldwork did not experience the same wild landscape that would have been experienced during the Neolithic. However, this does not mean that our results are not credible.

INDIVIDUAL VS. UNIVERSAL

My study never intended to depict the precise routes taken by Neolithic people nor model the exact landscape which they travelled through. Instead, the act of moving through the landscape as it exists today was an enactment of the processes of human wayfaring and the role the landscape played in that activity. I had no intention of quarrying the tuff nor gathering the herbs and fruits I encountered, as Neolithic people may have done on such journeys. To do so, would be fundamentally unreliable as all my fieldwork was unavoidably influenced by the modern features in the landscape such as the vast tracts of farmland in the Langdale valley. To avoid such anecdotal results, my aims were vastly different. As Heidegger emphasises, *being-in-the-world* allows us to understand the processes behind such activities as they are embodied within our own activities in the present day. Such processes are not strictly defined by historical conditionality but exist as traces which can be extrapolated through such embodied experience (Borić, 2010:4).

As I have stated, we are not inferring that my experience is universal. However, upon discarding the modern tools of navigation for my fieldwork and relying upon our knowledge of the model as well as the landscape itself, we were able to enact certain processes of spatial problem-solving which are defined by the landscape we traversed, rather than us, as humans, within it. Again, the landscape is not a solitary or static object, but is entangled within the process and the agents acting within it across time. To demonstrate this, I can take one of the many cairns which are dotted across the landscape of the Langdales. They are created through the repetition of the single action of placing a stone upon the landscape. Over days, weeks, months and years, the cairn grows and subsequently encourages more people to add to the pile. When we climbed Pike O' Stickle, we added a single stone to the summit cairn, like so many had done before us. Our reasons for adding to the cairn were not exactly the same as the people who came before us and so our experience was not exactly the same. However, the physical experience of placing the stone is shared through time by all who do it. Therefore, through our active participation we can share the process of a past action and thus infer mnemonic qualities of such process.

Returning to my results, our movement through the landscape revealed traces of past movements through the solid foundations of the earth and sky. In rain and shine in mid-July, our journey in the landscape from the immediate entrances of Elterwater and Stonethwaite took between seven and

Figure 33: The cairn which marks the summit of Pike O' Stickle is a palimpsest of the actions which formed it with each stone representing a memory of the past. Image courtesy of author.

eight hours to complete. Even with long summer days and a faster pace, it would be extremely difficult to travel into the landscape and conduct all the necessary activities within a single day. One could argue that travellers made overnight or weeklong trips, but this also does not agree with the evidence collected from our journey. Although there is not a universality to human experience, there is a universal element to wayfaring. Wayfaring *is* movement, a practice of *dasein*. Wayfaring requires the constant active engagement with the world as it opens around the wayfarer, both materially and perceptually (Ingold, 2011:150). These engagements are epistemological activities in which knowledge of the landscape is created and subsequently transmitted, either by the traveller or by their actions. As in the Inuit tradition, 'as soon as a person moves, he becomes the line' (Wiebe, 1989., in Ingold, 2011: 149). In the Inuit tradition, this concept comes from the lines of footprints through the snow creating a meshed surface of human movement across the landscape. Indeed, it is the movement of the person through the landscape which unifies all forms of wayfaring as such movement creates knowledge which is transmitted through the act of remembering, whether alone or communal, and through the mnemonic devices which may be accessed through physical engagement with the landscape. As Ingold states, 'they are their stories' (2011:162).

MNEMONIC MOVEMENTS

It is this act of remembering which I argue is the universal feature of wayfaring and is the method by which we can understand the past processes which occurred in this landscape during the Neolithic. Note that this is an act which must be engaged with and not merely a passive memory. This study began with a rejection of the material at either end of the journey it had taken. I made little attempt

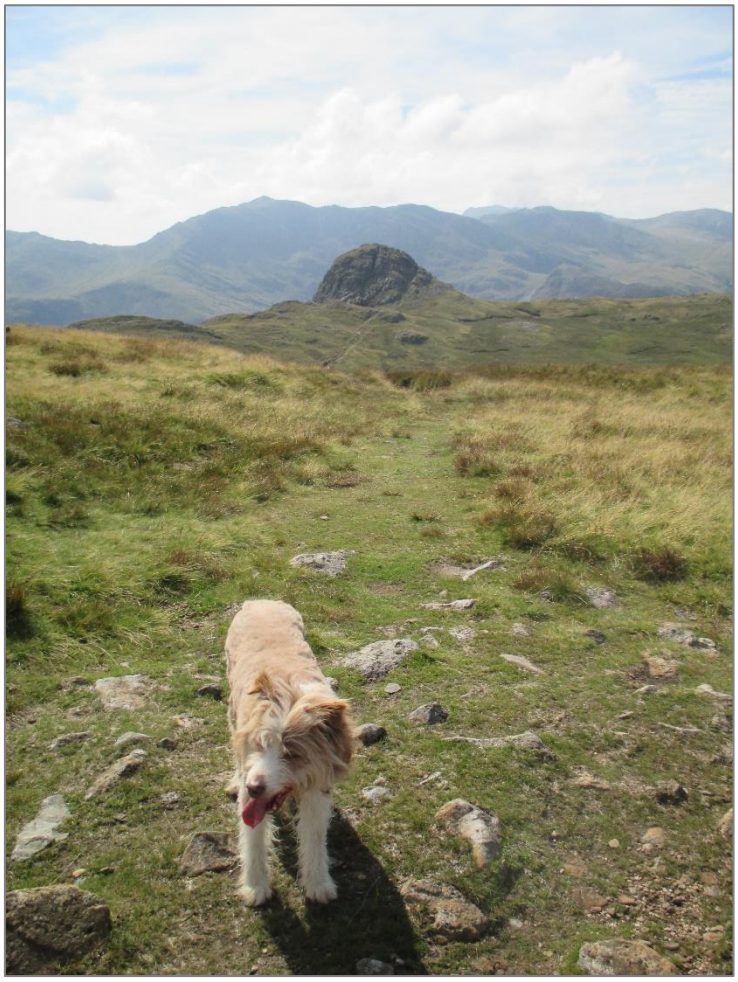

Figure 34: Norman successfully made it to Harrison Stickle after being rescued from his precarious boulder. Image courtesy of author.

through this study to examine in detail the quarry scars on the face of Pike O' Stickle nor the polishing stones found at Ehenside Tarn. Instead, it is the places in between which draw focus. Again, too often journeys are studied by the material or place at either end and assume the traveller to merely transport such goods from A to B. By analysing the physical and social process of how a person manoeuvres between A and B, we can demonstrate the memorial process and how such acts of remembrance bring about a rich, active and dynamic landscape without leaving a trace on the earth. These acts of 'storytelling' can still occur when people move about this landscape as a journey can be remembered through the most trivial things (Lorimer & Lund, 2008:192). For example, when lost in the fog on our descent from Harrison Stickle during our second day of fieldwork, we crossed a boulder field. Unstable and slippery underfoot, we looked for a better route down, when we remembered an old path which we had taken up this slope a few years ago. It sprung to mind when we recalled a story in which our dog, Norman, strayed from this small path on to the boulder field and had to be rescued when he got stuck on one particularly precarious boulder. From that memory, we remembered the path lay to the south of the boulders and, upon heading south, we soon found it.

Deprived of these memories, wayfaring is physically and mentally more difficult as the traveller is required to constantly be aware of macro and microtopography as well as their orientation in the landscape. Without modern tools for navigation, this can be a near impossible task. In fact, it is worth mentioning here the volume of walkers who prefer following the guidebooks of Alfred Wainwright, the most knowledgeable fell walker of recent memory. His seven 'Pictorial Guides to the Lakeland Fells' (Wainwright, 1955-66) are less like traditional maps of the many peaks of the Lake District, "but philosophical strolls, personal outpourings of feelings and observations, written and drawn by a craftsman, conceived and created as a total work of art" (Davies, H., in Askwith, 2005). Although not a social man himself, Wainwright's books provide a more narrative and social guide around the

Lakeland fells which has resulted in a greater uptake in his guidebooks as the tool for navigating. It is through his stories and creative descriptions of the landscape which people find the most understanding and thus, rather ill-advisably, abandon their compass and maps for his pocket companions.

Although Wainwright's guides are being used in the modern day, the preface remains the same. Wayfaring, through the medium of walking, is the emergence of social worlds through the act of remembrance which remain dependant on both detailed landscape knowledge as well as entangled associations and connections between person, place and thing (Lorimer & Lund, 2008:198). These connections are not historically conditional, but they are personal and, often, social. My fieldwork was conducted with two people, primarily for safety reasons and to provide a second opinion to bolster the credibility of my results. What was not intended, however, was the importance of my father in his memories. Since the late 1970's, my father has walked these fells for pleasure, each time gaining a greater knowledge and experience of the various crags and becks as well as the ever-changing climate. Such experience, aided by my own, allowed us to navigate the landscape successfully. Therefore, without the aids of modern navigational tools, it is this intergenerational and enduring experience which marks the way. As I have just mentioned, such experience is derived from a long personal history with the place and is gained over many years of sustained visits. As we have said, seasonal movement is the most practical form of movement to conduct all the activities proposed in this landscape during the Neolithic. Seasonal movement is also the only way in which such in depth experience could be collated. Years of repeated visits by the same people or peoples for weeks or months at a time would provide enough time for individuals to establish personal connection with people, place and thing thus developing an emmeshed surface of personal stories which could be used for navigation to and from the working sites and other areas of resource.

STORIED SPACES

Although not necessarily mystical or spiritual in nature, such complex entanglements of stories within the landscape could hold further meaning to the society to which the stories belong. Repeated returns to the same landscape could mark a cultural routine in which not only were specific activities, such as quarrying tuff, performed, but also social encounters which provided indirect experiences of the landscape (Edmonds, 1999:28). In my own fieldwork, alongside years of previous encounters with the Langdales, my knowledge has grown not only from repeated experience, but from the second-hand experiences of my father. Many of the stories I know of the landscape are not from my own life, but my father's many adventures. For example, I know many of the rock climbing and scrambling routes of Gimmer Crag and Jake's Rake due to my father's participation in such activities, not my own. In some ways, this type of movement recalls the methods that orators of antiquity likely used to remember their speeches. In order to remember the structure and flow of a long speech, an ancient orator would compartmentalise the arguments they wished to make into the spatial

Figure 35: My father's experience of this landscape was integral to the wayfaring process. Image courtesy of author.

organisation of a house so that they could move through the house in their minds eye, recollecting the contents of each room as they moved (O'Rourke, 2013:112).

Today, story tellers still use physical movement and gesture as a memory aid (Ingold, 2007:84). On a larger scale, the landscape of the Langdales can be used in the exact same way. The physical enactment of each journey by an individual is part of the process of memorialisation in which the creation of a single-story weaves in amongst the many stories that came before and would come after it. The paths themselves become storylines. 'To write is to carve a new path […]. To read is to travel through that terrain with the author as a guide' (Solnit, 2002:72). In this landscape, the metaphor is reversed; to carve a new path is to write. It is along these storylines where the Langdales break from the perceptions of a quiet landscape, with only the occasional sounds of knapping breaking the natural silence. Instead, these stories, without leaving a trace, transform this landscape into a living world, where the past, present and future converge.

In this sense, the landscape plays an important role in the reproduction and development of social and cultural traditions as it forms a foundation upon which intergenerational knowledge can be transmitted. To know the landscape, one must understand the culture under which the landscape was formed. Before the colonialist creation of maps, many societies, such as the indigenous populations of Canada, adopted a performative style of mapping (Caquard *et al.*, 2009:84). The 'maps' of these communities adopted the forms of art, dance and storytelling and, by such means, were visual and aural performance which viewed the world as secular, spiritual, static and dynamic (*ibid.*). Such performative quality was mirrored in the fieldwork through my father's storytelling. This performative transmission of knowledge is integral to the understanding of the Neolithic communities who were active in this landscape as this intergenerational communication is precisely the way in which knowledge, practices and values are transmitted within cultures and societies (Trommsdorff, 2009:126). This transmission is not necessarily linear from older generation to

younger but can vary based upon experience of the persons, their status in society, the relationships of the persons involved, the contents of the transmission and the wider context of the transmission itself (*ibid.*). Most commonly across all societies, cultural transmission is conducted from parent to child, as was the case with this study. Transmission through storytelling allows the child to internalise a created world view with which to explore the physical world around them. It is the parent who first constructs the home from which the child can grow from and begin to follow the tales for themselves (Legat, 2008:37).

INSTRUCTIONAL LANDSCAPES

From my aims, I recognised that this landscape is limited in its Neolithic archaeological sites (a further product of archaeological decision making and the engagement of modern land management schemes), with only the working sites and their artefacts providing meaningful data. However, as I have expressed over the course of this chapter, my fieldwork has provided data of a different kind, that which can only be known when experienced. The landscape of the Langdales is a rich tapestry of stories, created by each individual agents' journey through this area. The *memoryscapes* of this landscape not only provide personal and invisible handrails through the landscape which guide the traveller even on the foggiest of days, but also play a social role. Avoiding too great an inductive leap, such memoryscapes could have played a role in the oral traditions, and thus worked as a transmitter of traditional skills or information through the generations. For example, quarrying of Lingmell Tuff only occurred here and so, for this skill to survive, each new generation must have learnt to navigate the paths to the tuff, then identify the appropriate band for their stone axes and successfully remove blocks from the face of the rock surface. Moreover, these tasks were conducted for 500 years. These highly skilled tasks would have required extensive training in order to create the large distributions we have come to know.

When analysing the lithic record, the transmission of such knowledge alluded to through evidence of crude craftsmanship present in the debitage, which is argued, in some instances, to represent the presence of children in such activities (e.g. Högberg, 1999, 2008, 2018; Johansen & Stapert, 2008; Pigeot, 1990; Takura, 2013). At Stake Beck, Dungeon Ghyll and Thorn Crag, Bradley and Edmonds (1993:99-100) argue that the high volume of crude and irregular debitage showed little sign of control over the production process. The high volume of hinge and step terminations in the debitage as well as few examples of platform preparation indicates the low expertise of the knappers working there (*ibid.*). Bradley and Edmonds also discovered that many of these sites showed evidence of later stages of production, with blocks possibly being brought from other quarry sites to be reduced into crude and irregular roughouts (*ibid.*). From my explorations, these sites lie in strategic positions of entry into the immediate landscape of Pike O' Stickle and the intensive quarry sites. Therefore, these sites could show a cultural introduction to this landscape, both physically and socially. A place where new generations learnt their skills in the shadow of the bulb of Pike O' Stickle, before graduating to the

larger working sites. Such sites and their artefacts would be worth revaluating through the lens of child or apprentice knapping.

Again, it is worth reiterating the importance of the role of intergenerational transmissions of knowledge. Such instruction was not necessarily a linear order from parent to child. 'Each telling is an interpretive recreation rather than a recitation. Each telling realizes a shared creative authority' (Ridington, 2002:113). The recreation of this knowledge in each telling maintains the social traditions and practices in a performative approach to which the landscape provides an integral tool. In the previous section, I explored the importance of this transmission within human societies and cultures. However, in the context of Neolithic Langdale, such transmissions of knowledge move beyond human interaction and become an entangled web of communication between all the agents of the landscape, both human and otherwise. To be in the landscape and surrounded by all these agents is to learn. Tłı̨chǫ people consider true knowledge to only be recounted through the experiences of what they encountered or observed with those they travel with (Legat, 2008:38). When attempting to remove modern thought from the idea of Neolithic Langdale, no matter successfully, it is the landscape and its stories which remain. The problem with applying this form of knowledge to the past is that there is no longer anyone alive to remember the stories which pertain the working sites of the Langdale Pikes. Nonetheless, it is worth remembering the importance of such intergenerational storytelling when considering the importance and role of the Langdales during the Neolithic in the future.

A PUBLIC PLACE

My exploration of this landscape as a form of memoryscape has clear implications for my first aim of this study. If these were such rich landscapes filled with story and memory as created by intergenerational, sustained experience, then they were clearly not as challenging to obtain as previously thought. Conversely, the challenge comes from the transmission and maintenance of such detailed knowledge of these mountains as acquired through such long-term experience. In my own fieldwork, I ascertained that on a practical level, even the most exposed sites on the face of Pike O' Stickle could have been accessed easily by those who understood the landscape and environment intimately. Beyond the implications this has for understanding the role of these mountainscapes during the Neolithic, the understanding of the importance of detailed knowledge and experience highlights the importance of public archaeology. By this, I refer to the importance of engaging local people with these landscapes to learn their stories and listen to their own unique perspectives of the role of their landscape. By doing so, such research not only acknowledges the importance of local knowledge, traditions and culture, but also enhances the heritage of regions without such tangible archaeology.

Not only is this beneficial from an archaeological standpoint, this also fulfils the aims of the Faro Convention (Council of Europe, 2005) which emphasise the rights of all people to engage in their

heritage in order to benefit and enhance both their heritage and their own communities (Karl *et al*., 2014:32). Rather than diluting the archaeological pool of knowledge, instead we shall enhance the record through the inclusion of a more diverse range of voices and actors; all of whom can provide the widest range of meanings for this landscape thus providing a full review of its significance. Referring to this study, the phenomenological fieldwork and deep mapping provide an approach which could easily been undertaken by members of a community. The Story Maps especially provide a form which can be engaged with and added to by a wide group of people, without the physical limitations of organising events or groups to undertake such tasks. Applications for deep mapping like Story Maps could be used alongside webinars to provide a chance for anyone to engage in their heritage and landscape, especially those who may be physically limited in their abilities to physically engage in archaeological practices. Such multivocal research could thus lead to a better transmission of the complex cultural and archaeological significance of such landscapes and thus provide a better understanding of how to protect and communicate them in the future.

CHAPTER SEVEN

The Past, Present and Future of Langdale

THE PRESENT STUDY

Throughout this thesis, I have explored the role of the Langdales during the Neolithic in order to demonstrate that they were not the dangerous or liminal places they were assumed to be. Such danger and liminality were assumed due to their location, within a mountain range on precipitous crag faces and shifting scree slopes. However, through my personal experience of this landscape since a young age, I could not agree with these assumptions, as I had never experienced such danger within this landscape, even as a child. Therefore, I wanted to demonstrate that these mountains played a significant role for another reason. To achieve this, I employed a movement perspective which would demonstrate the dynamic and active qualities of this landscape and thus thoroughly explore all possible qualities that the landscape held. As I explored in chapters two and three, past movements in archaeological study have been approach through two polarising methods, computationally and experientially. For this study, I focussed on two of the most used methods of these opposing theories, least cost analysis using GIS and phenomenological fieldwork. Although there are many methods to model movement, these were chosen for their uses and misuses. For LCA, its routine use in archaeological movement modelling provided a vast field of content to evaluate for use in the development of a more appropriate methodology. For phenomenology, I chose this for its potential for use in landscapes with little archaeological data. As phenomenology has been heavily criticised in the past, I was able to evaluate its misuses to similarly develop more appropriate applications. Through their thorough exploration, I was able to use the critiques I had gathered on each theoretical approach to adapt and develop my own methodology for application to the landscape of Neolithic Langdale in chapter four.

The methodology of this study was key to achieving my second aim; to develop a more appropriate methodology for modelling movement in a landscape with minimal archaeological data. By applying LCA and phenomenology, my goal was to create data through the subjective experience of phenomenological fieldwork, whilst grounding said fieldwork in an objective and testable LCA model. By balancing these objective and subjective approaches, I was able to demonstrate the dynamism and activity of the landscape, characteristics which can only be demonstrated through physical experience of said dynamism and activity, whilst simultaneously providing a model that could be tested by multiple participants and multiple experiences. Furthermore, through this methodology, I could also resolve some of the issues outlined in my review of these methods. This resolution was achieved through the design of my methodological feedback loop which acted as a hermeneutical circle for revaluating each method and developing our depth of knowledge through repeated application. As demonstrated, this replication of my process provided the LCA method,

which had previously been criticised for its lack of humanity in movement processes, subjective data from the phenomenological fieldwork to develop more human representations of the landscape. In turn, these representations could denote more of the complexities and nuances of human movement through this landscape thus providing more accurate paths to be tested once again in the phenomenological fieldwork.

On the other hand, this methodology provided a medium to validate phenomenological fieldwork by using the LCA model as a testable base by a multitude of participants. Whilst embracing the subjectivity of experience, my fieldwork remained grounded in the modelled pathways around the landscape which could be tested repeatedly by any number of participants. Through the method, I denied any assumption that my experiences were universal. However, I also allowed the experiential approach to provide a medium to explore the mountains on a personal level in order to understand the role they played within my spatial decision-making. Overall, my method allowed for a harmonious, holistic and hermeneutic cycle of results that explored the subjective experience of the landscape, as a human moving through it, alongside a substantiated objective model that could be scrutinised and developed evermore within my methodological feedback loop.

IMPLICATIONS FOR THE FUTURE

Before revisiting my results and reviewing the implications of this study on the role of the Langdales during the Neolithic, it is worth outlining the implications of my methodology on further studies, both regarding Neolithic Langdale and prehistoric movement generally. Firstly, I wish to clarify that this study, in many ways, is only an introduction to the role of movement in this landscape. As I previously mentioned, the methodology applied is cyclical and could continue in perpetuity. Therefore, in the future, it is hoped that this cycle is resumed with evermore experiences by a diverse range of people. In particular, this study would be a great exercise for engaging the communities of Langdale and Borrowdale in their heritage, allowing them the opportunity to actively engage with their landscape and the archaeology within it and take some ownership and control over their heritage.

As briefly mentioned in chapter three (see page 16), regions lie Cumbria are experiencing a downturn in traditional occupations like agriculture, and more people are turning to the growing tourism industry for employment. In my fieldwork from Elterwater (see Appendix 4), I noted the depleting local population, with many of the local homes being rented as holiday cottages to the seasonal tourists. There is a growing need for local employment in these regions and further encouragement towards the maintenance of such landscapes through the local communities who inhabit them. Although by no means a result of this study, it would be beneficial for studies in Langdale in the future to actively engage the local populations. Perhaps by promoting the Neolithic heritage in the landscapes they live in, there could be a future for heritage tourism in the area. Such a focus could also provide the encouragement for special care in the management of these regions in order to

protect this heritage for future generations. By encouraging local participants involvement in projects such as this study, not only could we enrich the archaeological record, but also provide a meaningful impact on the future of these communities.

IMPLICATIONS FOR THE PAST

Returning to the results of this study, my LCA model and phenomenological fieldwork provided an intriguing, and unanticipated, insight to this landscape. By conducting my phenomenological walk along my modelled routeways, I intended to disprove the assumptions of these landscapes being dangerous and liminal zones during the Neolithic by exploring their role in human wayfaring. As I discussed in chapter six, our experience demonstrated that the landscape performed as a mnemonic device, with memories and anecdotes providing both social and navigational tools. It is only through the physical engagement with this landscape that such mnemonic devices can be unlocked. Furthermore, it is also through physical engagement that these devices can be created. Although our experience was not the same as our Neolithic forebears, our use of these mnemonic navigational tools allowed me to explore the possibility of this method for past movements in the landscape. This study does not assume to have experienced nor understood the memories this landscape may hold from the Neolithic, but the process of engaging with memory itself could have easily been shared.

In terms of the implications of this process, I would recommend revisiting the work of Bradley and Edmonds (1993). Their excavations were imperative in understanding the form and nature of work conducted in this landscape, however, their focus on understanding the wider axe trade in Britain meant the role of the landscape was missed. As I discussed in chapter six, the working sites and their artefacts could be revisited in order to determine whether there is any evidence of apprentice or chid knapping. Of course, this is not always easily identified but by applying this perspective, more evidence may come to light. Furthermore, archaeological survey, sampling and excavation in this landscape needs to move beyond the sites themselves and consider the landscape as a whole. Although such endeavours would be costly and time consuming, the results of this study have indicated that this was a seasonal landscape which could hold far more evidence for settlement and activity than previously recognised. Of course, this landscape has seen some major developments in recent centuries, thus such study may be futile on the valley floor. However, the peat bogs of Harrison Coombe and Thunacar Knott provide a fertile ground for archaeological discovery and would be ideal for further work. Such further archaeological study could play a role in my previous recommendation for public engagement as it would provide ample opportunity for local communities to learn, engage and enhance their understanding of their prehistoric heritage. Therefore, this study is merely a beginning. It offers an opportunity to return to the Langdales and revaluate their purpose during the Neolithic as a rich, diverse and dynamic landscape. By doing so, we may slowly reveal more of the complex palimpsest of active memories that this landscape has created and will create in the future.

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APPENDICES

Appendix 1: Definitions table for Conceptual Model (Figure 11) including more detailed relationships between entities.

Entity	Feature Class	Definition	Relationships
Peat	Natural Feature	Decayed plant material often used as fuel for burning.	Harrison Coombe, Stake Beck, Grassland
Landam Clearance	Anthropogenic Feature	Short term clearance of forested land for agricultural purposes usually through burning.	Elm Decline, Shelter
Elm Decline	Natural Event	Elm woodland declined between 5200BP and 5100BP causing clearances in the woodland up to 570m (200m below Pike O' Stickle summit) revealing areas which could be grazed.	Landam Clearance, Grassland
Grassland	Natural Feature	Area of cleared woodland or older grasslands suitable for grazing.	Landam Clearance, Elm Decline, Harrison Coombe
Pike O' Stickle	Natural Feature	Raised rocky summit at the height of 790m formed of volcanic tuff.	Pike O' Stickle Working Sites, South Scree, South Scree Slope Working Sites, Harrison Combe, Loft Crag
Pike O' Stickle Working Sites	Anthropogenic Feature	A number of quarry sites on the southern face of the bulb of Pike O' Stickle just below the summit continuing around most of the south and east face.	Pike O' Stickle, South Scree Slope, South Scree Slope Working Sites
Stickle Breast Working Sites	Anthropogenic Feature	Two smaller and interrupted scree-like slopes roughly 200m apart running down Stickle Breast.	South Scree Slope Working Sites, South Scree Slope, Pike O' Stickle
Stake Beck	Natural Feature	Stream drained from Harrison Combe bog into Langstrath.	Langstrath, Harrison Coombe, Peat
Stake Beck Working Sites	Anthropogenic Feature	Two areas of quarrying within the stream bed of Stake Beck.	Stake Beck, Langstrath, Harrison Coombe
Langstrath	Natural Feature	Beck which drains from Esk House (near Scafell) through the mountain valley to Borrowdale.	Glaramara
Dungeon Ghyll	Natural Feature	Stream drained from Harrison Combe bog down the south face of the Langdale Pikes into the Great Langdale Beck.	Harrison Combe, Great Langdale Beck
Stickle Ghyll	Natural Feature	Ghyll drained from Stickle Tarn down the south face of the Langdale fells into the Great Langdale Beck. Heavily eroded with many pools and precipitous drops.	Stickle Tarn, Great Langdale Beck

Stickle Tarn	Natural Feature	Situated in a natural corrie flanked by Pavey Ark and Harrison Stickle, this tarn was enlarged by a stone damn in 1838 in order to provide water for the communities in Langdale.	Harrison Stickle, Pavey Ark, Stickle Ghyll
Loft Crag	Natural Feature	Situated between Harrison Stickle and Pike O' Stickle at a height of 682 metres rising above Gimmer Crag below.	Harrison Stickle, Pike O' Stickle, Gimmer Crag
Loft Crag Working Sites	Anthropogenic Feature	Small areas of debitage present on the lower face of Loft Crag. Possible small-scale quarrying from visible outcrops or pit quarrying.	Loft Crag, Harrison Stickle, Dungeon Ghyll
Gimmer Crag	Natural Feature	Formed of volcaniclastic siltstone and mudstone and famous for rock climbing in the modern era due to its precipitous crag face.	Loft Crag
Harrison Stickle	Natural Feature	Following the ridge from Pavey Ark and rising to Thunacar Knott and marking the top of the ravine enclosing Dungeon Ghyll at 736m.	Pavey Ark, Thunacar Knott, Dungeon Ghyll, Pike O' Stickle, Loft Crag
Dungeon Ghyll Working Sites	Anthropogenic Feature	A number of small-scale quarry sites around the base of the crags of Harrison Stickle with a notable cluster facing Dungeon Ghyll.	Dungeon Ghyll, Harrison Stickle, Loft Crag, Loft Crag Working Sites
Pavey Ark	Natural Feature	Faced by a crag on the southern side and characterised by moorland of tarns, rocky outcrops and bilberry terraces. Volcanic tuff present in the crag face. Summit of 700m.	Stickle Tarn
Scafell Pike	Natural Feature	Highest mountain in England at a height of 978m. Volcanic tuff present but often buried.	Scafell Pike Working Sites
Scafell Pike Working Sites	Anthropogenic Feature	Presence of ephemeral working floors for Group VI axes as well as a series of badly disturbed extraction pits used to reach the buried tuff. No evidence of quarrying.	Scafell Pike
Glaramara	Natural Feature	Separates the valley of Langstrath from Grains Gill at a summit of 783m. Volcanic tuff exposed on surface of fell.	Langstrath, Glaramara Working Sites
Glaramara Working Sites	Anthropogenic Feature	Evidence of ephemeral working sites on a small scale but no evidence of quarrying.	Langstrath, Glaramara
Windermere	Natural Feature	Fed partly by water draining from the Langdale valley, this ribbon lake provides a natural thoroughfare through the landscape to the southern coast of Cumbria and Morecambe Bay.	Great Langdale Beck, Mickleden, River Brathay
River Brathay	Natural Feature	Fed by the Great Langdale Beck and leads on to Windermere.	Windermere, Great Langdale Beck.
Harrison Combe	Natural Feature	Formed of peat bog which drains into Stake Beck. Possible evidence of extraction pits.	Stake Beck, Pike O' Stickle, Harrison Stickle, Loft Crag

Harrison Combe Working Sites	Anthropogenic Feature	Concentrations of debitage concentrating in areas immediately north of Pike O' Stickle and South Scree Slope. Possibly an area for working material quarried from Pike O' Stickle or collected from the scree.	Harrison Coombe, Pike O' Stickle, Pike O' Stickle Scree Slope, South Scree Slope, South Scree Slope Working Sites
Copt Howe	Natural Feature	Two large glacial boulders of andesitic tuff naturally aligned to Pike O' Stickle.	Pike O' Stickle, Copt Howe Rock Art
Stake Pass	Natural Feature	Mountain pass between the valley of Langstrath and Langdale which follows a natural gully.	Troughton Beck Working Sites, Langstrath, Mickleden
Stake Gill	Natural Feature	Flowing from wetland below Stake Pass at the easterly end of Langdale, this small beck flows into Mickleden.	Stake Pass, Mickleden
Troughton Beck Working Sites	Anthropogenic Feature	A significant area of debitage near Stake Pass on the south face of the Langdale Fells.	Stake Pass, Pike O' Stickle, Langstrath, Mickleden
Troughton Beck	Natural Feature	A small beck running down the south face of the Langdale Pikes between Pike O' Stickle and Stake Pass, feeding eventually into Mickleden.	Stake Pass, Pike O' Stickle, Mickleden
Mickleden	Natural Feature	Small stream fed by, since drained, wetland, eventually feeding Great Langdale Beck.	Great Langdale Beck
Great Langdale Beck	Natural Feature	Beck fed by the waters of Mickleden, Dungeon Ghyll and Stickle Ghyll and leads to the River Brathay.	Mickleden, Dungeon Ghyll, Stickle Ghyll, River Brathay
Copt Howe Rock Art	Anthropogenic Feature	Cup and ring rock art carved into the natural geological formations of the Copt Howe glacial boulders. Unclear dating but unlikely to be contemporary with the axe production.	Pike O' Stickle, Copt Howe
South Scree Slope	Natural Feature	Partially natural scree slope originating from a ravine on the eastern face of Pike O' Stickle which has shifted from human disturbance from 12,000m² to 19,000m² in length.	Pike O' Stickle, South Scree Slope Working Sites
South Scree Slope Working Sites	Anthropogenic Feature	Place of significant stone working sites with 90.2% of all debris found there (possibly up to 950,000 flakes).	Pike O' Stickle, South Scree Slope
Lingmell Tuff	Natural Feature	Formed from volcanic ash, the Langdale's are formed of several forms of volcanic tuff. These include lapilli-tuff, rhyolitic tuff and rhyolitic lava-like tuff. Altogether they form a band known as the Lingmell Tuff Formation which spreads across much of the Lakeland Fells.	Pike O' Stickle, Harrison Stickle, Loft Crag, Scafell Pike, Glaramara

Fauna	Natural Feature	A variety of fauna exists within the fells from fish in Stickle Tarn to birds of prey on the crags. The exact types of fauna are unknown in this study, but their presence is recognised.	N/A
Shelter	Anthropogenic Concept	There are areas of shelter around the Langdale Pikes, most notably in the natural corrie around Stickle Tarn and on Harrison Combe behind Pike O' Stickle. Alternatively, shelter could be sought in the valleys or in cleared areas of woodland.	Landnam Clearance, Harrison Coombe, Stickle Tarn
Glacial Erratic's	Natural Feature	Naturally placed but possibly given meaning as guidestones or standing stones in ancestral memory.	Copt Howe
Modern Routeways	Anthropogenic Feature	Formal footpaths and roads crossing over the landscape managed by Lake district National Park Authority and South Lakes District Council. Most were created to facilitate and manage tourist movements throughout the area though some of the roads and paths in the valley are formalisation of much older local roads.	Stickle Ghyll, Stickle Tarn, Dungeon Ghyll, Mickleden, Langstrath, Harrison Stickle, Pike O' Stickle, Gimmer Crag, Loft Crag, Great Langdale Beck, Pavey Ark, Stake Pass
Dry Stone Walls	Anthropogenic Feature	Across the landscape, dry stone walls enclose much of the valley floor and the foothills. These walls are part of the quintessential Lakeland identity and cover much of the landscape. They are usually upkept by the farmers who still use them for managing livestock. However, due to the decline in farming, many have gone in to disrepair, mainly in the higher regions of the county.	Buildings, Field Enclosures, Sheep, Farmers
Buildings	Anthropogenic Feature	In the Langdale valley, there are many buildings, both domestic and agricultural. Some of these are older Victorian structures but many are now built to house the ever-growing tourist population.	Dry Stone Walls, Modern Amenities, Cumbria County Council, LDNPA, Farmers, Local Population, Tourism
Sheep	Anthropogenic Feature	Sheep, most commonly the native Herdwick, have populated this landscape for centuries though their origins are debated between Norse or Neolithic introduction. In recent centuries, the intensification of farming have led to sheep being key players in landscape management with the low vegetation of Cumbria being attributed to their presence.	Field Enclosures, Edible Flora, Medicinal Flora, Grassland, Local Population, Farmers

Field Enclosures	Anthropogenic Feature	Field enclosures cover the valley floor in order to manage livestock. Their presence restricts movement due to trespassing laws.	Sheep, Buildings, Farmers, Local Population, Dry Stone Walling, Grassland, Great Langdale Beck, Mickleden, Brathay, Langstrath
Motor Vehicles	Anthropogenic Feature	The rise in tourism in the area has subsequently increased the number of cars travelling along the B5343. The traffic in summer months make this road dangerous for pedestrians.	Car Parks, Local Population, Tourism, Cumbria County Council, LDNPA, Modern Amenities, Modern Routeways
Car Parks	Anthropogenic Feature	Due to the rise in tourism, the infrastructure of the region has been forced to accommodate more visitors thus leading to the building of car parks at the head of the valley. This is where modern travellers begin their journeys.	Motor Vehicle, Cumbria County Council, LDNPA, National Trust, Tourism, Local Population, Modern Amenities
Modern Amenities	Anthropogenic Feature	The increase in tourism has led to further developments in infrastructure including hotels, pubs and accommodation. Many of the older structures, such as Stickle Barn, have been repurposed from their original agricultural purpose in to a restaurant and music venue.	Car Parks, Local Population, Tourism, Cumbria County Council, LDNPA, National Trust, Farmers
Tourists	Anthropogenic Feature	The population in the valley is significantly increased in the summer months. In Cumbria in general, nearly 500 million tourists visit every year. This amount of foot traffic significantly effects the landscape in general.	Car Parks, National Trust, LDNPA, Cumbria County Council, Local Population, Farmers, Dungeon Force, Stickle Ghyll, Stickle Tarn, Harrison Stickle, Pavey Ark, Pike O' Stickle
Local Population	Anthropogenic Feature	The local population of Langdale and the wider landscape is relatively low but precise date is not available. The quarry works provide some employment alongside farming and the tourist industry but the limits in this employment pool mean there is little permanent population.	Cumbria County Council, Motor Vehicles, Modern Amenities, Tourism, Buildings
Farmer	Anthropogenic Feature	For centuries, farming has been the primary industry in this region and thus the actions of years of farming have drastically changed much of the landscape, particularly the valley floors.	Sheep, Field Enclosures, Dry Stone Walling, Buildings, LDNPA, Cumbria County Council, National Trust, Modern Amenities

Medicinal Flora	Natural Feature	There are many native British plants which have medicinal properties and exist in mountainous regions. Although the exact type of plants are not known, their presence should be taken into consideration.	Harrison Coombe, Pike O' Stickle, Harrison Stickle, Pavey Ark, Troughton Beck, Edible Flora, Sheep, Fauna, Grassland, Peat
Edible Flora	Natural Feature	There are many native British plants which are edible. In Cumbria, there are a few which still exist in the mountains such as bilberries and wild strawberries.	Harrison Coombe, Pike O' Stickle, Harrison Stickle, Pavey Ark, Troughton Beck, Medicinal Flora, Sheep, Fauna, Grassland, Peat
National Trust	Anthropogenic Concept	The National Trust is one of three organisations which care for the Langdale's. They manage tourist amenities such as the pub, campsite and car parks as well as work to care for the paths and general wellbeing of these fells.	LDNPA, Fix The Fells, Stickle Ghyll, Dungeon Ghyll, Tourism, Local Population, Farmers, Modern Amenities
Lake District National Park Authority	Anthropogenic Concept	Like the National Trust, the Lake District National Park Authority is also responsible for caring for this landscape and its community. This authority also has power over development in the region.	National Trust, Cumbria County Council, Fix The Fells, Stickle Ghyll, Dungeon Ghyll, Tourism, Local Population, Farmers, Modern Amenities
Cumbria County Council	Anthropogenic Concept	Unlike the other organisations, Cumbria County Council is responsible for the wellbeing of the communities of Langdale. This responsibility works hard to develop the permanent populations of Langdale into larger, more prosperous community.	LDNPA, Farmers, Local Population, Modern Amenities, Modern Routeways
Fix The Fells	Anthropogenic Concept	Fix The Fells is an organisation in partnership with LDNPA and National Trust which works to maintain the fells through path repairs. This prevents further erosion from walkers diverting around paths and damaging delicate ecosystems.	LDNPA, National Trust, Harrison Coombe, Stickle Ghyll, Dungeon Ghyll
Weather	Natural Event	Being a mountainous region close to the Irish Sea, the weather in this region is constantly changing. High winds and rain are common all year round but weather can change very quickly.	Visibility

Sound	Miscellaneous Concept	The wide open valley of Langdale means that sound can travel effectively from the valley floor to the mountain tops with cars often heard on the road below. Sound also travels along the stream gully's and can carry voices when apparently no one is around.	Dungeon Ghyll, Stickle Ghyll, Harrison Coombe, Mickleden, Great Langdale Beck, Langstrath
Visibility	Miscellaneous Concept	Due to the every changing weather, the visibility on the mountain top can change quickly. On clear days, the sea can be seen from the summit. However, the visibility can change quickly and cloud cover can restrict view to a few feet.	Weather
Bowfell	Natural Feature	Standing higher than Langdale at 902m, Bowfell dominates the southern end of the Mickleden valley. It is easily visible from both Langdale and Langstrath and has many monumental and recognisable features such as the Great slab on its north-eastern face.	Langstrath, Mickleden, Stake Pass, Scafell
Dungeon Force	Natural Feature	At the foot of Harrison Stickle and along the course of Dungeon Ghyll, Dungeon Force is an impressive 40ft waterfall.	Dungeon Ghyll, Dungeon Ghyll Working Sites, Harrison Stickle

Appendix 2: Participant Context Sheets for Marnie Calvert and Steve Calvert completed before first fieldwork walks.

PARTICIPANT CONTEXT SHEET

NAME	Marnie Calvert.

DATE	12 July 2019.

REASONS FOR GETTING INVOLVED

What were your motivations for getting involved in this fieldwork? What do you hope to achieve by taking part?

As the author of the study, I of course am taking part in this fieldwork as part of the fulfilment of my master. By that, I hope to achieve the research questions and aims of the study itself.

PRIOR KNOWLEDGE OF LANGDALE

What do you know about Langdale before conducting this fieldwork, inc. knowledge about the geography, archaeology or any other personal knowledge of the landscape?

Again, as author, I have a detailed knowledge of Langdale which I have gained through my master. However, I also have personal knowledge as I have walked here since I was a young girl and have also lived within ~~sight~~ sight of these mountains most of my life.

FITNESS LEVEL

Describe your general fitness with reference to the fieldwork to be undertaken. Include how this may affect your experience of the fieldwork.

Although not exceedingly fit, I am of perfect fitness to walk in these fells for between 6-10 hours depending on the terrain. I do not expect to encounter any physical problems with this fieldwork as I have walked this landscape many times before without hinderance.

PARTICIPANT CONTEXT SHEET

NAME	MR STEVE CALVERT

DATE	12 JULY 2019

REASONS FOR GETTING INVOLVED

What were your motivations for getting involved in this fieldwork? What do you hope to achieve by taking part?

TO SUPPORT MY DAUGHTER MARNIE

THE ACHIEVEMENT FOR ME WOULD BE THE COMPLETION OF A THOROUGH, DETAILED, AND INTERESTING PIECE OF WORK RELATING TO THE DISTRIBUTION OF NEOLITHIC AXES

PRIOR KNOWLEDGE OF LANGDALE

What do you know about Langdale before conducting this fieldwork, inc. knowledge about the geography, archaeology or any other personal knowledge of the landscape?

I HAVE BEEN WALKING, CAMPING, AND CLIMBING IN LANGDALE ON AND OFF SINCE THE LATE 1970's

I HAVE BEEN LIVING IN THE NATIONAL PARK SINCE 2001 AND HAVE HAD REGULAR WALKING TRIPS DURING THIS TIME IN THE LANGDALE VALLEY. I WOULD CLASS MY INTEREST IN THE GEOGRAPHY + ARCHAEOLOGY OF LANGDALE AS "KEEN + INTERESTED AMATUER"

FITNESS LEVEL

Describe your general fitness with reference to the fieldwork to be undertaken. Include how this may affect your experience of the fieldwork.

MY GENERAL FITNESS IS GOOD. I AM 5'9" AND 11 STONE WITH GOOD DIET. I REGULARLY CYCLE FOR PLEASURE TYPICALLY 50 MILES A DAY, AND CAN WALK IN THE FELLS WITHOUT ANY DIFFICULTY FOR 8-10 HOURS ON AVERAGE PER DAY WITH NO ADVERSE EFFECTS.

Appendix 3: Story Map for fieldwork from Stonethwaite.

To access the Stonethwaite fieldwork, please copy *https://arcg.is/09jHqL* into a web browser.

Appendix 4: Story Map for fieldwork from Elterwater.

To access the Elterwater fieldwork, please copy *https://arcg.is/09P0rG* into a web browser.

Appendix 5: Story Map for fieldwork from Langdale.

To access the Langdale fieldwork, please copy *https://arcg.is/1zKK0T* into a web browser.